PROJECT SCORECARDS

Serbia's SDG Investment Pipeline

Belgrade, September 2025

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Investors are empowered to choose projects that are not only financially viable but also deliver measurable SDG impact, ensuring every investment drives both returns and sustainable development.

Objective and Background

The purpose of the SDG Investment Pipeline is to identify and promote **investment-ready projects** in Serbia that combine **financial viability** with measurable **social, environmental, and governance impact**. The initiative functions as a structured, evidence-based mechanism linking **private capital** to projects aligned with **national priorities** and the UNDP SDG Impact Standards (Strategy, Management Approach, Transparency, and Governance).

Developed through a **multi-phase methodology**, the process included project sourcing, screening, scoring, and shortlisting. Projects were collected via national consultations, public-private dialogues, and sectoral analyses, ensuring alignment with Serbia's development agenda. The **eligibility filter** ensured regulatory feasibility, SDG alignment, and sufficient data for scoring. A composite scoring model evaluated each project across three perspectives: **Investor (60%), Public (20%), and SDG (20%),** balancing commercial logic with developmental relevance.

A total of **44 projects** scoring above **60% in each perspective** were shortlisted and visually presented through standardized **scorecards** summarizing business model, market potential, financial indicators, ESG narrative, and contribution to Serbia's sectoral development, providing a credible and transparent foundation for investor engagement.

The pathway of developing SDG Investment Pipeline and Scorecards

1. Project Sourcing

Projects were sourced via:

(1) structured consultations;
(2) private-sector calls and direct outreach to project sponsors;
(3) desk research on national strategies, FDI pipelines, and global comparators; and
(4) a backward-looking scan of investments delivered **in the past five years** to identify replicable models and bankability patterns.

The result was a longlist that reflected sectoral relevance (infrastructure, agriculture, renewables, health, tech/communications, and transport) and geographic balance.

Sector classification was based on an adapted version of the Sustainability Accounting Standards Board's (SASB) **Sustainable Industry Classification System (SICS)**, as applied in the SDG Investor Map of Serbia.

*Throughout the process, **continuous stakeholder engagement** was undertaken to ensure methodological credibility and contextual accuracy.*

***Semi-structured interviews** and **focus groups** were conducted with representatives of the public sector, such as the FDI Unit of the Office of the President, as well as with private investors, industry associations, and development partners. These consultations were complemented by the project team's own expert advisory knowledge, ensuring that the SDG Investment Pipeline reflects both institutional priorities and practical market insights.*

2. Initial Screening and Eligibility Filtering

Note: Concepts failing legal, SDG-alignment, or data-adequacy criteria were excluded at this stage.

An initial eligibility check filtered concepts based on:

- ☑ (i) alignment with relevant SDG targets and national priorities
- ☑ (ii) regulatory feasibility and compliance
- ☑ (iii) minimum data sufficiency required for scoring

The screen also considered a project's capacity to operationalize the **SDG Impact Standards pillars** during subsequent development.

The four standards of the SDG Impact Standards are Strategy, Management Approach, Transparency, and Governance. These standards are a framework that helps organizations integrate the SDGs into their operations by guiding them to define their impact intentions, implement a robust impact management process, report their performance transparently, and establish governance structures that support their commitments. They provide a consistent language and a practical management system to improve impact performance and accountability.

By applying the SDG Impact Standards in the **project selection process**, the assessment framework aligns investor decision-making with sustainable development priorities, ensuring that projects deliver measurable impact, uphold transparency, and contribute to resilient, inclusive, and responsible growth.

From Idea to Impact: Guiding Investors to SDG-Aligned Opportunities

TRANSPORTATION AND E-MOBILITY

STRATEGY	• Supports industrial decarbonization and SDG 9 and 13.
MANAGEMENT APPROACH	• Integration of energy efficiency, waste reduction, and supply risk management
TRANSPARENCY	• Public disclosure of emission savings and production standards.
GOVERNANCE	• Oversight mechanisms ensure fair labor, compliance, and responsible sourcing of materials.

FOOD & BEVERAGE

STRATEGY	• Aligns with SDGs 2, 12, and 15 by fostering sustainable production and consumption. • Promotes local value chains and food security.
MANAGEMENT APPROACH	• Integrates ESG and resource-efficiency elements; quality control, and compliance with food safety standards considers employment impacts. • Includes circular economy aspects.
TRANSPARENCY	• Traceability systems, certification, and public disclosure of sourcing, water use, and environmental impact. • Promotes SDG 9, SDG 12, and SDG 16 through accountable agricultural practices.
GOVERNANCE	• Ensure fair trade, labor rights protection, and compliance with environmental and agricultural regulations. • Aligned with SDG 16 and SDG 8

RENEWABLES AND ALTERNATIVE ENERGY

STRATEGY	• Aligns with SDGs 7, 9, 12, and 13 through clean energy access, innovation, and efficiency. • Ensures long-term sustainable transition and green investment positioning.
MANAGEMENT APPROACH	• Integrates ESG and impact KPIs into operational and reporting systems. • Promotes continuous improvement and responsible resource management.
TRANSPARENCY	• Supports SDG 12 and 16 by enabling clear disclosure and stakeholder accountability. • Ensures open data on energy output, emissions, and social value.
GOVERNANCE	• Advances SDG 16 by strengthening ethical decision-making and compliance. • Promotes accountability and risk management in all project phases.

INFRASTRUCTURE

STRATEGY	• Projects aligned with 7+ SDGs. • Circular waste systems, sustainable construction, clean water utilities, port modernization and green real estate.
MANAGEMENT APPROACH	• Lifecycle impact assessment, resource recovery, and resilience planning embedded in project execution
TRANSPARENCY	• Open environmental reporting and community consultation during development phases.
GOVERNANCE	• Strong oversight structures ensure regulatory compliance, labor safety, and anti-corruption standards.

HEALTHCARE

STRATEGY	• Directly contributes to SDG 3, SDG 9, SDG 16 and national life-science strategies by strengthening health infrastructure and innovation
MANAGEMENT APPROACH	• Encompasses ESG, workforce, and safety considerations. • Focus on quality control, ethical R&D, and supply chain integrity.
TRANSPARENCY	• Disclosure of safety standards, certifications, and community health outcomes.
GOVERNANCE	• Strict ethical and regulatory frameworks for healthcare and pharmaceutical manufacturing. • Governance ensuring patient safety and data integrity. • Compliance systems for pharma and biomedical production.

TECHNOLOGY & COMMUNICATION

STRATEGY	• Advances innovation and digitalization in line with SDG 8 and 9. • Enables productivity and sustainable transition.
MANAGEMENT APPROACH	• Captures market potential, risk and ESG performance of tech solutions. • Oriented toward adaptive, scalable models.
TRANSPARENCY	• Digital platforms enable real-time reporting, traceability, and open access to performance metrics, enhancing accountability. • Contributes to SDG 16 and SDG 12.
GOVERNANCE	• Ethical technology use, data protection, compliance with ICT standards, and stakeholder inclusivity in digital ecosystems. • Aligned with SDG 9 and SDG 16.

Projects have been specifically selected for their capacity to meet these standards in practice, enabling investors to engage with initiatives that can clearly demonstrate alignment with the SDGs and deliver tangible sustainability results.

All elements of this framework have been systematically reflected throughout the project scorecards within the *Business Model*, *Risk Matrix*, *Project Overview*, *ESG Assessment* and *How this project supports Serbia's sustainable development* sections.

The SDG Investment Pipeline mobilizes private capital toward projects that combine commercial viability with potential SDG contributions. By applying the SDG Impact Standards in sourcing, screening, and scoring, it prioritizes initiatives with credible potential for environmental improvement, social inclusion, and transparent governance. Each project's impact thesis is outlined in its scorecard through the business model, ESG narrative, and SDG alignment, illustrating the anticipated pathway from investment logic to potential social, environmental, and economic outcomes.

Note: At this stage, the focus is on anticipating rather than tracking impact, as projects are still in the conceptual phase. Anticipation provides an informed projection of potential outcomes, to be validated through future monitoring once implementation begins.

3. Development of Scoring Model

A structured scoring model was developed to ensure objective and transparent evaluation. The model integrates financial, social, and environmental criteria to assess project quality and investment readiness. The scoring approach is built around **three perspectives:**

Investor Perspective
Financial indicators: Payback period, NPV, Profitabiliy Index, ROI, CAPEX, Cost of equity
Market and Risk Exposure: Market potential, industry risk, revenue concentration risk, supply chain dependency, availability of workforce, possibility of failure to deliver impact, possibility of negative externalities

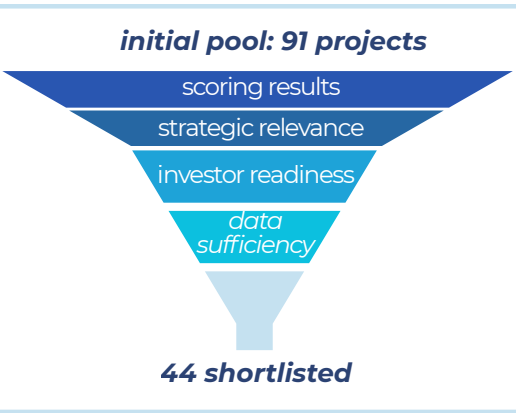
Public Perspective
Economic & Regional Impact: GDP multiplier effect, infrastrucutre developmet, sectorial shifts, attraction of complementary industries, basic monitoring intent

SDG Perspective
Social & Gender Impact: Occupational health and safety, workforce diversity, probability of female engagement, direct job creation potential, quality of employment
SDG Compliance: Number of SDGs accomplished, long-term sustainable impact, impact built into design, impact risk recognition, stakeholder consideration
Environmental impact: Environmental footprint, energy consumption level, level of greenhouse gas emissions

The weighting structure: **60% Investor, 20% Public, and 20% SDG Perspective** underscores the model's emphasis on financial viability and market readiness as primary investment drivers, while ensuring that social relevance and sustainability impact remain essential components of overall project evaluation and prioritization.

4. Shortlisting

Following, the next step involved ranking and shortlisting projects based on their total composite scores. The **60% threshold for each perspective** was set as a clear methodological benchmark to ensure credibility, consistency, and transparency in project selection. Analysis of score distribution revealed a natural break around this level, separating projects with solid financial, developmental, and ESG foundations from those still conceptually immature.
By applying this cut-off, only **investment-ready and SDG-aligned projects** were retained, ensuring comparability and investor confidence.
In total, **44 projects** surpassed the threshold and were included in the final SDG Investment Pipeline.



5. Scorecards and Scoring Visualization

The **scorecards** provide a **visual summary** of the 44 shortlisted projects that scored **above 60% in each perspective**, meeting the inclusion criteria for the **SDG Investment Pipeline**. Each two-page scorecard offers a concise overview of the project's market potential, business model, financial performance, SDG alignment, regional context, key milestones, risk profile, ESG narrative, and contribution to Serbia's sectoral development, ensuring clarity, comparability, and transparency across the portfolio.

Projects are grouped by sector, each assigned a distinct color code for visual clarity and thematic consistency:

- Renewables and Alternative Energy
- Food and Beverage
- Technology (Smart Agriculture related Projects)
- Healthcare
- Transportation
- Hospitality and Real Estate
- Port Infrastructure
- Water-related Projects (Smart Water Solutions, Water Utilities, etc.)
- Waste Management and Recycling

To visualize project performance, each scorecard integrates a spider chart showing results across the three perspectives - **Investor**, **Public**, and **SDG Perspective**, accompanied by a color-coded legend:

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

6. Filling in the Scorecard

Each field within the scorecard was **systematically completed** based on a **set of guiding analytical questions** to ensure consistency and depth of evaluation.

I Which SDGs does the project directly support, through which specific targets or outcomes, and how are these contributions reflected in its core activities? Does the project create synergies between multiple SDGs relevant to its sector?

II What is the project's score across the three perspectives and what does it indicate about its strengths, gaps, and investor readiness?

III What is Serbia's comparative advantage in this sector? What is the current market situation and investment potential of this project?

IV What is the nature and focus of the investment? What is the role of the investor (equity, partnership, technology, or expansion financing)? What are the main revenue streams and how is value generated along the value chain? Who are the target customers or end-users, and what is the project's market positioning?

V What is the estimated CAPEX, ROI, and payback period?

VI Where are the location-specific advantages for this project?

VII Are there any successful examples or reference projects of a similar type in Serbia? What are the lessons learned or proven success factors from these cases? Are there comparable examples in the region (Western Balkans or Europe) demonstrating feasibility or scalability?

VIII What are the key development stages of the project, from concept validation to full implementation?

IX How complex is the project in terms of design, implementation, and coordination requirements? What level of expertise and specialized knowledge is needed for successful execution? What is the degree of capital intensity relative to expected returns and sector standards? How labor-intensive is the project, and what does it imply for job creation and operational costs? Finally, is the concept scalable and replicable across regions or markets?

X What are the project's most significant risks, and which of up to six were prioritized for analysis? How does each risk score in terms of impact and probability, and what mitigation measures are proposed to manage or reduce their potential effects?

XI What are the project's positive environmental, social, and governance impacts, and which potential negative impacts have been identified? How can these potential negative effects be managed or mitigated through responsible design, sustainable practices, and stakeholder engagement?

XII What specific national or sectoral problem does the project address? How does the project contribute to solving this problem, and what direct outcomes are expected? In what way does the project align with Serbia's regulatory framework and strategic commitments, such as the EU Green Agenda or national energy transition goals? What is the project's systemic contribution? Which long-term benefits does the project generate for the sector and national sustainability objectives?

To ensure greater transparency and methodological consistency, each **group of analytical questions** has been aligned with the corresponding **Perspective**.

INVESTOR	III, IV, V, VII, VIII, IX, X
PUBLIC	VI, XII
SDG	I, XI

*Note: Question **II** considers all three perspectives simultaneously, reflecting the project's overall position within the scoring framework.*

RENEWABLES AND ALTERNATIVE ENERGY

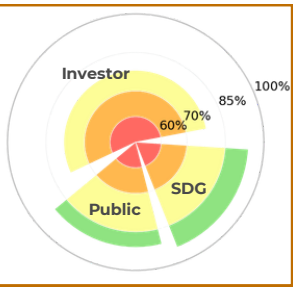
- Agrivoltaics
- Geothermal Power Plant
- Hybrid Power Plant
- Solar Farms
- Solar-Powered Irrigation Systems
- Wind Farms

AGRIVOLTAICS

Aligned with IOA 3. Decentralized solar energy generation

PROJECT SCORE

The project demonstrates **solid overall performance**, positioned near the green range, with best results under the Public and SDG perspectives, while indicating lower performance in the Investor perspective.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

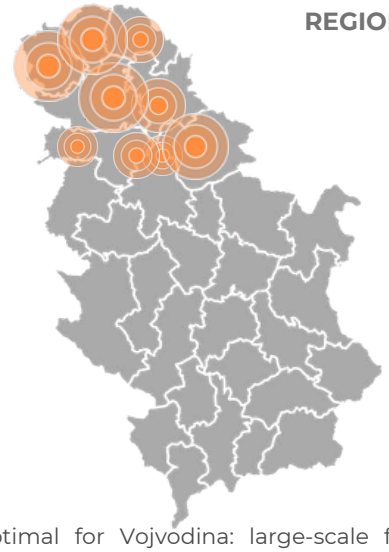
MARKET POTENTIAL

Serbia's **extensive agricultural land**, particularly in Vojvodina, combined with **high solar irradiance** (~1,200–1,550 kWh/m²/year), makes it a prime location for agrivoltaics development, enabling the co-production of food and electricity on the same land.

This **dual-use approach** can **increase land-use efficiency by 60–70%**, diversify income for farmers, and improve acceptance over conventional solar parks.

Europe-wide studies show **agrivoltaics capacity potential is enormous**, estimated at 51 TW across EU lands, with eligible land in countries like Hungary reaching over 50% of agricultural area, suggesting Serbia could also unlock substantial capacity given similar land patterns in Northern part of Serbia.

REGION



Optimal for Vojvodina: large-scale flat farmland with strong solar irradiance (1,200–1,550 kWh/m²/year).

SUCCESSFUL STORY

Agrosolar Kula is a 660 MW agrivoltaics project in Vojvodina, developed by Fintel Energija and MK Group with PowerChina as partner. Spanning about 700–770 ha, it integrates solar power with organic farming, where panels cover one-third of the land to allow crop cultivation almost year-round under improved microclimate conditions. Once operational in 2026, it will generate around 832 GWh annually, enough to supply 200,000 households, while cutting up to 0.8 Mt of CO_2 emissions. The project aligns with Serbia's renewable energy targets and envisions a second phase in green hydrogen and fertilizer production, with stable revenues expected through CfD auctions or corporate PPAs.

BUSINESS MODEL

Installation, operation, and maintenance of **elevated photovoltaic (PV) structures on arable land** to enable simultaneous electricity generation and agricultural production (e.g. crop cultivation or livestock grazing), while ensuring grid connection and continuous land-use efficiency improvements.

The investor is responsible for financing, constructing, and managing the PV infrastructure, securing land-use rights through lease or partnership agreements with farmers, and coordinating energy sales through power purchase agreements (PPAs), feed-in tariffs, or market-based mechanisms.

Additional value is created by preserving agricultural output under the panels, optimizing dual-revenue models (electricity + produce), and contributing to land sustainability and rural income diversification.

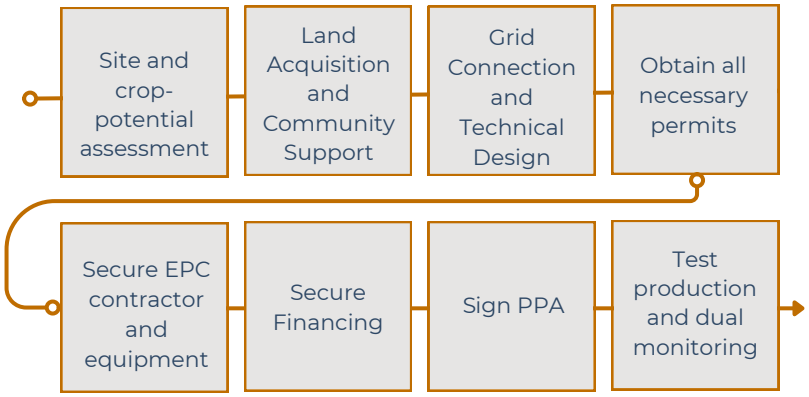
KEY NUMBERS

~€900K
$CAPEX_{/MW}$

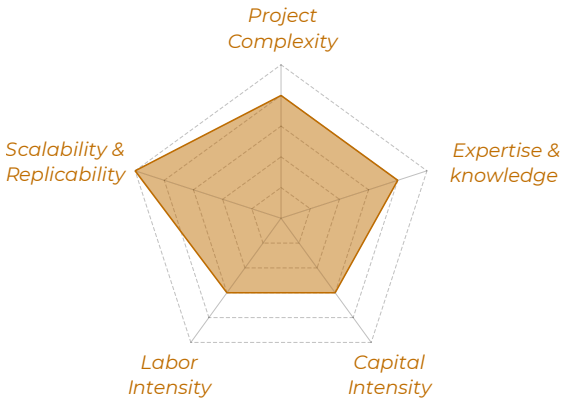
15%-25%
return on investment

4-7 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



Moderate to high complexity: agrivoltaics systems require combined planning for PV generation and agricultural yield, specialized mounting, and coordination with farming cycles.

Requires multidisciplinary expertise: agronomy, solar design, structural engineering, and farm management.

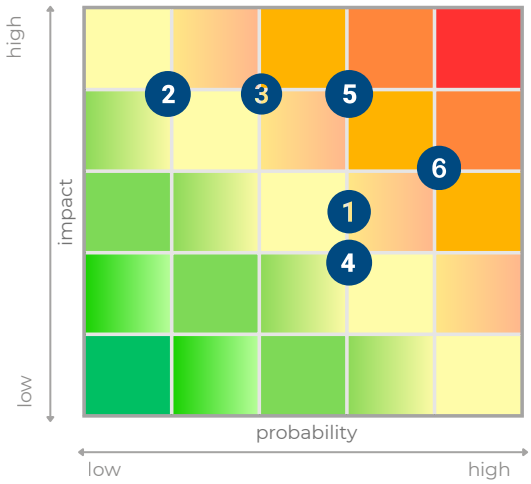
High CAPEX, including elevated panel structures and extra land prep; **operating costs** are moderate, includes PV maintenance and agricultural logistics.

Short-term jobs during PV installation; farming yields and maintenance sustain **long-term roles**.

Highly scalable and flexible — applicable to many Serbian agricultural zones, adaptable to crops like vegetables, cereals, or grazing, and ideal for modular deployment.

RISK MATRIX

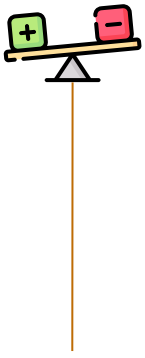
No.	Risk	Description
1	Regulatory and Land Use Risk	Unclear rules on whether land is classified as agricultural or energy-producing can cause permitting delays, tax disputes, or limits on subsidies.
2	Construction and EPC	Balancing solar design with farming needs requires careful planning of panel height, spacing, and layout. Poor design risks harming yields or power output.
3	Grid Connection and Curtailment	Projects may face delays in securing grid access or be subject to output curtailments. This can reduce revenue and affect financial planning.
4	Agricultural Yield Risk	Improper shading or restricted access can lower crop growth and soil quality, and hinder farm machinery. Cloud cover or terrain may also cut productivity.
5	Operational Coordination	Energy operations and farming cycles must align. Poor timing of maintenance or harvest can disrupt agriculture or damage equipment.
6	Revenue and Market Risk	Profitability depends on both energy and crops. Weak yields or low power prices, plus limited access to PPAs, can create revenue volatility.



ESG IMPACT ASSESSMENT

Positive impacts

- Combines solar energy generation with agriculture, improving land efficiency and reducing competition for arable soil.
- Enhances soil health and biodiversity while lowering GHG emissions and irrigation needs.
- Strengthens rural livelihoods by securing farmers' lease income, improving crop resilience, and creating new technical and agricultural jobs.
- Promotes gender inclusion and skills development through training programs engaging women in both farming and system operation.
- Ensures transparent governance through compliance with Serbian land-use laws, EU renewable frameworks, and clear partnership agreements that enhance investor confidence.



Potential negative impacts

- Changes in microclimate conditions may affect crop yields and local biodiversity.
- Construction may cause temporary soil disturbance and habitat disruption.
- Large-scale installations could alter traditional land-use patterns.

These aspects could be addressed through adaptive system design, crop selection aligned with shading conditions, responsible construction practices, and continuous biodiversity and environmental monitoring.

HOW DOES THIS PROJECT SUPPORT SERBIA'S ENERGY TRANSITION AND RURAL DEVELOPMENT?

Serbia faces the dual challenge of transitioning to clean energy while preserving agricultural productivity, particularly in rural regions where land availability and food security are strategic priorities.

This agrivoltaics project addresses both challenges by enabling:

- ✔ **Simultaneous clean energy generation and food production,** using elevated solar panels that maintain agricultural output while supplying renewable electricity.
- ✔ **Efficient land use and rural income diversification,** improving economic resilience for farmers and expanding access to distributed energy in agricultural areas.
- ✔ **Alignment with national energy and climate goals,** contributing to Serbia's 2030 renewable energy targets and the EU Green Agenda by decarbonizing power generation without compromising arable land.

GEOTHERMAL POWER PLANT

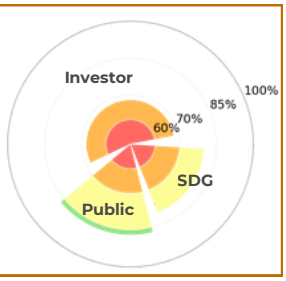
Aligned with White Space: Geothermal Power Plant

PROJECT SCORE

The project demonstrates **solid overall performance**, positioned in the yellow range, with strong results under the Public and SDG perspectives, while the Investor perspective has moderate performance.

LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold



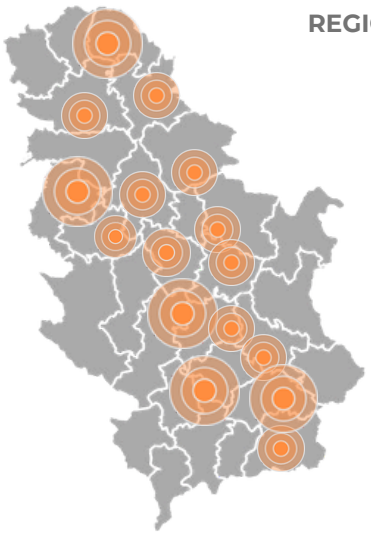
MARKET POTENTIAL

Serbia has substantial **untapped geothermal energy potential**, estimated at over 370 MW of geothermal heat flow capacity, of which only ~80 MW is currently utilized.

Based on the existing measurements, **the geothermal heat flow density in Serbia** ranges from 80 to 120 mW/m2, which **is above Europe's average** (60 mW/m2).

Serbia has the potential to generate approximately 2,400 MW of thermal power and up to 120 MW of electricity from geothermal sources. If fully developed, this capacity could provide heating for over 300,000 households and contribute significantly to the country's electricity grid, potentially replacing up to 20% of current fossil fuel use in the energy sector.

REGION



Over 90% of Serbia's geothermal potential lies in Southern & Eastern Serbia, Šumadija & Western Serbia, and Vojvodina.

BUSINESS MODEL

Exploit underground geothermal heat via deep wells and binary or flash geothermal power plants for electricity production and/or district heating.

The investor's role includes securing site rights, carrying out drilling and resource assessments, installing turbines and heat exchangers, and managing operations.

Value is created through reliable baseload electricity, district heating, lower OPEX compared to fossil fuels, and by offering clean, dispatchable energy.

KEY NUMBERS

~€3M
CAPEX/MW

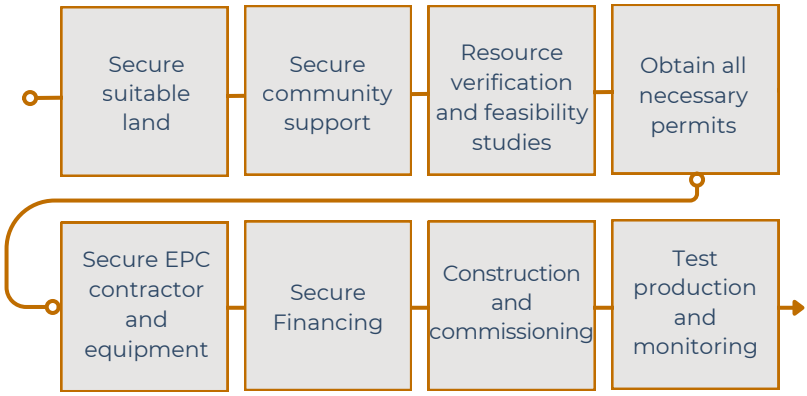
15%-25%
return on investment

4-7 years
payback period

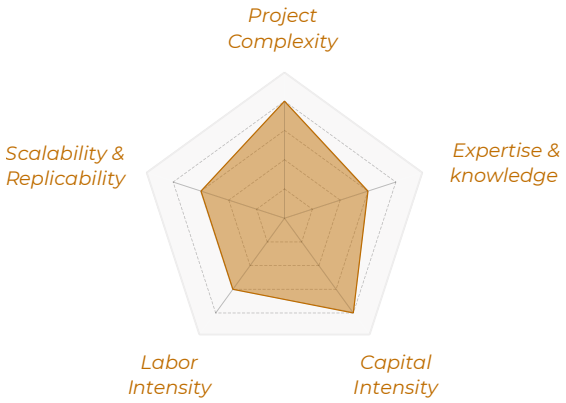
SUCCESSFUL STORY

Located near Bjelovar, Croatia, **Velika Ciglena** is the largest geothermal power plant in Southeast Europe, commissioned in 2019. With an installed capacity of 16.5 MW, it uses Organic Rankine Cycle (ORC) technology to convert high-temperature geothermal fluids into electricity. The project, developed by TGT Energija, required an investment of around €50 million, equivalent to about €3 million per MW, reflecting the higher upfront costs of geothermal. Beyond power generation, part of the extracted heat is used for district heating, improving overall efficiency and supporting local energy transition.

PROJECTS MILESTONES



PROJECT OVERVIEW



High complexity: significant resource planning and drilling expertise required.

Requires specialized expertise, including geothermal reservoir engineering, drilling operations, thermal cycle design, and long-term reservoir monitoring. SCADA and automated controls are used for performance optimization.

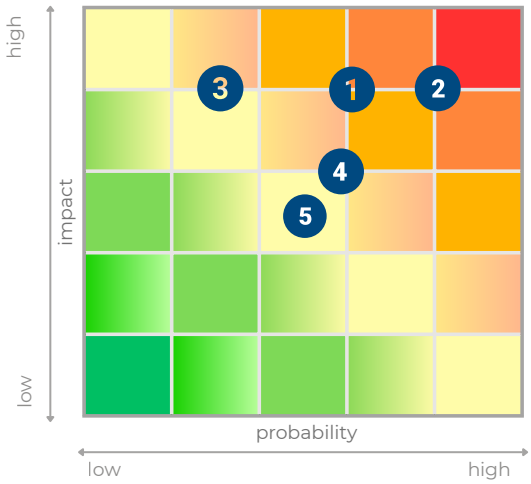
Very high upfront investment, especially for well drilling, plant infrastructure, and grid/district heat connection, but **low operational costs over long lifecycle**.

Requires skilled engineers in geothermal reservoir, thermodynamic systems, and resource monitoring.

Moderately scalable, depending on geothermal resource availability. Best suited for regions with proven heat flow and hydrothermal reservoirs. Can be combined with district heating to maximize resource use.

RISK MATRIX

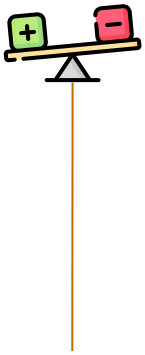
No.	Risk	Description
1	Permitting & Environmental	Complex permits and Environmental Impact Assessment (EIAs) can delay projects due to seismic, water, or emissions concerns. Conduction of comprehensive environmental assessments and adherence to regulatory standards.
2	Drilling & Construction	Deep drilling is costly and prone to failure; poor wells or overruns threaten viability. Use of skilled geothermal contractors and phased drilling to reduce technical and cost risks.
3	Operational & Tecnical	Wells may decline over time; scaling, corrosion, and reservoir management require expertise. Application of reservoir monitoring and preventive maintenance to sustain long-term output.
4	Market & Offtake	Stable output needs competitive PPAs; low prices or cheaper renewables reduce bankability. Securing of long-term power purchase agreements and alignment with renewable incentive schemes.
5	Community & Land Use	Local opposition may arise over land, water, or safety; early stakeholder engagement is vital. Implementation of transparent communication and early involvement of local stakeholders.



ESG IMPACT ASSESSMENT

Positive impacts

- Provides clean, fossil-free energy for heating and electricity generation, supporting Serbia's decarbonization and clean air goals.
- Reduces CO_2 emissions by replacing fossil fuels, with each GWh of geothermal energy avoiding around 380 tons of CO_2.
- Enhances energy independence and living standards through stable, renewable power and heating.
- Creates construction and operational jobs, fostering technical education and inclusion of women in engineering, geology, and project management.
- Ensures strong governance through alignment with Serbia's Law on Energy, EU Taxonomy, and ESG reporting standards for transparency and long-term sustainability.



Potential negative impacts

- Possible localized seismic activity, surface subsidence, or groundwater contamination from drilling and well operation.
- Chemical waste generation during reinjection and mineral scaling processes.

These aspects could be addressed through the use of advanced drilling and closed-loop technologies, strict environmental safeguards, and continuous monitoring of seismic activity, reservoir pressure, and water quality.

HOW DOES THIS PROJECT SUPPORT SERBIA'S ENERGY TRANSITION?

Serbia continues to rely heavily on coal and imported energy sources, making its power system vulnerable to both environmental and supply-side risks.

This geothermal power plant project addresses the challenge by enabling:

- ✔ **Baseload decarbonization,** replacing lignite-based generation with clean, dispatchable geothermal energy that operates 24/7, reducing CO_2 emissions and supporting long-term climate goals.
- ✔ **Energy independence,** by utilizing Serbia's domestic geothermal potential and reducing dependence on imported fossil fuels and volatile energy markets.
- ✔ **Strategic alignment with EU climate and energy policy,** contributing to Serbia's Integrated National Energy and Climate Plan (INECP) targets, including a 40% renewable share by 2030, and supporting regional energy stability in line with the EU Green Agenda for the Western Balkans.

SDG addressed:

HYBRID RENEWABLE ENERGY PARK

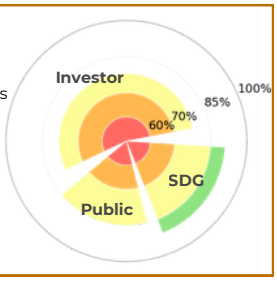
Aligned with IOA 3. Decentralized solar energy generation

IOA 4. Wind Farms

White Space: Biomass Energy Production

PROJECT SCORE

The project demonstrates **solid overall performance**, positioned in the upper yellow to green range, with stronger results under the Public and SDG perspectives, while showing moderate performance under the investor perspective.



LEGEND

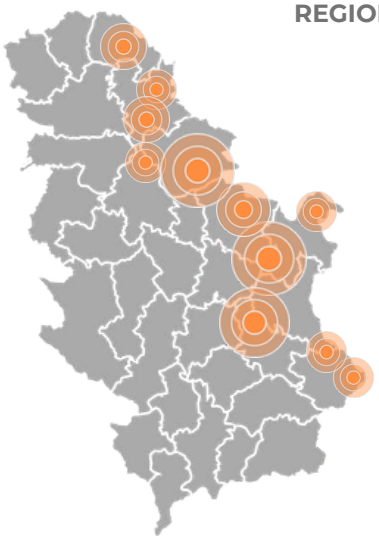
85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Serbia has a unique comparative advantage in hybrid renewable parks given its **abundant and complementary natural resources**, namely, continuous Košava-driven **wind** (average 6 m/s or more), **high solar irradiance** (1,200–1,550 kWh/m²/year), and **accessible biomass from agricultural residues**, making combined wind, solar, and biomass/biogas systems particularly effective. The optimal regions for hybrid deployment are Banat (Vojvodina) and eastern Serbia, where wind and solar potentials align with good network connectivity, while rural agricultural zones elsewhere offer opportunities for biomass feedstock.

According to IRENA and national assessments, Serbia has a technical **potential for up to 15 GW of wind capacity** and **3.6 GW of solar capacity**. This positions the country for the development of hybrid renewable parks, with a combined potential exceeding 3.4 million toe per year—including substantial **untapped biomass resources, equivalent to approximately 9,030 MW of continuous capacity**.

REGION



Best suited for Banat and eastern Serbia, where wind, solar, and biomass allow efficient integration into a single project.

SUCCESSFUL STORY

Termosolar Borges is a 22.5 MW hybrid solar–biomass plant in Spain, commissioned in 2012 as the first fully integrated facility of its kind. Producing around 98 GWh annually, it powers 27,000 homes and avoids 24,500 tons of CO_2, with a design that ensures 24/7 renewable generation and supports both direct and indirect jobs.
Building on such examples, Serbia will see its first hybrid project with **Lederata Energy**, a 182.9 million EUR CWP Global development combining 100 MW of wind, 50 MW of solar, and 20 MWh of storage. Expected to start operations in 2027, it will generate about 380 GWh per year, enough for 90,000 households, while cutting over 400,000 tons of CO_2 annually.

BUSINESS MODEL

Development, construction, and operation of a **hybrid renewable energy park** that combines wind, solar, optionally storage (BESS) or biomass/biogas to supply clean electricity to the national grid or industrial off-takers.

The investor is responsible for securing suitable land, conducting resource assessments, obtaining multi-technology permits, financing CAPEX, coordinating engineering, procurement, and construction (EPC), managing operations, and negotiating long-term power purchase agreements (PPAs) or participating in market premium auctions. The hybrid model enables optimized grid usage, load balancing, and higher generation efficiency, creating long-term value through diversified and resilient clean energy output.

KEY NUMBERS

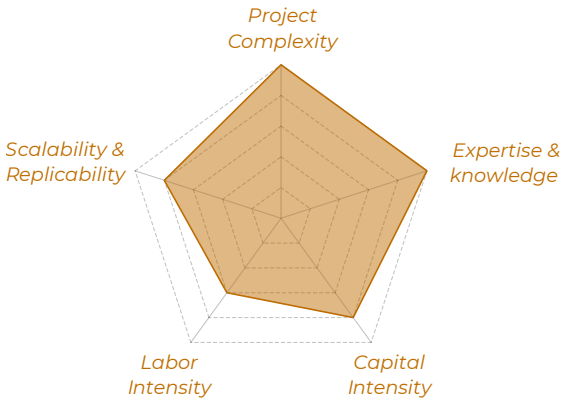
~€2M
$CAPEX_{/MW}$

10%-15%
return on investment

7-10 years
payback period

PROJECTS MILESTONES

PROJECT OVERVIEW



High complexity: requires multi-source resource assessment, multiple permitting streams (land use, environmental, energy), grid connection agreements, and integrated technical design. Hybridization increases design and coordination complexity but enhances energy reliability and system value.

Requires multidisciplinary expertise for planning, hybrid system optimization, grid integration, and control systems. Operation and monitoring require trained technicians, with additional workforce for biomass logistics if applicable.

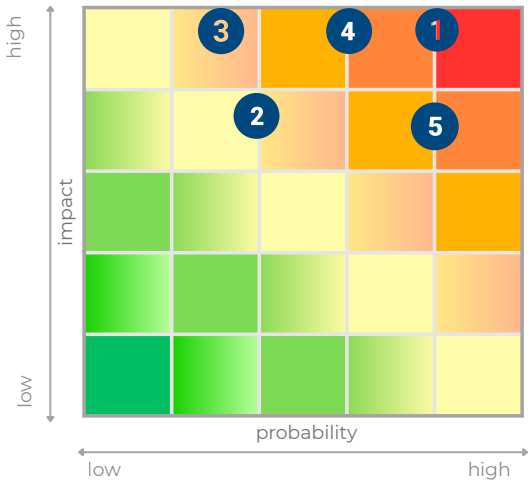
High upfront investment required for land acquisition, wind turbines, solar panels, substations, optional battery systems or biomass units, and shared grid infrastructure. **Operating costs vary depending on configuration** (low for solar/wind, moderate for biomass).

Short to medium-term employment generated during construction across civil, electrical, and mechanical works; long-term jobs in O&M, especially in biomass-integrated models.

Flexible and scalable — hybrid renewable farms can be tailored to available resources, land, and grid capacity, offering resilient, location-adapted solutions that optimize generation across time and weather conditions.

RISK MATRIX

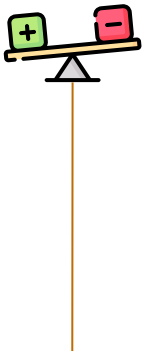
No.	Risk	Description
1	Regulatory and Permitting	Hybrid projects need multiple permits. Delays or legal changes increase costs and extend timelines. Early engagement with authorities and clear permitting strategies reduce delays.
2	Construction and EPC	Combining technologies raises risks of delays, overruns, and logistics issues. Select experienced hybrid EPCs with proven track records.
3	Grid Connection and Curtailment	Variable generation profiles require close Transmission System Operator coordination. Without it, congestion and curtailment cut revenues. Early grid studies and negotiated agreements limit curtailment.
4	Operational and Technical	Wind, solar, and biomass have different O&M needs, making management complex. Poor integration lowers output. Integrated O&M planning and predictive maintenance sustain performance.
5	Power Price and Revenue Volatility	Market price swings and intermittent supply raise risks,. Diversification helps only with strong structuring. Secure long-term PPAs to stabilize revenues.



ESG IMPACT ASSESSMENT

Positive impacts

- Combines multiple renewable sources (wind, solar, biomass/biogas, or battery storage) to replace fossil-based generation, supporting Serbia's NDC target of 40% renewables in final energy consumption by 2030.
- Creates construction and long-term operational jobs, particularly in biomass supply chains that strengthen rural economies.
- Promotes gender inclusion through targeted training and mentorship, addressing the underrepresentation of women in technical and managerial energy roles.
- Ensures transparency and accountability through compliance with EU Taxonomy, Serbia's Green Bond Framework, and third-party ESG audits.



Potential negative impacts

- High land and resource requirements due to integration of multiple technologies (solar, wind, biomass, storage).
- Air emissions, odor, or unsustainable biomass sourcing if supply chains are not well managed.
- Visual and acoustic disturbances for nearby communities.
- Complex grid connection and infrastructure demand that may temporarily affect local ecosystems.

These aspects could be addressed through sustainable biomass sourcing, careful spatial and environmental planning, responsible construction practices, and continuous monitoring aligned with EU ESG standards.

HOW DOES THIS PROJECT SUPPORT SERBIA'S ENERGY TRANSITION?

Serbia remains heavily reliant on fossil fuels, with over 65% of its electricity still coming from coal—contributing to high CO_2 emissions and energy security risks.

This hybrid renewable energy project addresses the challenge by enabling:

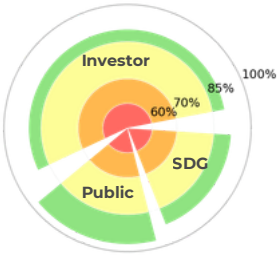
- ✔ **Decarbonization of electricity**, replacing lignite-based generation with a combination of wind, solar, and biomass or storage, providing clean and reliable renewable energy throughout the day and across seasons.
- ✔ **Energy diversification and grid stability,** integrating multiple renewable sources to reduce variability, optimize grid usage, and ensure more balanced generation profiles.
- ✔ **Strategic alignment with national and EU climate goals,** directly supporting Serbia's commitment to reach 40% renewable energy share by 2030, in line with the EU Green Agenda and the country's Integrated National Energy and Climate Plan (INECP).

SOLAR FARMS

Aligned with IOA 3. Decentralized solar energy generation

PROJECT SCORE

The project demonstrates **strong overall performance** placing within the top (green) range across all perspectives, with the highest rating from the public perspective.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

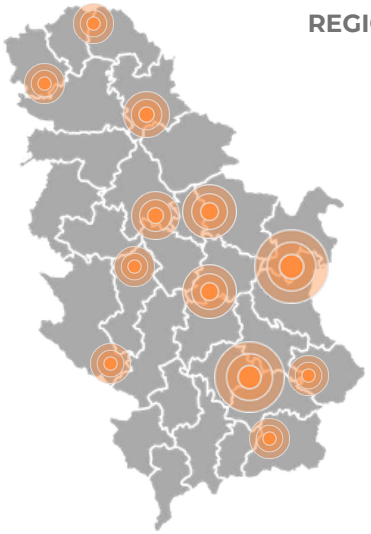
MARKET POTENTIAL

Serbia possesses favorable natural conditions for the development of photovoltaic power plants. **Solar radiation levels** in the country are approximately **30% higher than** those **in Western Europe**, with an average of around 270 sunny days per year. The average annual solar irradiation across the Northeast, Central, and Southeast regions is approximately 1,383 kWh/m².

According to figures from the Association of Renewable Energy Sources of Serbia (RES Serbia), Serbia's cumulative solar capacity has reached 281MW.

The International Renewable Energy Agency (IRENA) estimates **Serbia's untapped solar potential at approximately 3.6 GW**. This potential is equivalent to the combined capacity of around 360 solar farms, each with a power of 10 MW.

REGION



Across the entire territory, with particular focus on Southern and Eastern Serbia.

SUCCESSFUL STORY

DeLasol is a 9.9 MW solar power plant located in Lapovo, Central Serbia, and represents one of the first large-scale private investments in solar energy in the country. Commissioned in 2023 by MT-KOMEX, it produces around 15 GWh of electricity annually, enough to supply over 2,000 households. The facility includes 17,980 advanced panels (650/655 Wp) manufactured by Canadian Solar. Supported through project financing by ProCredit Bank, DeLasol reduces CO_2 emissions by more than 11,000 tons per year, contributing to Serbia's clean energy transition.

Other: Petka, Solarina, Saraorci, etc.

BUSINESS MODEL

Development, construction, and operation of a **solar farm** that generates and supplies renewable electricity to the national grid through long-term power purchase agreements (PPAs) with private or public off-takers.

The investor's role includes securing suitable land, obtaining permits, financing, and overseeing engineering, procurement, and construction (EPC), as well as managing long-term operations and maintenance to ensure stable energy output and financial returns.

Solar farm development in Serbia is well-suited for project financing by local banks, which have experience with similar renewable energy projects. Their familiarity with regulatory frameworks and risk profiles enables efficient due diligence and tailored financing solutions.

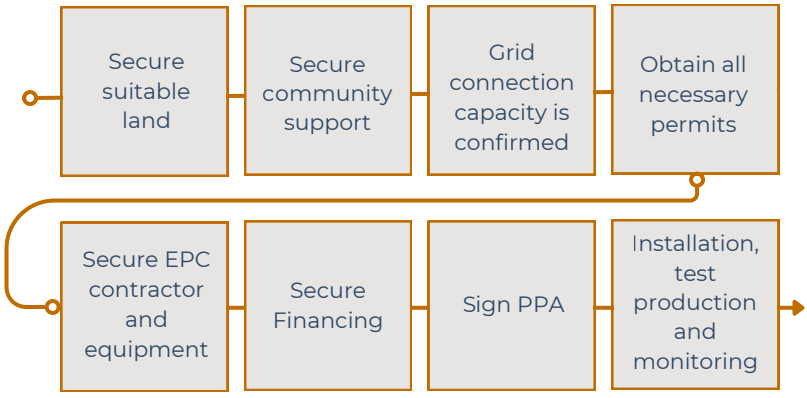
KEY NUMBERS

€800-900K
$CAPEX_{/MW}$

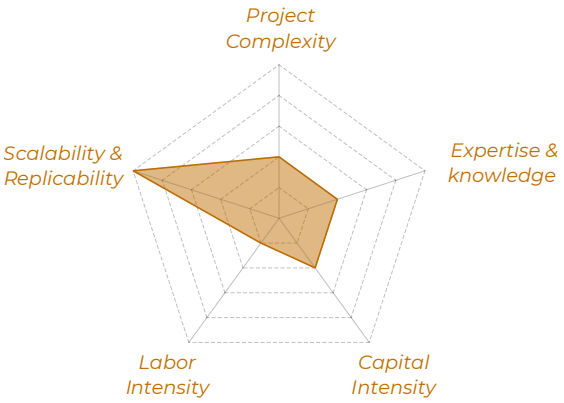
15%-25%
return on investment

4-7 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



Moderate complexity: requires permits (land use, environmental), grid connection agreements, and technical design. However, standardized engineering and modularity reduce risk.

Needs **skilled experts** for design and grid integration; Operations and monitoring require **moderate training** with technical oversight.

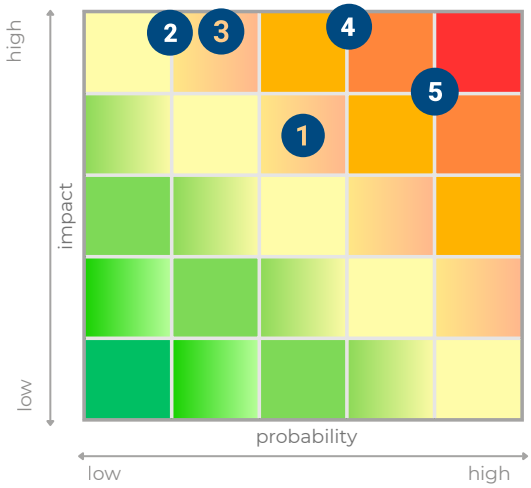
High upfront investment is required for land, while **moderate** investments are needed for PV modules, inverters, substations, and grid connection. **Very low operating costs.**

Short-term jobs during construction; **minimal workforce** needed for operation and maintenance.

Highly scalable and replicable — solar farms can be deployed at different scales and locations with similar technical models.

RISK MATRIX

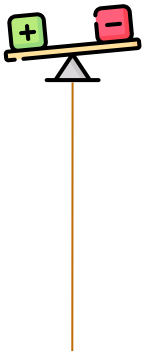
No.	Risk	Description
1	Regulatory and Permitting	Changes in laws, delays in permitting, or withdrawal of incentives can affect project timelines and returns. Stable and predictable regulation is key to investor confidence.
2	Construction and EPC	Delays or budget overruns may arise due to poor planning or underperformance of contractors. Selecting experienced EPC partners mitigates this risk.
3	Grid Connection and Curtailment	Projects may face delays in securing grid access or be subject to output curtailments. This can reduce revenue and affect financial planning.
4	Operational and Technical	Equipment failures, poor maintenance, or underperformance can disrupt electricity generation. Ongoing monitoring and quality components help ensure stable output.
5	Power Price and Revenue	Volatile electricity prices or unreliable offtakers may impact projected revenue. Long-term PPAs with creditworthy buyers help reduce this risk.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces CO_2 emissions and supports Serbia's 2030 climate targets through large-scale renewable generation.
- Creates jobs in construction and maintenance, especially in rural areas, and opens opportunities for women in technical roles.
- Complies with Serbia's renewable energy framework and qualifies for green bond financing.
- Ensures transparent management through audits, stakeholder engagement, and alignment with EU Taxonomy and ISO standards.



Potential negative impacts

- Land-use pressure and possible disturbance of biodiversity if installations are placed on agricultural or sensitive land.
- Dust, noise, and waste generation during construction.
- End-of-life challenges related to solar panel recycling and material disposal.

These aspects could be addressed through careful site selection, dual land use (agrivoltaics), responsible construction practices, and recyclable materials.

HOW DOES THIS PROJECT SUPPORT SERBIA'S ENERGY TRANSITION?

Serbia remains heavily reliant on fossil fuels, with over 65% of its electricity still coming from coal—contributing to high CO_2 emissions and energy security risks.

This solar farm project addresses the problem by enabling:

- ✔ **Decarbonization of electricity,** replacing coal-based generation with clean, renewable solar energy and directly reducing greenhouse gas emissions.
- ✔ **Energy diversification**, strengthening grid resilience and lowering dependence on imported or volatile energy sources.
- ✔ **Regulatory and climate alignment**, supporting Serbia's commitments under the EU Green Agenda and national energy transition strategies toward a more sustainable, low-carbon future.

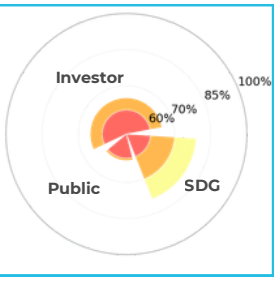
SDG addressed:

SOLAR-POWERED IRRIGATION SYSTEMS

Aligned with IOA 3. Decentralized solar energy generation

PROJECT SCORE

The demonstrates **moderate overall performance**, positioned in the orange to yellow range, with the strongest results under the SDG perspective, while showing lower performances in both the Investor and Public perspectives.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

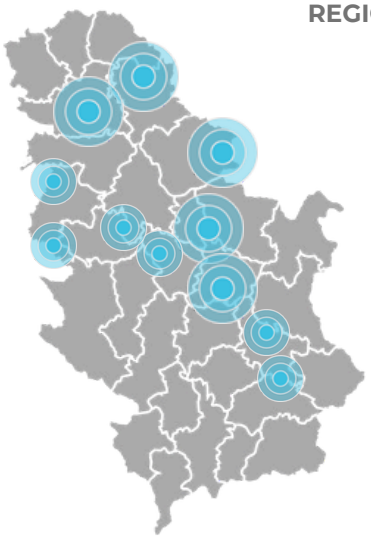
MARKET POTENTIAL

Serbia benefits from a **high solar potential** (1,200–1,550 kWh/m² annually) and an **agricultural sector that contributes ~4% of GDP**; however, irrigation systems are often outdated and energy-intensive. The combination of strong insolation and the need for cost-efficient, sustainable irrigation creates a competitive edge in the Balkans.

In 2023, **only 47,579 hectares were irrigated**, a 12.9% drop from the previous year. Of this, 93.4% were arable lands and gardens, 6% orchards, and 0.6% other land types. This equals barely 2% of arable land, showing that irrigation coverage is extremely low compared to Serbia's overall agricultural potential.

Yet Serbia holds vast untapped capacity. Water mapping indicates **the potential to irrigate hundreds of thousands of hectares** using river alluvials and multipurpose reservoirs, **up to 450,000 hectares** from the Danube, Sava, and Velika Morava catchments alone. Expanding irrigation would significantly enhance productivity, climate resilience, and yield stability in core farming regions.

REGION



Most relevant for Vojvodina, Pomoravlje, and Southern Serbia, especially near rivers where irrigation demand is high and grid coverage remains weak.

SUCCESSFUL STORY

Acciona Energía developed a 7.35 MWp solar-powered irrigation system in Spain's Ebro Basin (La Rioja and Aragón), commissioned in 2023. The €7 million project, co-financed by a €4.1 million grant from the European Commission's CINEA program, produces around 12,000 MWh of electricity annually and avoids nearly 1,800 tons of CO_2 emissions by replacing grid and diesel pumps. Implemented with local irrigation communities, the Polytechnic University of Madrid, and Cingral consultancy, the initiative lowers farmers' energy costs while ensuring reliable irrigation supply, offering a replicable model for renewable-powered agriculture in Southern Europe.

BUSINESS MODEL

Development and deployment of **irrigation systems powered entirely by photovoltaic (PV) panels**, providing off-grid water pumping and distribution for agriculture while replacing diesel or grid pumps to cut costs and eliminate fuel dependency.

Investors fund the procurement of PV modules, pumps, storage tanks, and installation, as well as training for farmers. Revenue streams come from direct equipment sales, leasing models, maintenance contracts, and potential carbon credit sales. The value lies in reducing farmers' energy expenses, increasing irrigation reliability, and enabling cultivation in water-scarce rural regions.

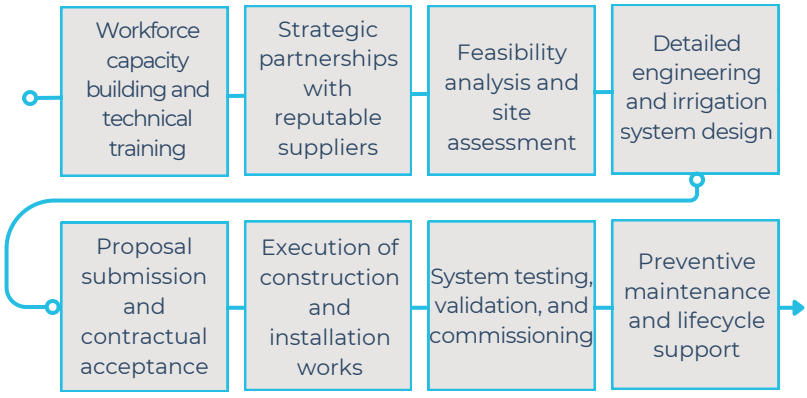
KEY NUMBERS

~€2.5M
CAPEX

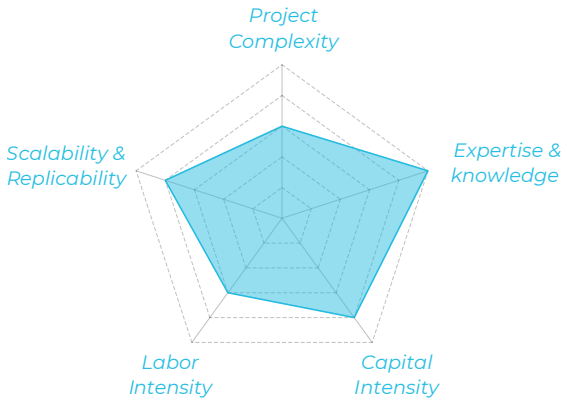
>10%-15%
return on investment

7-10 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



Moderate complexity; entails coordinating equipment supply, integrating PV with irrigation systems, and delivering adaptable turnkey solutions for agricultural clients.

The provider must secure **expertise** in renewable energy engineering, irrigation system design, and water management, while investing in local training programs to build the necessary skills base over time.

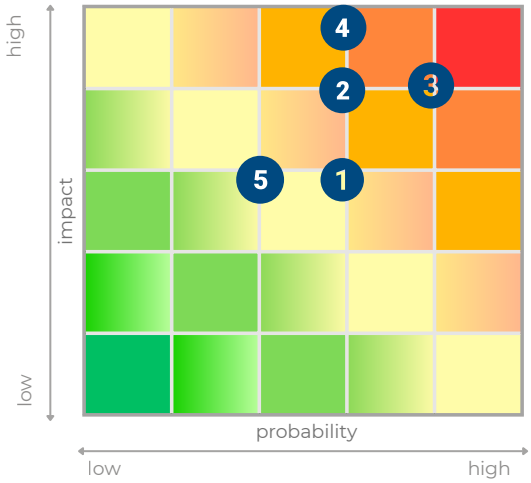
Initial CAPEX is driven by inventory build-up of panels, pumps, and storage systems, while ongoing operating costs for the provider remain minimal beyond logistics and service.

Low to moderate labor intensity; most effort lies in system installation and after-sales servicing, while ongoing operational involvement for the provider is minimal once projects are delivered.

The company can expand installations from smallholder farms to large agricultural enterprises and **replicate** its service model across rural Serbia and the Western Balkans with **minimal adaptation.**

RISK MATRIX

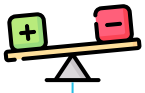
No.	Risk	Description
1	Technical and Design	Poor design or sizing of panels, pumps, or storage causes unreliable irrigation and water shortages. Engagement of experienced engineers and use of site-specific feasibility studies.
2	Supply Chain and Material	Delays or shortages in panels, pumps, or storage units raise CAPEX, extend delivery times, and can damage client trust. Diversification of suppliers and maintenance of buffer inventories.
3	After-sales service and warranty	Failure to provide strong after-sales service increases warranty costs and reputational risk; mitigated by dedicated service teams and standardized protocols.
4	Operation and Maintenance	Lack of trained staff for cleaning, repairs, and troubleshooting often leads to failures, while dust, degradation, or pump clogging reduces lifespan and increases downtime. Implementation of regular staff training and preventive maintenance schedules.
5	Reputation	Failed projects, poor quality control, or aggressive competition could erode market position and brand credibility. Application of strict quality control and transparent client communication.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces agricultural water consumption by up to 20% and eliminates CO_2 emissions from diesel-powered irrigation, contributing to both water efficiency and decarbonization.
- Enhances food security and climate resilience by providing reliable and affordable irrigation, particularly benefiting smallholder farmers.
- Strengthens rural livelihoods and social stability through higher yields and stable income opportunities.
- Promotes transparent governance via measurable indicators (e.g., water saved, CO_2 avoided, yield gains) aligned with Serbia's Green Agenda and EU water management frameworks.



Potential negative impacts

- Improper disposal of used solar panels and batteries may pose environmental risks.
- Over-irrigation or mismanagement of water resources could reduce long-term efficiency benefits.
- Limited technical capacity among farmers may hinder optimal system use and maintenance.

These aspects could be addressed through proper recycling and disposal of solar components, user training and capacity-building programs, and ongoing performance monitoring to ensure responsible and efficient water management.

HOW DOES THIS PROJECT SUPPORT SERBIA'S ENERGY TRANSITION?

Serbia's agricultural productivity is constrained by low irrigation coverage, high energy costs, and reliance on outdated, fossil-fuel-powered pumping systems.

This solar-powered irrigation project addresses the challenge by enabling:

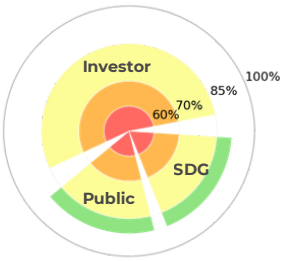
- ✔ **Decarbonization of agriculture**, replacing diesel-powered pumps with renewable energy, directly cuts greenhouse gas emissions.
- ✔ **Increased food production resilience**, providing reliable, low-cost irrigation for rural farmers.
- ✔ **Energy diversification**, reducing dependence on imported fuels, and aligning with EU Green Agenda commitments.

WIND FARMS

Aligned with IOA 4. Wind Farms

PROJECT SCORE

The project demonstrates **solid to best-performing results** across all perspectives, with exceptionally high scores under the Public and SDG perspectives.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

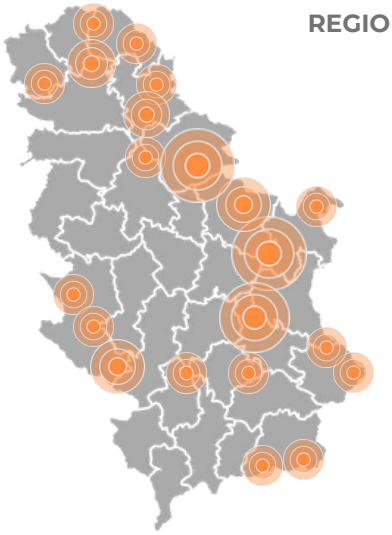
MARKET POTENTIAL

Serbia presents a compelling investment case for wind energy, combining robust natural resources with improving regulatory and market conditions. Average wind speeds of 6–7 m/s at 100 meters, combined with flat terrain and reliable grid access, provide **high-capacity factors and lower integration costs**—particularly in the Banat, eastern, and southeastern regions

As of 2025, Serbia's installed wind power capacity stands at 685 MW, with an additional 76 MW currently under construction.

Technical assessments indicate **potential for up to 15 GW of new wind farms capacity**, equivalent to approximately 250 wind farms of 60 MW each.

REGION



The highest wind energy is mostly in Južni Banat; potential is concentrated in Serbia's northeast and southeast.

SUCCESSFUL STORY

Čibuk 1 is a 158 MW onshore wind farm near Kovin, commissioned in 2019 with 57 GE turbines. It produces around 457 GWh annually—powering 113,000 households—and reduces over 370,000 tons of CO_2 emissions per year.
Developed by Tesla Wind (Masdar 60%, Taaleri Energia 30%, DEG 10%), the ~EUR 300 million project was financed by the EBRD and IFC (EUR 107.7 million each) with syndicated loans and later refinanced with EUR 205 million in 2022. Operating under a 12-year PPA, it ensures stable revenues while supporting local jobs and infrastructure.

Other: Pupin, Blacksmith, Krivačica, Kovačica, Plandište 1, Kula, etc.

BUSINESS MODEL

The development, construction, and operation of **wind turbines** to generate renewable electricity, which is sold to the national grid through long-term power purchase agreements or on electricity markets.

The investor is responsible for securing land, obtaining permits, financing the project, and managing construction and operations. Revenue is generated from electricity sales and potentially from green certificates or carbon credits.

Wind farm development in Serbia is well-suited for project financing by local banks, which have experience with similar renewable energy projects. Their familiarity with regulatory frameworks and risk profiles enables efficient due diligence and tailored financing solutions.

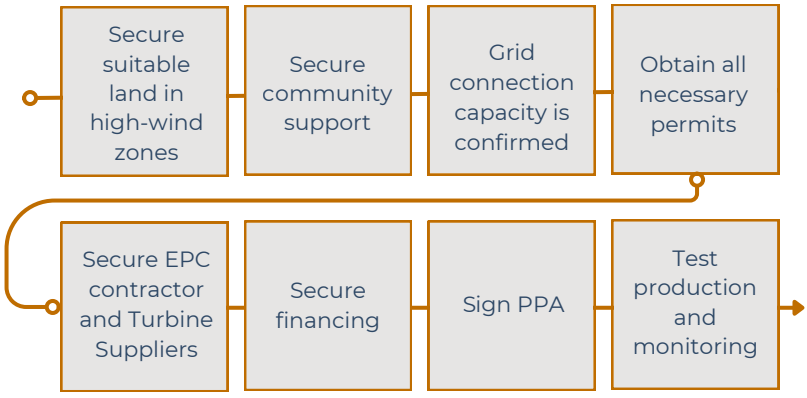
KEY NUMBERS

~€1.5M
$CAPEX_{/MW}$

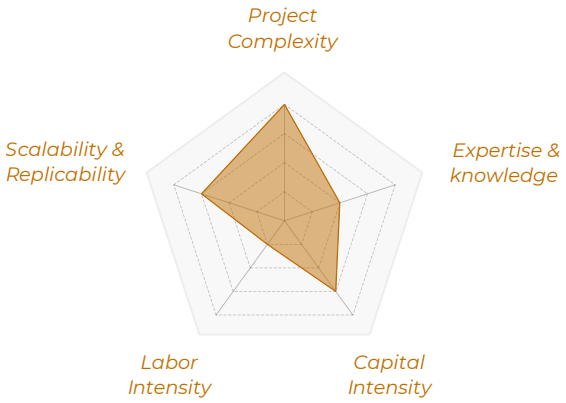
≥25%
return on investment

≤4 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



Moderate to high complexity — requires wind resource assessment, environmental permits (including impact on wildlife), aviation clearance, grid connection agreements, and precise micrositing. Site-specific conditions increase technical and permitting requirements.

Requires **specialized engineering expertise** for turbine selection, wind flow modeling, and structural design. Operation requires trained technicians and remote monitoring systems.

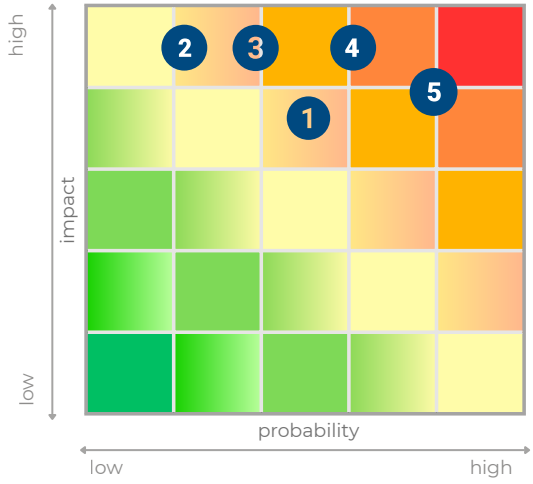
High upfront investment required for land access, wind turbines, foundations, electrical infrastructure, and grid connection. **Operating costs** are relatively low but include periodic maintenance and monitoring.

Short-term jobs during construction; **minimal workforce** needed for operation and maintenance.

Scalable in appropriate wind zones — wind farms can be replicated across regions with consistent wind profiles and grid availability, although less modular than other RES, such as solar.

RISK MATRIX

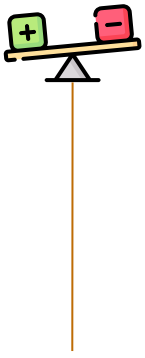
No.	Risk	Description
1	Regulatory and Permitting	Changes in laws, delays in permitting, or withdrawal of incentives can affect project timelines and returns. Stable and predictable regulation is key to investor confidence.
2	Construction and EPC	Challenges include turbine transport logistics, terrain constraints, and underqualified contractors. Selecting experienced wind-focused EPC firms and planning transport in advance helps avoid delays and cost overruns.
3	Grid Connection and Curtailment	Weak or saturated grids in remote areas can limit generation. Early coordination with the TSO, firm connection agreements, and planned grid upgrades ensure stable output.
4	Operational and Technical	Turbine faults, gearbox issues, and poor wind forecasting can lower performance. Proven technology, digital monitoring, and robust O&M contracts maintain efficiency.
5	Power Price and Revenue	Wind variability and price volatility can reduce income, especially without PPAs. Long-term offtake contracts and conservative wind yield estimates help stabilize returns.



ESG IMPACT ASSESSMENT

Positive impacts

- Significantly reduces CO_2 emissions by replacing coal-based generation, directly supporting Serbia's 2030 climate targets and the EU Green Agenda.
- Generates employment during construction and creates long-term technical jobs in rural areas.
- Enhances gender inclusion potential through training and mentorship programs (e.g. WISE Serbia), addressing the gender gap in the renewable energy workforce.
- Qualifies for Serbia's green bond financing and complies with national and EU renewable energy legislation, ensuring transparent governance and reporting.



Potential negative impacts

- Visual and noise disturbance, particularly for nearby communities and wildlife.
- Bird and bat populations' vulnerability due to turbine blade collisions.
- Erosion during construction phases.

These aspects could be addressed through thorough environmental assessments, careful turbine placement outside migration corridors, responsible construction practices that prevent soil erosion, and ongoing stakeholder engagement to address biodiversity concerns.

HOW DOES THIS PROJECT SUPPORT SERBIA'S ENERGY TRANSITION?

Serbia remains heavily reliant on fossil fuels, with over 65% of its electricity still coming from coal—contributing to high CO_2 emissions and energy security risks.

This wind farm project supports the transition by enabling:

- ✔ **Decarbonization of electricity,** replacing coal-based generation with clean wind energy and helping achieve Serbia's 2030 target of at least 40.3% renewables in final energy consumption under the INECP.
- ✔ **Energy diversification**, strengthening grid resilience, lowering dependence on imported or volatile energy sources, and improving energy price stability.
- ✔ **Regulatory and climate alignment**, contributing to EU climate goals and facilitating Serbia's integration into the Western Balkans regional electricity market, while strengthening grid resilience and clean energy exchange.

FOOD AND BEVERAGE

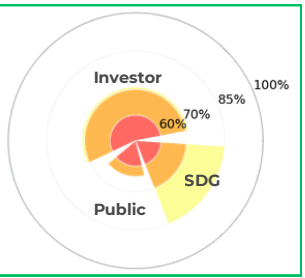
- Aquaponics farms
- Hydroponics farms
- Organic Crop Production
- Passive Solar Greenhouses For Year-Round Growing
- PCE Dragline System
- Regional Fertilizer Production Plant
- Regional Vegetable Processing Facility
- Scaling Regenerative Farming Practices

AQUAPONICS FARMS

Aligned with IOA 2. Organic Agricultural Production

PROJECT SCORE

The project demonstrates **solid overall performance**, showing its strongest results from the SDG perspective, while performance from the public and investor perspectives is moderate to solid.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

The aquaponics market in Serbia presents a promising opportunity for sustainable agriculture and investment. These systems, which **combine aquaculture and hydroponics in a closed-loop environment**, use **up to 90% less water** than traditional agriculture and can produce **high yields** in limited spaces; for example, a 200-square-meter space produces 700 kg of fish and 4 tons of vegetables annually.
Aquaponics reduces the need for chemical fertilizers and pesticides, lowers greenhouse gas emissions, and aligns with growing consumer demand in Serbia for locally produced, organic, and sustainable food.
The Serbian **government also supports** innovative agricultural practices through funding programs and initiatives aimed at modernizing the sector, while educational institutions are increasingly providing training and knowledge transfer to foster adoption. Together, these factors highlight Serbia as a favorable environment for aquaponics, offering both environmental benefits and economic potential.

BEST FISH AND PLANT COMBINATIONS IN AQUAPONICS

Tilapia is a warm-water fish that pairs well with plants requiring higher temperatures and nitrogen-rich conditions.

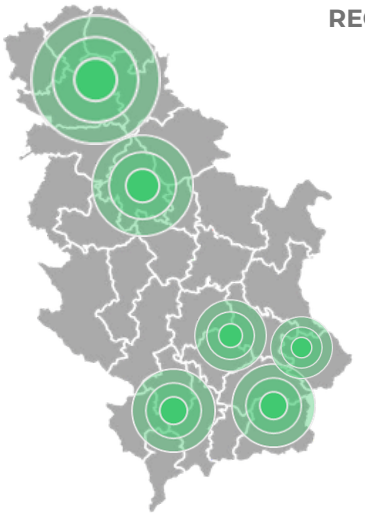
Trout is a cold-water fish, better suited for plants that prefer lower temperatures.

Koi thrive in cooler water, matching the temperature requirements of many herbs.

+

Leafy Greens
High Phosphorus / K Potassium Vegetables
Herbs

REGION



Suitable regions for aquaponics in Serbia include **Vojvodina,** with fertile soils, flat terrain, and strong agricultural infrastructure, **southern Serbia** with warm, dry summers suitable for vegetables and fruits, and **central Serbia** with good market connectivity.

SUCCESSFUL STORY

Urban Organika is a modern aquaponics farm located in **Kikinda**, focusing on the year-round production of high-quality leafy greens, herbs, and salad vegetables. Their system enables efficient use of space and resources, providing the local community with fresh, organic produce without the use of pesticides.

Family Farm in Stapar, near Sombor, decided nearly a decade ago to adopt an ecologically sustainable approach to food production. On their six-acre property, they implement aquaponics – an integrated system where fish and plants coexist in a mutually supportive cycle. Their system enables the production of vegetables and fish under controlled conditions, without the use of pesticides or artificial fertilizers.

ECF Farmsystems is a German company pioneering the implementation of aquaponics in urban environments. Their farm in Berlin uses an aquaponics system to produce fish and vegetables in the heart of the city. This model allows for local food production, reduces CO_2 emissions associated with transportation, and helps minimize the environmental footprint. ECF Farmsystems demonstrates how aquaponics can be successfully integrated into urban settings, providing sustainable solutions for city-based food production.

BUSINESS MODEL

The aquaponics business model centers on integrated, sustainable food production that generates value through the simultaneous cultivation of fish and vegetables in a controlled, closed-loop system. The activities involve **designing, constructing, and operating aquaponics facilities, including fish tanks, hydroponic grow beds, water recirculation systems, and climate-controlled greenhouses.** These facilities enable year-round production of high-quality, chemical-free produce and fish, targeting local markets as well as regional export opportunities.

The project leverages **advanced simulation tools**, such as the SDM-Aqua model, to improve planning and resource management, monitor environmental impact, and forecast production outcomes. By simulating production and environmental dynamics, this approach helps to optimize operations, reduce risks, and ensure more reliable outcomes.

Within this framework, the **investor plays a critical role** in financing the construction and maintenance of the facility, supporting the adoption of advanced monitoring and automation technologies, and facilitating market access. By providing capital and strategic guidance, the investor enables the project to deliver both financial returns and measurable sustainable impact, aligning with broader IOA objectives.

KEY NUMBERS

<€1M
CAPEX

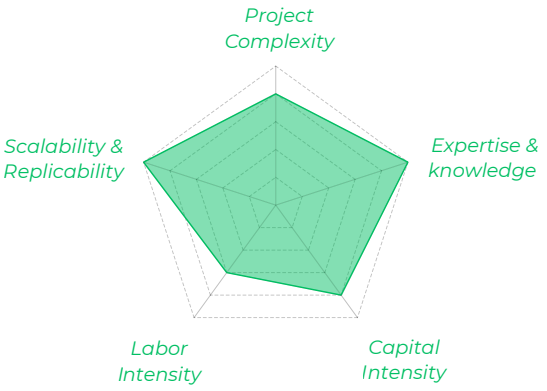
15%-25%
return on investment

4-7 years
payback period

PROJECTS MILESTONES

- Fish tanks, hydroponic beds, and water recirculation systems optimized for maximum yield and minimal resource use
- Advanced monitoring systems for water quality, nutrient levels, and climate control implemented
- Reliable supply chains and partnerships with retailers, restaurants, and local markets secured
- Personnel recruited and educated to efficiently manage both aquaculture and hydroponics systems
- National and EU food safety, organic certifications, and environmental standards met for market access
- Expanded production capacity and proved scalability

PROJECT OVERVIEW



Aquaponics requires careful integration of aquaculture and hydroponics systems, including water quality, nutrient cycles, and climate control. Coordinating these elements makes the project **moderately complex.**

Specialized knowledge in aquaculture, hydroponics, system engineering, and operational management is essential for successful implementation and maintenance.

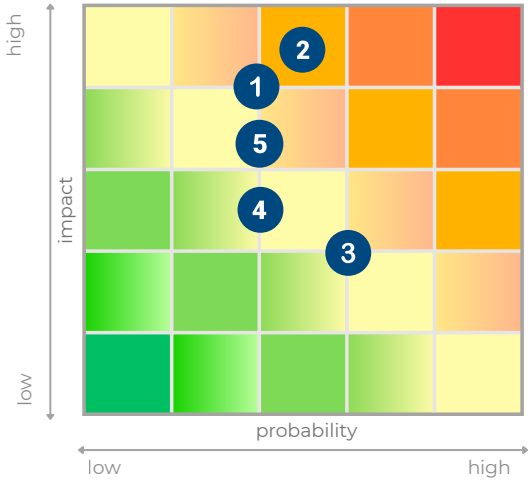
Initial investment in tanks, grow beds, pumps, climate control, and monitoring systems is significant, though operational costs are moderate compared to traditional agriculture.

While automation reduces manual labor, **skilled personnel** are still required for daily monitoring, harvesting, and maintenance of the ecosystem.

The modular nature of aquaponics allows **easy scaling and replication** across different locations, making it highly adaptable for both urban and rural settings.

RISK MATRIX

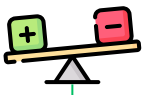
No.	Risk	Description
1	Water Scarcity	Insufficient or unreliable water supply can disrupt the aquaponics cycle. Mitigation strategy is implementing water recycling systems, rainwater harvesting, and backup water sources.
2	Disease Outbreak in Fish or Plants	Fish diseases or plant pests can reduce yields significantly. To avoid this risk, take regular health monitoring, quarantine procedures, and use of biosecure systems.
3	Market Price Volatility	Fluctuating prices for vegetables and fish can affect revenue. Diversify crops and fish species, secure contracts with retailers, and explore export markets.
4	Technical Failures	Pump, filtration, or climate control failures can disrupt operations. To mitigate this risk install backup systems, perform regular maintenance, and train staff for quick response.
5	Regulatory and Compliance Risks	Non-compliance with food safety, environmental, or zoning regulations may halt operations. To adress this risk stay updated with laws, obtain necessary certifications, and work with local authorities.



ESG IMPACT ASSESSMENT

Positive impacts

- Uses up to 90–99% less water than conventional agriculture and recycles up to 98% of wastewater, reducing CO_2 emissions and fossil fuel use by about 45%.
- Eliminates chemical fertilizers and minimizes environmental impact, promoting sustainable resource use and climate resilience.
- Strengthens food security through year-round, local production of fresh vegetables and fish, reducing import dependence and seasonal supply risks.
- Creates skilled jobs in agriculture, technology, and research, fostering rural economic growth and innovation.
- Promotes community engagement through education and training programs for farmers, students, and entrepreneurs.
- Ensures transparent and efficient resource management through real-time monitoring of water quality, nutrient balance, and system performance.



Potential negative impacts

- High initial CAPEX and energy demand for pumps, lighting, and climate control systems.
- Water contamination or fish mortality if the system balance (pH, ammonia, oxygen) is not properly maintained.
- Potential overuse of electricity if renewable energy sources are not integrated.

These aspects could be addressed through renewable energy integration, advanced automation for system monitoring, regular water quality testing, and preventive maintenance to ensure operational stability and environmental performance.

HOW DOES THIS PROJECT SUPPORT SERBIA'S TRANSITION TO SUSTAINABLE AGRICULTURE?

Serbia faces challenges in sustainable food production due to limited adoption of innovative farming systems, fragmented supply chains for fresh vegetables and fish, and insufficient infrastructure for year-round controlled production. Conventional farming methods often rely on high water usage, chemical fertilizers, and pesticides, contributing to soil degradation, water pollution, and greenhouse gas emissions. By establishing a commercial aquaponics facility, the project:

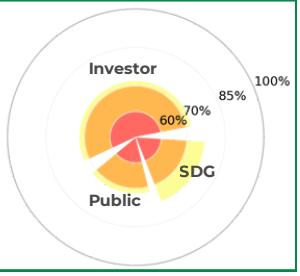
- ✔ Integrates fish and plant production in a closed-loop, resource-efficient system.
- ✔ Provides consistent, year-round supply of high-quality, chemical-free products.
- ✔ Strengthens rural economies by creating modern, sustainable jobs.
- ✔ Reduces environmental footprint through lower water use and elimination of chemical fertilizers and pesticides.

HYDROPONICS FARMS

Aligned with IOA 5. High-tech for Agriculture Production

PROJECT SCORE

The project demonstrates **solid overall performance**, with balanced results across all three perspectives.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Soil degradation and urban expansion are reducing productivity in traditional agriculture, creating a **growing gap between supply and market demand** for fresh, high-quality produce. **Hydroponic farming produces the equivalent of dozens of hectares of conventional farmland on just a few hundred square meters, dramatically increasing yields per square meter while using less water and land.** , Offering higher yields with year-round production, independent of seasonal and weather constraints, and providing greater control over quality and supply, hydroponic farming presents a compelling investment opportunity for investors to secure a strong market position where demand for high-quality vegetables is growing. **By eliminating the need for soil**, **hydroponics preserves fertile land and enables cultivation in urban and peri-urban areas where market absorption is highest**.

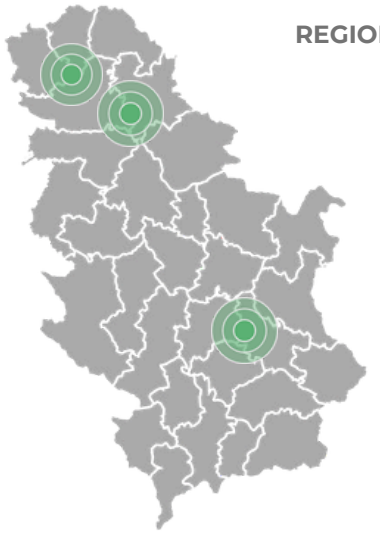
The most suitable crops for hydroponic cultivation in Serbia

Leafy greens - lettuce, spinach, arugula
Herbs - parsley, dill, basil
Fruit vegetables - tomatoes, cucumbers, peppers
Short-cycle fodder crops - wheatgrass, barley, oats

Hydroponic systems can boost tomato yields by **up to 30%** compared to traditional soil cultivation.

Hydroponic basil can yield **up to 1.8 kg** per square meter, compared to 0.6 kg in soil-based systems.

REGION



Hydroponic farms in Serbia should be located in or near urban and peri-urban areas (Belgrade, Novi Sad, Niš), where demand from retailers, HoReCa, and export channels is concentrated. Such locations ensure efficient distribution, reduced logistics costs, and strong market absorption.

SUCCESSFUL STORY

Sfera Agricola, located in Gavorrano, Italy, is the largest hydroponic greenhouse in Southern Europe and a flagship example of how advanced technology can transform vegetable production. By combining closed-loop irrigation with rainwater harvesting, the facility achieves up to 15 times higher yields while using just 10–20% of the water required in traditional farming. Its controlled environment eliminates the need for pesticides, relying instead on biological methods, and ensures year-round supply of fresh produce regardless of weather conditions. Today, Sfera Agricola is recognized as one of Europe's leading models of sustainable, high-tech farming.

Although not based on the same business model, Serbia has already demonstrated the feasibility of hydroponic technology through the project in **Čurug**, where Global Seed pioneered the production of green cattle feed without soil. Supported by UNDP, **this initiative showed how hydroponics can thrive under Serbian conditions**, reducing resource use while delivering consistent, high-quality output. This success confirms that the Serbian market is ready for more advanced applications of hydroponics, including high-yield vegetable farming.

Others: Growy (Netherlands), Hydroponics Factory (China), Plenty (USA)

BUSINESS MODEL

Establish and operate **controlled-environment hydroponic production units** for high-yield vegetable and herb cultivation using nutrient-enriched water systems. **Modular infrastructure** will be equipped with automated climate control, LED grow lighting, and fertigation systems, supported by sensors for pH, EC, temperature, humidity, and CO_2 monitoring. Biological pest control will replace chemical pesticides, ensuring clean and safe production. Activities also include sourcing of sustainable inputs and integration with urban or peri-urban distribution channels to reduce logistics costs and improve freshness.

The investor's role includes financing, equipping, and managing hydroponic units, as well as developing long-term contracts with local retailers, HoReCa clients, and export aggregators to ensure market absorption and impact scalability.

Once the core farm is established, **the model can expand by offering expertise, consulting, and technology integration to other growers or companies.** By leveraging know-how, promoting sustainable hydroponic practices, and generating additional revenue streams through partnerships, while enhancing the overall impact on Serbia's agriculture sector.

KEY NUMBERS

€1M-5M
CAPEX

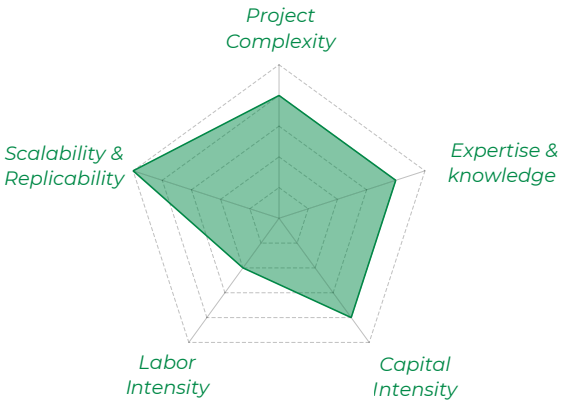
15%-25%
return on investment

4-7 years
payback period

PROJECTS MILESTONES

- Securing suitable land in urban or peri-urban locations with access to utilities
- Obtaining necessary permits and approvals for construction and food production
- Sourcing and contracting suppliers securing
- Recruiting skilled personnel for farm setup, operation, and maintenance
- Establishing initial distribution agreements with retailers, HoReCa clients end export partners
- Full capacity launch and knowledge transfer

PROJECT OVERVIEW



Complexity of this project involves integration of advanced systems (climate control, LED lighting, nutrient management, and fertigation) and continuous monitoring for optimal production, alongside regulatory compliance, sustainable input sourcing, and coordination with urban or peri-urban distribution channels

Skilled agronomists, hydroponics specialists, and technical staff are essential for setup, maintenance, and yield optimization.

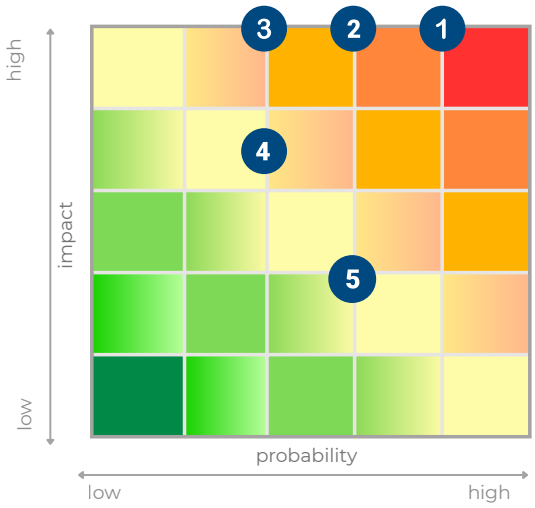
Substantial upfront investment is required for modular infrastructure, technology, and environmental controls.

Highly automated operations reduce manual labor requirements compared to traditional farming.

Modular design enables rapid replication in multiple urban/peri-urban locations once the model is proven.

RISK MATRIX

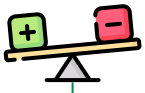
No.	Risk	Description
1	Equipment failure	Equipment malfunction (e.g., pumps, lights) can disrupt the system. To mitigate this risk, implement preventive maintenance, install backup systems, and conduct regular inspections.
2	Water Contamination	Water contamination can lead to crop loss and health risks. As a control measure, use water filtration systems, regularly test water quality, and establish emergency response protocols.
3	Power Outage	Power failure may halt essential operations, causing crop damage. To minimize potential impact, install backup generators, use energy-efficient systems, and have contingency plans in place.
4	Structural Hazards	Poor structural integrity (such as unstable racks or poor ventilation) can lead to physical injury or compromised growing conditions. To address this risk, use properly designed load-bearing structures, ensure good ventilation and airflow, and maintain a clean, organized workspace.
5	Operational Oversight Risk	Mistakes in monitoring nutrient levels, climate control, or equipment operation can lead to reduced yields or system inefficiencies. To reduce this risk, implement standardized operating procedures (SOPs), automated monitoring and alerts, and continuous staff training programs.



ESG IMPACT ASSESSMENT

Positive impacts

- Reuses up to 90% of water in closed-loop systems, preserving freshwater resources.
- Reduces land use by up to 97% and enables efficient urban food production.
- Eliminates chemical pesticides, reducing soil and water contamination and improving food safety.
- Shortens supply chains, significantly lowering transport-related CO_2 emissions and improving produce freshness.
- Enhances food security by ensuring year-round access to healthy, locally grown produce, including for underserved communities.
- Creates skilled jobs, promotes social inclusion, and ensures transparent ESG reporting and compliance.



Potential negative impacts

- High initial investment and operating costs due to advanced technology and energy consumption for lighting and climate control.
- Dependence on electricity may increase the carbon footprint if not powered by renewables.
- System failures (e.g., pump malfunction or nutrient imbalance) that could cause crop loss.

These aspects could be addressed through renewable energy integration, efficient climate and lighting management, preventive maintenance and automation systems, and gradual scaling to optimize operational and financial performance.

HOW DOES THIS PROJECT SUPPORT SERBIA'S AGRICULTURE & FOOD SECURITY CHALLENGES?

Serbia's growing demand for fresh, high-quality produce presents a significant market opportunity. This hydroponic farm project boosts food sustainability by:

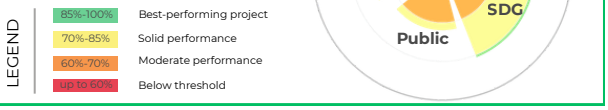
- ✔ Enabling **high-yield**, **year-round** vegetable and herb production in **controlled environments**.
- ✔ It **reduces reliance on traditional farming**, **preserves arable land**, and supplies **fresh** produce to urban and peri-urban markets.
- ✔ Creates opportunities for **long-term contracts** with retailers, HoReCa clients, and export partners.
- ✔ Designed for **growth**, the project can **scale** through additional units, technology licensing, and expanded distribution, offering investors a sustainable, impact-driven opportunity.

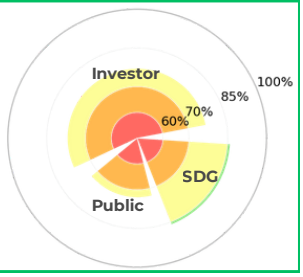
ORGANIC CROP PRODUCTION AND PROCESSING FACILITY

Aligned with IOA 2. Organic Agricultural Production and partially aligned with IOA 1. Fresh Fruit and Vegetable Primary Production

PROJECT SCORE

The project demonstrates **solid overall performance**, with the strongest results under the SDG perspective and the lowest under the public perspective.





MARKET POTENTIAL

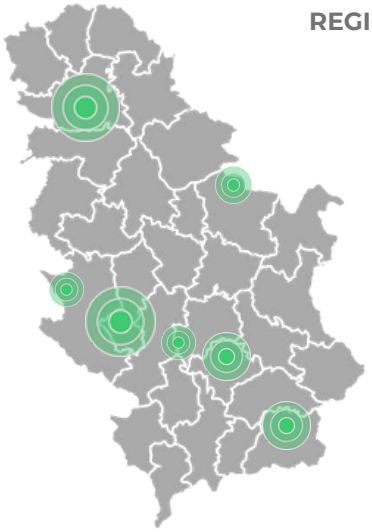
Serbia offers strong advantages for organic agriculture, with fertile land, a favorable climate, and a tradition in fruit, vegetable, and grain production. Its strategic location ensures access to EU, Middle Eastern, and Eurasian markets under CEFTA and preferential EU trade terms. The sector is **expanding but still underdeveloped**, with certified organic farming accounting for **less than 1%** of farmland, while Serbia has **over 5 million hectares of agricultural land in total**. In 2022, Serbia produced over **1.7 million tons** of vegetables, with tomatoes and peppers alone accounting for more than half of that volume, while exports of fresh and processed vegetables reached over **€200 million**, mainly directed to the EU. Most **premium organic produce is exported to high-value EU markets**, while the **domestic organic supply remains fragmented,** with increasing interest from retail chains, wholesalers, and food processors. This gap creates a compelling opportunity for investment in high-quality, ISO-certified production and processing facilities. By integrating cultivation, post-harvest handling, and processing, the project can deliver both fresh and processed organic products, meeting rising demand and establishing Serbia as a supplier of certified, environmentally responsible vegetables in the region. Additionally, the majority of organic producers in Serbia operate within cooperatives or group production models, facilitating certification and market access, which significantly reduces entry barriers for investors and enables rapid scaling of sourcing and distribution networks. **Government support** has been robust: in 2023, subsidies amounted to approximately 63,000 RSD (~€538) per hectare for organic farming, **around 2.5 times higher than for conventional** production, helping offset certification costs, lower yields, and higher input prices. In 2024, the maximum subsidy a beneficiary could receive for organic crop production in a single year was 2,520,000 RSD (~€21,515).

EXPORT DESTINATION primarily to Germany, the USA, the Netherlands, France, Austria and Italy

EXPORT VALUE around 50M EUR in 2024

SHARES OF ORGANIC FARMING fruits (33,4%) and grains (30,5%)

REGION



The most suitable region for this project is **Western Serbia** (e.g., Užice, Arilje, Ivanjica), **Šumadija** and **Southern Serbia** (e.g., Toplica, Pčinja) also show potential for organic vegetables and cereals.

SUCCESSFUL STORY

ITN Group is a Serbian company that has developed an integrated model for organic and sustainable food production, including cooling, packaging, and processing of fruits and vegetables. Processing more than 11,000 tonnes of berries annually, along with a range of vegetables under the All Fresco brand and private labels, ITN Group exports to the EU, Russia, the Middle East, and Asia, adhering to certifications such as HACCP, ISO 9001, BRC, IFS, SMETA, FDA, NOP, Halal, Kosher, GlobalGAP, Organic, and Walmart standards.
The company has invested in energy-efficient infrastructure, certification, and logistics, linking primary production with retail and export. By working with local growers and applying international standards, ITN demonstrates how investment in post-harvest capacity creates added value and long-term impact.
Others: Hipp GmbH & Co. (Germany), Driscoll's Organic (SAD), Alce Nero (Italy)

BUSINESS MODEL

The project entails the **construction of an ISO-certified organic production and processing facility**, equipped with energy-efficient machinery and packaging lines using biodegradable or recyclable materials. The facility will **integrate cultivation, post-harvest handling, and processing** of key crops such as raspberries, apples, plums, wheat, maize, tomatoes, and peppers, sourced from in-house production and certified organic and fair-trade growers. This approach combines direct production with partnerships, ensuring sufficient volumes and high-quality organic products.

Activities include completing the certification process, establishing a logistics network, and applying sustainable processing methods. Products will be marketed through retail, wholesale, export partnerships, and private-label arrangements. Value will be created through a transparent supply chain, compliance with environmental standards, and Serbia's position as a potential regional hub for traceable organic food.

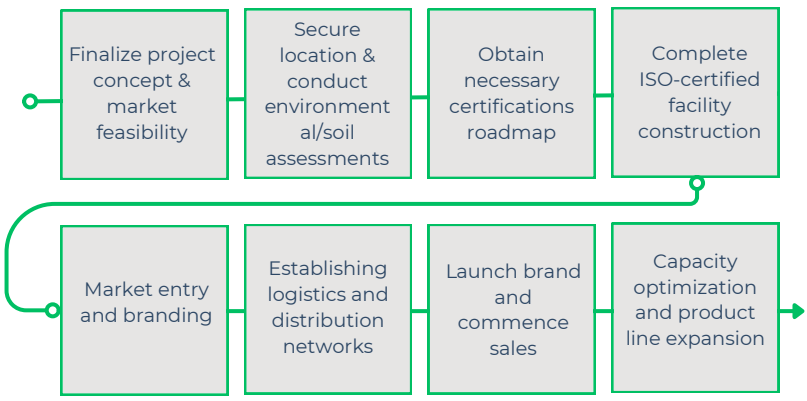
KEY NUMBERS

€1M-5M *CAPEX*

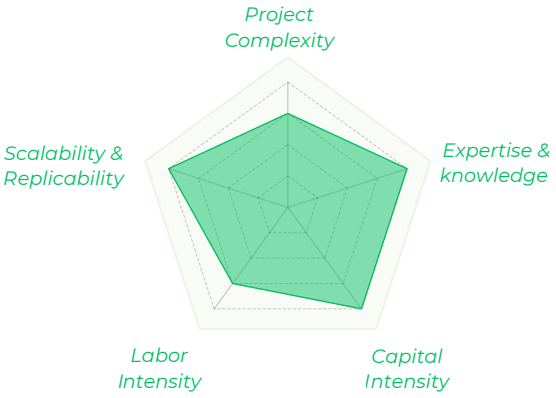
10%-15% *return on investment*

7-10 years *payback period*

CRITICAL SUCCESS FACTORS



PROJECT OVERVIEW



This project is **moderately complex**, as it includes multiple stages such as cultivation, processing, certification, and distribution, which require good coordination but not highly complex technology.

Specialized knowledge in organic farming, certification standards, and efficient processing and supply chain management is necessary.

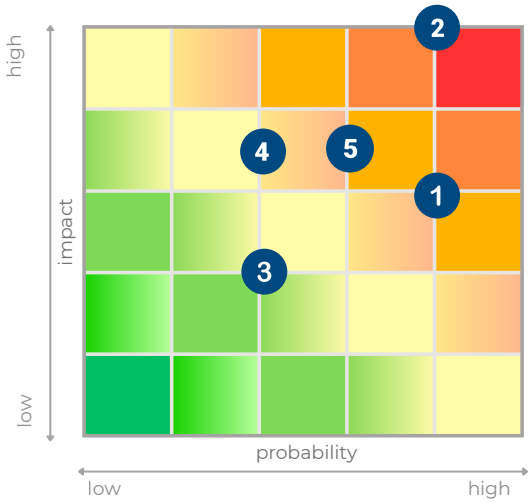
Significant upfront investment in infrastructure, equipment, and certification is required, with an expectation of long-term returns.

Moderate manual labor is needed, especially in cultivation and packaging, but processing can be optimized with machinery.

The model can be **expanded to other regions or increased in capacity** due to standardized processes and growing organic food demand.

RISK MATRIX

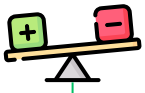
No.	Risk	Description
1	High Certification and Transition Costs	Producers face significant costs during the transition period when products cannot yet be labeled as organic. These expenses can deter small and medium farmers from entering the organic market.
2	Climate Change and Extreme Weather Events	Unpredictable weather conditions, such as droughts and heatwaves, negatively affect crop yields and product quality. To mitigate this risk, implement climate-resilient farming practices, diversify crops, and use weather monitoring systems.
3	Low Consumer Awareness	Consumers in Serbia are not sufficiently informed about the benefits of organic products, which limits market demand. Implementing targeted marketing and educational campaigns. should raise consumer awareness and demand.
4	Underutilized Irrigation Infrastructure	Despite the growth of organic farming, a lack of efficient irrigation systems limits production potential and crop yields. Invest in irrigation infrastructure and adopt water-efficient technologies to improve resilience.
5	Supply Chain Disruptions	Inefficient logistics, limited cold chain infrastructure, and fragmented suppliers can delay delivery and reduce product quality. To mitigate this risk develop reliable supply networks, invest in cold storage, and establish partnerships with trusted suppliers.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces GHG emissions by replacing synthetic fertilizers with organic inputs and enhancing soil carbon sequestration.
- Improves soil health, water retention, and biodiversity, strengthening long-term climate resilience.
- Uses energy-efficient machinery and biodegradable or recyclable packaging to lower environmental footprint.
- Creates rural employment opportunities, particularly for women, while promoting fair-trade principles and community well-being.
- Ensures transparency and traceability through ISO, organic, and fair-trade certifications, aligning with EU and global sustainability standards.



Potential negative impacts

- Higher production costs and lower short-term yields compared to conventional farming.
- Contamination from non-organic neighboring farms or supply chain partners.
- Energy use and waste generation during processing and packaging phases.

These aspects could be addressed through cooperative supply-chain management, buffer zones to prevent contamination, renewable energy use, efficient waste recycling, and productivity improvements supported by training and certification programs.

HOW DOES THIS PROJECT SUPPORT SERBIA'S TRANSITION TO SUSTAINABLE AGRICULTURE?

Serbia struggles with **low levels of certified organic agricultural production**, **limited processing capacity for organic products**, and **fragmented supply chains** that hinder consistent market supply—both domestically and for export. Additionally, many rural areas suffer from **high unemployment** and a **lack of economic opportunities tied to sustainable agriculture.** Conventional farming practices contribute to **soil degradation**, **biodiversity loss**, and **greenhouse gas emissions**, impacting long-term environmental health. By establishing an ISO-certified organic production and processing facility:

- ✔ This project directly tackles the problem of underdeveloped organic value chains, enabling increased production, improved quality, and reliable supply of organic products.
- ✔ It also promotes sustainable farming methods that preserve soil and biodiversity, reduces Serbia's environmental footprint, and generates employment and income in rural communities.
- ✔ Thus, it supports Serbia's transition toward a greener, more competitive, and socially inclusive agricultural sector.

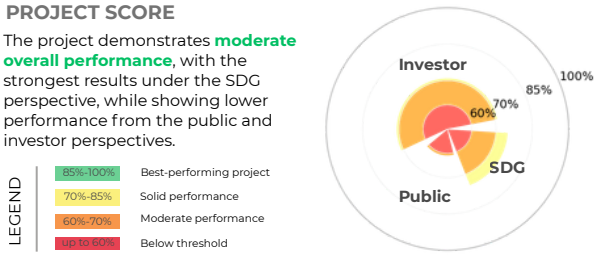
PASSIVE SOLAR GREENHOUSES FOR YEAR-ROUND GROWING

Aligned with IOA 1. Fresh Fruit and Vegetable Primary Production

IOA 3. Decentralized Solar Energy Generation

PROJECT SCORE

The project demonstrates **moderate overall performance**, with the strongest results under the SDG perspective, while showing lower performance from the public and investor perspectives.



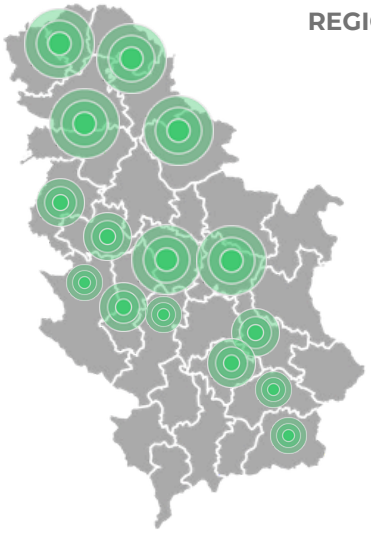
MARKET POTENTIAL

Serbia has a strong comparative advantage due to its **extensive agricultural base** (~3.24 million hectares of arable land) and **high solar irradiance** ranging from 1,200 to 1,550 kWh/m²/year, especially in the south and central regions. Combined with a dry continental climate and low-cost rural land, these conditions position passive solar greenhouses as an efficient solution for year-round vegetable production such as tomatoes, cucumbers, peppers, and lettuce.

Current deployment in Serbia remains very limited, with only scattered experimental or small-scale installations. Energy studies show that **traditional greenhouses in Serbia consume up to 50% of their energy for heating**, offering substantial opportunities for passive solar solutions to reduce costs.

Research and simulation studies in Serbia, including projects in Kragujevac combining solar systems and thermal storage, confirm that passive greenhouses can achieve **near zero-net-energy operation, providing both economic efficiency and resilience in agricultural production**.

REGION



Best suited for Vojvodina and central Serbia, especially flat areas with cold winters and strong solar radiation.

BUSINESS MODEL

Development and operation of well-insulated passive solar greenhouse designed with thermal mass and optimized geometry to retain heat naturally throughout the year.

On owned or leased land, the investor both finances and installs the greenhouse and directly oversees the year-round cultivation of high-demand vegetables such as tomatoes, cucumbers, peppers, and lettuce. Once scale is achieved, the investor can expand revenue by selling his know-how to other stakeholders.

Revenues are generated through sales to wholesalers, supermarket chains, HoReCa distributors, and local markets, with added value derived from lower energy costs and the premium margins of off-season production.

KEY NUMBERS

~€800K
CAPEX/ha

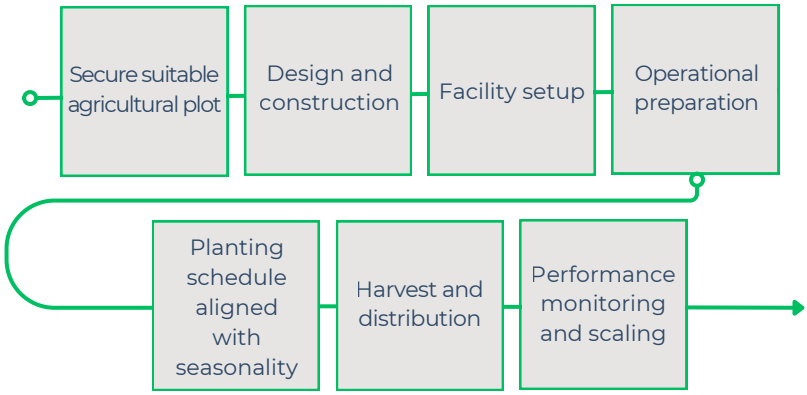
15%-25%
return on investment

4-7 years
payback period

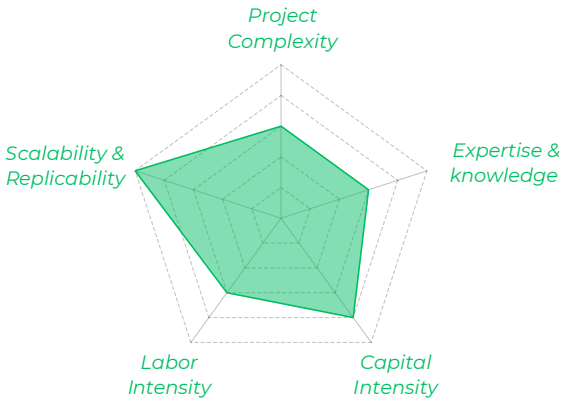
SUCCESSFUL STORY

In Serbia, **Agrikol Group** provides advanced greenhouse solutions, emphasizing energy efficiency and structural quality tailored to client needs. This local capacity shows that Serbia has the know-how to support advanced greenhouse projects, including passive solar models.
Comparable successes abroad highlight the potential of solar greenhouses: in Puglia, Italy, a 14,000 m² unit with amorphous silicon panels produces ~1.5 GWh annually while enabling year-round tomato cultivation, and in France, Sun'Agri's strawberry greenhouse integrates a 190kW smart-tracking system generating ~260 MWh per year while balancing yields and energy output.

PROJECTS MILESTONES



PROJECT OVERVIEW



Moderate complexity: requires balancing thermal design with agronomic planning to ensure stable year-round vegetable production.

Medium expertise: While passive design lowers energy needs, successful operations require agronomic expertise and skilled labor management to control input costs and maintain efficiency.

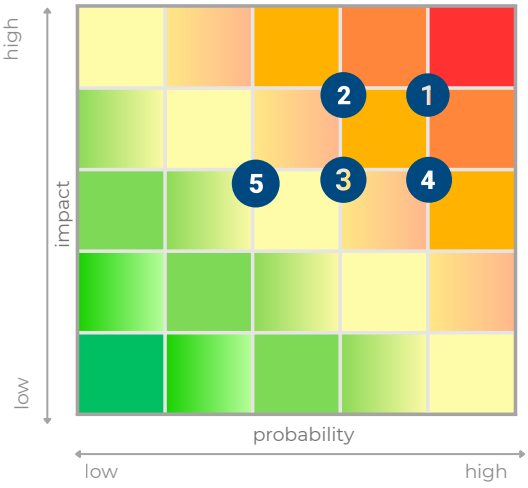
High upfront investment: significant CAPEX for greenhouse facilities, irrigation, and post-harvest infrastructure, offset by lower long-term energy costs.

Labor intensity: medium; workforce is needed for planting, harvesting, and packaging, with moderate technical oversight for greenhouse management.

Highly scalable and replicable: production can be expanded to additional hectares, with know-how transferable to other stakeholders once scale is achieved.

RISK MATRIX

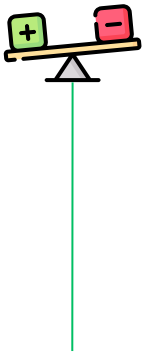
No.	Risk	Description
1	Market price volatility	Fluctuations in vegetable prices (tomatoes, peppers, cucumbers, lettuce) directly affect profitability, especially during seasonal oversupply. Diversification of sales channels and forward contracts to stabilize revenues.
2	Labor shortages or rising wage costs	Heavy reliance on manual labor makes operations vulnerable to workforce shortages and rising wages. Workforce planning and investment in training to secure reliable labor supply.
3	Climate variability	Passive design reduces energy needs, but extreme weather can still affect yields and require costly supplemental heating or cooling. Installation of backup heating/cooling and use of resilient crop varieties.
4	Plant diseases and pest outbreaks	Intensive greenhouse production increases vulnerability to rapid spread of pests and diseases, reducing yields and revenues. Implementation of integrated pest management and strict biosecurity protocols.
5	Supply chain disruptions	Dependence on imported materials such as greenhouse glazing, insulation, or agricultural inputs (seeds, fertilizers) exposes operations to delays, price spikes, or trade restrictions. Diversification of suppliers and maintenance of critical input stock reserves.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces fossil-based heating needs by 60–75% through passive solar design, cutting energy use and CO_2 emissions while improving climate resilience.
- Aligns with Serbia's NECP and EU sustainability goals, enhancing eligibility for climate-linked and green agricultural financing.
- Supports year-round food production, rural employment, and knowledge transfer, strengthening local economies.
- Promotes gender equality and entrepreneurship through targeted training, land access facilitation, and inclusive participation in agribusiness.
- Ensures transparent governance and accountability through integrated impact monitoring and stakeholder engagement, attracting institutional and donor confidence.



Potential negative impacts

- High upfront investment costs and technical complexity of construction and insulation systems.
- Material waste and inefficiencies if thermal performance is poorly implemented.
- Potential exclusion of smallholders without access to financing or technical expertise.

These aspects could be addressed through careful project design and cost optimization, use of sustainable construction materials, targeted farmer training, and partnerships with public and donor programs to ensure broad accessibility.

HOW DOES THIS PROJECT SUPPORT SERBIA'S TRANSITION TO SUSTAINABLE AGRICULTURE?

Serbia's agriculture remains vulnerable to climate change, energy volatility, and seasonal constraints, limiting year-round production and rural resilience.

Passive solar greenhouses address these challenges by enabling:

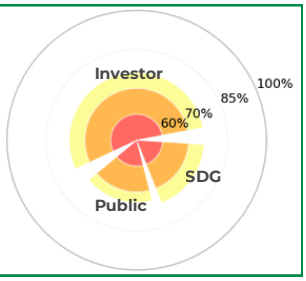
- ✔ **Decarbonization of farming**, replacing fossil-fuel heating with solar-based thermal design, and reducing energy use and emissions in food production.
- ✔ **Agricultural transformation**, extending growing seasons, stabilizing rural income, and supporting food self-sufficiency in line with national priorities under the EU Green Agenda.
- ✔ **Inclusive rural development**, creating employment and entrepreneurial opportunities, particularly for women, in underserved regions, while integrating energy and food systems through sustainable, low-tech innovation.

PCE DRAGLINE SYSTEM

Aligned with IOA 5. High-tech for Agriculture Production

PROJECT SCORE

The project demonstrates **solid overall performance**, with balanced results across all perspectives, although lower performance is observed under the public perspective.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Serbia has favorable agricultural conditions, especially in Vojvodina, with fertile soils, well-established farming traditions, and considerable livestock and crop production. **Each year, Serbia generates approximately 8.6 million m³ of liquid manure, a largely underutilized source of nutrients and organic matter**. The EU Nitrates Directive (which Serbia is in the process of transposing into national law) requires the identification of nitrate-vulnerable zones, adoption of action programmes, and limits on nitrogen application from manure.
Subsurface manure application methods (such as injection) are well recognized in scientific studies to **reduce ammonia emissions by 40-90% compared to surface spreading, thereby mitigating air pollution and nutrient losses.**
Economically, **farmers can gain both direct and indirect benefits** from adopting precision manure injection. Directly, more efficient use of nutrients means that less mineral nitrogen fertilizer is needed, **reducing input costs**. Indirectly, by complying with upcoming EU and national regulations (such as limits on nitrate leaching and mandatory subsurface application), farmers **avoid potential fines and maintain eligibility** for rural development support and EU funding programs. Experience from projects implemented in Serbia under World Bank, GEF, and IPARD initiatives shows that investments in improved manure management infrastructure not only reduce nitrogen and phosphorus runoff—protecting soil and water quality—but also build practical knowledge and technical capacity among farmers and agricultural advisors, fostering long-term, sustainable farming practices.

REGION

The project will focus on **Vojvodina**, a region with fertile soils and a high number of livestock farms producing liquid manure. Its farm density and infrastructure allow for practical implementation of precision manure injection services.

SUCCESSFUL STORY

I**n Serbia, Almex** has pioneered the use of PCE dragline manure injection equipment, introducing the country's first system for subsurface application of liquid manure. The company provides farmers with access to technology that enhances nutrient efficiency, reduces nitrogen and phosphorus runoff. Almex works as a **service provider,** combining equipment use with training and support.

In the United States, Bazooka Farmstar has established itself as a leading manufacturer of dragline manure application systems. Farmers adopting these systems have achieved significant reductions in ammonia emissions and soil compaction, alongside measurable cost savings. Studies show that return on investment can be completed within three years, due to reduced reliance on synthetic fertilizers and third-party application services. Bazooka relies on a **product-sales model**, supported by after-sales service and spare parts.

BUSINESS MODEL

The project involves the **implementation of a PCE dragline system**, procured from international manufacturers, for direct injection of liquid manure at depths of 3–15cm. The system improves nutrient uptake, reduces nitrogen and phosphorus runoff, and prevents soil compaction.
The value chain includes acquiring and maintaining the imported dragline equipment, installing and managing underground injection systems on farms, delivering precision manure application services, and collecting data to optimize nutrient use and soil health.
Main revenue comes from service contracts, with additional income from consultancy, seasonal maintenance packages, and aggregated farm data.
Investors provide capital for equipment purchase, infrastructure, and operational expansion, enabling regional coverage, staff training, and scaling of the service network. This service-based model allows farmers to access advanced technology without large upfront investments, enhances soil fertility and crop yields, and generates recurring revenue through a fully integrated precision manure application service.

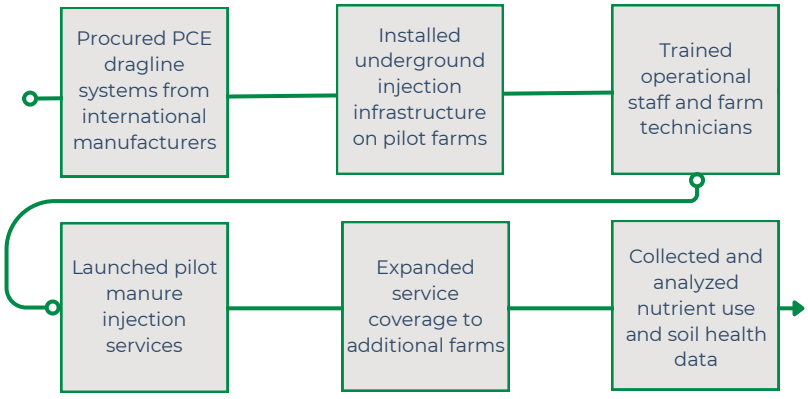
KEY NUMBERS

€ 1M-5M
CAPEX

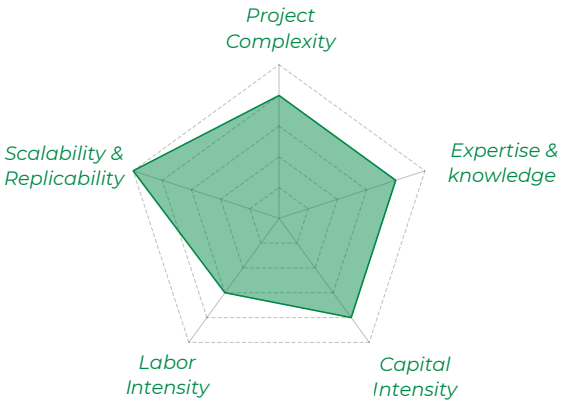
15%-25%
return on investment

4-7 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



Implementing precision manure injection requires coordination of equipment, underground infrastructure, farm schedules, and regulatory compliance, making it **moderately complex**.

The project needs technical **knowledge** of dragline systems, soil science, and nutrient management, along with operational and maintenance skills.

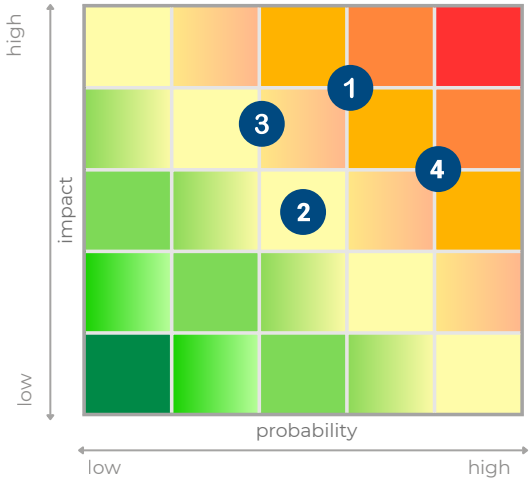
Initial investment in imported dragline systems and underground infrastructure is high, though service-based revenues can offset costs over time.

Service delivery requires trained operators and field technicians, but mechanization reduces overall **labor** compared to manual application.

Once established, the service model can be replicated across multiple farms and regions with similar soil and livestock conditions, making it **highly scalable.**

RISK MATRIX

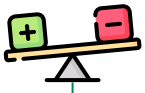
No.	Risk	Description
1	Technical failures	Malfunction or breakdown of dragline equipment could interrupt service. Preventive measures include regular maintenance schedules and staff training for rapid troubleshooting.
2	Farmer adoption	Farmers may be hesitant to adopt the new service-based model. Encourage uptake through demonstrations, pilot programs, and clear cost-benefit communication.
3	Regulatory changes	Unexpected changes in nitrate regulations or subsidies could affect demand. Minimize exposure by monitoring regulatory updates and engaging with local authorities to adapt services.
4	Weather conditions	Heavy rain or frozen soil can delay or prevent injection operations. Reduce impact by planning flexible service schedules and maintaining contingency periods for operations.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces greenhouse gas emissions and ammonia release by up to 90% compared to surface spreading, improving air quality and mitigating climate impact.
- Prevents nutrient runoff and protects watercourses, while enhancing soil health and nitrogen retention.
- Minimizes soil compaction through non-invasive manure application, preserving long-term land productivity.
- Creates rural employment in machinery operation, maintenance, and advisory services, supporting skill development and local economic growth.
- Improves living conditions in rural areas by reducing odors and air pollution, enhancing public health.
- Ensures compliance with EU Nitrates Directive and national agricultural regulations, promoting transparency and environmental accountability.



Potential negative impacts

- High upfront investment and maintenance costs for advanced dragline equipment.
- System malfunction or over-application leading to localized soil or water contamination.
- Limited adoption among small farms due to cost and training requirements.

These aspects could be addressed through targeted subsidies or leasing schemes, regular equipment maintenance and calibration, operator training, and data-driven monitoring to ensure safe and efficient nutrient management.

HOW DOES THIS PROJECT SUPPORT SERBIA'S TRANSITION TO SUSTAINABLE AGRICULTURE?

Serbia faces challenges with inefficient manure management, nutrient losses, and limited adoption of sustainable agricultural practices, which contribute to soil degradation, water pollution, and greenhouse gas emissions. Many rural areas lack modern farming technologies and economic opportunities linked to sustainable practices. By introducing a PCE dragline system for deep manure injection, this project addresses these issues by:

- ✔ Improving nutrient efficiency, preserving soil health, and reducing environmental impacts.
- ✔ Creating skilled employment opportunities and strengthens advisory services for farmers

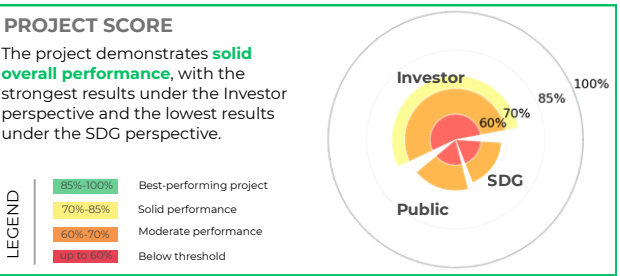
SDG addressed:

REGIONAL FERTILIZER PRODUCTION PLANT

Aligned with New Potential Area: Green Transition Minerals-to-Food Chain

PROJECT SCORE

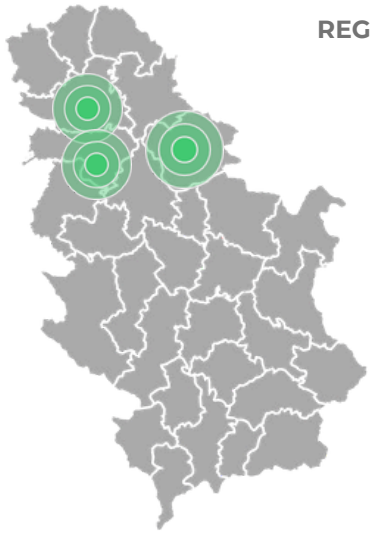
The project demonstrates **solid overall performance**, with the strongest results under the Investor perspective and the lowest results under the SDG perspective.



MARKET POTENTIAL

Serbia offers **strong market potential for regional fertilizer production** due to its extensive arable land of more than **3.4 million hectares, with over 60 percent dedicated to field crops** such as wheat, maize, soybean, and sunflower. These crops require consistent and intensive fertilization, creating a stable and sizable demand base. While domestic production exists, the market remains **heavily import-dependent,** with imports of fertilizers reaching approximately **EUR 287 million in 2024,** highlighting both Serbia's reliance on foreign supply and the opportunity for local manufacturing to enhance self-sufficiency. This reliance underscores both a vulnerability to external shocks and an opportunity for import substitution through local manufacturing. **Untapped potential lies in specialized fertilizers** such as liquid, foliar, and crop-specific blends, which are under-supplied, as well as in **strengthening distribution** to cooperatives and mid-sized farms that currently face higher costs and delayed access to products. Furthermore, Serbia's position allows **future export expansion** into surrounding Balkan markets with similar demand profiles. By combining competitive local production with compliance to EU environmental standards, Serbia can position itself as a regional hub, while also addressing untapped demand for specialized fertilizers tailored to soil and crop needs.

REGION



The **Vojvodina** region, particularly areas like **South Bačka** (centered around Novi Sad), **South Banat** (centered around Pančevo), and **Srem** (with towns such as Inđija, Sremska Mitrovica, and Ruma), stands out as an optimal choice.

SUCCESSFUL STORY

Fertil (Victoria Group, Pančevo): Fertil produces NPK and NP mineral fertilizers using compacting technology, supplying cooperatives and large farms in Serbia. The company focuses on granular fertilizers with flexible packaging and reliable domestic distribution. Fertil serves as a benchmark for efficient local production targeting mainstream crop needs.

Elixir Group (Šabac / Prahovo): Elixir is a leading producer of phosphoric acid and complex mineral fertilizers in Southeast Europe. Their specialized MAP/TMAP production focuses on high-quality, water-soluble fertilizers for both domestic and regional markets. Elixir exemplifies a high-capital, technology-driven approach to specialized fertilizer production.

HIP-Azotara (Pančevo): HIP-Azotara is Serbia's largest producer of nitrogen-based fertilizers, including ammonia, urea, and liquid N fertilizers. The company operates at large scale, serving both domestic and regional agricultural markets. Its operations highlight the challenges and scale of traditional, high-capital fertilizer production in Serbia.

Other examples in Serbia: Fertico (Niš), Agrounik (Belgrade)

BUSINESS MODEL

The project envisions the **establishment of a regional fertilizer production facility** capable of producing granular, liquid, and powder fertilizers tailored to local soil conditions and crop requirements. **The value chain** starts with raw material procurement, including nitrogen, phosphates, and potassium compounds, sourced from domestic and regional suppliers, followed by processing, quality control, packaging, and distribution to cooperatives, input retailers, and large farms.

The investor's role is to provide capital for plant construction, machinery, and working capital, while supporting strategic decisions and market entry. Investors may also facilitate access to regional networks and potential offtake agreements.

Revenue streams come from wholesale sales to cooperatives and input retailers, direct contracts with large farms, and premium pricing for specialized fertilizers. Additional revenue opportunities may arise from premium pricing for specialized fertilizers tailored to specific crops or soil conditions, as well as potential regional exports to neighboring Balkan markets. By combining local production, targeted product differentiation, and efficient distribution, the project aims to deliver both financial returns and increased supply resilience to the agricultural sector.

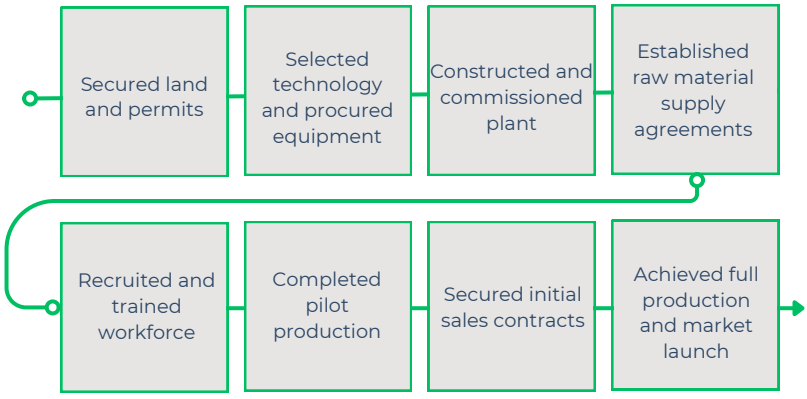
KEY NUMBERS

€15M-20M
CAPEX

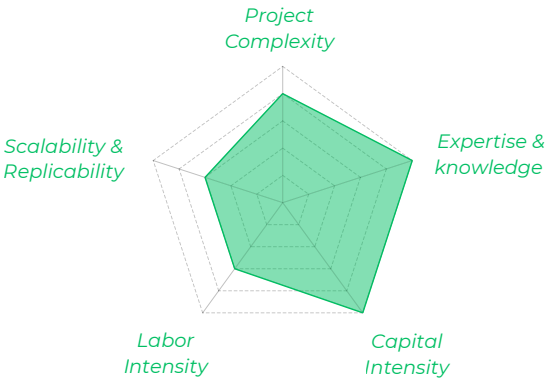
15%-25%
return on investment

4-7 years
payback period

CRITICAL SUCCESS FACTORS



PROJECT OVERVIEW



The project involves multiple production processes (granular, liquid, and powdered fertilizers), procurement logistics, regulatory compliance, and distribution networks. Coordinating these elements makes it **moderately to highly complex.**

Significant technical expertise is needed in chemical engineering, agronomy, quality control, and production management. Regulatory knowledge and supply chain management are also important.

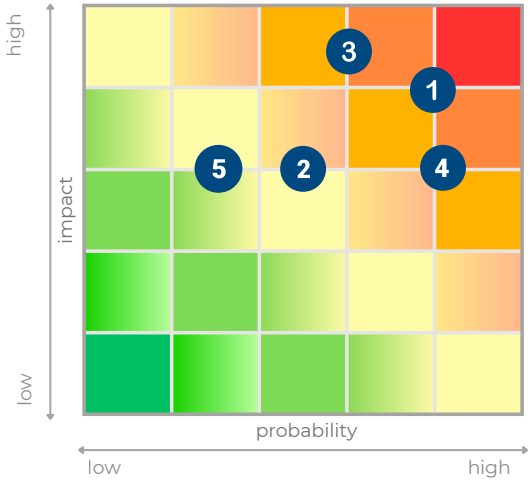
High upfront investment is needed for production facilities, equipment, storage, and packaging infrastructure.

While production is mechanized, **skilled labor** is needed for operation, maintenance, and quality control. Routine monitoring and logistics management also require a dedicated workforce.

The production model can be **scaled up** within Serbia and replicated in neighboring Balkan markets. However, site selection, regulatory compliance, and supply chain optimization are essential for successful replication.

RISK MATRIX

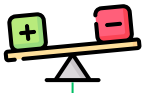
No.	Risk	Description
1	Raw Material Supply Disruption	Delays or shortages in sourcing raw materials (phosphates, nitrogen, potassium) from local or regional suppliers. To address this risk, prioritize local sourcing, Establish multiple supplier agreements, maintain buffer stocks.
2	Regulatory and Environmental Compliance Risk	Non-compliance with EU-aligned fertilizer regulations or environmental standards could delay production or incur fines. To mitigate this risk, mplement a dedicated compliance team and regular environmental audits to ensure adherence to all local and EU regulations.
3	Operational Risk	Equipment failure, production downtime, or workforce inefficiencies could disrupt output. To address this risk, establish preventive maintenance programs, staff training, and contingency plans to minimize production downtime.
4	Market Volatility and Price Fluctuations	Fertilizer prices are subject to global market trends, energy costs, and seasonal demand, which may impact profitability. To mitigate this risk, use product diversification, long-term contracts, and hedging strategies to reduce exposure to market fluctuations.
5	Environmental Pollution from Fertilizer Production	Improper handling or overuse of fertilizers may lead to soil and water contamination, affecting ecosystems and community health. To address this risk, employ specialized fertilizer formulations, optimized nutrient application, and sustainable production practices to minimize environmental impact.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces import-related emissions and risks by establishing local fertilizer production tailored to Serbia's soil and crop needs.
- Optimizes nutrient efficiency, lowering greenhouse gas emissions and minimizing soil and water contamination.
- Strengthens supply chain resilience and supports Serbia's energy transition and industrial decarbonization goals through membership in ASEII.
- Creates direct and indirect employment in rural areas, improving livelihoods and supporting local economic development.
- Ensures compliance with EU fertilizer regulations and Serbia's Law on Plant Nutrition and Soil Improvers, enhancing transparency and governance.



Potential negative impacts

- High energy consumption and potential air or wastewater pollution from production processes.
- Improper storage or handling of chemical inputs leading to localized contamination.
- Potential community concerns related to odor, emissions, or industrial safety.

These aspects could be addressed through energy-efficient technologies, strict environmental controls for emissions and waste, safe storage and handling protocols, and transparent community engagement ensuring compliance with EU and national environmental standards.

HOW DOES THIS PROJECT SUPPORT SERBIA'S FERTILIZER SELF-SUFFICIENCY?

Serbia relies heavily on imported fertilizers, while domestic production capacity for specialized mineral fertilizers remains limited. This dependence creates vulnerability to price volatility, supply chain disruptions, and delayed access to high-quality inputs for farmers, particularly cooperatives and mid-sized agricultural enterprises. Conventional fertilizer supply patterns also contribute to inefficiencies in nutrient management, impacting soil health, crop productivity, and long-term sustainability. By establishing a regional production facility for granular, liquid, and powdered fertilizers:

- ✔ This project directly addresses the gap in local fertilizer manufacturing, providing reliable, competitively priced inputs tailored to local soil and crop requirements.
- ✔ It enhances agricultural productivity, supports efficient nutrient use, and reduces Serbia's reliance on imports.
- ✔ At the same time, it generates skilled employment opportunities, strengthens regional supply chains, and fosters economic development in rural areas.
- ✔ Thus, it contributes to Serbia's transition toward a more self-sufficient, sustainable, and resilient agricultural sector.

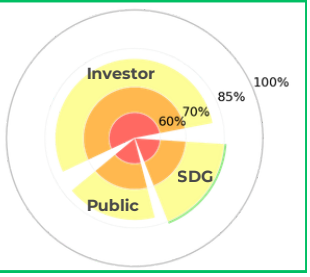
SDG addressed:

REGIONAL VEGETABLE PROCESSING FACILITY

Aligned with New Potential Area: Processing of Fruits and Vegetables

PROJECT SCORE

The project demonstrates **solid overall performance**, with consistent results across all perspectives, particularly strong under the SDG perspective.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Serbia's favorable climate and proximity to EU markets create strong export opportunities. The food processing industry accounts for about **one-third of the country's total processing sector**, with over **20,000 food businesses** operating in the country. In the context of vegetable processing, Serbia's sector is experiencing growth but still faces challenges, with **limited cold-chain infrastructure** leading to **high post-harvest losses of up to 30%.**

The **frozen and processed vegetable market in Serbia is valued at EUR 191 million in 2025**, with total vegetable revenues of **EUR 1.05 billion** and expected growth of **6% annually**. Despite producing **1.4 million tons of vegetables annually**, Serbia imports nearly **EUR 170 million** (≈ EUR 186 million) worth of vegetables, highlighting the potential for import substitution and export growth. Rising demand for frozen and processed vegetables, both domestically and across the EU, positions Serbia as a strategic hub for investment in modern processing and freezing facilities that can reduce losses, extend shelf life, and generate higher value-added products.

EXPORT frozen sweet cron, peas, peppers, fresh and processed cucumbers
IMPORT potatoes, tomatoes and beans

EXPORT DESTINATION primarily to Germany, Italy and Russia along with regional contries like Croatia, Montenegro and Bosnia and Herzegovina

REGION

The best location for a regional vegetable processing facility in Serbia is **Vojvodina**, with top sites including Bačka Palanka, Senta, Zrenjanin, and Pančevo, offering fertile land, skilled labor, and strong logistics for domestic and export markets.

BUSINESS MODEL

Establishment of a regional vegetable processing facility focused on sorting, freezing, packing, and exporting products.

The model includes establishing cold-chain infrastructure, integrating contract farming with local producers, implementing quality control systems, and securing logistics and distribution to both domestic and EU markets. **Main revenue streams** include sales of processed vegetables to retail chains and HoReCa clients.

By transforming fresh vegetables into standardized, high-quality products for retail, foodservice, and industry, the model enables better market access and pricing. Direct integration with farmers and efficient logistics reduces post-harvest losses and ensures a consistent supply.

KEY NUMBERS

€5M-8M *CAPEX*

15-25% *return on investment*

4-7 years *payback period*

SUCCESSFUL STORY

Friglo is a Serbian company based in Futog that operates a modern cold storage and vegetable processing facility. It works directly with farmers in Vojvodina to purchase, freeze, and pack vegetables such as sweet corn, peas, and mixed vegetables. Friglo supplies both domestic retail and hospitality sectors, as well as foreign markets, with private-label frozen products and industrial-grade ingredients. Friglo has created a stable business model that benefits local producers while ensuring year-round availability of high-quality processed vegetables.

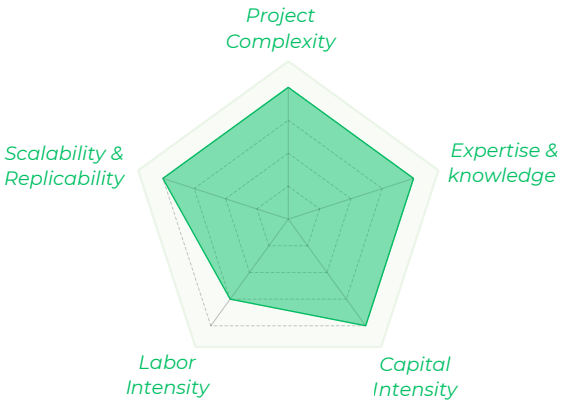
Other companies in Serbia: Mambikom Agrar Ltd. (Senta), Flora – MK Group (Bečej), Fortis Fruits (Senta), Z.A. Fruit d.o.o. (Valjevo)

Foreign companies: Ardo (Belgium), Hortex (Poland)

PROJECTS MILESTONES

1. Finalised project design, performed market analysis, selected location, and secured initial approvals
2. Obtained environmental permits, food safety certifications and any local regulatory approvals
3. Constructed the processing facility, installed freezing and sorting lines, and built cold storage capacity
4. Acquired processing, packaging, and quality control equipment, and integrate with production lines
5. Established contract farming, sourcing, and logistics
6. Recruited operational staff, technicians, and quality control personnel
7. Launched pilot operations and ensured compliance with quality standards
8. Reached full production capacity and commenced export to domestic and EU markets

PROJECT OVERVIEW



This project involves **complex coordination** of facility construction, cold-chain setup, contract farming, and international distribution, with strict regulatory compliance.

The project requires **a moderate level of manual and skilled labor,** including operational staff for sorting, freezing, packaging, quality control, and coordination with local farmers. Automation reduces some repetitive tasks, but human oversight remains essential.

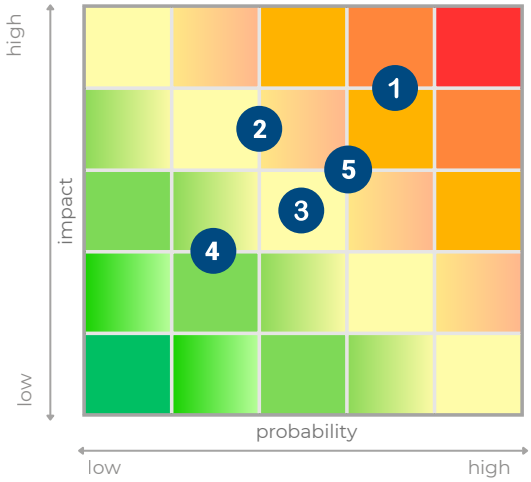
High initial investment needed for construction, freezing and packing technology, and cold storage infrastructure.

Project demands **specialists** in food technology, logistics, supply chain management, international trade, and quality certification.

The model can be **scaled** by adding new lines or capacities and replicated in other agricultural regions with similar agro-climatic conditions.

RISK MATRIX

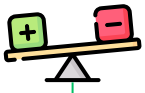
No.	Risk	Description
1	Supply Variability	Seasonal fluctuations and farmer non-compliance can disrupt the raw vegetable supply. To address this risk, establish multi-year contract farming agreements and diversify supplier base.
2	Cold Chain Breakdowns	Power outages or equipment failure can compromise frozen product quality. To mitigate this risk, invest in backup generators, preventive maintenance, and real-time monitoring systems.
3	Export Market Access	Changes in EU standards or logistics bottlenecks may limit entry to target markets. To mitigate this risk, align with EU food safety norms from the start and secure logistics partnerships with experienced exporters.
4	Currency Risk	Fluctuations in the Serbian dinar (RSD) against foreign currencies can increase costs for imported equipment, inputs, and logistics, impacting project profitability. Use forward contracts or hedging, keep part of revenues in foreign currency, and include price adjustment clauses in contracts.
5	Certification Delays	Obtaining HACCP, ISO, or export certifications may take longer than expected. To address this risk, initiate certification processes early and engage accredited consultants.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces post-harvest losses and associated CO_2 emissions through modern cold-chain and energy-efficient processing technologies.
- Optimizes water and energy use, minimizing resource consumption and operational costs.
- Enhances food security and market stability by integrating contract farming and ensuring stable income for local producers.
- Creates rural employment and supports inclusive economic growth through stronger farmer–industry cooperation.
- Ensures compliance with ISO 22000 and HACCP standards, improving food safety, quality, and export competitiveness.



Potential negative impacts

- High initial energy demand for refrigeration and processing systems.
- Potential generation of wastewater and organic waste requiring proper management.
- Overdependence of small farmers on single-buyer contracts.

These aspects could be addressed through renewable energy integration, efficient waste and wastewater treatment systems, and fair, transparent contracting models that ensure balanced partnerships with local farmers.

HOW DOES THIS PROJECT SUPPORT SERBIA'S VEGETABLE SECTOR AND EXPORT GROWTH?

Serbia faces challenges in vegetable production and processing, including outdated technologies, limited freezing and processing capacity, and fragmented supply chains that constrain consistent market supply—both domestically and for export. Additionally, many rural areas experience high unemployment and limited economic opportunities linked to agriculture. By establishing a modern regional vegetable processing facility, this project directly addresses these gaps, enabling:

- ✔ Increased processing volumes, improved product quality, and reliable supply of frozen and processed vegetables.
- ✔ The facility integrates contract farming with local producers, reduces post-harvest losses, extends shelf life, and strengthens export potential.
- ✔ It also generates employment, enhances value for farmers, and supports Serbia's competitiveness in regional and EU markets, contributing to a more resilient and sustainable food system.

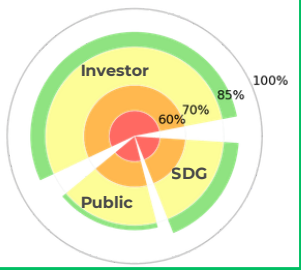
SDG addressed:

SCALING REGENERATIVE FARMING PRACTICES

Aligned with IOA 1. Fresh Fruit and Vegetable Primary Production
IOA 2. Organic Agricultural Production

PROJECT SCORE

The project demonstrates **excellent overall performance**, with outstanding results across all perspectives, particularly under the Investor and SDG perspectives.



LEGEND

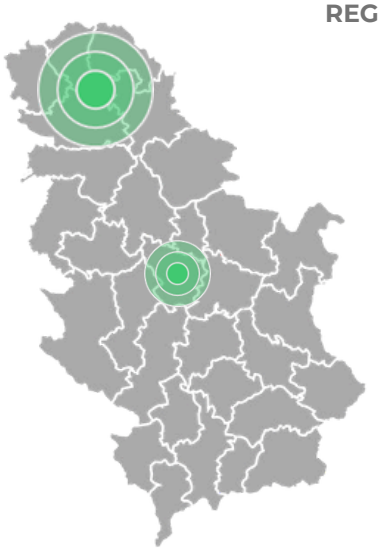
85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Serbia holds a strong comparative advantage for **regenerative agriculture** due to its **large share of arable land** (over 3.2 million hectares), **specialization in grains and oilseeds, and established export orientation.** Awareness and interest in regenerative practices are growing, yet **standardized solutions, independent measurement, and supporting service infrastructure remain limited**. Adoption is still in its early stages, concentrated in pilot projects, demonstration farms, and organized actors such as alliances and networks promoting and validating the benefits of cover crops, intercropping, and trap cropping. Most farms in Serbia are family-based structures with varying readiness for capital-intensive changes, while larger agribusinesses and buyers are showing growing interest driven by ESG pressures and the need for more stable yields. Policy support is expanding, with agricultural budgets and IPARD III funding enabling co-financing of innovative practices and equipment.

There is significant underexploited potential in scaling cover cropping, intercropping, trap cropping, and crop rotation across intensive crop systems (wheat, maize, sunflower, soybean), which can reduce input costs, enhance soil fertility, and improve climate resilience. In parallel, there is a major gap in MRV services (measurement, reporting, verification), tailored seed inputs, and ecosystem credit monetization, representing additional market opportunities. Finally, there is potential for rapid commercialization through partnerships with large buyers and food companies seeking sustainably sourced raw materials.

REGION



The project will focus on Vojvodina, and potentially Šumadija, as these regions combine extensive arable land, fertile soils, and a strong presence of commercial farms, making them ideal for scaling regenerative cropping practices.

SUCCESSFUL STORY

In USA, General Mills' regenerative agriculture pilot focuses on demonstration farms to generate data on yields, input savings, and ecosystem benefits. The harvested data supports ESG reporting and demonstrates sustainable sourcing to buyers, while farmers receive financial incentives to adopt regenerative practices. Unlike a direct product sales model, General Mills integrates these practices into its supply chain, using sustainably produced raw materials in its commercial products.

In Serbia, a non-profit organization called Donau Soja acts as a regional implementation partner of the EIT Food regenerative agriculture program. The company collaborates with farmers to adopt practices that restore soil health, increase biodiversity, and strengthen the resilience of the food system. The program includes training, technical support, and access to markets that value sustainable practices.

Nestlé Serbia has implemented a regenerative agriculture program in collaboration with local sunflower producers, such as Rača d.o.o. and Victoriaoil. This program includes the adoption of sustainable farming practices, such as cover crops and reduced tillage, aiming to preserve soil fertility and reduce carbon emissions. The company received the "Đorđe Vajfert" award for corporate social responsibility in this area.

These examples highlight approaches similar to the proposed "prove-and-scale" model, with the key difference that, in our case, the end buyer could be a large corporate partner, such as Nestlé.

BUSINESS MODEL

Establish a hybrid "prove-and-scale" model, where the investment is focused on four interconnected activities that, together, create value and measurable impact.

1. Project-field portfolio and demonstration blocks. The investor establishes and maintains pilot research plots (recommended 30–100 ha per pilot) with control and treatment units applying combinations of intercropping, relay systems, cover crops, trap strips, and conservation tillage. These fields provide reliable public data on yields, input savings, and ecosystem benefits, which are key for buyer negotiations.

2. Production-distribution portfolio of inputs and equipment. Investor supports production or contracting of specialized seeds for cover crops and trap crops, biological input formulations (microbial inoculants, biostimulants), and service equipment such as intercropping/no-till seeders for regenerative practices through an asset-light model with existing producers. Focus is on storage, quality control, procurement, and supply chain guarantees.

3. Professional services & MRV packages which cover agronomy consulting, lab testing, digital monitoring, and MRV/ESG reporting, generating revenue via per-hectare contracts, monitoring subscriptions, and verified report fees, and licensing of digital monitoring tools or agronomy protocols for scalability and know-how transfer.

4. Transition incentives and revenue sharing include providing upfront incentives and financing to farmers to support the transition to regenerative practices such as cover cropping, while capturing value from cost savings, premium prices, and ecosystem service credits. Investors secure returns through revenue-sharing and long-term buyer agreements.

Revenues come from input/equipment sales, consulting and MRV services, partnership agreements, and carbon/ecosystem credits. Investor funds CAPEX for demos and MVP, later monetizing through operations and financial instruments.

KEY NUMBERS

€1M-2.5M
CAPEX

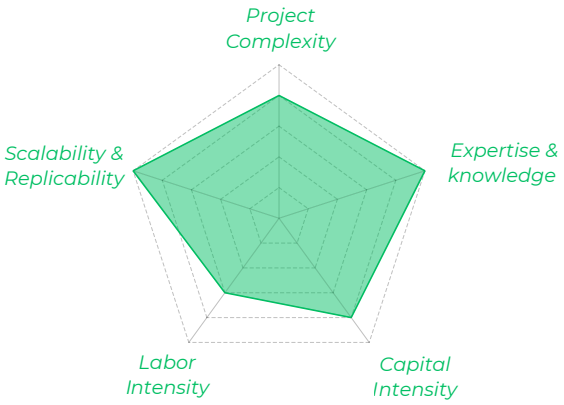
>25%
return on investment

≤4 years
payback period

PROJECTS MILESTONES

- Selected demonstration plot sites
- Obtained all necessary regulatory approvals and organic certifications.
- Established pilot fields with control and treated units
- Implemented regenerative cropping practices
- Deployed input and equipment portfolio and launched MRV/consulting services.
- Trained farmers and agribusiness partners on regenerative techniques
- Secured first commercial contracts with large farms and off-takers
- Scaled operations and partnerships

PROJECT OVERVIEW



The project involves **multiple interconnected activities** (demonstration plots, input production, MRV services, revenue sharing), requiring careful coordination and management.

High-level agronomic, **environmental**, and **technical expertise** is needed for regenerative practices, MRV systems, and farm consulting.

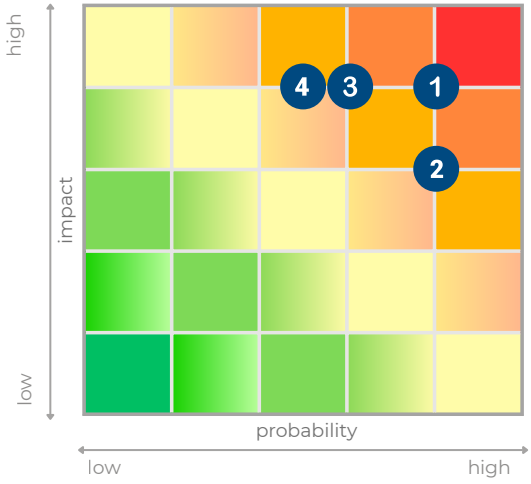
Initial investment is significant for land, equipment, and lab setup, but "asset-light" partnerships and leveraging existing suppliers help mitigate some costs.

Moderate labor is needed for field operations and demonstration plots, but digital monitoring and consulting reduce direct manual work.

Once proven, the model can be **scaled across multiple regions** and **replicated with other crops** or **in neighboring countries**, especially via partnerships with large producers and off-takers

RISK MATRIX

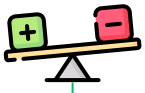
No.	Risk	Description
1	Climate Change	Unpredictable weather or extreme events could reduce yields and affect trial plots. To mitigate this risk, select multiple pilot locations, use resilient cropping systems, and monitor weather patterns for adaptive management
2	Slow adoption by family farms	Small, family-owned farms may be hesitant to adopt capital-intensive regenerative practices, and some farmers may be reluctant to try new seeds, biological inputs, or MRV services. The project addresses this by focusing initial engagement on large producers and off-takers, while providing demonstration plots, training, and incentives to encourage adoption and reduce perceived risk
3	Acquisition and regulatory delays	Complex land tenure, zoning restrictions, or prolonged certification processes could postpone project initiation and elevate upfront costs. As response to this risk, engage legal and regulatory advisors early, conduct comprehensive due diligence, and secure pre-approvals or long-term leases to ensure timely access to land and necessary certifications.
4	Operational and supply chain risks	Delays in input production, logistics, or equipment availability could impact scaling. Establish multiple sourcing channels and develop contingency plans to ensure timely delivery of inputs and equipment



ESG IMPACT ASSESSMENT

Positive impacts

- Restores soil fertility, enhances biodiversity, and improves water retention through regenerative practices such as cover cropping, intercropping, and conservation tillage.
- Reduces dependence on synthetic fertilizers and pesticides, lowering emissions and improving long-term soil health.
- Strengthens farmer resilience and income stability through training, demonstration plots, and access to transition incentives.
- Generates data for transparent monitoring, reporting, and verification (MRV), aligning with EU Green Agenda and Serbia's Green Bond Framework.
- Supports inclusive rural growth by creating new agronomy, consulting, and monitoring jobs and fostering collaboration across the value chain.



Potential negative impacts

- Higher short-term costs and lower yields during transition to regenerative practices.
- Limited farmer participation due to a lack of technical knowledge or access to finance.
- Potential data management or verification inconsistencies within MRV systems.

These aspects could be addressed through capacity-building programs, transition financing and incentives, digitalized MRV platforms, and partnerships with research and agricultural extension services to ensure adoption, data accuracy, and long-term economic viability.

HOW DOES THIS PROJECT SUPPORT THE ADOPTION OF REGENERATIVE CROPPING PRACTICES IN SERBIA?

This project directly tackles some of Serbia's most pressing agricultural challenges: **widespread soil degradation, decreasing humus levels, and increasing vulnerability to climate extremes**. Conventional practices, such as monoculture cropping and intensive tillage, have left large areas of arable land, especially in Vojvodina, highly susceptible to erosion and nutrient loss. By implementing regenerative practices such as cover cropping, intercropping, and trap cropping, this project:

- ✔ Enables farmers and agribusinesses to restore soil fertility, enhance biodiversity, and improve water retention.
- ✔ Reduces dependency on chemical inputs and lowers production costs over time.
- ✔ Increases crop resilience and stabilizes yields under variable climate conditions.
- ✔ Facilitates access to premium markets through sustainable and verifiable practices.
- ✔ Supports carbon sequestration and contributes to measurable ESG and climate goals.

TECHNOLOGY AND COMMUNICATION

- Autonomous Livestock Management System
- Blockchain Farm-to-Fork Traceability System
- Drone Manufacturing for Agriculture
- Modular Agriculture Robot
- Smart Irrigation Systems
- Water Leak Detection Sensors

AUTONOMOUS LIVESTOCK MANAGEMENT SYSTEM

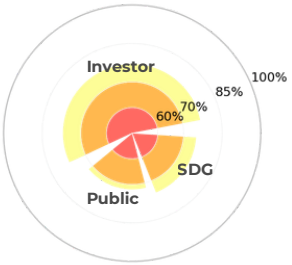
Aligned with IOA 5. High-tech for Agriculture Production

PROJECT SCORE

The project demonstrates **solid overall performance**, with balanced results across all perspectives, with the public and SDG perspectives positioned just above the orange scope.

LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold



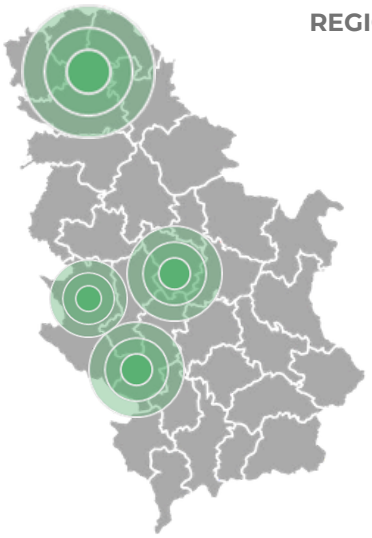
MARKET POTENTIAL

In December 2024, Serbia counted about 699 thousand cattle, 2.3 million pigs, 1.8 million sheep, and 14.8 million poultry. The number of cattle continues to decline. This has led to a drop in cow's milk production, which is 2.5% lower than in the previous year and almost 10% below the five-year average. Livestock farming is marked by regional concentration, with cattle mostly in Šumadija and Western Serbia and pigs in Vojvodina, and by a highly fragmented structure of over 313 thousand of agricultural holdings engaged in livestock production.

The technological level of Serbian livestock farming remains modest. Most farms rely on traditional methods, with limited automation and outdated housing systems. Advanced digital technologies, including artificial intelligence combined with data from the internet and other sources, can significantly enhance farm operations, stimulate innovation, and transform food production while considering the environment, climate, and people. However, the adoption of digital tools in agriculture and the broader food system remains slow. Perceived high costs, lack of digital skills and trust, limited tailored solutions, and connectivity challenges are the main barriers preventing farmers from fully embracing digitalization, which creates **productivity gaps**.

The EU's **Common Agricultural Policy (CAP) 2023–2027** highlights digitalization and innovation as key objectives to modernize agriculture through knowledge sharing, research, and digital tools. These priorities are highly relevant for Serbia, where adoption is still limited, underscoring the need for affordable and practical solutions to improve productivity and long-term competitiveness in livestock farming. Taken together, the size of the livestock sector, its fragmented structure, low technological base, and the strategic importance of digitalization point to a **strong market potential** for solutions that increase productivity, cost efficiency, and sustainability in livestock management.

REGION



The most suitable regions for this solution are Šumadija and Western Serbia, where cattle and dairy farming dominate, and Vojvodina, which is the center of pig farming and fattening production.

SUCCESSFUL STORY

CattleEye, a UK-based agri-tech company, created an AI-powered monitoring system that uses cameras and software to detect lameness and assess cow condition without physical sensors. Farmers receive real-time alerts and trend data through a simple app.

The system is now monitoring over 150,000 cows worldwide, cutting severe lameness by up to 75%, lowering veterinary costs, and boosting milk yields. Its success lies in combining affordable hardware with AI insights that directly improve profitability and animal welfare.

In Serbia, comparable example is **Agroprodukt Šinković**, a leading poultry producer, which implemented the poultryNET system to improve animal welfare and farm efficiency. Using AI-powered cameras and digital monitoring, the company reduced bird mortality by around 20% and improved feed efficiency by 2%, while ensuring continuous oversight without constant on-site presence. This shows that Serbian farms are open to adopting AI monitoring technologies, even if currently applied only to poultry.

BUSINESS MODEL

Development of a livestock monitoring solution that combines artificial intelligence (AI)-enabled smart cameras with a mobile application for farmers. The project focuses on the **development of proprietary AI software**, which is embedded into suitable off-the-shelf cameras to track animal movement, feeding patterns, and health indicators, while the mobile app provides farmers with real-time alerts and insights.

The solution **creates value** by improving productivity, reducing animal losses, and optimization of farm management without requiring complex or expensive infrastructure. Primary users are small and medium farms seeking affordable monitoring, while large farms require broader integration

The investor's role is to finance the development of AI software and mobile application, integrate the solution into monitoring devices, and secure supply agreements with equipment providers. The investor also conducts promotional activities and sales of devices with integrated AI software.

Revenues come from the one-time sale of smart monitoring devices with integrated AI software. Sales are realized through direct contracts with farms, as well as agricultural equipment retailers and online shops for wider market access.

KEY NUMBERS

<€1M
CAPEX

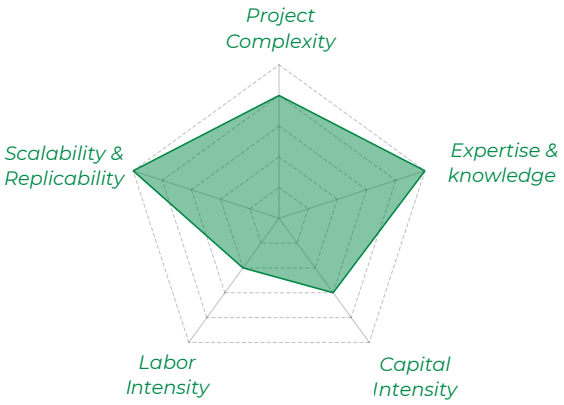
>25%
return on investment

≤4 years
payback period

PROJECT MILESTONES

- Secured supply agreements for smart cameras
- Developed proprietary AI monitoring software
- Integrated AI solution into camera devices
- Developed mobile app or platform for farmers that connects to monitoring devices
- Validated system performance in farm trials
- Marketing and promotional activities
- Commercial launch of the device
- After-sales support to customers

PROJECT OVERVIEW



Project complexity: Integration of AI software, camera devices, and a farmer-friendly mobile app makes the project technically advanced but still feasible with existing technologies.

The project requires **strong expertise** in artificial intelligence, livestock management, and IoT integration is essential to ensure accurate monitoring and reliable system performance.

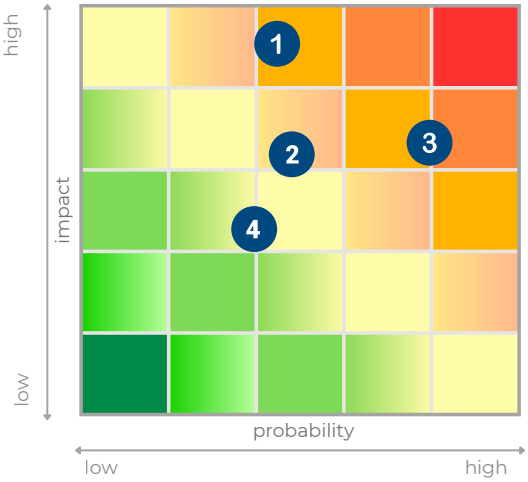
Capital intensity: The project requires moderate to low investment, primarily in software development and integration.

Labor intensity: Once deployed, the system reduces the need for manual animal supervision, making labor requirements relatively low compared to traditional livestock management.

Scalability: The solution can be replicated across farms of different sizes and livestock types, offering strong potential for expansion in Serbia and other regional markets.

RISK MATRIX

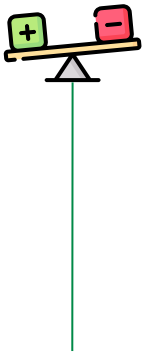
No.	Risk	Description
1	Software Development Risk	Developing proprietary AI software that reliably detects animal behavior is complex and may require more time and resources than planned. Use of phased development with early prototypes and validation on pilot datasets can reduce the risk
2	Hardware Compatibility Risk	The software may not integrate smoothly with all camera models or IoT devices available on the market. Focus on widely available camera standards and test across multiple suppliers can reduce the risk.
3	Technology Adoption Risk	Farmers may hesitate to adopt AI-based solutions due to lack of digital skills or skepticism. Additionally, some farmers may perceive the solution as too costly compared to traditional practices. Mitigation measures include simple design of mobile apps and promotional activities to highlight benefits of the solution.
4	Hardware Supply Risk	Delays or shortages in sourcing compatible cameras could slow project rollout. Securing of long-term agreements with and diversification of suppliers can ensure stable supply.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces environmental footprint of livestock farming through real-time monitoring of animal health, feeding, and movement.
- Enables early illness detection and optimized feeding, reducing antibiotic use, feed waste, and mortality rates.
- Improves animal welfare and transparency in production, strengthening consumer trust.
- Decreases water and energy use through efficient resource management.
- Promotes digital inclusion and skills among small farmers via affordable, user-friendly technology.
- Creates opportunities for training and employment in the agri-tech sector, supporting rural resilience.
- Aligns with national and EU digitalization goals in agriculture.



Potential negative impacts

- Increased energy use and electronic waste from AI and IoT devices.
- Financial and digital skill gaps could disadvantage small farmers.
- Continuous data collection raises privacy and cybersecurity concerns.

These aspects could be addressed through energy-efficient equipment selection, responsible disposal of electronic components, targeted capacity-building programs for small farmers, and strict application of data protection and cybersecurity standards.

HOW DOES THIS PROJECT SUPPORT DIGITALIZATION OF AGRICULTURE IN SERBIA?

Serbia has a low level of digitalization in agriculture, particularly in livestock farming, where most farms still rely on traditional methods and limited automation.

The project addresses these challenges by:

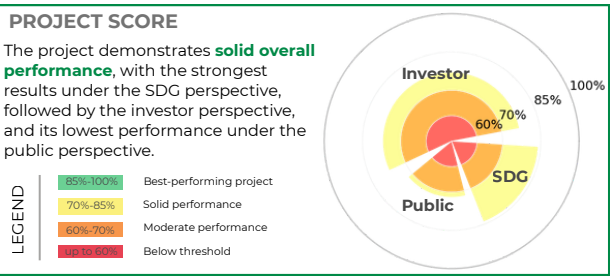
- ✔ **Providing affordable AI-enabled monitoring devices** and a mobile application that deliver real-time insights into animal health, feeding, and movement.
- ✔ **Empowering small and medium farms**, by offering scale-neutral digital tools accessible even to fragmented and low-tech agricultural holdings.
- ✔ **Improving productivity and cost efficiency of farms,** through early detection of health and feeding issues that reduce losses and optimize resource use.

BLOCKCHAIN FARM-TO-FORK TRACEABILITY SYSTEM

Aligned with IOA 6. Sophisticated Software Solutions

PROJECT SCORE

The project demonstrates **solid overall performance**, with the strongest results under the SDG perspective, followed by the investor perspective, and its lowest performance under the public perspective.



MARKET POTENTIAL

Serbia is a highly agricultural country, with **approximately 3.24 million hectares of utilized agricultural land, covering about 36.6% of the country's territory.** The sector contributes **6–7% to Serbia's GDP**, highlighting its economic significance**. Small and medium-sized producers dominate the sector, creating a clear demand for affordable, scalable traceability solutions that help meet rising market and regulatory requirements.** In 2024, Serbia exported agricultural and food products worth **€4.5 billion**, constituting **more than one-fifth of the country's total exports**. This growth underscores the sector's increasing competitiveness and the opportunity for traceability systems to support market access and quality assurance.
Despite this success, **advanced digital traceability systems, particularly blockchain-based solutions, remain rare, leaving considerable space for further growth and innovation.** Significant gaps exist across the value chain. **Postharvest losses** in fruits and vegetables are estimated at **30–40%** due to inadequate storage, transportation, and handling. Approximately **247,000 tonnes of edible food are wasted annually in Serbia, including over 40,000 tonnes in the commercial sector alone** (restaurants, retail, hotels, and schools).

These inefficiencies highlight the need for better monitoring, digital record-keeping, and traceability solutions. The untapped potential lies in the introduction of scalable digital traceability infrastructure, including blockchain nodes, IoT-enabled sensors at farms, distribution centers, and retail, and secure data platforms. Export-oriented producers face increasing demands from EU and global markets for verifiable proof of product quality, origin, and safety, creating space for blockchain solutions to bridge this gap. High-value segments such as organic and premium food production are expanding but often lack robust traceability tools, which limits consumer trust and market access.

REGION

The best regionis **Vojvodina**, due to its high concentration of farms, diverse crop and livestock production, and good digital infrastructure, making it ideal for piloting and scaling the system. Secondary deployment could target **Central Serbia** for high-value fruits and vegetables.

BUSINESS MODEL

The Blockchain Farm-to-Fork Traceability System digitizes and immutably records every stage of the agri-food supply chain, from farm to retail or export, ensuring full transparency, compliance, and fraud prevention. The platform creates value by integrating food waste reduction and resource optimization into every step:
Producers/Farmers: Verify product origin, track harvest quantities, and optimize distribution to minimize surplus and spoilage. Blockchain alerts help redirect potential excess to processing or secondary markets. **Distributors:** Optimize logistics based on real-time data, ensuring timely delivery and reducing losses in transit. Transparent storage and temperature records reduce postharvest waste. **Retailers/Restaurants:** Monitor inventory and expiry dates in real time, enabling precise stock management and proactive redirection of products nearing end-of-life to food processing or donation channels. **Food Waste Management Companies:** Access verified data to efficiently collect and process surplus food into biogas, compost, or other sustainable outputs, reducing landfill use and associated CO_2 emissions. **Consumers:** Build trust in product authenticity, quality, and sustainability practices, knowing that every stage of the supply chain is transparent and accountable. **Revenue** is generated through a scalable mix of subscription fees for producers, premium licensing for exporters and retailers, and data analytics services for regulators and industry stakeholders. **The investor's role** is to finance and enable the deployment and maintenance of digital traceability infrastructure—such as blockchain nodes, IoT-enabled farm and distribution sensors, and secure data platforms—ensuring the system's scalability, interoperability, and long-term adoption across supply chains, while unlocking value through enhanced waste reduction, environmental impact mitigation, and supply chain transparency.

KEY NUMBERS

<€1M
CAPEX

≥25%
return on investment

≤4 years
payback period

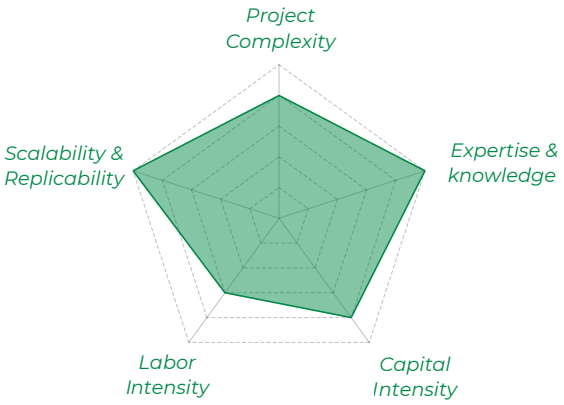
SUCCESSFUL STORY

The WASTELESS project leverages blockchain to track and verify the production, distribution, and consumption of food products, aiming to reduce waste. By providing real-time data, the system helps stakeholders make informed decisions, minimizing surplus and losses.
Nestlé employs IBM's Food Trust blockchain to trace products like Mousline purée and Zoégas coffee. This transparency allows consumers to verify product origins, ensuring quality and reducing waste by facilitating better demand forecasting and inventory management.
Silal Fresh has implemented a blockchain solution that provides consumers with detailed information about their food's journey. This transparency helps identify and address delays in deliveries, improving satisfaction and reducing spoilage.
In Serbia, Plate by Plate (UNDP) uses digital traceability to manage food donations efficiently, demonstrating demand for transparent, data-driven platforms. The platform allows humanitarian organizations to access real-time information about available food donations from retail stores.

PROJECT MILESTONES

- Defined project scope, identified key stakeholders, and secured initial investor commitment
- Developed blockchain platform design, integrated IoT sensors, and established data security and interoperability framework
- Implemented blockchain and IoT sensors on selected farms, tracked harvest and origin, and verified system functionality
- Extended platform to distributors, enabled real-time logistics monitoring, and optimized storage conditions and routing
- Dashboards and apps launched for management inventory and authenticity tracking
- Connected food waste processors, provided verified data for efficient collection, processing, and CO_2 emission reduction
- Executed end-to-end testing, optimized processes, ensured scalability, and refined analytics for regulators and stakeholders
- Subscription/ licensing model rolled out and adoption expanded

PROJECT OVERVIEW



The project involves integrating blockchain, IoT sensors, and data analytics across multiple supply chain stages, requiring coordination among diverse stakeholders, which makes it **moderately to highly complex.**

Expertise in blockchain development, agri-food supply chains, IoT, data security, and regulatory compliance is essential, demanding a **highly skilled multidisciplinary team.**

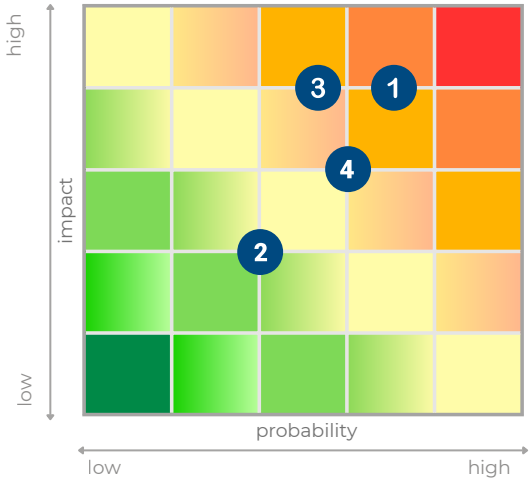
Significant upfront investment is needed for infrastructure deployment, IoT devices, secure servers, and software development, though operational costs decrease after scaling.

While the platform automates many processes, initial setup, integration with producers, distributors, and retailers, and ongoing support require **moderate labor input.**

Once implemented, the platform can be **scaled** to additional regions, crops, or countries, and replicated across different agri-food chains with relatively low incremental cost, offering high growth potential.

RISK MATRIX

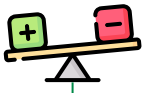
No.	Risk	Description
1	Technology Adoption Risk	Stakeholders (farmers, distributors, retailers) may be slow to adopt blockchain and IoT systems. Mitigation strategy is to provide training programs, user-friendly interfaces, and demonstrate clear ROI.
2	Data Security and Privacy Risk	Sensitive supply chain data may be vulnerable to breaches or unauthorized access. To address this problem implement end-to-end encryption, multi-layer authentication, and compliance with data protection regulations. Regular security audits.
3	Operational and Integration Risk	Difficulties in integrating the platform with existing logistics, inventory, and ERP systems. Develop standardized APIs, phased rollouts, and provide technical support for integration. Pilot testing with selected partners.
4	Financial Risk	The project requires significant upfront investment, and slower-than-expected adoption by supply chain participants could delay return on investment. Implement phased funding, secure strategic partnerships, and generate early revenue through subscription and licensing models.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces food waste and associated CO_2 emissions by improving tracking, inventory management, and logistics efficiency across the supply chain.
- Optimizes use of water, energy, and fertilizers through real-time monitoring, reducing unnecessary production and resource depletion.
- Strengthens food safety, quality, and traceability, increasing consumer trust and enabling small producers to access export markets.
- Enhances social inclusion and food security by facilitating surplus redistribution to donation and humanitarian programs.
- Promotes transparent governance and accountability through immutable blockchain records, minimizing fraud and ensuring compliance with national and international standards.



Potential negative impacts

- High initial costs and energy consumption associated with blockchain infrastructure and data storage.
- Limited digital literacy or access among small farmers, potentially restricting adoption.
- Data privacy, cybersecurity, or interoperability between systems.

These aspects could be addressed through renewable-powered data centers, digital training and inclusion programs for farmers, and robust cybersecurity and interoperability frameworks ensuring secure and accessible platform operation.

HOW DOES THIS PROJECT STRENGTHEN SERBIA'S FOOD SUPPLY CHAIN TRANSPARENCY AND TRACEABILITY?

This project directly supports Serbia in addressing a critical challenge in the agri-food sector – **the lack of transparency and traceability across the entire supply chain.** Many farms, distributors, and retailers currently operate with limited digital oversight, leading to inefficiencies, food losses, and difficulties in ensuring compliance with quality and safety standards. By introducing a Blockchain Farm-to-Fork Traceability System:

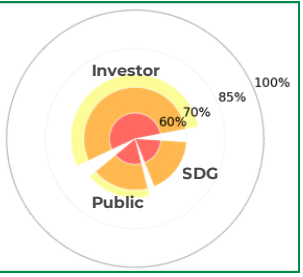
- ✔ The project enables producers, distributors, retailers, and waste management companies to digitally record and verify every stage of food production and distribution. This ensures product authenticity, optimizes logistics, reduces surplus and spoilage, and facilitates sustainable waste management.
- ✔ In doing so, the project accelerates the digital transformation of Serbian agriculture, strengthens trust among consumers and supply chain partners, aligns with EU food safety and sustainability standards, and enhances Serbia's capacity to deliver high-quality, traceable, and environmentally responsible food products to domestic and international markets.

DRONE MANUFACTURING FOR AGRICULTURE

Aligned with IOA 5. High-tech for Agriculture Production

PROJECT SCORE

The project demonstrates **solid overall performance**, with balanced results across all perspectives in the orange to yellow range, with the lowest under the SDG perspective.



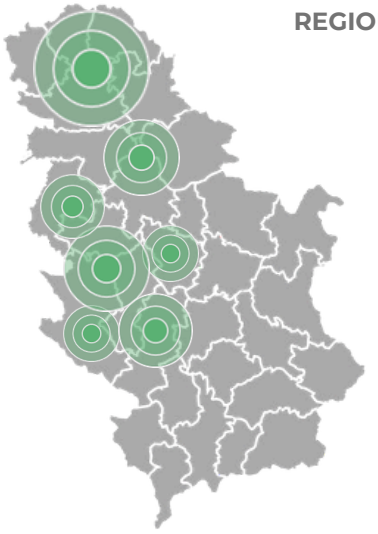
MARKET POTENTIAL

In Serbia, agricultural drones are already showing clear efficiency benefits. They allow **faster and more precise crop spraying, reduce labor, lower exposure to high summer temperatures, and use fewer chemicals than traditional methods.** Farmers using precision agriculture tools (including drones, sensors, and weather stations) have seen impressive results: raspberry yields increased by 100%, apples by 65%, pears by 44%, and potatoes by 40%, resulting in an **overall 12% increase** in crop productivity compared to the previous year.

Despite this growth, most farmland is still managed by small family farms, which limits widespread adoption of drone technology. At the same time, there is a **gap in the domestic production** of agricultural drones designed for Serbia's specific needs. This project aims to fill that gap by developing locally manufactured drones that integrate hardware and software tailored to the local agricultural landscape, improving accessibility, efficiency, and adoption.

The **projected global growth** of the agricultural drone market, from EUR 5.2 billion in 2024 to EUR 20.22 billion by 2032 at a CAGR of 18.5%, is expected to drive investment opportunities, together with the **Serbian government's initiatives** to promote food sovereignty and rural development.

REGION



The optimal region would be **Vojvodina** (Novi Sad, Subotica, Zrenjanin), offering flat terrain, developed infrastructure, proximity to large farms, and access to research centers like the BioSense Institute, while **Šumadija, Western Serbia, and Belgrade surroundings** can support logistics, R&D, and distribution.

SUCCESSFUL STORY

Livona is a leading distributor of XAG agricultural drones in Serbia. They offer models such as the XAG P40 and XAG P100, specialized for spraying, fertilizing, and seeding. Livona also provides training and after-sales support for users.

Agremo, although it is not a drone manufacturer, its platform uses AI and computer vision to analyze drone imagery. Their software enables farmers to efficiently monitor crop health, detect weeds, and optimize resource use

While Serbia has initiatives for developing agricultural drones, the global market is much more advanced. Companies like **DJI** and **XAG** dominate the market, offering a wide range of drones with advanced capabilities.

BUSINESS MODEL

This project aims to **develop and manufacture agricultural drones specifically designed for Serbia's farming landscape, combining hardware and AI-driven software to provide precise crop spraying, monitoring, and data analytics.**

Target customers include family-owned farms, commercial agribusinesses, cooperatives, and government-supported rural development programs.

The value chain starts with R&D and design, followed by sourcing electronic components and sensors, local assembly in a manufacturing facility, software integration, and distribution through direct sales and distributors.

Recurring revenue will come from subscription-based software services, maintenance, and training.

Key resources include a local manufacturing facility, an R&D team, supply chain partnerships, and collaborations with research institutions, while strategic partnerships with suppliers, universities, cooperatives, and government agencies will support growth.

Investors' role is to provide the necessary capital to establish production, support R&D, and accelerate market entry, bridging the gap in domestic drone production.

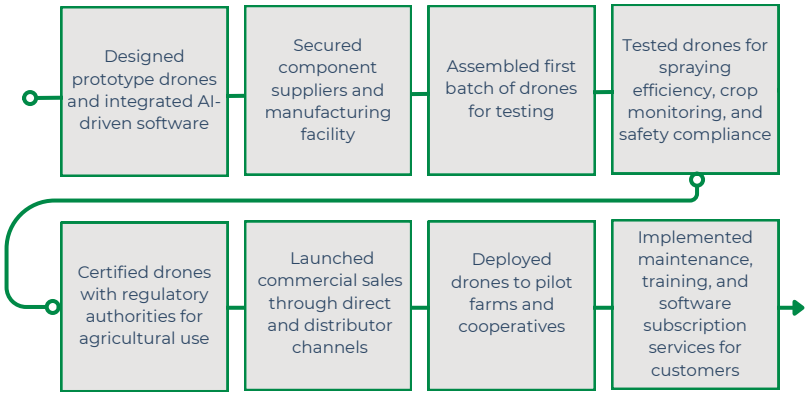
KEY NUMBERS

€1M-5M
CAPEX

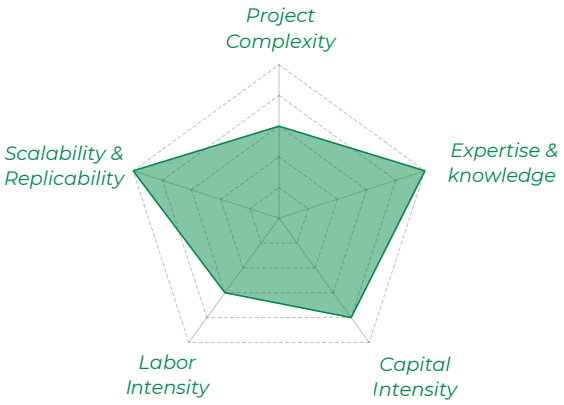
15-25%
return on investment

4-7 years
payback period

CRITICAL SUCCESS FACTORS



PROJECT OVERVIEW



Developing and integrating hardware and AI-driven software for precision agriculture drones involves multiple disciplines and regulatory compliance, making the project **moderately complex.**

High-level technical expertise is needed in drone engineering, AI software development, agricultural sciences, and regulatory standards to ensure successful design, production, and deployment.

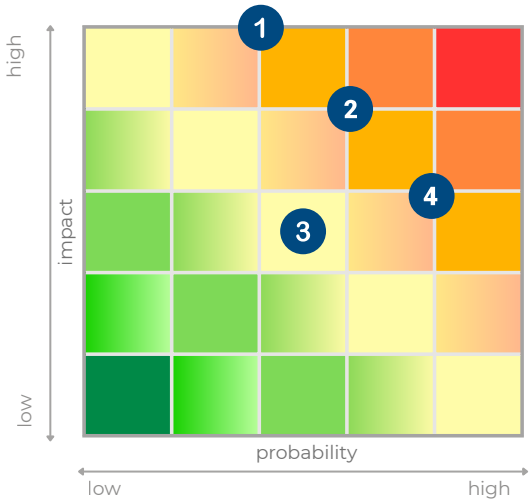
Initial investment in manufacturing facilities, R&D, testing, and certification is significant, though operational costs can be partially offset by recurring software and service revenues.

While the manufacturing and R&D phases require **skilled labor**, once production and deployment scale, **operational labor needs decrease** due to automation and software-assisted processes.

The project has strong potential for **scaling** within Serbia and replicating in neighboring markets, as drones and precision agriculture solutions can be adapted to similar agricultural landscapes and farm sizes.

RISK MATRIX

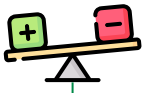
No.	Risk	Description
1	Robot Malfunction or Design Flaws	Poorly designed components or coding errors in autonomous functions can lead to operational failures and reputational damage. To minimize this risk, invest in R&D, enforce strict quality assurance standards, and conduct continuous field testing before scaling production.
2	Slow Farmer Uptake	Many farmers may be reluctant to adopt drone technology due to high costs, lack of technical knowledge, or skepticism about its benefits. To reduce this risk, provide training programs, financing options, and demonstration projects that clearly showcase the value of drones in agriculture.
3	Drone Crashes and Malfunctions	Hardware or software failures, loss of GPS signal, or adverse weather can result in drone crashes, damaging equipment and reducing user trust. To mitigate this risk, implement rigorous testing, predictive maintenance systems, and build redundancy into navigation and safety features.
4	Supply Chain Risk	Dependence on specialized components such as sensors, batteries, and microchips can lead to production delays and cost increases if suppliers face disruptions. To address this risk, diversify suppliers, establish local sourcing options, and maintain strategic inventory reserves.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces pesticide, fertilizer, and water use through precision spraying and monitoring, minimizing environmental pollution and promoting sustainable farming.
- Enhances productivity and resilience in Serbia's agricultural sector, where only 8.3% of farmland is currently irrigated.
- Creates skilled jobs in drone manufacturing, R&D, software development, and farm operations, fostering innovation and rural development.
- Improves occupational safety by reducing human exposure to chemicals and extreme temperatures.
- Strengthens governance and transparency through compliance with national agricultural regulations and accountable operational practices.



Potential negative impacts

- Energy use and electronic waste from drone production and battery disposal.
- Data misuse or privacy breaches from drone-based monitoring systems.
- Potential disturbance to wildlife or communities if drone operations are poorly managed.

These aspects could be addressed through responsible e-waste recycling and battery recovery programs, strict data protection and privacy policies, and adherence to operational standards minimizing noise and environmental disturbance.

HOW DOES THIS PROJECT SUPPORT SERBIA'S AGRICULTURAL MODERNIZATION?

This project directly supports Serbia in modernizing its agricultural sector, where the adoption of precision agriculture and drone technologies remains limited. Many farms still rely on manual labor and traditional methods, which are time-consuming, resource-intensive, and constrain productivity growth.
By introducing locally manufactured agricultural drones:

- ✔ The project enables farmers, cooperatives, and agribusinesses to adopt smart, data-driven solutions that optimize crop spraying, monitor field conditions, and increase yields.
- ✔ In doing so, it accelerates technological modernization in Serbian agriculture, strengthens resilience against labor shortages, promotes sustainable farming practices, aligns with global precision agriculture standards, and enhances the country's capacity to meet growing domestic and international food demand.

MODULAR AGRICULTURAL ROBOT

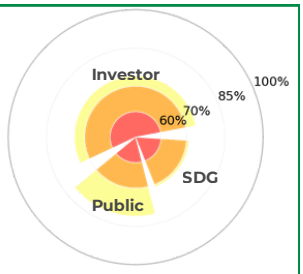
Aligned with IOA 5. High-tech for Agriculture Production

PROJECT SCORE

The project demonstrates **solid overall performance**, within the yellow range in all three perspectives, with the strongest results under the public perspective.

LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

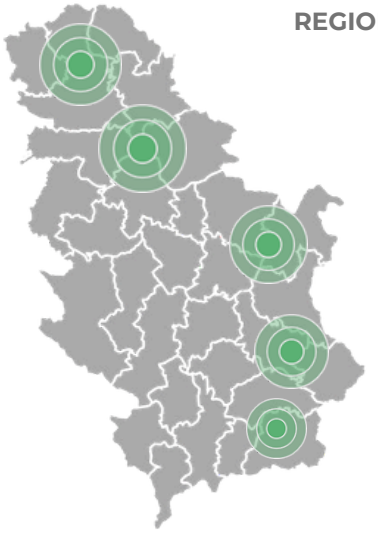


MARKET POTENTIAL

Serbia offers strong comparative advantages for agri-tech investments, combining fertile land, diverse crop production, and preferential access to EU and CEFTA markets. According to the official 2023 agricultural census, the **agricultural sector is dominated by small family farms, 99.6 % of all holdings**, with an average farm size of just 6.4 hectares. Most of these farms continue to rely on **outdated machinery and equipment**, constraining productivity and overall competitiveness. At the same time, a 10% decline in the number of holdings since 2018 points to ongoing consolidation processes and highlights the potential for further modernization within the sector.

This **untapped potential** is reinforced by a strong R&D ecosystem and growing agri-tech infrastructure, including institutions like the BioSense Institute, the Science and Technology Park in Niš, and European programs such as the European Institute of Innovation & Technology (EIT) and the EU Innovation Fund, which support startups, research, and the development of agricultural robotics solutions. By developing **cost-effective, modular systems tailored not only for small and medium farms but also scalable to meet the needs of large producers and agri-companies**, investors can capture emerging demand, support sustainable modernization, and position Serbia as an agri-tech hub with both national impact and regional export potential.

REGION



Vojvodina offers the best conditions for large-scale deployment and commercialization, **southern and eastern regions** provide opportunities to test robots on challenging terrains, and **central Serbia** is ideal for service hubs, distribution, and collaboration with R&D institutions.

SUCCESSFUL STORY

AgAR is a modular, fully electric agricultural robot developed by the Serbian company COMING in cooperation with the University of Niš. Designed for multiple tasks, such as plowing, planting, spraying, irrigation, and harvesting, it adapts to various terrains, including steep slopes. Operated remotely via mobile app, AgAR boosts farm productivity and reduces labor costs. Recognized internationally, it won an innovation award at the Agrotech Fair in Poland, showcasing successful private-sector innovation in Serbian agri-tech.

Others: Hands Free Hectare (UK), Fieldwork Robotics (UK), XAG (China)

BUSINESS MODEL

The Modular Agricultural Robot is an innovative agri-tech solution designed to transform farming operations. By enabling one adaptive robotic system to perform multiple tasks, such as **planting, spraying, irrigation, and harvesting, across different terrains**, it directly addresses labor shortages, improves productivity, and promotes sustainable agriculture.

The investor's role is to fund product development and commercialization, including the establishment of service hubs and leasing models for farmers. **Revenues** are generated through sales, leasing schemes, maintenance services, and digital applications. Positioned as both a practical solution and the foundation of a new agri-tech sector in Serbia, this initiative offers investors a scalable opportunity with strong regional and global export potential.

KEY NUMBERS

€1M-5M
CAPEX

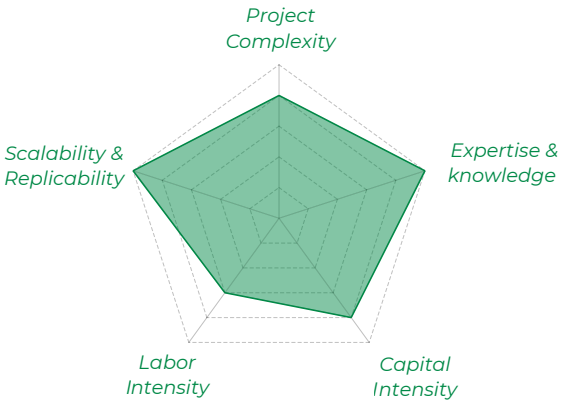
15-25%
return on investment

4-7 years
payback period

CRITICAL SUCCESS FACTORS

- Successfully design, build, and test the modular agricultural robot under diverse crop types and terrains.
- Obtain necessary certifications and approvals for machinery, safety, and environmental standards.
- Establish a local factory or assembly line capable of scalable production
- Secure first customers through pilot programs, leasing models, or partnerships with farms and cooperatives.
- Collaborate with universities, research centers, EU programs, and funding institutions
- Continuously improve robot performance, efficiency, and adaptability for diverse farming tasks.
- Develop maintenance hubs, training programs, and remote support infrastructure
- Capacity optimization and product line expansion

PROJECT OVERVIEW



Developing a modular, multipurpose agricultural robot involves advanced engineering, robotics integration, and adaptation to diverse terrains, making the project **technically challenging but feasible with the right R&D support**.

Success requires **high-level expertise** in robotics, software development, agricultural engineering, and systems integration, supported by partnerships with universities and innovation hubs.

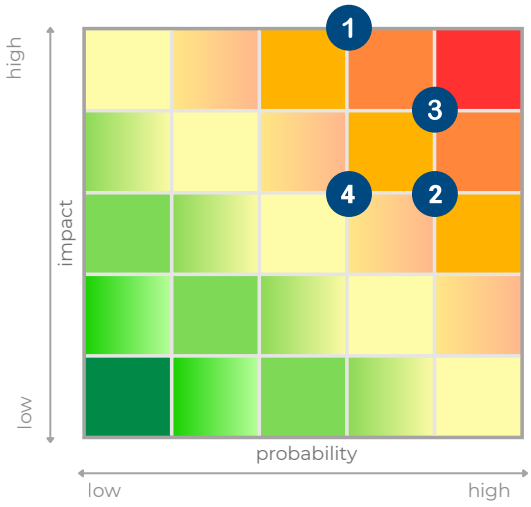
Initial investment is significant, covering R&D, factory setup, equipment, and pilot deployments, but **economies of scale** and **modular design** can optimize costs over time.

While the robot **reduces labor on farms**, the project **requires skilled labor** for R&D, production setup, assembly, and maintenance infrastructure.

The modular design allows **replication across different farm sizes**, **terrains**, and **crop types**, offering strong potential for regional expansion and adoption in other markets.

RISK MATRIX

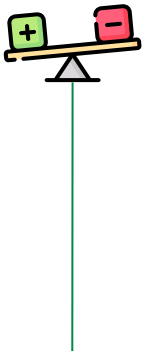
No.	Risk	Description
1	Robot Malfunction or Design Flaws	Failures in hardware or software could reduce robot performance or cause downtime. Mitigation strategy is rigorous R&D testing, modular design for easy replacement of components, and continuous software updates.
2	Slow Farmer Uptake	Small and medium farms may be reluctant to adopt new robotics due to cost, training requirements, or skepticism. To address this problem undertake pilot programs, leasing models, training and support services, and demonstration projects to show ROI.
3	Budget Overruns	Actual R&D, manufacturing setup, or deployment costs may exceed projections, affecting ROI and payback period. Implement phased investments, maintain contingency budgets, secure EU grants/funding programs and continuously monitor costs against projections.
4	Extreme Weather Events	Severe droughts, floods, or storms could damage crops or delay robot operations. Design robots for all-terrain use, implement predictive monitoring and irrigation systems, and diversify crop applications.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces greenhouse gas emissions by replacing fossil fuel machinery with energy-efficient, electric-powered robots.
- Enhances water-use efficiency and soil management through precision irrigation and monitoring systems, supporting climate-resilient agriculture.
- Enables sustainable farming on steep and diverse terrains, expanding agricultural productivity and land utilization.
- Builds a skilled workforce in robotics, AI, and precision agriculture, fostering technological innovation and regional economic growth.
- Aligns with Serbia's Low Carbon Development Strategy and EU innovation programs, strengthening regulatory compliance and public-private governance.



Potential negative impacts

- High production and maintenance costs may limit accessibility for smaller farms.
- Electronic waste and battery disposal could pose environmental risks if not properly managed.
- Increased automation may reduce demand for low-skilled agricultural labor.

These aspects could be addressed through leasing and subsidy models for smallholders, circular management of electronic components, and workforce reskilling programs to integrate displaced labor into higher-value agri-tech roles.

HOW DOES THIS PROJECT SUPPORT SERBIA'S AGRICULTURAL AUTOMATION?

This project directly supports Serbia in addressing one of its most pressing challenges in the agricultural sector – **the low level of automation and technological modernization**. Serbian agriculture is still largely dependent on traditional methods, characterized by labor intensity, inefficiencies, and limited productivity growth.
By introducing a Modular Agricultural Robot:

✔ The project enables farmers and food producers to adopt smart solutions that reduce waste, increase efficiency, and improve competitiveness.

✔ In doing so, it not only accelerates the digital transformation of Serbian agriculture but also strengthens resilience against workforce shortages, aligns with EU standards, and enhances the country's capacity to meet rising global demand with sustainable practices.

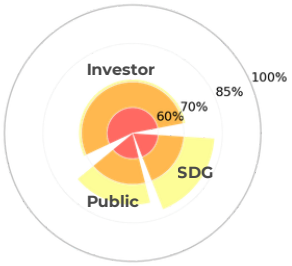
SDG addressed:

SMART IRRIGATION SYSTEM

Aligned with White space: Affordable Irrigation Systems
IOA 6. Sophisticated Software Solutions

PROJECT SCORE

The project demonstrates **solid overall performance**, with best results under the SDG perspective and stable but moderate scores under the Investor and Public perspectives.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

A large base of arable land (UAA 3.24m ha; 77.7% arable) plus an **existing canal network** (DTD ~600 km of navigable waterways in Vojvodina) enables rapid roll-out and retrofit of smart irrigation; at the same time, rising drought exposure increases the yield and financial upside of precision watering.

In 2023, **only 47,579 ha were irrigated** (–12.9% y/y), a small share of total farmland; drought reports show **substantial losses** and structural lag in irrigation systems (losses near ~€0.85 billion in 2022; irrigated share below the global average).

With <~2% of land irrigated, Serbia holds vast untapped capacity. Water mapping indicates the potential to irrigate hundreds of thousands of hectares using river alluvial and multipurpose reservoirs, up to 450,000 hectares from the Danube, Sava, and Velika Morava catchments alone. Expanding irrigation would significantly enhance productivity, climate resilience, and yield stability in core farming regions.

REGION

Most relevant in Vojvodina, Pomoravlje, and Southern Serbia, near rivers with high irrigation demand, fruit and vegetable growth, and drought risk mitigation.

SUCCESSFUL STORY

In Slovenia's Goriška Brda region, the Smart Vineyard project demonstrated how IoT soil and climate sensors combined with the FeelGrid digital platform can reduce water use, stabilize grape quality, and lower operating costs, proving the scalability of smart irrigation from vineyards to orchards and other high-value crops; this experience is directly relevant to Serbia, where a **pilot developed by Delta Agrar in Čelarevo** (Vojvodina) already showed ~20% water savings and four times fewer field visits at a CAPEX of ~€450/ha, highlighting that with EU IPARD subsidies and less than 2% of farmland currently irrigated, Serbia offers a substantial untapped opportunity for investors to scale precision irrigation solutions.

BUSINESS MODEL

Development and commercialization of IoT-based smart irrigation systems that use sensors, controllers, and automated pumps to optimize water use. The systems track soil conditions in real time and adjust irrigation, with data transmitted to digital platforms.

The investor's role includes financing production or assembly, establishing distribution, and developing subscription-based monitoring. Revenue derives from kit sales, installation, maintenance, and recurring analytics fees.

In Serbia, demand for precision farming and access to IPARD and green transition subsidies support adoption, with local banks experienced in financing agricultural equipment and digital solutions.

KEY NUMBERS

~100-500K
CAPEX

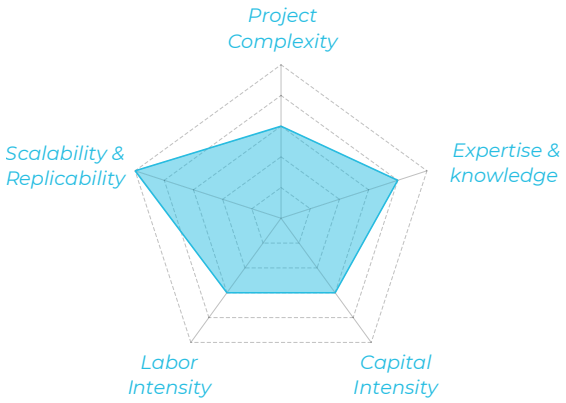
15-25%
return on investment

4-7 years
payback period

PROJECTS MILESTONES

- Assembly of IoT irrigation modules
- Field testing and validation
- Contracting with farms and cooperatives
- Training and digital onboarding
- Customized engineering and design
- Regional feasibility analysis
- Partnerships with suppliers and telecoms
- Maintenance, updates, and lifecycle support

PROJECT OVERVIEW



Overall moderate complexity: The project integrates standard irrigation infrastructure with IoT modules and digital platforms. While the hardware assembly and installation are straightforward, data management and connectivity require additional coordination.

Moderate to high expertise: Strong technical knowledge is needed in IoT systems, agronomy, and software integration, combined with expertise in precision agriculture and local farming practices.

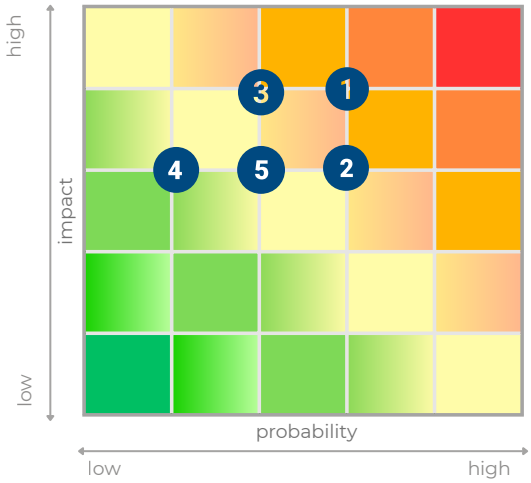
Upfront investment is required for sensor production, pump systems, and platform development, but compared to large infrastructure projects, the financial burden is relatively lower and supported by subsidies.

Skilled technicians and engineers are needed for installation, calibration, and software support, while routine operations demand less labor once systems are established.

High scalability: The business model is **modular and adaptable**, **allowing replication** across Serbia's agricultural regions and **scalability** to different crops and farm sizes.

RISK MATRIX

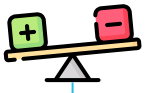
No.	Risk	Description
1	Regulatory and Subsidy Uncertainty	Changes in agricultural subsidy schemes (e.g., IPARD, national green programs) or delays in certification/approval could undermine financial projections and adoption rates.
2	Technology Integration Challenges	Compatibility issues between IoT sensors, pumps, and connectivity networks may affect system reliability and investor returns. Selecting experienced vendors and ensuring pilot testing can mitigate the risk.
3	Supply Chain Disruptions	Price volatility or shortages of imported IoT modules, semiconductors, or pump equipment may increase CAPEX and delay rollouts. Long-term contracts with suppliers are essential.
4	Market Uptake	Adoption may be slower than expected if farmers and cooperatives are reluctant to invest in digital solutions despite available subsidies, limiting revenue growth.
5	System Performance Gaps	If field conditions (soil variability, connectivity, maintenance) reduce system efficiency below expectations, investor confidence and recurring revenues (SaaS subscriptions) may decline.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces water use and CO_2 emissions through precision irrigation, supporting Serbia's NDC targets and Paris Agreement commitments.
- Improves soil health, crop yields, and resource efficiency, lowering the need for pesticides and enhancing long-term sustainability.
- Strengthens rural economies by creating technical jobs in installation, maintenance, and training, while improving farmers' income stability.
- Promotes inclusive rural development and community resilience through modern, climate-smart agricultural practices.
- Enables transparent ESG reporting via digital monitoring systems, aligning with international green finance and impact investment standards.



Potential negative impacts

- High upfront costs for equipment and digital systems may limit adoption by smallholders.
- Electronic waste or system malfunction if not properly maintained.
- Potential overreliance on technology without adequate user training.

subsidy and grant programs for small farmers, proper e-waste recycling and maintenance systems, and capacity-building initiatives ensuring effective technology use and long-term sustainability.

HOW DOES THIS PROJECT STRENGTHEN SERBIA'S SUSTAINABLE AGRICULTURE?

The efficiency of irrigation in Serbia remains low, with less than 2% of arable land irrigated compared to a global average of ~17%, leaving farmers highly vulnerable to drought and climate variability.

This elderly care homes project strengthens the system by:

- ✔ **Expanding access to precision irrigation technologies**, enabling farmers across Vojvodina, Pomoravlje, and Southern Serbia to adopt cost-effective, IoT-based systems.
- ✔ **Improving resource efficiency and climate adaptation** by reducing water and energy consumption in irrigation by 20–30% while stabilizing crop yields under variable weather.
- ✔ **Supporting national sustainability commitments** by integrating digital monitoring and ESG-aligned reporting tools that enhance transparency and facilitate green financing.

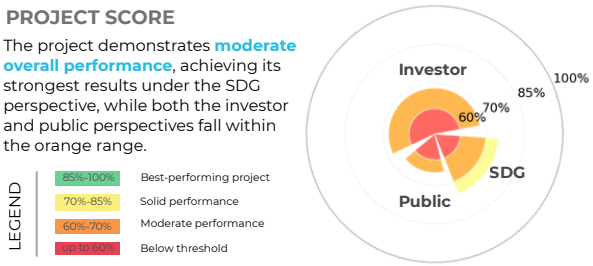
SDG addressed:

WATER LEAK DETECTION SENSORS

Aligned with IOA 6. Sophisticated Software Solutions

PROJECT SCORE

The project demonstrates **moderate overall performance**, achieving its strongest results under the SDG perspective, while both the investor and public perspectives fall within the orange range.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Serbia faces significant challenges in water management, with public utilities experiencing substantial losses due to aging infrastructure, leakages, and inefficient distribution. While the country has abundant freshwater sources, including rivers, lakes, and groundwater, the **actual availability of reliable potable water is uneven**, particularly in rural and underserved urban areas. Studies show that in ten major cities, water losses are particularly high, with Novi Pazar at 61%, Užice at 55%, Leskovac at 53%, Niš at 48%, and Kragujevac at 45%. Overall Serbian water utilities collect approximately **687 million m³ of water annually**, **but around 35% of this volume (roughly 242 million m³) is lost due to system inefficiencies such as pipeline leaks, pumping losses, inaccurate metering, and insufficient maintenance.** These inefficiencies result in economic losses, service interruptions, and limited access to reliable water, highlighting a **clear market gap**. The government has recognized these challenges and is investing in modernization efforts, including **€96 million from the European Investment Bank and the European Union** for infrastructure upgrades and initiatives to improve wastewater treatment. According to **Serbia's Strategy for the Development of Public Water Supply and Sewerage Enterprises**, modernizing infrastructure and strengthening operational efficiency are key priorities, which create a **clear investment opportunity** for solutions such as Water Leak Detection Sensor technology. These systems provide **real-time monitoring, predictive analytics, and early leak detection**, enabling utilities to reduce losses, optimize operations, and improve reliability. By implementing such systems, Serbia can **enhance water supply efficiency, reduce infrastructure strain, and move towards sustainable and resilient water management practices.**

REGION

Belgrade is suitable for pilot and demonstration projects, while **cities with higher water losses** (Novi Pazar, Užice, Leskovac, Niš, Kragujevac) represent the mass market for full-scale implementation.

SUCCESSFUL STORY

In 2020, in Serbia, ASTERRA conducted a pilot project utilizing satellite technology to detect water leaks in the distribution networks of Pančevo, Kovin, and Kovačica. This innovative approach allowed for the identification of leaks that were previously undetectable by conventional methods, leading to more efficient water loss management in these regions.

In the UK, FIDO Tech, in collaboration with United Utilities, developed an AI-powered leak detection system capable of calculating the size of leaks. This advancement enables water companies to prioritize larger leaks for investigation and repair, significantly improving the efficiency of leakage management and reducing non-revenue water.

BUSINESS MODEL

The project creates value by equipping municipal water utilities with **modular leak detection sensors connected to a centralized monitoring platform**, providing real-time leak detection, predictive analytics, and automated alerts.
Revenue comes from sensor deployment, financed via purchase, leasing, or contract manufacturing/local assembly, and from recurring service contracts covering platform access, data management, and audits. **Investors finance** the initial roll-out, platform development, and operational scaling, gaining stable, contract-based returns and ESG impact through water savings and efficiency.
Key stakeholders include public utility companies (JKP) benefiting from reduced leakages and lower costs, municipalities and cities financing projects through budgets or international funds, private investors providing capital and recovering it through service contracts or PPP arrangements, regulators ensuring compliance and efficiency standards, and local communities enjoying more reliable water supply and sustainable resource management.

KEY NUMBERS

€1M-5M
CAPEX

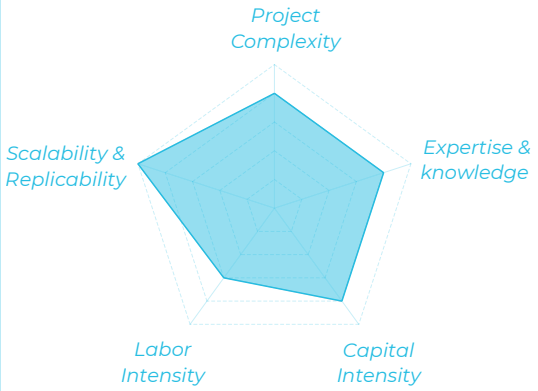
10%-15%
return on investment

5-10 years
payback period

PROJECT MILESTONES

- Defined scope, objectives, budget, and completed technical feasibility
- Developed sensor specifications and built initial platform
- Built and tested initial sensors and software platform
- Installed sensors in selected municipalities and tested real-time monitoring
- Provided ongoing support, predictive maintenance, and ESG reporting
- Deployed sensors and platform across target cities with high water loss
- Finalized production, procurement, logistics, and training materials for utilities
- Evaluated sensor performance, analytics accuracy, and operational workflows

PROJECT OVERVIEW



The **project complexity** involves integrating hardware (sensors), software (centralized monitoring platform), and data analytics. Managing these components across multiple municipalities requires careful coordination and technical expertise.

The **required expertise** spans multidisciplinary knowledge, including IoT hardware development, software engineering, data analytics, and understanding of water utility operations. Collaboration with local utilities and regulatory bodies is also essential.

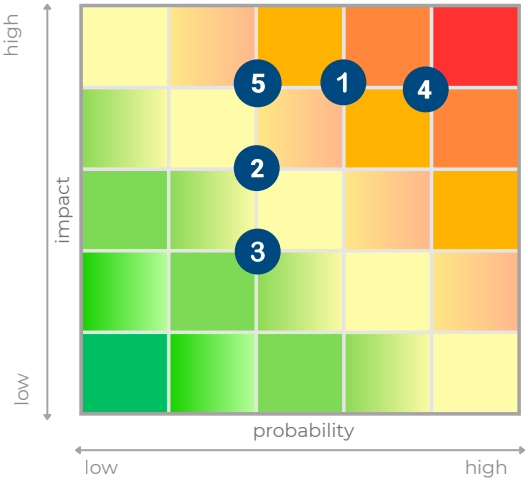
The **capital intensity** is high due to substantial upfront investment for sensor production, platform development, and deployment. However, the recurring revenue model from service contracts helps mitigate financial strain over time.

The **labor intensity** is moderate; while the initial deployment phase requires significant labor for installation and training, ongoing operations demand less intensive labor, primarily for monitoring and maintenance.

The **scalability and replicability** of the project is strong; the modular nature of the technology allows for easy scaling and replication across different regions, both within Serbia and regionaly, adapting to various infrastructure sizes and complexities.

RISK MATRIX

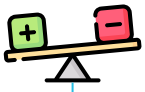
No.	Risk	Description
1	Technological Integration Challenges	Difficulty in integrating sensors, platform, and analytics across multiple municipalities. This risk can be reduced by conducting thorough pilot testing and phased deployment.
2	Community Resistance	Lack of understanding or acceptance from local residents or municipal staff. Mitigate by implementing education and outreach programs to demonstrate benefits.
3	Regulatory Delays	Potential delays in approvals or compliance with local water and environmental regulations. Early engagement with regulatory bodies ensures compliance and reduces approval time.
4	Data Security Concerns	Risk of unauthorized access to sensitive water usage and operational data. Can be reduced by employing advanced cybersecurity measures and strict data governance protocols.
5	Supply Chain Disruptions	Delays in sourcing sensors, hardware, or software components. Mitigate by diversifying suppliers and maintaining buffer inventories for critical components.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces water losses of 15–20% in municipal networks, conserving resources and lowering energy use and CO_2 emissions from water pumping and treatment.
- Improves water supply reliability and public health, particularly in underserved urban and rural communities.
- Strengthens cooperation between utilities, municipalities, and local communities, promoting shared responsibility for water conservation.
- Creates local employment during installation, maintenance, and monitoring phases, supporting regional economic growth.
- Enhances transparency, accountability, and regulatory compliance through real-time monitoring, data analytics, and public reporting.



Potential negative impacts

- High initial investment and maintenance costs for sensor networks and digital platforms.
- Potential electronic waste generation from outdated or damaged sensors.
- Data privacy or cybersecurity breaches in digital monitoring systems.

These aspects could be addressed through phased deployment and public–private partnerships, circular recycling of sensor components, and implementation of robust cybersecurity and data protection measures.

HOW DOES THIS PROJECT SUPPORT SERBIA'S WATER MANAGEMENT EFFICIENCY AND SUSTAINABILITY?

This project addresses Serbia's critical challenge of water losses in municipal networks. Many utilities operate with aging infrastructure and limited monitoring, causing inefficiencies and wastage. By implementing a Water Leak Detection Sensor System:

- ✔ Utilities gain real-time monitoring, early leak detection, and predictive analytics, improving operations and reducing non-revenue water.
- ✔ The project supports the digital transformation of water management, aligns with EU sustainability standards, and strengthens reliable, resource-efficient water supply across urban and rural communities.

INFRASTRUCTURE

- Atmospheric Water Generators (AWG)
- Biomedical Waste Management
- Carbon-Storing Concrete Facility
- Construction and Demolition Waste Recycling Facility
- Eco-Brick Made from Plastic Waste
- Energy-from-Waste Incineration Plant
- Food Waste Management
- Mountain Resort Hotel
- Multimodal River Port Expansion
- Plastic Roads
- Real Estate Green Smart Development
- Rehabilitation Centres for Psychophysical Health
- Sanitization and Rehabilitation of Wild Landfills and Illegal Dumpsites
- Spa Tourism Development
- Sustainable Packaging Solutions
- Treatment of Municipal Waste
- Urban Hotel Development
- Wastewater Treatment Facility

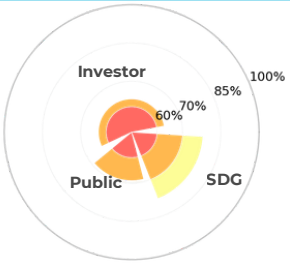
SDG addressed:

ATMOSPHERIC WATER GENERATORS

Aligned with WS E9 Water supply systems for the production of drinking water

PROJECT SCORE

The project demonstrates **moderate overall performance**, with the strongest results under the SDG perspective, and lower performance in the other two perspectives.



LEGEND

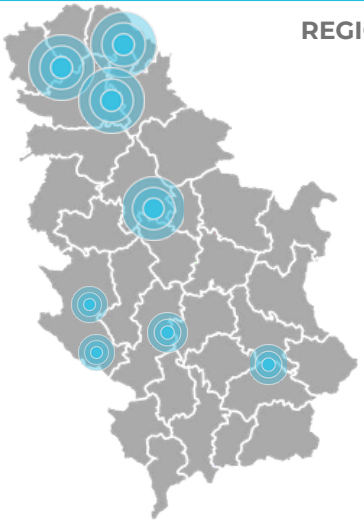
85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Serbia faces persistent challenges in water supply, especially in **rural and mountainous areas where traditional infrastructure is limited or outdated.** Around **12.6% of households are not connected to the public water supply**, representing approximately 315,000 households. Meanwhile, **rural populations make up about 42.63%** of the total population in 2024, largely relying on small-scale systems or individual sources, such as wells and local pipelines. These problems are worsened by climate change: declining river levels, recurrent droughts, and, in 2025, record-high temperatures that left many rivers at their biological minimum, causing severe shortages across municipalities. **Atmospheric Water Generators (AWG)** provide a viable alternative, as they operate best in **humidity above 40–50%**. Serbia's **average relative humidity of 60–75%**, especially in mountainous and forested regions, creates favorable conditions for deployment. Additionally, tourist destinations and remote facilities could also benefit from reliable on-site water production, eliminating dependence on municipal water supplies. Water needs for a community of 100 people are about 200–300 liters daily. Commercial AWG units produce between 20 and 200 liters per day depending on model and humidity, meaning 2–3 mid-sized units (100–150 liters/day) can reliably supply such a community, with reserve capacity for drier days. **This makes AWG scalable for rural settlements of 50–150 people, offering decentralized, resilient water security.**

The key enabler is **energy access**: if grid electricity is available, AWG units can operate directly; if off-grid, solar panels or hybrid mini-grids can provide sustainable, independent power. This flexibility makes AWG suitable both for rural communities and for industrial and commercial clients that require higher-capacity systems.

REGION



Regions with moderate to high humidity as primary potential zones, including **rural and mountain ranges** (e.g., Kopaonik, Zlatibor, Suva Planina) and **forested areas**. **Plains** (Vojvodina, central Serbia) can be secondary zones where AWG supplements existing water systems.

SUCCESSFUL STORY

GENAQ, a Spanish company founded in 2008, develops and produces AWG systems that generate drinking water from air using only energy and moisture. Their systems are used in over 70 countries for humanitarian aid, military operations, industrial sites, and urban applications.

GENAQ products range from small-scale units for homes and offices (Stratus) to large industrial plants (AWGplant) capable of producing up to 1.5 million liters per day. All systems include advanced filtration and mineralization, and many can operate with solar power and remote monitoring.

The company focuses on sustainability by reducing plastic waste, using eco-friendly cooling methods, integrating solar energy, and developing innovative solutions for safe, decentralized water supply.

BUSINESS MODEL

The AWG business model in Serbia delivers clean drinking water where it is most needed: rural villages, small communities, and industrial users. Units are installed in central community locations or as modular systems in dispersed areas, running either on grid electricity or solar power.

For rural areas, public-private partnerships (PPP) represent the most effective model: municipalities provide sites and basic infrastructure, while investors finance the units, oversee production or procurement, and ensure installation and servicing. Revenue comes from long-term contracts with municipalities, pay-per-liter models, or subscriptions, supported by subsidies and EU development funds.

Industrial and commercial clients such as factories, hospitals, and offices create an additional market by purchasing or leasing larger units to secure water independence. In this model, the investor's role is clear: to fund the technology, manage setup and servglafice, and capture steady returns while contributing to sustainable water security in Serbia.

KEY NUMBERS

<€1M
CAPEX

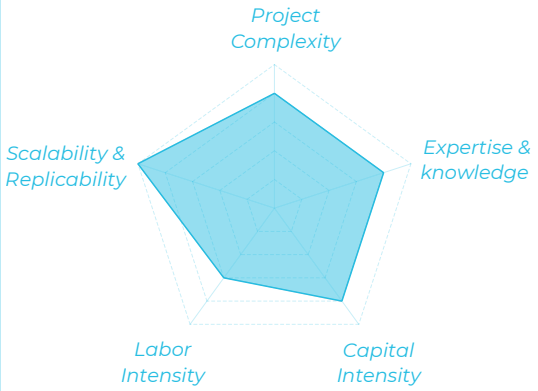
10%-15%
return on investment

7-10 years
payback period

PROJECT MILESTONES

- Water generation reliably tested under local climate conditions
- All permits and certifications secured
- AWG units produced and prepared for delivery
- Systems transported, set up, and commissioned on-site
- Staff trained and maintenance protocols implemented
- Systems fully operational and producing potable water
- Monitored and optimized performance
- Expansion strategies for capacity increase or new locations prepared

PROJECT OVERVIEW



The **project complexity** involves integrating integrating advanced water generation technology with local infrastructure and renewable energy solutions, requiring coordination across multiple stakeholders.

Deployment demands **technical knowledge** in AWG systems, electrical and civil engineering, water resource management, and renewable energy integration (if needed).

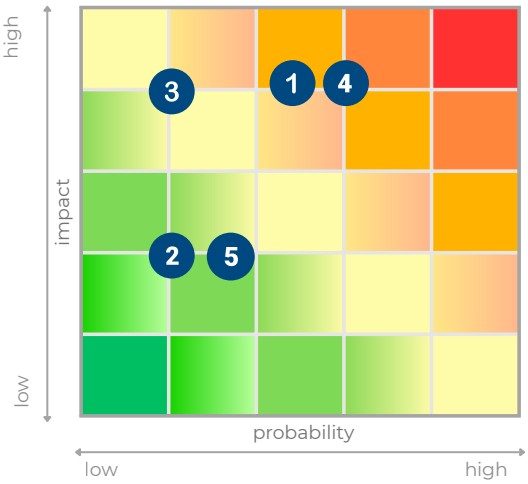
High upfront investment is needed for AWG units, site preparation, and optional solar infrastructure, though long-term returns and subsidies can offset costs.

In terms of **labor intensity**, installation and maintenance require skilled technicians, but systems are largely automated once operational, reducing ongoing labor needs.

AWG systems can be **replicated** across multiple rural or industrial sites, with modular designs allowing flexible deployment and expansion based on local demand.

RISK MATRIX

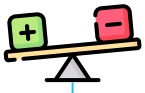
No.	Risk	Description
1	Equipment Malfunction	AWG units may experience mechanical or electrical issues, reducing water output. To address this risk, implement regular preventive maintenance, remote monitoring, and establish rapid-response service teams to ensure continuous operation.
2	Community Resistance	Lack of understanding or acceptance from local residents or municipal staff. Mitigate by conducting community engagement, education programs, and demonstrating water quality and reliability to build trust.
3	Regulatory Changes	Changes in water or energy regulations could affect project operation. To mitigate this risk, maintain active communication with regulators and align project design with current and anticipated legal frameworks.
4	Insufficient Electricity Supply	Off-grid or unreliable grid connections could limit AWG functionality. To reduce this risk, design hybrid systems with solar backup or integrate battery storage to maintain operation during power outages.
5	Water Quality Concerns	Generated water may not meet local drinking water standards due to maintenance lapses or contamination. To mitigate this risk, implement strict water quality monitoring, periodic laboratory testing, and timely filter replacements.



ESG IMPACT ASSESSMENT

Positive impacts

- Provides decentralized, renewable water generation that reduces dependence on overburdened or damaged water infrastructure.
- Strengthens resilience to droughts and water scarcity by supplying clean drinking water for households, livestock, and irrigation.
- Improves public health and hygiene through reliable on-site water access for schools, clinics, and rural communities.
- Reduces CO_2 emissions and plastic waste by eliminating the need for water transport and bottled water production.
- Creates local employment in system installation, maintenance, and technical support, contributing to rural economic stability.
- Aligns with Serbia's Law on Waters and Water Management Strategy (2034), reinforcing good governance and environmental responsibility.



Potential negative impacts

- High initial investment and energy requirements for AWG operation, particularly in low-humidity regions.
- Potential e-waste from system components and filters if not properly managed.
- Uneven access or affordability for low-income communities.

These aspects could be addressed through renewable energy integration (e.g., solar-powered AWGs), circular maintenance programs for component recycling, and inclusive pricing or subsidy schemes ensuring affordability and equitable access.

HOW DOES THIS PROJECT SUPPORT SERBIA'S WATER SCARCITY PROBLEM?

This project addresses Serbia's urgent challenge of water scarcity, particularly in rural, mountainous, and underserved communities. Many households rely on limited or outdated infrastructure, small-scale water systems, or individual wells, leaving them vulnerable during droughts and extreme weather. By deploying Atmospheric Water Generators (AWG):

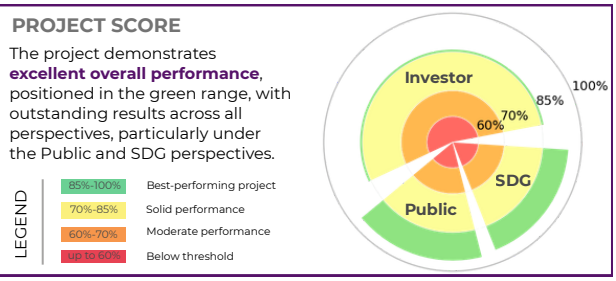
- ✔ Communities gain decentralized, on-site access to safe drinking water for households, livestock, and small-scale irrigation
- ✔ AWG systems enhance resilience, reduce reliance on overburdened or unreliable networks, and provide a sustainable solution that can operate with grid or solar power
- ✔ The project supports sustainable water management, aligns with EU and national environmental standards, and strengthens reliable, resource-efficient water supply for both residential and commercial users across Serbia.

BIOMEDICAL WASTE MANAGEMENT

Aligned with IOA 7. Waste Management Services

PROJECT SCORE

The project demonstrates **excellent overall performance**, positioned in the green range, with outstanding results across all perspectives, particularly under the Public and SDG perspectives.



LEGEND

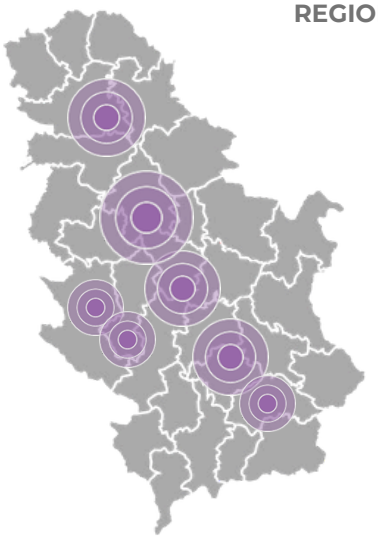
85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

In 2023, Serbia generated approximately 4,166 tons of medical waste, while only 3,321 tons were treated across 54 licensed facilities, leaving a **treatment gap of 845 tons annually**. By 2030, the volume of biomedical waste is **projected to increase to 5,000 tons**, creating additional demand for new treatment capacities. A significant portion of this waste consists of **infectious waste**, which includes materials contaminated with blood, body fluids, or other potentially pathogenic substances and requires special handling and disinfection methods, most commonly through autoclaving.

Demand for biomedical waste treatment services comes from a wide range of generators, including public hospitals and primary care facilities, private clinics, dental practices, laboratories, elderly care homes, and pharmacies, as well as veterinary clinics, pharmaceutical companies, and research institutions. This growing and diversified demand reinforces the need for modern, treatment infrastructure and **opens clear market opportunities** for public-private partnerships and investment.

REGION



Strong potential near regional healthcare centers in Belgrade, Novi Sad, and Central Serbia, with further demand emerging across Western, and Southern regions.

SUCCESSFUL STORY

Remondis Medison, based in Zrenjanin, is the company licensed for pharmaceutical waste treatment. It serves more than 4,000 healthcare institutions, providing a full service chain — collecting hazardous waste directly from hospitals, pharmacies, and clinics; transporting it with specialized, GPS-tracked vehicles; and processing it in a dedicated facility under strict EU-compliant safety protocols. Its facility has a capacity of about 1,300 tons per year, though current processing is 200–250 tons. The project demonstrates the role of private operators in Serbia's biomedical waste sector.

Others: FCC Environment, Stericycle (UK)

BUSINESS MODEL

Deployment of biomedical waste treatment systems to safely collect, transport, and process hazardous medical waste from healthcare institutions, with a focus on infectious and pharmaceutical waste. The process relies on a continuous input stream of medical waste from hospitals and clinics, supported by dedicated logistics and treatment infrastructure to ensure uninterrupted operation.

Investor's activities include the acquiring specialized vehicles, autoclaving equipment and other equipment, and secure waste handling protocols compliant with national and EU standards.

Value is created by reducing health and environmental risks, ensuring regulatory compliance for hospitals and clinics, and minimizing the potential for public incidents related to improper disposal.

Revenue streams include service contracts with healthcare providers and municipal waste management tenders. Operational efficiency is achieved through route optimization and modular treatment capacity. In addition, the model offers strong **potential for public-private partnerships**, enabling risk sharing, stable financing, and long-term collaboration with public institutions.

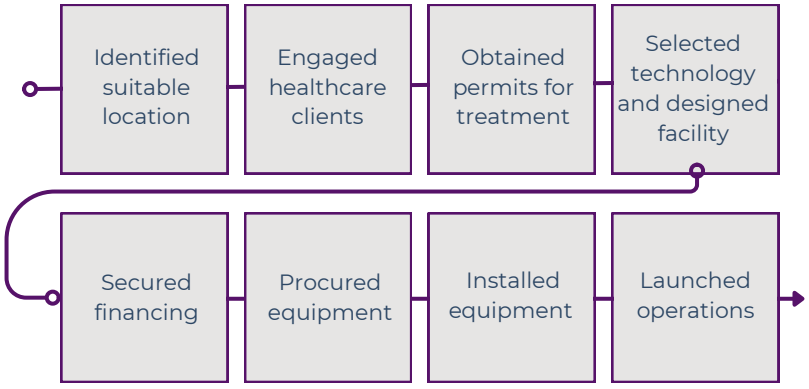
KEY NUMBERS

>€10M
CAPEX

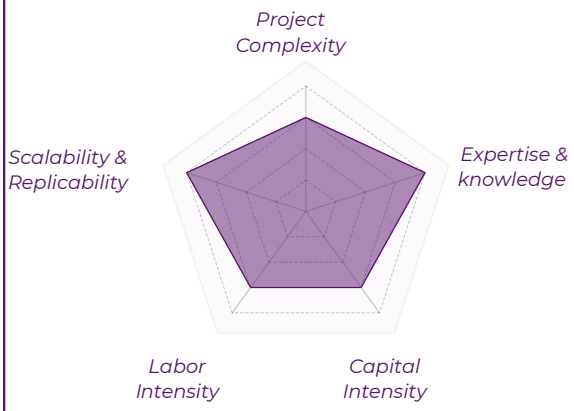
≥25%
return on investment

≤4 years
payback period

PROJECT MILESTONES



PROJECT OVERVIEW



Project complexity is moderate, as it follows standardized biomedical waste management practices, while also requiring strict regulatory compliance and specialized logistics.

Moderate to high expertise: Specialized knowledge is needed in waste treatment technologies, hazardous material handling, and environmental regulations.

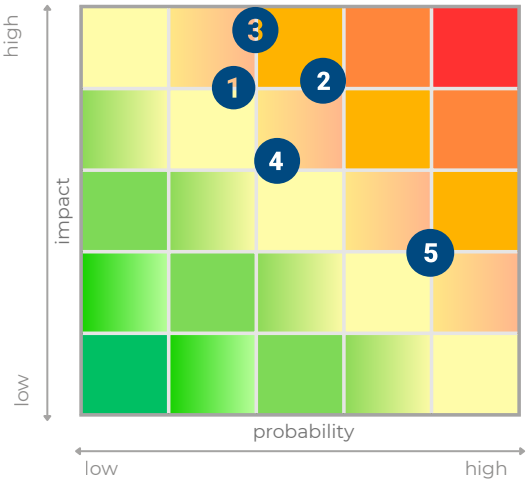
Capital intensity: Moderate upfront investment is required for treatment facilities, equipment, and certified transport vehicles.

Labor intensity: A moderate workforce is needed for collection, logistics, operation, and monitoring, with potential for automation in larger systems.

Scalability potential is relatively high, as the model is modular and can be replicated regionally or adapted for mobile treatment units in underserved areas.

RISK MATRIX

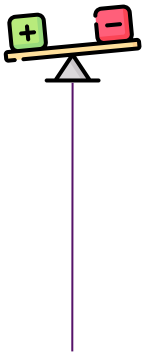
No.	Risk	Description
1	Regulatory Permits Delays	Extended approval timelines for medical waste transport and treatment facilities can postpone project launch, which can be mitigated through early engagement with regulators
2	Inadequate packaging	Waste not properly packaged (thin bags, no sealing, or use of inappropriate containers) can result in tearing, leakage, and accidental exposure of infectious materials, which is reduced by using standardized certified containers and training staff on proper packaging.
3	Operational Failures	Autoclaving or other treatment equipment may not meet required sterilization levels, leading to compliance breaches.. This can be prevented by regular maintenance.
4	Occupational Safety Incidents	Handling infectious or sharp waste carries risks of injury or exposure for staff, potentially halting operations and increasing liability. The risk is minimized by regular training and safety drills to ensure correct handling practices.
5	High Operational Costs	In areas with dispersed healthcare facilities, collection and transport costs may outweigh revenue, reducing profitability. This can be mitigated through route optimization.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces contamination of drinking, surface, and groundwater by preventing landfill disposal of untreated medical waste.
- Decreases release of hazardous substances (dioxins, furans, mercury, cytotoxic residues) through controlled treatment technologies.
- Promotes use of autoclaving, a low-carbon process emitting up to 50 times less CO_2 per ton than high-temperature incineration.
- Improves occupational safety by preventing needle-stick injuries and infections among healthcare and waste workers.
- Creates skilled employment in waste treatment, logistics, maintenance, and administration.
- Strengthens regulatory compliance and traceability of hazardous medical waste in line with Serbia's Waste Management Strategy (2022–2031).



Potential negative impacts

- Increased energy use and CO_2 emissions from treatment operations.
- Generation of residual waste and wastewater.
- High operational costs and strict compliance standards may limit access for smaller healthcare institutions.
- Transport of biomedical waste to centralized facilities may increase fuel use and local air pollution.

Using energy-efficient equipment, proper residual waste and wastewater handling, and optimized transport routes with low-emission vehicles can significantly reduce the project's negative impacts.

HOW DOES THIS PROJECT SUPPORT WASTE MANAGEMENT IN SERBIA?

Serbia is experiencing a growing biomedical waste treatment gap, with over 800 tons left untreated each year and volumes projected to rise by 2030, increasing environmental and public health risks.

The biomedical waste treatment project addresses the issue by enabling:

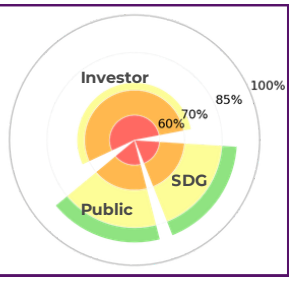
- ✔ **Infrastructure improvement,** expanding national capabilities for biomedical waste management and addressing the growing needs of both public and private healthcare providers.
- ✔ **Environmental risk reduction,** by increasing capacity for proper waste handling and preventing uncontrolled disposal that can lead to soil and water contamination.
- ✔ **Public health protection,** through safe and compliant treatment of infectious biomedical waste, reducing exposure risks for healthcare workers, patients, and the wider population.

CARBON-STORING CONCRETE FACILITY

New potential area

PROJECT SCORE

The project demonstrates **solid overall performance**, with excellent results under the Public and SDG perspectives, and solid performance in the Investor perspective.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

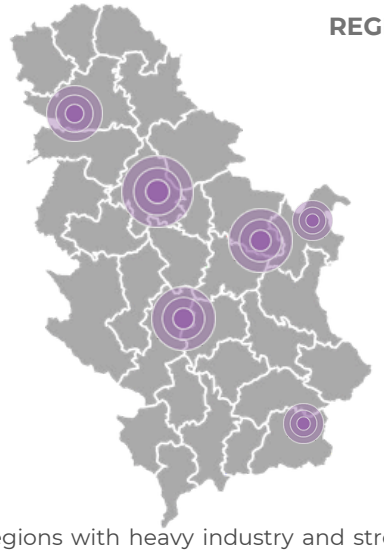
MARKET POTENTIAL

Serbia has a unique advantage for carbon-storing concrete due to its **strong base of CO_2-emitting industries**, coupled with a **dynamic construction sector** that accounted for around 8.3% of gross value added and 7.1% of GDP in 2023. The country's **geographic position** allows access not only to the domestic market but also to the broader Western Balkans region, where sustainable building materials are increasingly demanded.

The Serbian cement & concrete sector is sizable, with **cement capacity estimated at 3.5 million tons annually** and sector revenues projected to reach **1.1 billion EUR by 2025**. The value of construction works in 2022 exceeded **4.8 billion EUR, showing continuous expansion**. However, most of this production still relies on conventional, high-emission methods, leaving the low-carbon materials niche largely untapped.

The potential lies in **green-certified buildings, infrastructure projects financed through EU funds, and licensing opportunities for local concrete producers**. By integrating carbon-storing technologies, **Serbia could capture 5–20% of the domestic concrete market in the next decade**, translating into hundreds of millions of dollars in revenue and permanent storage of industrial CO_2. This positions the country not only as a consumer of sustainable solutions but also as a regional hub for circular construction innovation.

REGION



Regions with heavy industry and strong construction activity, such as Belgrade, Beočin, Kosjerić, Popovac, Smederevo, and Kostolac.

SUCCESSFUL STORY

In Croatia, **Holcim's KOdeCO** project in Koromačno aims to become the first net-zero cement plant in the Mediterranean by 2028, capturing around 366,000 tons of CO_2 annually, while the CO_2NTESSA project in Našice will retrofit an existing plant to capture over 700,000 tons of CO_2 per year. Both projects are backed by EU funds and show how large-scale carbon capture and storage is being deployed in the region.
In Serbia, **Lafarge** (Holcim Group) plans to invest in a new plant in Obrenovac to produce green cement using fly ash from EPS coal power plants. This initiative demonstrates Serbia's readiness to follow similar decarbonization pathways.

BUSINESS MODEL

Development, construction, and operation of a **facility for carbon-negative concrete blocks** that permanently store captured CO_2 through mineralization. CO_2 from industrial emitters such as cement plants, power plants, or steelworks is integrated into the curing phase, producing materials with neutral or negative carbon footprints.

The investor's role includes financing the production line, securing technology licenses or partnerships, partnering with CO_2-emitting industries, and ensuring compliance with EU standards. Revenue comes from sales to construction companies, technology licensing, and monetization of stored CO_2 via carbon credit schemes.

Carbon-negative concrete in Serbia aligns with EU decarbonization trends and rising demand for sustainable materials, with potential for blended financing through private capital, EU funds, and local banks experienced in green and circular projects.

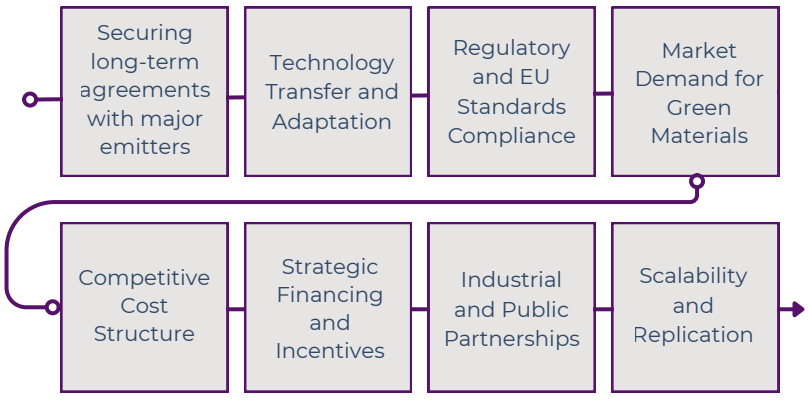
KEY NUMBERS

>€10M
CAPEX

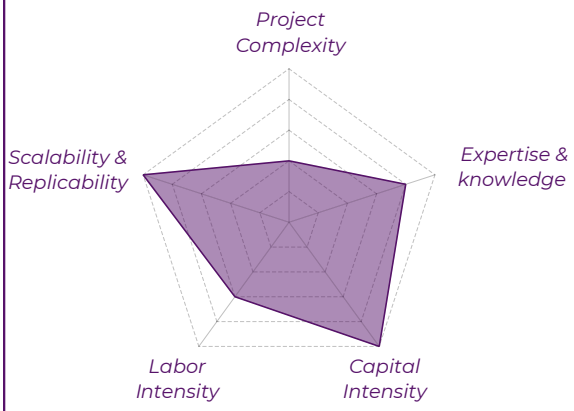
15%-25%
return on investment

4-7 years
payback period

CRITICAL SUCCESS FACTORS



PROJECT OVERVIEW



Moderate to low complexity, as the project combines conventional concrete production with an added mineralization step. While technology integration requires attention, the process builds on existing industrial practices and does not involve highly novel or untested systems.

Requires moderate to high expertise, particularly in CO_2 mineralization technology, sustainable construction standards, and green certification. Financial structuring and regulatory compliance also demand specialized knowledge, though the base construction expertise is widely available in Serbia.

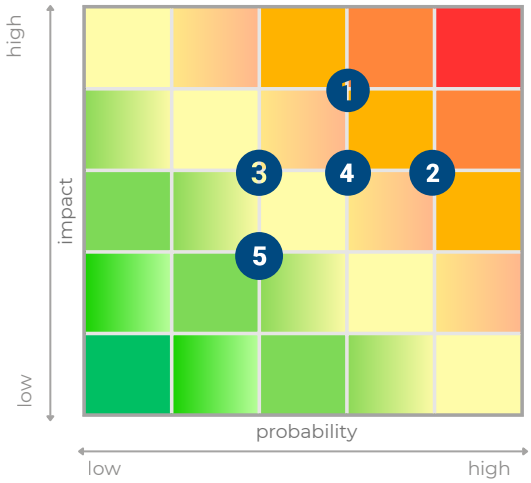
Capital-intensive project. Upfront costs cover land acquisition, construction of production facilities, specialized curing systems, and integration of CO_2 capture and injection technology.

Labor needs are moderate, with a higher demand for skilled workers during facility construction and retrofitting phases, followed by lower workforce requirements during regular operations. The operational stage is less labor-intensive but requires technically trained staff.

The model is highly scalable, as facilities can be replicated near major urban centers and industrial emitters across Serbia and the Western Balkans. Strong and growing demand for sustainable building materials further supports replication potential.

RISK MATRIX

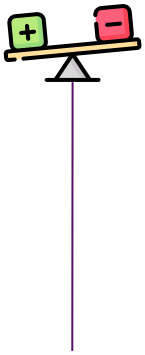
No.	Risk	Description
1	Unreliable CO_2 Supply	Interruptions in CO_2 delivery from industrial emitters (e.g., power plants, cement plants) could disrupt production and reduce output. Securing multi-source agreements and considering on-site capture options.
2	Technology Underperformance	The mineralization process may not achieve the expected CO_2 storage efficiency, undermining both environmental claims and customer trust. Pilot testing, strict quality controls, and vendor support contracts.
3	Regulatory and Certification Delays	Changes in construction and sustainability regulations could delay certification, restrict market entry, or require costly design modifications. Requires early alignment with regulators and green building certification bodies.
4	Market Adoption	Construction companies may resist shifting to higher-priced green concrete if incentives or procurement rules are weak, limiting sales volumes. Involving targeted partnerships, green procurement advocacy, and demonstration projects.
5	Financial and Funding	Delays in securing blended financing could postpone project start or increase financing costs. Including early structuring of financing packages and securing letters of intent from lenders.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces embodied carbon in construction materials by storing CO_2 in concrete, directly supporting Serbia's and the EU's emission reduction targets under the NECP and CBAM framework.
- Lowers lifecycle emissions in the building sector, which accounts for ~40% of total CO_2 output in the EU, contributing to large-scale decarbonization.
- Creates green jobs during construction and operations, while fostering workforce upskilling in sustainable industrial technologies.
- Improves air quality, public health, and living standards through the adoption of cleaner building materials.
- Enhances transparency and investor confidence through ESG reporting, compliance with sustainability standards, and eligibility for green financing instruments.



Potential negative impacts

- High initial CAPEX and energy intensity during plant setup and early production phases.
- Waste management, carbon capture system efficiency, or safety of CO_2 handling.
- Possible public resistance if environmental benefits are not clearly communicated.

These aspects could be addressed through renewable energy integration, strict adherence to safety and waste protocols, transparent communication with local communities, and third-party ESG audits ensuring continuous environmental performance verification.

HOW DOES THIS PROJECT SUPPORT SERBIA'S LOW-CARBON CONSTRUCTION

Serbia's construction sector remains heavily dependent on conventional, high-emission materials, while the availability of certified sustainable building products is still limited compared to EU market expectations.

This project responds to that problem by:

- ✔ **Expanding the market** with carbon-storing concrete blocks for infrastructure, commercial, and residential projects.
- ✔ **Cutting embodied emissions**, as each cubic meter can store 10–20 kg of CO_2, directly contributing to Serbia's and the EU's decarbonization targets.
- ✔ **Boosting competitiveness** by aligning with EU green rules and accessing new markets.

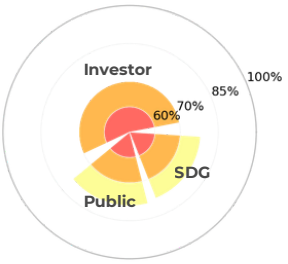
SDG addressed:

CONSTRUCTION AND DEMOLITION WASTE RECYCLING FACILITY

Aligned with IOA 7. Waste Management Services

PROJECT SCORE

The project demonstrates **solid overall performance**, with balanced results across all perspectives and slightly stronger outcomes under the Public and SDG perspectives.



LEGEND

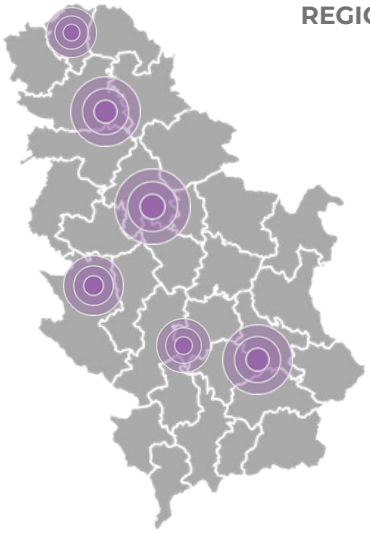
85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Construction and demolition (C&D) waste accounts for over 75% of total waste generated in Serbia, with an estimated 100 million tonnes produced annually, according to the Serbian Association for Demolition, Decontamination and Recycling. About 75% of this waste is excavated soil, and 12–25% is concrete, bricks, and tiles, materials suitable for reuse in cement plants, asphalt production, or landfill cover. Currently, Serbia recycles only a small fraction of its C&D waste, but **national plans target a 40% recycling rate by 2030**, aligning with EU directives. The country is experiencing a boom in construction and infrastructure development, which further accelerates C&D waste generation. However, most of this waste is still landfilled or illegally dumped, with minimal recycling infrastructure in place.

To fill the gap, Serbia plans to establish five regional C&D waste treatment plants by 2027, which is supported with €7.5 million in funding, alongside the procurement of mobile crushers. This upcoming infrastructure demonstrates both the scale of investment interest and the need for organized C&D recycling, creating a favorable environment for private investors and technology providers to position themselves within a growing regulated market.

REGION



Regions where construction activity is high, such as the wider Belgrade region, followed by major urban and tourism development zones in Serbia.

SUCCESSFUL STORY

The Vinča Resource Recovery Center in Belgrade includes a C&D waste recycling unit, launched in 2021 with a capacity of 200,000 tons per year, with a process line capable of 300 tons per hour. Implemented as a PPP with Beo Čista Energija (a consortium of Veolia (France), Itochu Corporation (Japan), and the Marguerite Fund (EU)) and financially supported by the IFC, EBRD, and OeEB, the plant processes concrete, bricks, and other debris into recycled aggregates and metals, generating revenues from treatment fees and material sales while reducing landfill pressure and supporting circular economy goals

Others: The Velde Pukk (Norway), REMEX (Germany)

BUSINESS MODEL

Design, construction, and operation of facilities for the treatment of construction and demolition waste such as concrete, bricks, wood, metals, and glass. Waste is delivered to the facility . Through mechanical separation, crushing, and sorting, the waste is converted into secondary raw materials (recycled sand and aggregates) sold to construction companies, concrete producers, roadworks firms, and public infrastructure projects.
The model can also be implemented through Public-Private Partnerships (PPPs), where the private investor finances, builds, and operates the C&D waste treatment plant, while municipalities secure a stable inflow of waste. The plant functions as a complementary facility to Regional Waste Management Center, where RWMC secures collection C&D waste, while the private investor provides technology, capital, and operations.
The investor's role is to provide capital, technology, and expertise, manage plant operations, and secure long-term contracts with municipalities and buyers to ensure stable revenues and compliance.
The business model relies on revenues from the sale of recycled materials and waste treatment fees.
Revenue streams come from treatment and collection fees paid by municipalities and contractors, complemented by sales of recycled secondary materials to the construction sector and public infrastructure projects.

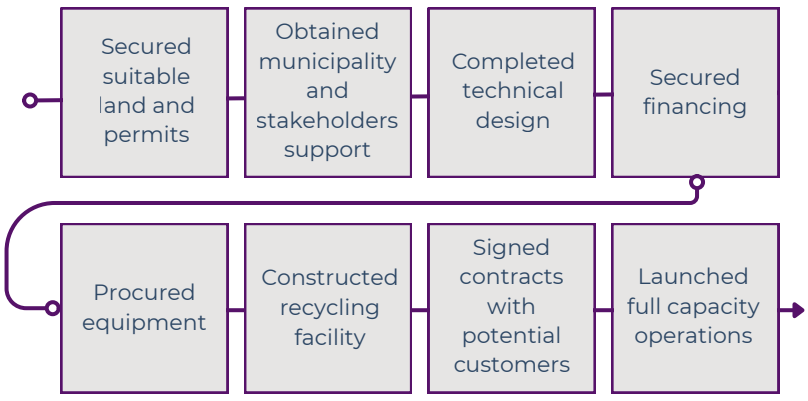
KEY NUMBERS

>€10M
CAPEX

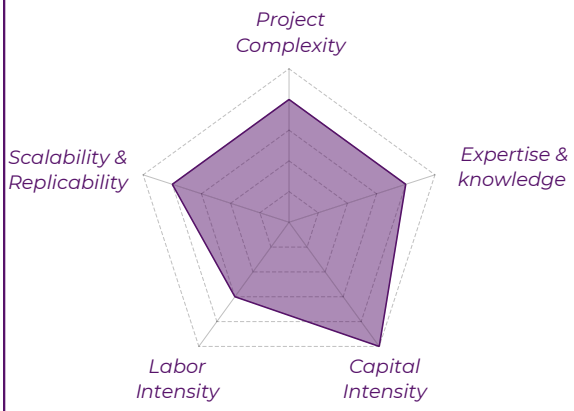
15-25%
return on investment

4-7 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



Project complexity: Requires coordination with diverse stakeholders, adherence to environmental and construction standards, implementation of advanced processing technologies, and adequate quality of recycled materials.

High expertise: Requires strong expertise in waste management and construction sectors practices.

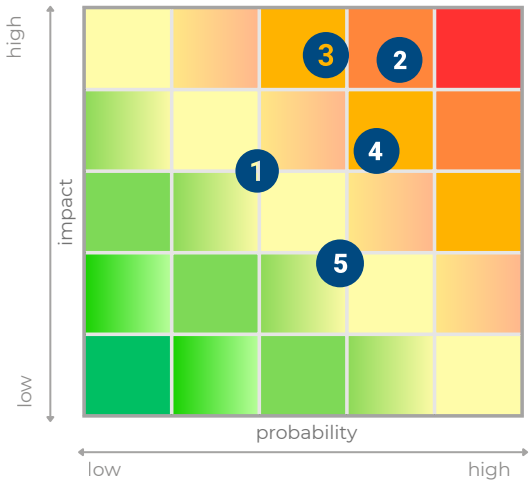
Capital intensity: Significant investment is necessary for infrastructure and equipment.

Labor intensity: The operations require a skilled but moderately sized team, required for sorting, machinery operation and logistics.

High scalability: The model is adaptable to various regions with active construction and limited recycling capacity.

RISK MATRIX

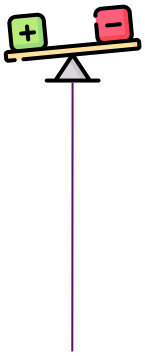
No.	Risk	Description
1	Delays in Securing Permits	Prolonged approval processes or lack of formal backing from municipalities and regional waste centers can postpone facility development. Risk can be mitigated by early engagement with municipalities.
2	Low Collection Rates	Insufficient segregation and collection of recyclable materials at construction sites can limit facility throughput and revenue. Risk can be reduced by providing logistics support to construction companies.
3	Quality Issues with Recycled Output	If processed materials fail to meet technical or certification standards, market acceptance and pricing potential may drop. Risk can be prevented by investing proven sorting, crushing, and screening technologies.
4	Logistics and Transport Inefficiencies	High transport costs or poor coordination between construction sites and the recycling facility can cause delays, increase costs and reduce material recovery rates. Placing the facility near major construction hubs can prevent this risk.
5	Market Demand Volatility	Demand for recycled aggregates and secondary raw materials may fluctuate due to market preferences, regulatory shifts, or price competition with virgin materials. Risk can be limited by securing long-term offtake contracts.



ESG IMPACT ASSESSMENT

Positive impacts

- Recycling 1 t of construction waste saves ~100 kg of CO_2 by substituting carbon-intensive materials such as cement and gravel.
- Reduces extraction of sand, stone, and other virgin aggregates, preserving natural habitats and landscape stability.
- Encourages use of certified recycled materials, supporting circular economy goals and green building standards.
- Diverts waste from landfills and illegal dumpsites, lowering risks of soil and groundwater pollution.
- Improves air quality and safety in nearby communities through formalized, controlled waste processing.
- Generates employment in waste treatment, transport, and material recovery while supporting compliance with Serbia's 2030 recycling target.



Potential negative impacts

- Facility construction and operation may cause local noise and dust emissions.
- Crushing and sorting require energy, increasing the project's carbon footprint.
- Transport of bulky waste raises fuel use and traffic congestion.
- Improper handling of residuals may cause localized soil or water contamination.

Adopting advanced dust and noise control measures, powering operations with clean energy sources, optimizing transport routes, and ensuring safe handling of residual materials can substantially lower the facility's local environmental footprint.

HOW DOES THIS PROJECT SUPPORT WASTE MANAGEMENT IN SERBIA?

Serbia has set a national target to recycle 40% of construction and demolition (C&D) waste by 2030, yet currently lacks the necessary infrastructure to achieve this goal.

This Construction and Demolition waste recycling facility addresses these challenges by:

- ✔ **Waste valorization and circular economy,** transforming inert construction waste into certified secondary raw materials
- ✔ **Stimulating green industry development**, by delivering recycled construction materials
- ✔ **Environmental and health protection,** by reducing the amount of construction waste ending up in landfills and improving environmental conditions in urban and peri-urban areas.

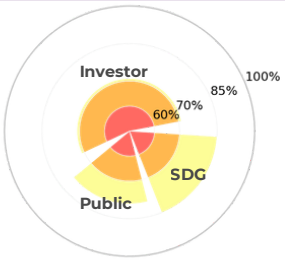
SDG addressed:

ECO-BRICKS MADE FROM PLASTIC WASTE

Aligned with IOA 7. Waste Management Services

PROJECT SCORE

The project demonstrates **solid overall performance**, with the strongest results under the SDG perspective and consistent scores under the Investor and Public perspectives.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

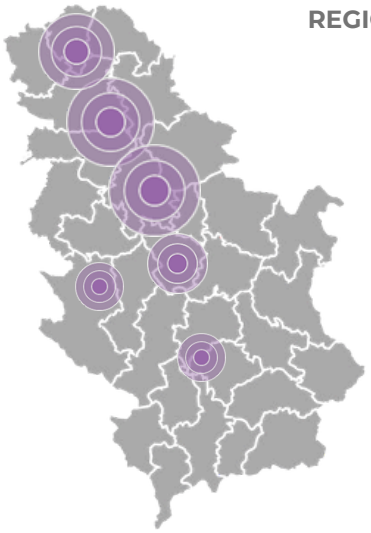
MARKET POTENTIAL

In Serbia, plastic waste generation remains high, with **close to 900,000 tons** produced between 2017 and 2019, most of it from households. However, only about 2% of this plastic was separately collected and recycled, while the overwhelming majority ends up in mixed municipal waste streams and landfilled. This leaves a large, untapped volume of low-value plastics that could be redirected as feedstock for eco-bricks.

The Serbian **construction industry is in growth**, with the value of construction works on residential and non-residential buildings reaching approximately 340 billion RSD (around 2.9 billion EUR) in 2024. The sector remains heavily dependent on concrete, which dominates both residential and commercial projects. Cement, the main component of concrete, is among the most carbon-intensive materials globally, responsible for roughly 8% of total CO_2 emissions, with each ton of cement generating close to 0.9 tons of CO_2. As demand for construction project rises, there is growing need to find more sustainable materials that can meet this demand while reducing environmental impact.

Combining the availability of underutilized plastic waste with the expansion of the construction market creates **strong market potential for eco-bricks**. By replacing part of cement-based materials with recycled plastic bricks, the project can deliver carbon savings, reduce dependency on virgin raw materials, and provide the Serbian construction industry with an affordable, eco-friendly alternative aligned with circular economy and EU Green Deal targets. Currently, eco-bricks are not yet produced on a commercial scale in Serbia, which makes this project an innovative local solution, while similar models have already gained traction in international markets. This gives the project a clear first-mover advantage, with the chance to build a strong market position

REGION



Belgrade and Vojvodina are most suitable regions due to high plastic volumes and construction demand, while Central Serbia and mountain tourist areas offer strong expansion potential.

SUCCESSFUL STORY

ByFusion is a U.S. cleantech company that developed ByBlock, construction blocks made from 100% recycled plastic, including non-recyclables. Using steam compression without additives, the blocks are lighter but as strong as concrete, and have been used in community projects across the U.S. The blocks have been applied in public projects, fences, and community infrastructure. ByFusion has already processed over 100 million tons of plastic waste, with cities such as Los Angeles adopting the technology to convert local plastic streams into usable building materials.

In Serbia, there is still no proven business model of this kind, but international examples highlight significant potential for developing such solutions.

Others: Block Solutions (Finland), Ecobrick (Hong Kong)

BUSINESS MODEL

Collection, sorting, and processing of plastic waste to produce eco-bricks as sustainable building materials for residential and commercial construction. The primary input is locally sourced plastic waste, secured through buy-back programs and partnerships with municipal utility services. The collected plastic is cleaned, compacted, and processed, resulting in certified eco-bricks that are lighter yet equally strong as traditional concrete blocks.

The investor's role is to finance the establishment of collection and processing facilities, secure and integrate buy-back networks for plastic supply, introduce the technology for eco-brick production, and manage operations and market expansion.

The revenue come mostly from the direct sale of eco-bricks to construction firms, architects, and real estate developers, complemented by institutional contracts with municipalities.

The model creates **value** by turning plastic waste into sustainable building materials, lowering carbon intensity in construction.

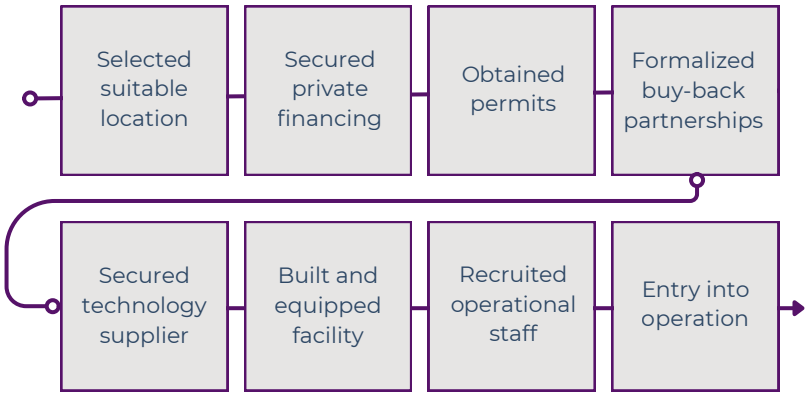
KEY NUMBERS

€1M-5M
CAPEX

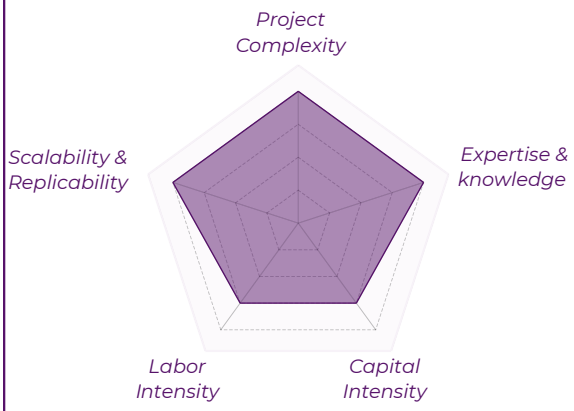
15-25%
return on investment

4-7 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



Moderate to high complexity: While the production technology is straightforward, the project requires building a reliable supply chain for plastic collection, and integration of buy-back systems

Moderate to high expertise: Running the facility requires technical know-how in waste processing and equipment operation, but most skills can be transferred through training; specialized expertise is only needed for initial technology setup and quality certification.

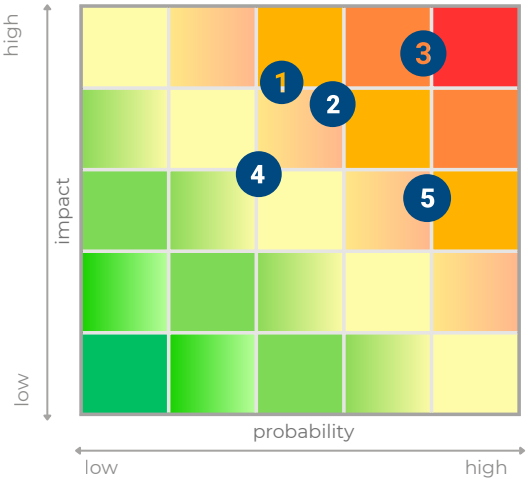
Capital intensity: Requires a moderate level of investment to establish facilities and purchase and install processing equipment

Moderate labor intensity: Involves a moderate operational workforce focused on processing and logistics

Replicability: The project can be replicated in regions with plastic waste streams and construction demand, offering strong growth potential.

RISK MATRIX

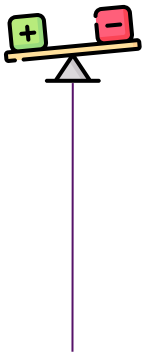
No.	Risk	Description
1	Delays in Permitting	Slow or complex administrative procedures can postpone facility launch. The risk is mitigated by preparing complete documentation and engaging early with regulatory bodies.
2	Unstable Plastic Supply	Irregular or insufficient plastic collection may disrupt production. The risk is mitigated by diversifying buy-back partners and securing long-term supply agreements.
3	Market Acceptance Risk	Construction firms may be reluctant to adopt eco-bricks over conventional materials. The risk is mitigated by obtaining certifications and developed marketing strategy..
4	Technology Failure	Breakdowns or underperformance of equipment can reduce output and increase costs. The risk is mitigated by choosing proven suppliers, and ensuring maintenance contracts.
5	Price Competitiveness	Eco-bricks may face difficulties competing with conventional materials on cost. The risk is mitigated by optimizing efficiency, leveraging incentives, and emphasizing environmental benefits.



ESG IMPACT ASSESSMENT

Positive impacts

- Replaces conventional concrete blocks with low-carbon eco-bricks made from recycled plastic, reducing CO_2 emissions from cement production.
- Decreases reliance on virgin raw materials and lowers environmental burden from extraction and manufacturing.
- Diverts plastic waste from landfills and open burning, preventing methane, CO_2, and toxin emissions.
- Enhances community engagement through citizen and school participation in waste collection and brick production.
- Creates local green jobs and promotes social inclusion by transforming waste into valuable building materials.
- Ensures compliance with national waste and construction regulations and ISO standards for safety and performance.



Potential negative impacts

- Production may generate secondary microplastic particles and energy-related emissions.
- Poor waste sorting can cause contamination of inputs, lowering product quality and recyclability.
- Certain additives or binders may raise environmental concerns at the end of the product's lifecycle.

Ensuring careful separation of collected plastics, using contained washing and filtration systems, energy-efficient equipment, and certified recycling methods at the end of product life can significantly reduce emissions and microplastic leakage during production.

HOW DOES THIS PROJECT SUPPORT SUSTAINABLE CONSTRUCTION IN SERBIA?

Serbia's construction sector is still dominated by conventional, carbon-intensive materials such as concrete, while demand for greener, low-emission alternatives is growing.

The eco-bricks project reduces the problem by enabling:

- ✔ **Improvement of sustainable building practices,** by offering affordable, eco-friendly alternatives to conventional blocks and strengthening Serbia's alignment with EU green construction standards.
- ✔ **Reduction of environmental impact**, by lowering CO_2 emissions linked to cement use and replacing virgin raw materials with recycled plastic.
- ✔ **Increase in resource efficiency,** by transforming low-value plastic waste into certified building materials that extend product lifecycles and support circular economy goals.

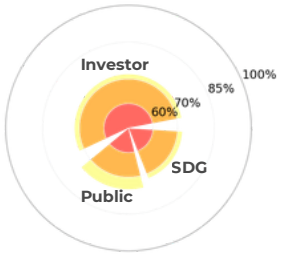
SDG addressed:

ENERGY-FROM-WASTE INCINERATION PLANT

Aligned with IOA 7. Waste Management Services
New Potential Area: Waste-to-Energy

PROJECT SCORE

The project demonstrates **solid overall performance**, with balanced results across all perspectives, though none reaching the top-performing range.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

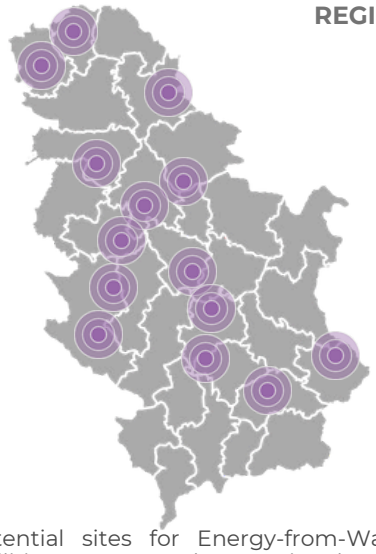
MARKET POTENTIAL

Serbia generated a total of **3.07 million tons of municipal waste** in 2023, the majority of which ended up in unsanitary landfills or wild dumps. With a recycling rate of only 15.5%, a significant share of waste is neither recycled nor recovered, highlighting untapped potential for modern treatment solutions. National policy targets aim to raise the municipal waste recycling rate to 35% by 2030, creating strong demand for new regional facilities that combine safe disposal with sorting, recycling, and resource recovery. Energy from Waste (EfW) represents one of the most effective ways to address this challenge, by converting residual waste fractions into electricity through advanced incineration processes. This approach not only reduces landfill dependency but also supports energy diversification and climate objectives.

The country's energy demand is considerable, with 5,093 kWh of electricity consumed per capita in 2023. Yet out of the total 40,027 GWh of electricity produced that year, only **14 GWh came from waste incineration**, highlighting how marginal this contribution is. Accounting for less than 0.05% of Serbia's electricity mix, it clearly shows that the energy potential of municipal waste remains largely untapped, leaving significant room for EfW development.

EfW projects can deliver multiple benefits: they provide municipalities with a reliable waste treatment solution, generate renewable baseload electricity for the national grid, and contribute to meeting Serbia's circular economy and climate policy targets. With strong waste supply, high energy demand, Serbia offers a **favorable environment** for scaling up EfW development over the coming decade.

REGION



Potential sites for Energy-from-Waste facilities are areas where regional waste management centers are planned or already built.

SUCCESSFUL STORY

The Vinča EfW facility, Serbia's first large-scale waste-to-energy plant, was officially opened in 2024 as part of a PPP between the City of Belgrade and the consortium Beo Čista Energija. Designed to treat about 340,000 tons of municipal waste annually, the plant generates 30 MW of electricity and 56 MW of thermal energy for Belgrade's power grid and district heating network. It is equipped with advanced combustion and flue gas cleaning systems in full compliance with EU Industrial Emissions standards, reduces landfill volumes by more than 90%, and recovers metals from bottom ash, making it one of the most modern EfW facilities in Southeast Europe.

Others: Industriepark Höchst RDF Combustion Plant (Germany), Isséane EfW Plant (France)

BUSINESS MODEL

Development and operation of Energy from Waste (EfW) incineration plants that process municipal solid waste. These plants receive residual mixed waste, collected through municipal systems, and subject it to thermal treatment under controlled conditions. The incineration process reduces waste volume while generating electricity for the grid and heat for district heating networks or industrial users. Alongside energy recovery, by-products such as metals and mineral aggregates are extracted from bottom ash and safely reintroduced into the economy. The project is suitable for **public-private partnerships.**

The investor provides capital for construction, introduces the required technology, provides required expertise and manages plant operations.

Revenues are primarily generated through three streams:

- waste treatment fees from municipalities or public utility companies paid per ton of delivered waste,
- energy sales to the electricity grid operators
- sale of recovered materials

The project creates **value** by providing a sustainable waste management solution that reduces landfill dependency, generates renewable electricity, recovers materials, while ensuring stable revenues for the investors.

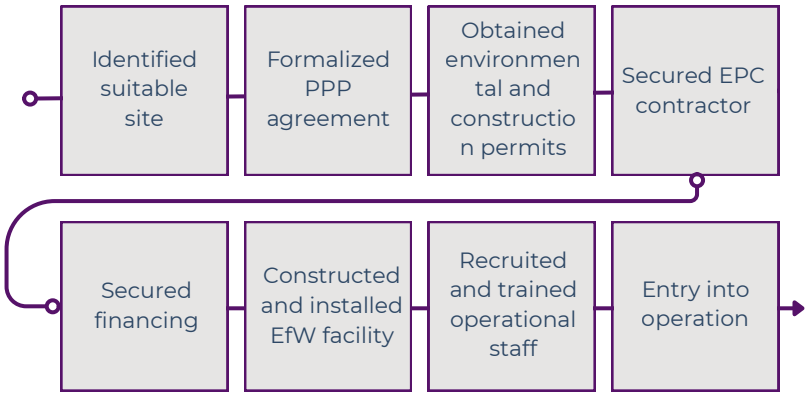
KEY NUMBERS

>€10M
CAPEX

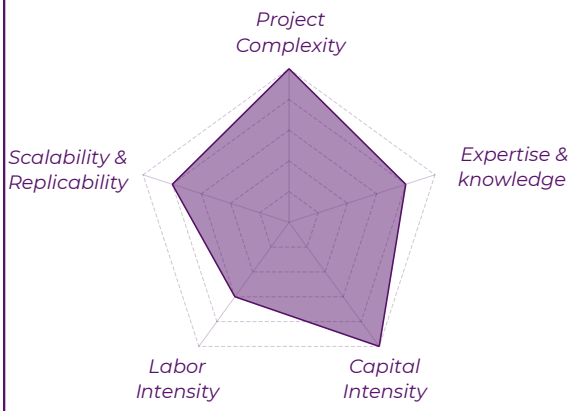
≥25%
return on investment

≤4 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



High complexity: EfW projects are highly complex due to demanding engineering, advanced flue gas cleaning, and strict permitting requirements.

Moderate to high expertise: Successful implementation requires significant technological know-how and specialized operational expertise.

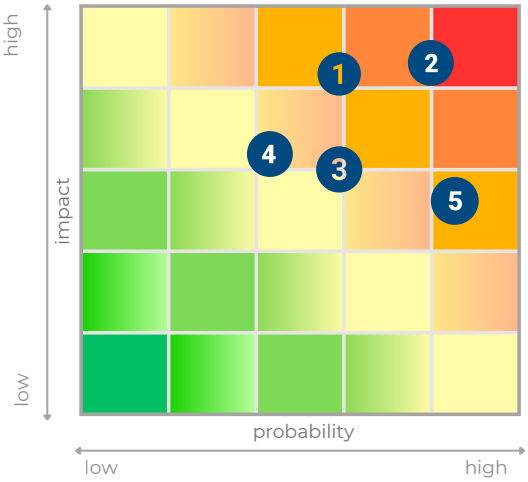
Capital intensity: EfW plants demand very high upfront investment, typically several hundred million euros.

Labor intensity: Staffing needs are moderate compared to other infrastructure projects, with most costs tied to technology rather than labor.

Project scalability: EfW can be replicated in large urban centers with stable waste supply and energy demand.

RISK MATRIX

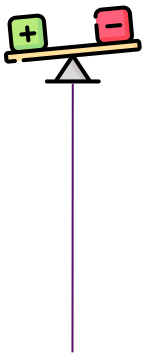
No.	Risk	Description
1	Delays in Permitting	Prolonged negotiations with municipalities and lengthy environmental/construction permit procedures can delay project start;. The project must engage early with municipalities and regulatory authorities to reduce risks
2	Financing Risks	fW projects require significant upfront investment, and difficulties in securing financing or cost overruns can threaten financial viability. To mitigate risk, financing should be structured through PPP or project finance, with long-term gate fee and energy offtake agreements secured
3	Technology Risk	Technical failures or poor operational performance may lead to downtime, efficiency losses, or environmental breaches. To mitigate risk, proven technology providers must be selected, while EPC contracts should include performance guarantees
4	Social Acceptance	Local communities may oppose EfW projects due to concerns about emissions and health impacts, leading to protests or legal challenges. Transparent public consultations should be held, with environmental monitoring results regularly shared in order to prevent risk
5	Offtake Risk	Variability in electricity market prices or lack of long-term offtake contracts can reduce project revenues and financial stability; to mitigate risk, the project should secure long-term Power Purchase Agreements (PPA)



ESG IMPACT ASSESSMENT

Positive impacts

- Diverts large volumes of municipal waste from unsanitary landfills, reducing soil and groundwater contamination.
- Prevents methane emissions from landfills, a gas with 84 times higher warming potential than CO_2 over a 20-year period.
- Generates renewable electricity that provides stable baseload power and reduces reliance on fossil fuels.
- Enables recovery of metals and mineral aggregates from bottom ash, which can be reused in construction, supporting circular economy goals.
- Improves public health by reducing exposure to odors, vermin, and fires resulting from unmanaged waste.
- Contributes to Serbia's Renewable Energy and Climate Policy objectives under the Energy Sector Development Strategy up to 2040/2050.



Potential negative impacts

- Incineration may produce greenhouse gas emissions and air pollutants (e.g., particulates, NO_x) if not effectively controlled.
- Residual ash and by-products require secure treatment and disposal to prevent soil and water contamination.
- High capital and operational costs may limit equitable access to cleaner waste management solutions for smaller municipalities, creating disparities in environmental service coverage.

Implementing high-efficiency thermal treatment and flue-gas cleaning technologies, ensuring secure treatment and monitoring of residual ash, and promoting inclusive financing mechanisms for smaller municipalities can strengthen the project's environmental integrity and equitable social impact.

HOW DOES THIS PROJECT SUPPORT WASTE MANAGEMENT IN SERBIA?

In Serbia majority of municipal waste is disposed in landfills, with minimal energy recovery and only one operational EfW facility.

The project fills this gap by enabling:

- ✔ **Waste diversion from landfills,** through the incineration of residual fractions in modern facilities instead of uncontrolled dumping.
- ✔ **Renewable electricity generation,** by transforming non-recyclable waste into a stable source of baseload power for the national grid.
- ✔ **Public health benefits,** by reducing exposure to pollutants, odors, and spontaneous fires linked to unmanaged waste.

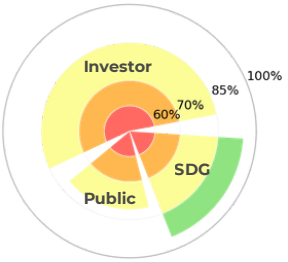
SDG addressed:

FOOD WASTE MANAGEMENT

Aligned with IOA 7. Waste Management Services

PROJECT SCORE

The project demonstrates **excellent overall performance**, positioned in the green range, with outstanding results under the SDG perspective and strong performance across other two perspectives.



LEGEND

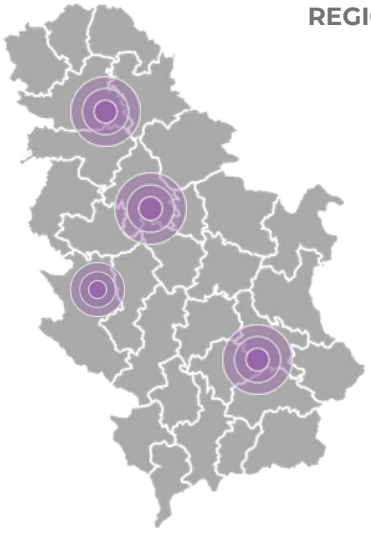
85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Serbia generates approximately **247,000 tons of food waste each year**, with the majority originating from households (42%), the food processing industry (39%), and the hospitality sector (14%). These three sectors contribute to over 95% of the country's total food waste, opening significant opportunities for the implementation of collection, redistribution, and processing services. With an average of 30-40 kg of food lost per capita annually, there is **strong potential** to recover edible surplus and valorize the rest into compost or feed. Belgrade alone produces about 158,000 tons of food waste each year and, with over 2,700 registered food establishments, represents a strategic hotspot for initiating operations.

According to CEVES, 1 kg of food waste contains about 0.13 m^3 of biogas (130 m^3 per ton), each cubic meter producing around 2.85 kWh of energy. Food waste also yields roughly 0.75 kg of compost (750 kg per ton). These conversion rates highlight the high resource recovery potential embedded in food waste, making it a **valuable feedstock for both the energy and agricultural sectors.**

REGION



Regions that bring together a high concentration of HoReCa and food industry actors with well-developed infrastructure.

SUCCESSFUL STORY

Milan (Italy) has one of Europe's most successful food waste management systems. **Montello Plant** processes around 130,000 tons of food waste per year, collected from households, restaurants, and markets. The collection system relies on dedicated bins and frequent pick-ups, which keeps contamination below 5%. The facility combines anaerobic digestion and composting: digestion produces over 11 million m^3 of biogas annually, while composting generates about 26,000 tons of high-quality compost for agricultural use. The system has reduced landfill disposal, lowered CO_2 emissions, and increased Milan's overall recycling rate to more than 60%.

In Serbia such a model has not yet been established, but a pilot initiative by **Delta Holding and Eso Tron** collected almost 24 tons of food waste from restaurants in three months and converted it into biogas, preventing over 16 tons of CO_2 emissions.

These stories illustrate both the proven potential of large-scale food waste management project in Europe and the first steps already taken in Serbia, highlighting the opportunity to scale such solutions domestically.

Others: SUEZ Organics

BUSINESS MODEL

Development and operation of a food waste processing facility with its own collection logistics. Waste is sourced from HoReCa, households (via municipal cooperation), and the food industry. The operator provides standardized bins and ensures regular pick-up through a fleet of specialized vehicles designed for organic waste transport, with collection schedules adapted to the needs of restaurants, households, and industry. The waste is then consolidated at the facility for pre-treatment and processing. All collected waste goes to treatment, where it is converted into outputs such as biogas, compost, and animal feed. The model is well-suited for **public-private partnerships**.

Investor's role is to organize the logistics, build processing capacity, secure supply agreements, and manage operations.

Revenue is generated through the sale of biogas or biomethane to energy distributors, compost and digestate to the agricultural sector, animal feed to livestock producers, as well as service fees for waste collection and treatment from HoReCa and municipalities.

Value is created by transforming food waste into marketable products like biomass or organic compost, thereby turning a disposal challenge into a sustainable source of value.

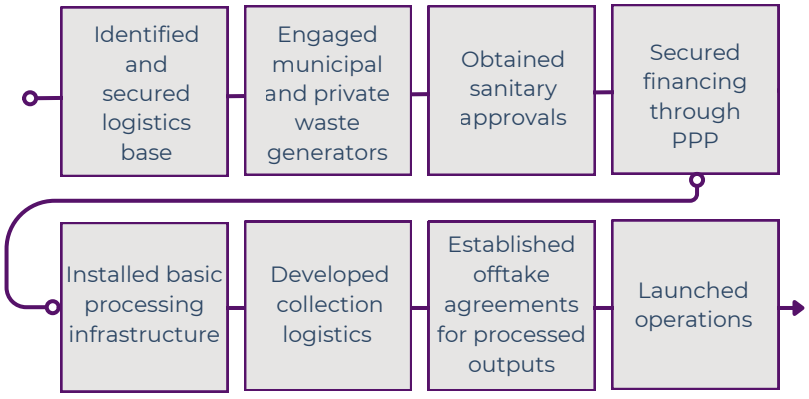
KEY NUMBERS

>€10M
CAPEX

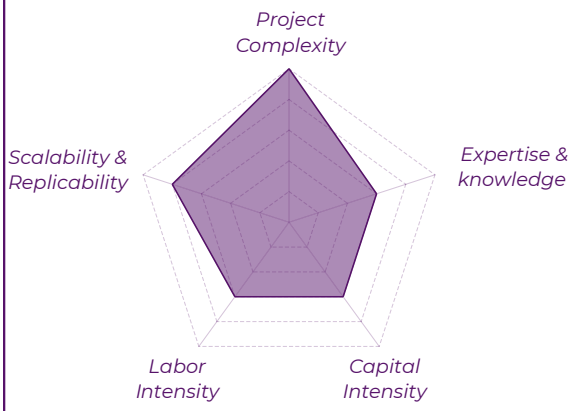
15-25%
return on investment

4-7 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



High complexity: The project requires the coordination of multiple actors, integration of collection and processing streams, and implementation of operational models that are not yet widely practiced in Serbia.

Required expertise: While the technologies involved are not complex, successful implementation demands significant knowledge in logistics, food safety standards, and waste practices.

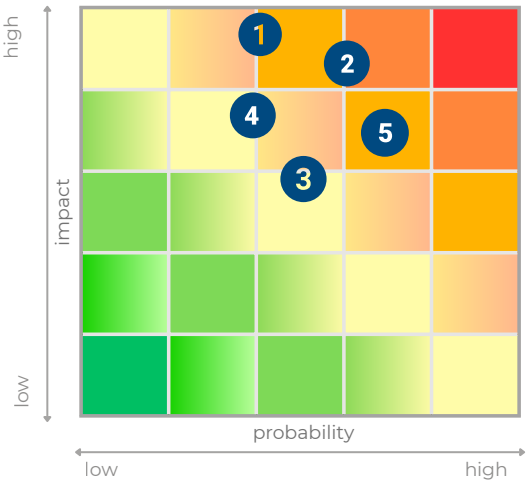
Capital intensity: Moderate investment, that mainly covers logistics, basic processing equipment, and storage infrastructure.

Labor intensity: A moderately sized workforce is needed for collection, sorting, and daily operations.

Scalability: The model is highly scalable and easily adaptable to different municipalities and regions, with strong potential for replication across Serbia and beyond.

RISK MATRIX

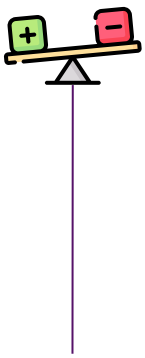
No.	Risk	Description
1	Regulatory delays	Prolonged approval processes for handling edible surplus or compost production can delay or prevent the launch of operations. Early regulatory alignment is crucial to avoid bottlenecks.
2	Insufficient Supply of Food Waste	Failure to secure enough pre-sorted organic waste from HoReCa businesses, households, or processors can undermine operational efficiency and processing capacity utilization. Establishment of long-term supply contracts with HoReCa, municipalities, and food processors can reduce the risk.
3	Contamination of Collected Waste Streams	High levels of non-organic or unsafe materials in collected waste can reduce compost quality, create health hazards, and increase disposal costs. Risk can be mitigated by introducing standardized bins and clear sorting instructions,
4	Limited Market Demand	Weak or unstable demand for compost, animal feed, or biogas feedstock can reduce revenue streams and affect long-term profitability. Risk can be prevented by establishing offtake agreements in the early phase.
5	Reputation Risk	Negative publicity or community concerns may undermine public trust and reduce stakeholder willingness to cooperate. It is important to maintain transparency in operations, establish strong communication with local communities and stakeholder



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces food waste sent to landfills through composting and other low-emission processing methods.
- Helps lower the carbon footprint of the hospitality sector, which generates around 28,000 t CO_2e annually, by reducing landfill disposal and associated emissions.
- Mitigates methane emissions, conserves landfill capacity, and protects soil and water quality through compost and digestate use.
- Creates green jobs in collection, logistics, and processing while supporting inclusion and local entrepreneurship.
- Increases public awareness of sustainable consumption and strengthens alignment with Serbia's Waste Management Program (2022–2031) and EU Circular Economy goals.



Potential negative impacts

- Processing facilities may rely on non-renewable energy, reducing the project's overall sustainability gains.
- Inefficient segregation of food waste at source can lower processing quality and increase contamination.
- Transport and treatment activities generate moderate CO_2 emissions that partially offset environmental benefits.
- Poorly managed composting or anaerobic digestion can cause unpleasant odors and bioaerosol emissions affecting nearby residents.

Using renewable energy in processing, improving waste segregation, optimizing transport, and applying strict environmental controls in composting facilities can reduce emissions, odors, and community impacts while enhancing sustainability performance.

HOW DOES THIS PROJECT SUPPORT WASTE MANAGEMENT IN SERBIA?

Serbia faces rising challenges linked to excessive food waste, with over 95% of it coming from households, hospitality, and the food industry.

The food waste management project tackles the issue by enabling:

- ✔ **Efficient recovery and transformation** of food waste into compost, animal feed, or energy through integrated collection and processing streams.
- ✔ **Reduction of edible food losses**, by diverting food waste from landfills toward low-emission treatment and processing solutions.
- ✔ **Introduction of models for food waste collection** and processing that are not widely practiced in Serbia.

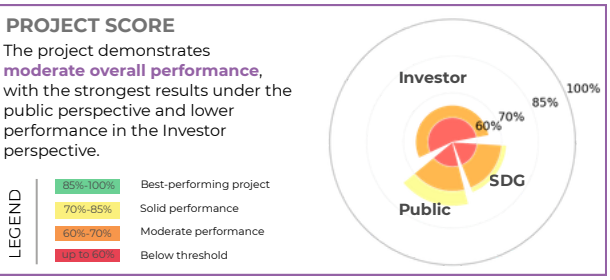
SDG addressed:

MOUNTAIN RESORT HOTEL

Aligned with IOA 10. Hospitality Faacilities

PROJECT SCORE

The project demonstrates **moderate overall performance**, with the strongest results under the public perspective and lower performance in the Investor perspective.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

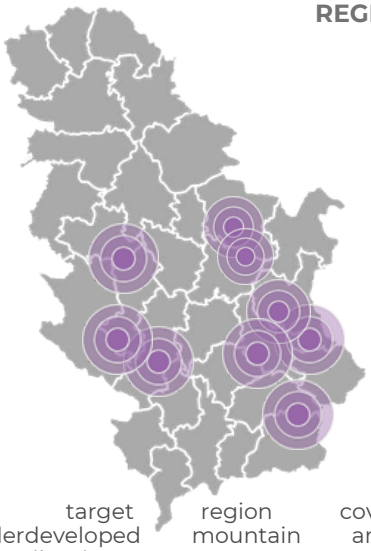
MARKET POTENTIAL

The majority of Serbia's territory lies within mountainous areas, stretching from the north to the south of the country. There is over 100 mountains in Serbia, yet tourism activity is highly concentrated in a few destinations. Out of a total of 12.66 million overnight stays in 2024, **mountain centers accounted for 2.9 million**, with Zlatibor alone recording 1.2 million and Kopaonik 636,000. Other popular mountain destinations include Tara, Fruška gora, Divčibare, Stara Planina, Golija, Goč, etc.

However, the vast majority of Serbia's mountains have a total accommodation **capacity of fewer than 1,000 beds**, and service quality well below that of established resorts in more developed markets. significantly limiting their ability to serve tourists. Many of these locations lack modern infrastructure and premium lodging options, further constraining their competitiveness in attracting more demanding visitors.

This creates a substantial market potential for the further development of sustainable mountain tourism, with a focus on diversification of visitor flows beyond the current few dominant destinations. By investing in modern, eco-friendly accommodation and complementary infrastructure across underdeveloped mountain areas, Serbia can reduce seasonal and geographic imbalances, attract new market segments.

REGION



The target region covers underdeveloped mountain areas primarily in Western, Eastern, and Southern Serbia.

SUCCESSFUL STORY

Six Senses Crans-Montana is a benchmark for sustainable luxury in mountain tourism. Built to eco-certified standards (LEED, BREEAM), it integrates renewable energy, water-saving technologies, and waste reduction systems. Local sourcing and circular practices complement its year-round offer, from ski-in/ski-out in winter to hiking and cultural tours in summer, ensuring high occupancy.

In Serbia, **Stara Planina Resort** is a fully integrated mountain destination. With over 140 rooms, spa, conference halls, and ski access, it applies energy-efficient systems and waste management practices while supporting local employment and regional tourism. Although it lacks international eco-certifications, it still represents a solid domestic case of sustainable mountain hospitality.

Others: Viceroy Kopaonik, Mona Plaza Zlatibor, Ramonda Rtanj

BUSINESS MODEL

Construction, operation, and management of eco-certified hotels in mountain areas, serving both winter (ski) and summer (hiking, biking) tourism. Facilities include accommodation, spa and wellness centers, panoramic restaurants, family zones, and outdoor recreation infrastructure, powered by renewable energy and efficient resource management systems. The main customers are domestic and international tourists seeking premium year-round mountain experiences such as skiing, hiking, and wellness retreats, together with families and corporate groups.

Investor's role is to provide capital for hotel development and certification, securing returns through operational cash flows. In addition, they support governance, and international partnerships that strengthen the project's market position. **Revenue** is generated through accommodation bookings complemented by spa and wellness services, restaurant services, event hosting, equipment rentals in winter, and guided tours with outdoor activities in summer.

After entry into operation, the resort provides guests with premium and sustainable mountain experiences, while ensuring stable cash flows for investors, as well as the potential to scale the model to other destinations.

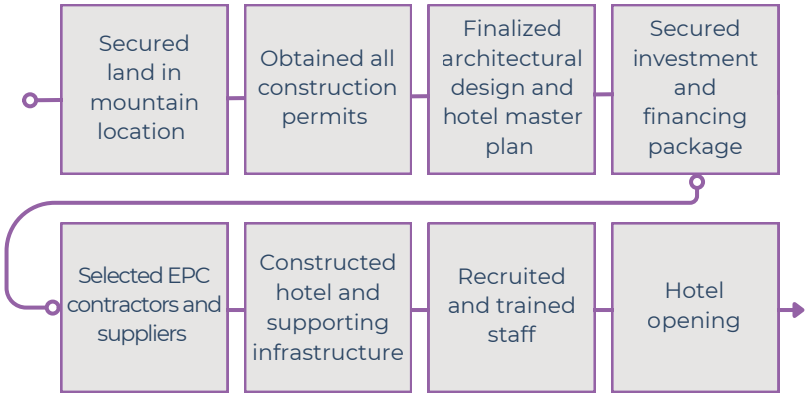
KEY NUMBERS

>€10M
CAPEX

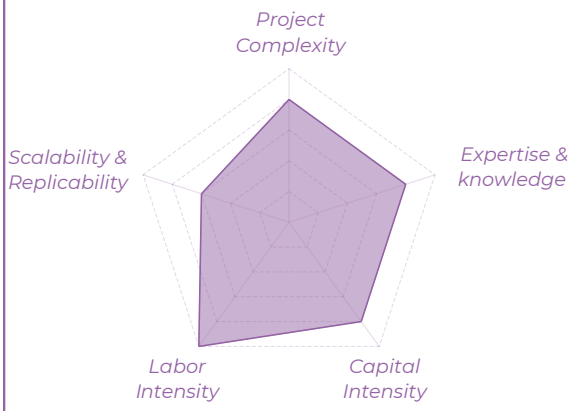
10-15%
return on investment

7-10 years
payback period

PROJECT MILESTONES



PROJECT OVERVIEW



Moderate to high complexity: Combines construction of high-capacity accommodation, wellness and spa facilities, restaurants, and outdoor recreation areas in a mountain setting, requiring adaptation to challenging terrain, seasonal weather constraints, and strict environmental regulations.

Required expertise: Requires expertise in hospitality architecture adapted to mountain environments, construction project management, and hotel operations management.

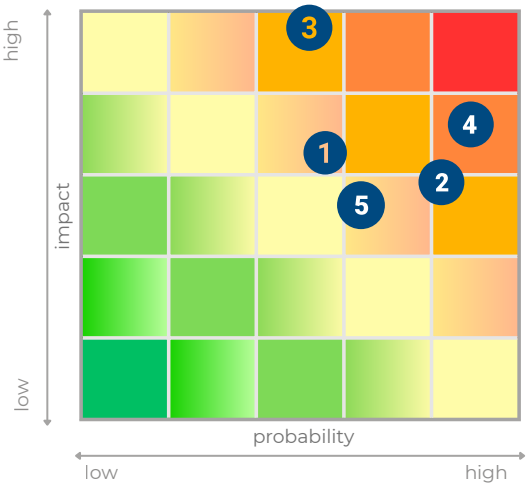
Capital intensity: Requires major upfront funding for land acquisition, and construction, with a relatively long lead time before full return on investment.

Labor intensity: Tourism and hospitality are inherently labor-intensive industries, relying on a large and diverse workforce to deliver personalized services and maintain high operational standards.

Moderate scalability: Resort model can be adapted to other mountain destinations with tourism potential, but success depends on location-specific demand, accessibility, and environmental constraints.

RISK MATRIX

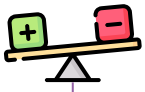
No.	Risk	Description
1	Permit and Regulatory Approval Challenges	Complex approval processes for construction, and other permits in central urban areas can cause significant delays, especially if the site involves protected architecture or is located near culturally sensitive zones. This can be mitigated by early engagement with regular authorities
2	. Construction Cost Overruns	Urban sites face higher costs from limited space, traffic management, and premium labor and materials, which can strain budgets and impact project returns. Fixed-price contracts can reduce this risk.
3	Demand Volatility	Demand peaks in the winter and summer high seasons, while shoulder seasons experience low occupancy, affecting revenue and profitability
4	Operational Workforce Fluctuation	High employee turnover in the hospitality sector can lead to increased training costs, inconsistent service quality, and operational inefficiencies. The risk can be reduced by offering competitive compensation.
5	Competition from New or Upgraded Hotels	The entrance of new hotels or the renovation of existing ones in strategic urban locations can intensify competition, putting downward pressure on room rates and occupancy levels. This risk can be mitigated by strengthening customer loyalty .



ESG IMPACT ASSESSMENT

Positive impacts

- Integrates eco-certified materials, high-performance insulation, and energy-efficient systems that significantly reduce greenhouse gas emissions compared to conventional hotels.
- Green building design typically cuts energy and water use by 20–40%, lowering operational costs and environmental footprint.
- Protects local biodiversity through careful site selection and landscape planning that avoids ecologically sensitive zones.
- Creates employment and strengthens local supply chains in underdeveloped mountain regions, generating inclusive economic growth.
- Supports gender equality, as women represent over half of the tourism workforce globally.
- Complies with national tourism and nature protection laws, ensuring that development respects local conservation regimes.



Potential negative impacts

- Use of imported materials and long-distance supply chains can increase the project's carbon footprint.
- Rising visitor numbers may strain local infrastructure and natural resources without proper capacity management.
- Construction or operation that exceeds renewable energy capacity could heighten local energy demand and environmental pressure.
- Overdevelopment in ecologically sensitive zones may disrupt habitats and reduce biodiversity.

Prioritizing local materials and supply chains, managing visitor capacity, maintaining renewable energy balance, and enforcing strict land-use and conservation standards can minimize environmental pressure and protect biodiversity in mountain areas.

HOW DOES THIS PROJECT SUPPORT SERBIA'S HOSPITALITY SECTOR

Serbia's mountain tourism is highly concentrated in a few destinations, while the majority of mountains remain underdeveloped, with limited accommodation capacity.
This project addresses the problem by enabling:

- ✔ **Tourism diversification,** attracting visitors to underdeveloped mountain areas and reducing overreliance on a small number of destinations
- ✔ **Regional economic development,** creating jobs in rural communities, supporting local supply chains, and increasing economic activity in less developed municipalities
- ✔ **Sustainable tourism growth,** integrating eco-certified construction, renewable energy use, and efficient resource management

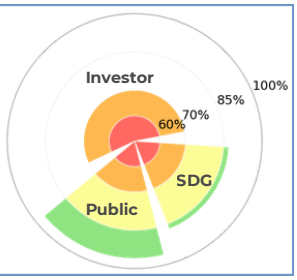
SDG addressed:

MULTIMODAL RIVER PORT EXPANSION

Aligned with IOA 8. Port Infrastructure

PROJECT SCORE

The project demonstrates **solid overall performance**, with excellent results under the Public and SDG perspectives and moderate performance in the Investor perspective.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

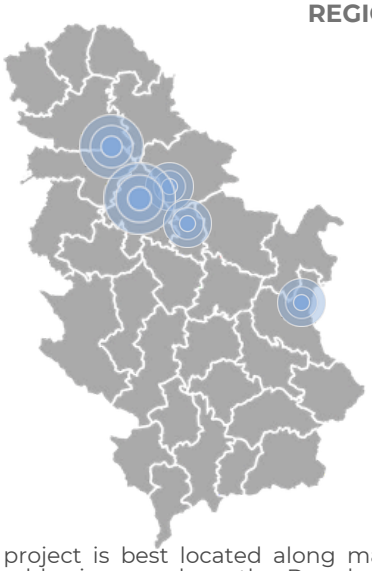
MARKET POTENTIAL

With a river network stretching over 66,000 kilometers, Serbia enjoys a natural advantage in water transport through its main arteries, the Danube, Sava, and Tisa. The Danube River alone, which flows through Serbia for 588 kilometers, serves as the country's main inland waterway corridor and is internationally recognized as Corridor 7 (Danube Corridor). The Port Governance Agency recorded a **cargo transshipment of 15.2 million tons** on Serbian rivers in 2024, of which 12.8 million tons moved along the Danube, the country's most important inland waterway corridor. The largest ports include Belgrade, Novi Sad, Pančevo, Smederevo, and Prahovo, Ports in Serbia are generally characterized by outdated superstructure, with cranes over 50 years old, low productivity, and high operating costs that limit competitiveness. Equipment is poorly maintained due to lack of spare parts and expertise, resulting in longer cargo handling times and higher transport costs.

The importance of upgrading river infrastructure is strongly reflected in the **EU's NAIADES III Action Plan**, which promotes the shift of freight to inland waterways and multimodal nodes. The strategy sets clear targets: a **25% increase in inland waterway transport by 2030 and a 50% increase by 2050** compared to 2015 levels. This policy framework underlines the relevance of developing modern multimodal river ports in Southeast Europe, ensuring alignment with EU transport and sustainability objectives.

Multimodal ports offer a **clear path to improving efficiency and competitiveness** by transforming outdated river facilities into integrated logistics hubs. By combining river, rail, and road transport, they reduce handling times, lower costs, and create new opportunities for regional and international trade. In addition, the shift from road to water transport brings secondary benefits such as reduced congestion and limited environmental impact, further strengthening the case for investment.

REGION



The project is best located along major navigable rivers such as the Danube, in proximity to industrial and logistics hubs with access to road and rail networks.

SUCCESSFUL STORY

The Port of Ruse, Bulgaria's largest port on the Danube, is being modernized through the construction of a new intermodal terminal with rail integration and improved cargo handling facilities. Strategically located near the Romanian border, it is positioned to become a cross-border logistics hub connecting river, rail, and road transport. This strengthens Ruse's role in regional trade flows and enhances its importance in European multimodal transport networks.

Although this model has not yet been developed in Serbia, the Danube river provides a clear opportunity to replicate proven business cases for multimodal river ports along this strategic corridor.

Others: Vienna Port Austria, Port of Duisburg (Germany)

BUSINESS MODEL

Construction of specialized terminals for containerized, bulk, and liquid cargo. The project includes potential connections to existing road and rail networks by building access links and upgrading terminal infrastructure, ensuring full intermodal integration. The site functions as a **logistics hub**, where goods are received, transferred between different transport modes, stored, consolidated, and prepared for further distribution. In addition to cargo handling, the hub enables value-added services such as customs clearance, packaging, and digital supply chain integration.

The model is well-suited for **PPPs**, as it combines infrastructure of public importance with strong revenue potential, but it can also be developed by a private investor under a **concession or long-term lease arrangement**, ensuring rights to manage the port and capture revenues.

The investor's role is to finance the development of specialized terminals, manage and maintain port operations, and secures long-term contracts with logistics and industrial clients.

Revenue streams come from terminal and warehouse fees, cargo handling charges, and value-added services such as customs brokerage. The project reduces transit times for inland-based companies, strengthens regional trade flows, and supports the modal shift from road to river and rail transport.

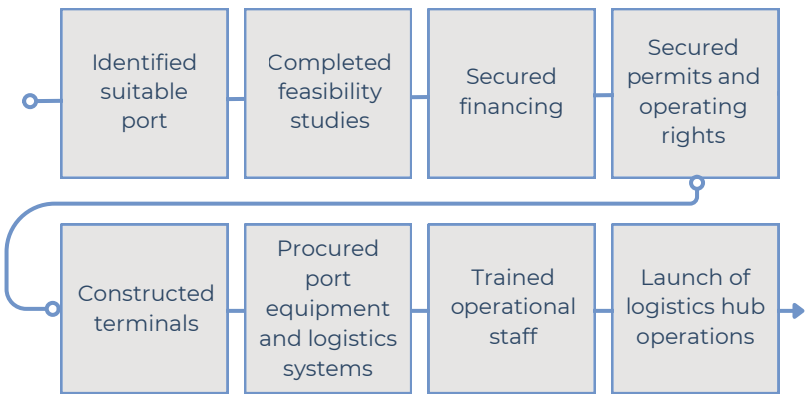
KEY NUMBERS

>€10M
CAPEX

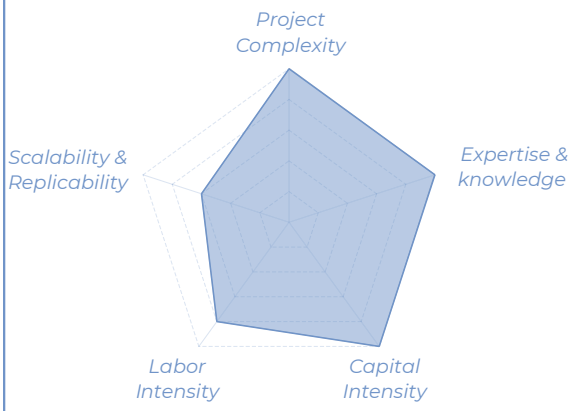
10-15%
return on investment

5-10 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



High complexity: The project is highly complex due to integration of multiple transport modes, regulatory approvals, and coordination of infrastructure, technology, and stakeholders.

Required expertise: The project demands specialized multidisciplinary expertise in port engineering, intermodal logistics, digital systems.

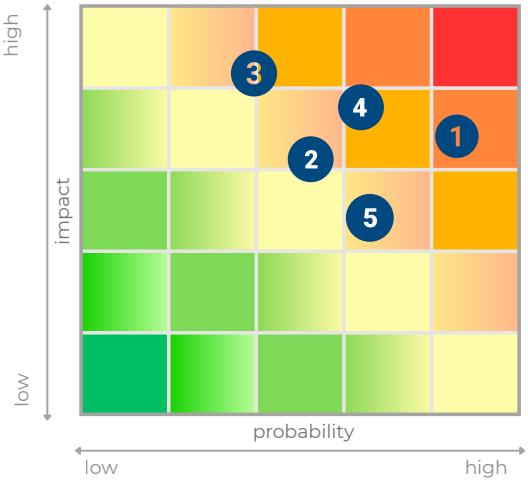
Labor intensity: Construction and operations require a moderate to high level of workforce involvement, as the project entails significant physical works during the building phase and sustained staffing needs for cargo handling, maintenance, and logistics services once operational.

Capital intensity: The project is highly capital intensive, involving significant investment in terminals, equipment, and intermodal links.

Replicability: The model is replicable along other Danube and other inland river ports, but site-specific infrastructure and demand limit unlimited scaling.

RISK MATRIX

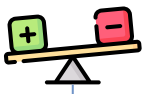
No.	Risk	Description
1	Financing Risk	Large upfront investment may strain financing and project returns.. To reduce risk, financing should be structured through blended sources and phased investment implemented.
2	Lower-than-Expected Cargo Volumes	Lower demand for port services may underperform projections. To mitigate risk, long-term contracts with key shippers and logistics operators should be secured
3	Climate and Water Level Risks	Extreme weather and fluctuating water levels on the rivers may limit navigability and disrupt port operations. o mitigate risk, resilient infrastructure design and adaptive scheduling should be implemented.
4	Infrastructure Connectivity Gaps	Insufficient or delayed road/rail links can reduce intermodal efficiency. To reduce risk, authorities should be engaged in the early phase to ensure timely delivery of access links.
5	Operational Risks	Failures in equipment, or workforce capacity can disrupt operations. To mitigate risk, robust digital systems, staff training, and preventive maintenance programs should be implemented.



ESG IMPACT ASSESSMENT

Positive impacts

- Promotes a modal shift from road to inland waterway transport, which emits about 33 g CO_2 per ton-km compared to 137 g for road freight.
- Reduces fuel consumption, logistics costs, and delivery times by consolidating river, rail, and road operations in one hub.
- Decreases heavy truck traffic, congestion, and noise, improving air quality and community safety.
- Creates jobs during construction and long-term operations while enhancing workforce skills through new technologies.
- Strengthens governance and compliance with Serbia's Waterborne Transport Strategy and EU NAIADES III targets for sustainable freight growth.



Potential negative impacts

- Construction activities may cause temporary disturbance of aquatic habitats, sedimentation, and water pollution.
- High reliance on fossil-fuel equipment or inefficient logistics chains can increase emissions and reduce sustainability benefits.
- Expansion of cargo capacity without adequate green infrastructure may lead to local congestion and higher freight-related pollution.

Adopting low-emission port equipment, and integrating green infrastructure and efficient transport management can substantially reduce negative impacts and protect surrounding river ecosystems.

HOW DOES THIS PROJECT SUPPORT PORT INFRASTRUCTURE DEVELOPMENT?

Serbia's river ports still rely on outdated infrastructure, limiting efficiency and alignment with modern logistics needs.

This project fills the gap by enabling:

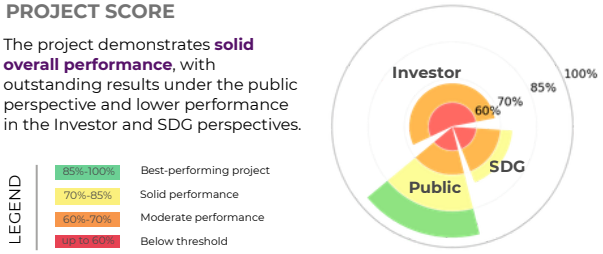
- ✔ **Development of modern multimodal logistics hubs** integrating river, rail, and road transport.
- ✔ **Increased efficiency** through upgraded infrastructure, improved cargo handling, and integrated logistics that streamline storage, and intermodal transfers.
- ✔ **Contribution to sustainable transport** by reducing road congestion, emissions, and overall logistics costs.

PLASTIC ROADS

New potential area

PROJECT SCORE

The project demonstrates **solid overall performance**, with outstanding results under the public perspective and lower performance in the Investor and SDG perspectives.



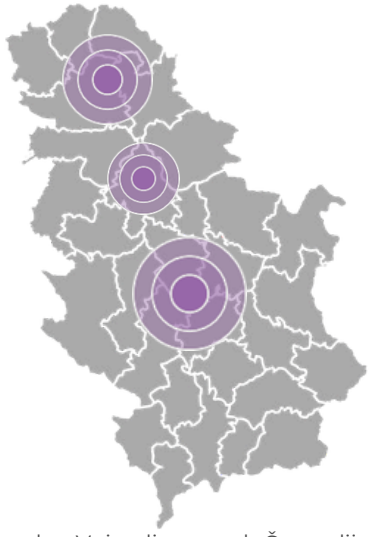
MARKET POTENTIAL

Serbia shows **steady road-building demand** (network ~45,220 km, ~953 km of toll motorways, with ~1,000 km of express roads planned), while **low recycling rates** ensure a stable feedstock of non-recyclable plastics and a strong circular-economy case. At the same time, **Serbia imports ≈ €23.8 m (49.4 m kg) of bitumen annually**, so substituting 6–10% with plastic reduces costs and currency risk. This combination of infrastructure demand, low recycling, and bitumen dependency makes the country well-suited for Plastic Roads.

Analysis of the cement and concrete market (2018–2021) confirms an active domestic base, with asphalt plants nationwide and ~1.3 m t of asphalt produced in 2015—indicating readiness for modified mixes and rapid scale-up.

Introducing 6–10% plastic substitution, even in part of national or local construction, can cut bitumen imports and emissions while attracting green finance. With recycling rates still low (2020: 15.45% overall, <2% household waste), abundant plastic is available for diversion from landfills, creating opportunities for municipal pilots, regional road projects, and green-procurement schemes.

REGION



Belgrade, Vojvodina, and Šumadija & Western Serbia, due to intensive road construction and high plastic waste generation.

SUCCESSFUL STORY

The **PlasticRoad** pilot in Zwolle, Netherlands, built a 30-meter bike path from recycled plastics, proving faster installation and 2–3 times longer durability than conventional materials.

In Germany, ecopals apply EcoFlakes—recycled plastic granules replacing part of bitumen—cutting the carbon footprint by ~20% and already used on highways and regional roads.

These cases confirm the feasibility and point to clear opportunities for scaling Plastic Roads in Serbia.

BUSINESS MODEL

Development and integration of **non-recyclable plastic waste (LDPE, HDPE) into asphalt production**, where shredded plastic pellets replace 6–10% of bitumen. This approach improves road durability, extends lifespan, and reduces both plastic pollution and reliance on petroleum-based materials.

The investor finances and operates plastic processing facilities, secures waste supply through agreements with municipalities and recycling operators, and collaborates with asphalt plants and road construction companies. Pilot road sections validate performance and compliance before large-scale deployment.

Revenues derive from supplying modified asphalt to public infrastructure programs and private contractors, with added potential from EU green financing and circular economy incentives. Serbia's steady demand for road construction and alignment with European sustainability goals provides a stable and scalable market.

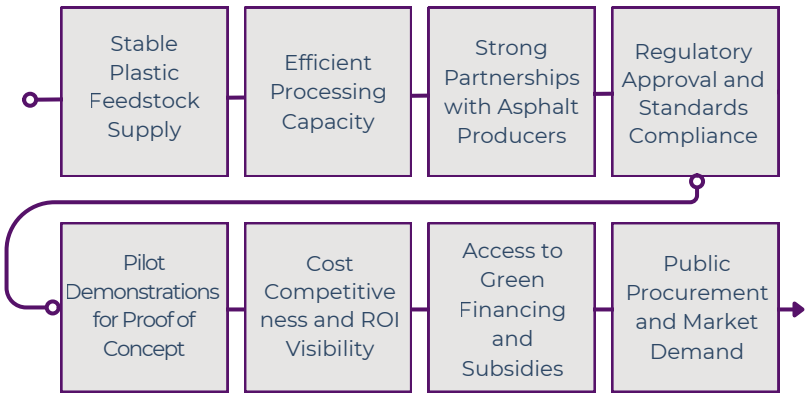
KEY NUMBERS

€6-8M
CAPEX/1km

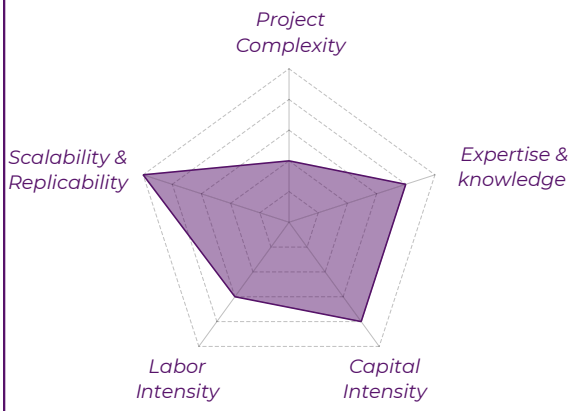
10%-15%
return on investment

7-10 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



Moderate complexity, as the project combines standard asphalt production and road construction processes with the integration of recycled plastics, requiring regulatory validation and performance testing.

Moderate to high expertise is required, with strong needs in road engineering, polymer processing, environmental certification, and financing mechanisms linked to circular economy projects.

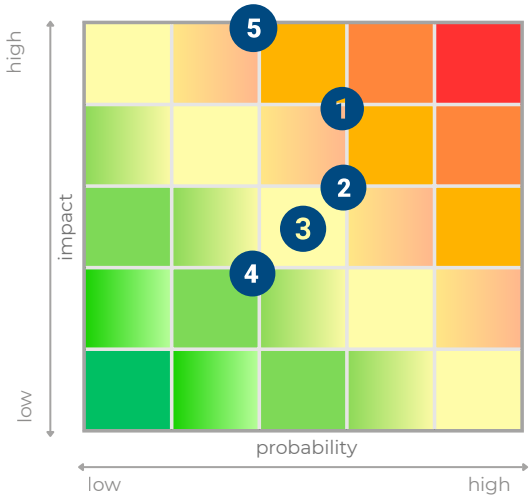
High capital intensity due to significant upfront investments in shredding and pelletizing facilities, technology integration with asphalt plants, and pilot project implementation.

Moderate labor intensity, with demand for a skilled workforce during construction and retrofitting phases, while long-term operational needs remain relatively limited.

Very high scalability, as the model can be replicated across municipalities and regions, leveraging consistent road construction demand and abundant plastic waste streams to enable wide adoption.

RISK MATRIX

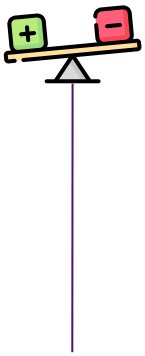
No.	Risk	Description
1	Regulatory and Approval Delays	Lengthy permitting procedures or evolving road construction standards could delay project initiation and increase pre-construction costs. Early coordination with road authorities can mitigate this risk.
2	Feedstock Supply Uncertainty	Inconsistent quantity or quality of collected plastic waste could disrupt asphalt mix production. Long-term agreements with municipalities and waste operators are essential.
3	Technology and Process Integration	Difficulties in adapting asphalt plants or failures in plastic shredding and pelletizing equipment may reduce performance. Selecting proven technologies and experienced partners lowers this risk.
4	Market Uptake and Demand	Public buyers and contractors may be hesitant to adopt plastic-modified asphalt due to limited awareness or perceived risks. Pilot demonstrations and awareness campaigns can build confidence.
5	Performance and Durability Gaps	If plastic-modified asphalt fails to deliver expected durability and maintenance benefits, credibility and scalability could be undermined. Rigorous pilot testing and monitoring are required.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces landfill use and plastic pollution by repurposing LDPE and HDPE waste into asphalt, cutting GHG emissions from virgin plastic and bitumen production.
- Improves resource efficiency and supports Serbia's transition toward a circular economy aligned with EU waste and environmental directives.
- Enhances air quality and public health by reducing waste burning, frequent maintenance works, and particulate emissions.
- Increases road durability, lowering maintenance frequency, traffic disruptions, and community exposure to dust and noise.
- Strengthens regulatory alignment and investor reputation through ESG compliance, contributing to Serbia's Waste Prevention Program (2020–2025) and EU Green Agenda objectives.



Potential negative impacts

- Possible microplastic release from road wear over time if not properly managed.
- Inconsistent plastic quality or contamination affecting material performance.
- Potential environmental contamination if waste segregation and preparation are poorly controlled.

These aspects could be addressed through rigorous plastic quality control, use of certified polymer blends with low microplastic shedding potential, lifecycle monitoring of road performance, and adherence to EU environmental and recycling standards.

HOW DOES THIS PROJECT SUPPORT SERBIA'S CIRCULAR ECONOMY AND SUSTAINABLE INFRASTRUCTURE?

The road sector in Serbia faces high maintenance costs, reliance on imported bitumen, and limited solutions for non-recyclable plastic waste.

This project responds to that problem by:

- ✔ Substituting 6–10% of bitumen with recycled plastics, **reducing dependence on petroleum imports and lowering emissions.**
- ✔ **Diverting significant volumes of low-value plastics from landfills** (< 2% of household waste is recycled in Serbia), directly supporting national and EU circular economy goals.
- ✔ **Extending road durability and cutting maintenance needs,** which decreases costs, traffic disruptions, and pollution, while aligning infrastructure development with ESG standards.

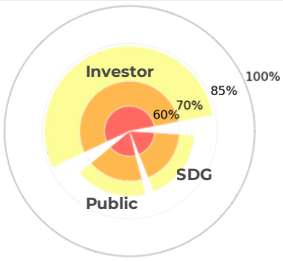
SDG addressed:

REAL-ESTATE GREEN SMART DEVELOPMENT

Aligned with IOA 9. Energy-efficient Residential Housing

PROJECT SCORE

The project demonstrates **solid overall performance**, with the strongest results under the Investor perspective and moderate performance under the Public and SDG perspectives.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

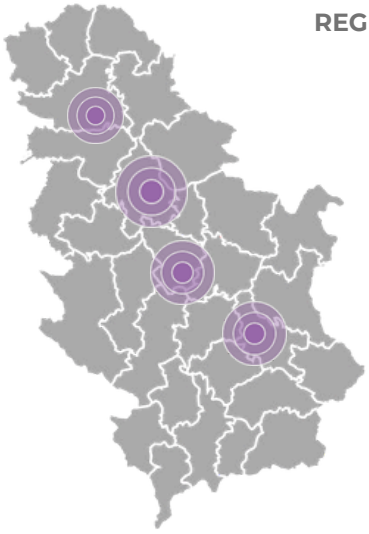
The demand for green-certified buildings is strong and growing, as tenants increasingly seek healthier, more sustainable spaces to live and work. According to the IFC, while developers often perceive green construction costs to be about 30% higher than conventional buildings, the actual additional cost is typically between 0.5% savings and 12% higher - a gap easily offset by higher market value, lower operating expenses, and stronger tenant retention.

Serbia's green construction sector is in a growth phase and expanding rapidly. As of 2023, there are **42 certified buildings totaling 1.26 million m²,** mostly located in Belgrade, and spanning the retail, warehouse/logistics, office, and residential segments.

The demand for green buildings in Serbian market is expected to rise as new international companies entering the market **require ESG-compliant spaces** and existing tenants are increasingly educated about the benefits of green buildings. While Belgrade remains the primary hub for certified buildings, certification trends are gradually spreading to other cities, opening opportunities for diversified regional development.

The market potential is additionally reinforced by **EBRD green investments**, which amounted about €494 million in 2024., and credit lines such as **SME Go Green and GEFF** that support retrofits and energy-efficient upgrades, while also stimulating tenant demand, expanding access to green financing, and lowering regulatory risks, thus **creating a favorable environment for private investors** to capture value through green-certified smart developments.

REGION



In rapidly developing urban centers in Serbia where demand for premium, sustainable commercial and residential spaces is growing.

BUSINESS MODEL

Design, development, retrofitting, and operation of **green-certified smart buildings**, covering both commercial spaces (offices, retail, hospitality) and residential units, equipped with IoT-based systems for optimized energy use, water management, security, and occupant comfort.

Assets are **designed for low emissions**, renewable energy integration, and use of sustainable materials. This includes smart HVAC, lighting, water usage, security, and the integration of renewable energy and low-emission materials.

The investor's role is to provide capital for the construction and development of these assets, with value realized either through sales or through leasing, which generates stable and long-term rental income

Value is created through reduced operational costs, increased property value, and enhanced user experience. **Revenue** is generated through leasing or selling of smart-certified properties, along with premium building management services.

KEY NUMBERS

€1.000-1.700
CAPEX/m²

>25%
return on investment

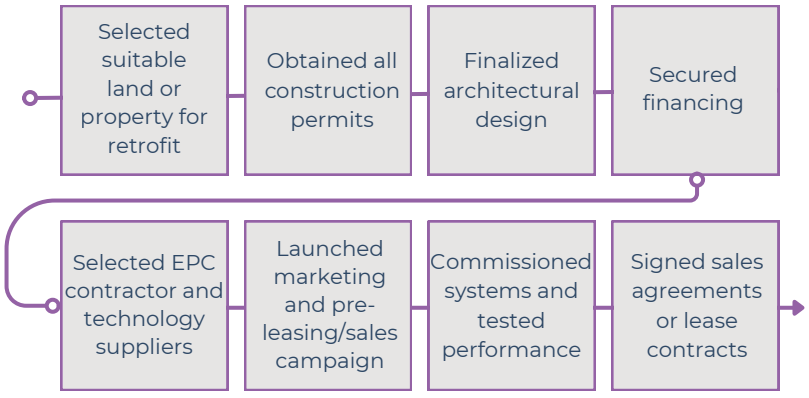
≤4 years
payback period

SUCCESSFUL STORY

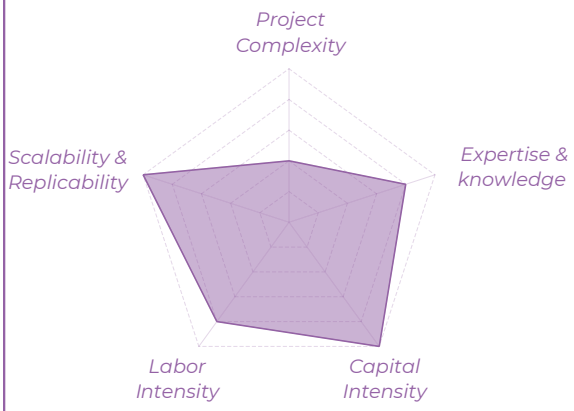
Completed in 2020, **Green Heart** is a five-building Class A office complex in Belgrade, combining two refurbished and three newly built structures with a total of 46,300 m². In 2021, its N3 building achieved LEED Gold certification, marking the entire complex as fully LEED-certified. Featuring smart energy management, efficient HVAC and lighting systems, and sustainable materials, Green Heart has attracted premium tenants and achieved above-market occupancy and rental rates, reinforcing its position as one of Serbia's benchmark green commercial developments.

Others: InGrid - Schneider Electric Hub, The Edge Amsterdam

PROJECT MILESTONES



PROJECT OVERVIEW



Moderate to low complexity: Combines standard construction processes with specialized sustainable design and smart technology integration.

Required expertise for the project is overall **moderate to high**, with strongest needs in real estate development, green certification, and financing.

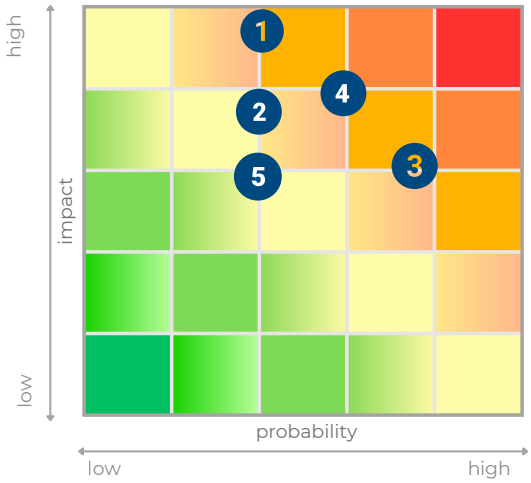
High capital intensity: Significant upfront investment is needed for land acquisition, construction, and advanced technology integration.

Moderate to high labor intensity: Construction and retrofitting demand skilled labor, especially during construction period, with lower workforce needs in the operational phase.

High scalability: The model can be replicated across urban centers with strong demand for sustainable residential and commercial spaces.

RISK MATRIX

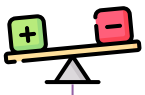
No.	Risk	Description
1	Delays in Obtaining Construction Permits	Prolonged permitting procedures, regulatory changes, or additional requirements could delay project initiation, increase pre-construction costs, and push back leasing/sales timelines., which can be prevented by early engagement with authorities.
2	System integration challenges	Incompatibility between different smart building technologies or delays from technology vendors can disrupt system performance and reduce tenant satisfaction. The risk can be reduced by selecting experienced technology vendors.
3	Increase in material costs	Price volatility or supply chain disruptions for certified low-emission materials may significantly raise CAPEX. Therefore, the important step includes securing long-term supply contracts or pre-purchase of critical materials.
4	Low tenant uptake	Market demand may not reach the projected level, which could affect occupancy rates and overall returns. The marketing campaigns should be conducted.
5	System performance gaps	Advanced building systems (smart HVAC, lighting, water management, and IoT platforms) may not deliver the expected efficiency or comfort levels due to integration issues, user adaptation challenges, or higher-than-anticipated maintenance needs



ESG IMPACT ASSESSMENT

Positive impacts

- Applies sustainable, low-emission construction materials and efficient HVAC and lighting systems to cut operational emissions and align with climate goals.
- Reduces dependence on fossil fuels and lowers peak electricity demand.
- Enhances indoor comfort and health through high air quality, natural light, and effective ventilation systems.
- Integrates green spaces and biophilic design elements that improve mental well-being and encourage active lifestyles.
- Expands access to affordable, green-certified spaces, supporting social inclusion and reducing utility costs by up to 20%.
- Generates employment across construction, maintenance, and facility management, contributing to local economic growth.
- Ensures compliance with LEED/BREEAM certification and EU sustainability standards, reinforcing transparency and regulatory alignment.



Potential negative impacts

- Sourcing materials or equipment from imported or non-certified suppliers can increase embodied carbon footprint.
- Use of advanced smart systems may raise energy consumption and produce electronic waste at the end of their lifecycle.
- Large-scale developments can contribute to urban sprawl or overconcentration, reducing spatial balance and sustainability of urban areas.

Selecting certified low-carbon materials, designing energy-efficient smart systems with recyclability in mind, and focusing on compact, sustainable urban development can minimize negative impacts and strengthen long-term sustainability impacts.

HOW DOES THIS PROJECT SUPPORT SERBIA'S ENERGY-EFFICIENCY?

The availability of certified sustainable spaces remains limited compared to rising demand for ESG-compliant buildings.

This project responds to that problem by:

- ✔ **Expanding sustainable urban capacity** by delivering certified commercial and residential spaces that align with national sustainability and urban greening goals
- ✔ **Diversifying the market offer** with new high-quality certified properties across different segments (office, residential), making green spaces more widely available to tenants beyond Belgrade.
- ✔ **Improving energy performance and climate resilience,** by cutting energy and water use by 20-40%, and integrating renewable systems to lower emissions.

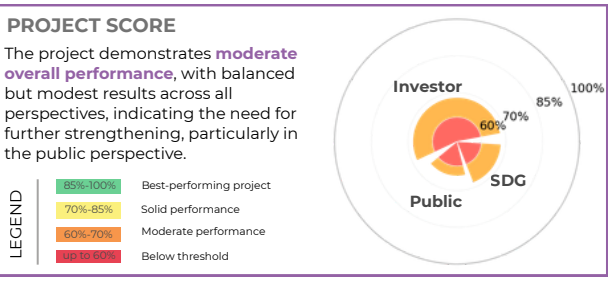
SDG addressed:

REHABILITATION CENTERS FOR PSYCHOPHYSICAL HEALTH

Aligned with IOA 10. Hospitality Facilities

PROJECT SCORE

The project demonstrates **moderate overall performance**, with balanced but modest results across all perspectives, indicating the need for further strengthening, particularly in the public perspective.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

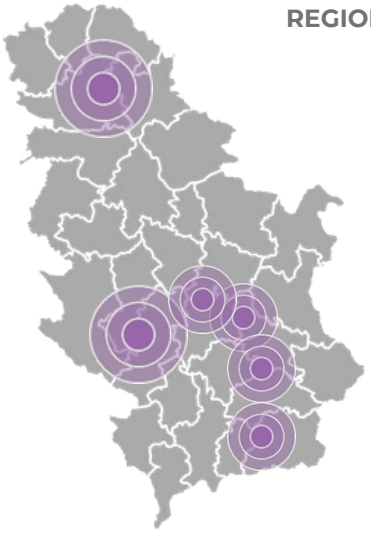
MARKET POTENTIAL

Serbia has over 30 spa towns with recognized thermal and mineral waters and a long tradition of health tourism, including Vrnjačka Banja, Sokobanja, and Niška Banja. These destinations attract visitors, but infrastructure is outdated and rarely aligned with modern rehabilitation standards, creating an **opportunity to combine natural spa assets with certified medical, psychological, and recovery services**.

Beyond tourism, the need for structured rehabilitation is reinforced by mental health trends. Recent studies show that **one in five schoolchildren in Serbia has at least one psychiatric disorder, while more than 10 % of adolescents report depressive symptoms and high levels of anxiety**. These findings highlight a strong demand for professional support services, especially for young people and working-age adults, which current health infrastructure cannot adequately meet.

Globally, the World Health Organization estimates that **2.4 billion people** need rehabilitation, with demand rising due to ageing and chronic disease. Serbia faces a high prevalence of cardiovascular, musculoskeletal, and addiction-related conditions, alongside growing mental health needs, while rehabilitation capacity is limited. Modern centres can address these gaps and attract regional patients from the Western Balkans, creating cross-border health and recovery potential.

REGION



Šumadija and Western Serbia have the strongest spa potential, followed by Southern and Eastern Serbia, while Vojvodina offers niche potential.

SUCCESSFUL STORY

The **Special Rehabilitation Hospital "Rusanda,"** next to Lake Rusanda in Banat, shows how Serbia's spa assets can become a modern rehabilitation hub. The lake and its peloid mud are mineral-rich and used as natural therapeutic resources. The hospital specializes in physical medicine and rehabilitation, treating patients after stroke, Parkinson's disease, multiple sclerosis, meningitis, spinal pain, and neuropathies. With decades of clinical expertise and integration of spa resources, Rusanda is a national leader in neurorehabilitation and physical therapy, proving that medical rehabilitation and spa infrastructure can be effectively combined.

BUSINESS MODEL

Develop and operate specialized rehabilitation centers in Serbia's spa towns, combining clinical rehabilitation (physiotherapy, diagnostics, occupational therapy, post-acute protocols), psychological counseling, and addiction recovery, with spa therapies applied as medical support. The centers address the needs of people recovering after injuries, surgeries, neurological or cardiac conditions, as well as those requiring psychological support or treatment for addictions.

The investor finances, builds, and equips medical and therapy units, secures healthcare licenses, and integrates hospitality infrastructure for accommodation, nutrition, and wellness. Long-term value is created through diversified payer channels—private pay, insurers, corporate wellness programs, and public–private partnerships—supported by outcomes tracking and recognized international accreditation. The model is suitable for blended financing, combining local bank loans with international sustainability funds targeting healthcare, wellness, and green tourism.

KEY NUMBERS

~€1M
CAPEX

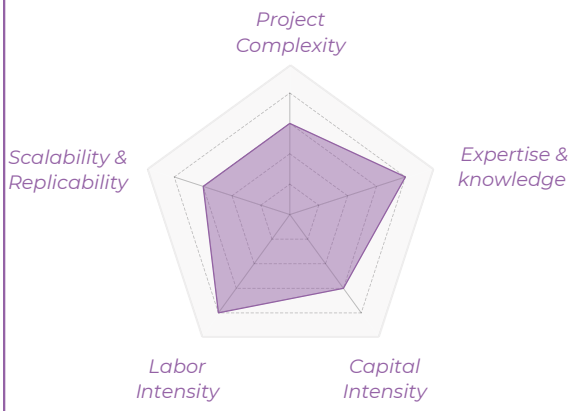
15%-25%
return on investment

4-7 years
payback period

PROJECTS MILESTONES

- Site selection and resource due diligence
- Concept development and licensing process
- Architectural design and medical engineering
- Capital investment planning and equipment procurement
- Recruitment of staff and specialized training
- Establishment of payer agreements and service channels
- Launch of pilot rehabilitation programs
- Expansion and full operational scale-up

PROJECT OVERVIEW



Medium complexity due to dual compliance with medical and hospitality standards, hydrothermal engineering requirements, and clinical governance. Demands careful coordination but manageable once a pilot centre is validated.

Requires strong interdisciplinary expertise in neurology, orthopedics, cardiology, mental health, and addiction treatment, with integration of balneology and modern rehabilitation protocols. Specialized, but not unattainable in Serbia with targeted training and partnerships.

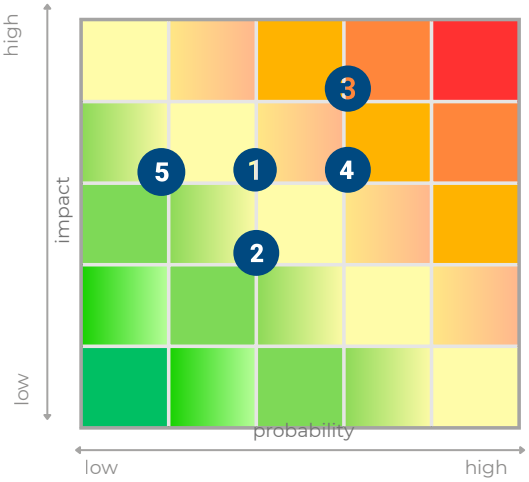
Medium upfront investment for construction, pools, spa infrastructure, rehabilitation technology, and accommodation. Capital requirements are significant but lower than for hospitals, and scalable through phased development.

Labor-intensive, requiring physiatrists, physiotherapists, occupational and speech therapists, psychologists, rehabilitation nurses, and support staff for spa, diagnostics, and hospitality. Staff demands are high, but create stable, formal jobs.

The model **can be replicated** across spa towns with a hub-and-spoke structure, including satellite units and tele-rehabilitation. Replication is possible, though dependent on workforce availability and regional demand.

RISK MATRIX

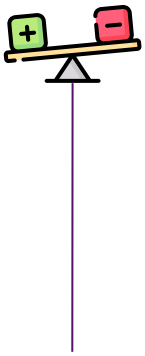
No.	Risk	Description
1	Regulatory and licensing	Delays in obtaining medical licenses, permits for water use, or hospitality approvals can postpone the launch. Early engagement with regulators and complete procedures reduce this risk.
2	Construction	Errors in pool and water systems, ventilation, or accessibility features can lead to rework and higher operating costs. Involving designers experienced in healthcare and hospitality lowers the risk.
3	Operational and clinical	Staff shortages, equipment failures, or weak clinical protocols can affect outcomes and ratings. Continuous training, regular maintenance, and strong clinical governance are required.
4	Market and revenue	Dependence on seasonal tourists or a single source of payment can reduce financial stability. Diversifying services with prevention programs and corporate packages increases resilience.
5	Environmental and safety	Air quality, radon exposure, or water discharge issues in some spa towns can create hazards. Regular monitoring and engineering controls ensure compliance with safety standards.



ESG IMPACT ASSESSMENT

Positive impacts

- Utilizes renewable thermal and mineral waters for heating, reducing fossil fuel dependence and cutting operating costs by 20–30%.
- Lowers carbon emissions and increases access to green or sustainability-linked financing in line with EU climate and energy goals.
- Expands access to rehabilitation and preventive healthcare, improving public well-being and reducing long-term disability burdens.
- Creates stable, skilled employment in healthcare and hospitality, strengthening rural economies and reducing urban migration.
- Ensures strong governance through compliance with Serbian environmental and health regulations and alignment with international quality and sustainability standards.



Potential negative impacts

- Overuse or improper management of geothermal and mineral water sources could lead to depletion or ecosystem imbalance.
- Construction and operation may produce wastewater or solid waste, affecting local water systems.
- High energy demand during development phases if efficiency measures are not fully implemented.

These aspects could be addressed through sustainable water extraction limits, closed-loop heat and water systems, wastewater recycling, and continuous environmental monitoring to ensure long-term ecosystem and operational sustainability.

HOW DOES THIS PROJECT CONTRIBUTE TO SERBIA'S SUSTAINABLE HEALTH AND HOSPITALITY SECTOR?

Serbia's rehabilitation capacity is strained by chronic disease, injuries, and the seasonality of spa tourism.

This project contributes by:

- ✔ **Evidence-based recovery and prevention** – integrating certified rehabilitation with spa resources to shorten disability and improve long-term health outcomes, responding to a global unmet need for rehabilitation.
- ✔ **Economic diversification and year-round occupancy** – stabilizing local economies and jobs by combining healthcare and hospitality in established spa hubs, in line with European analyses of health tourism as a tool for reducing seasonality.
- ✔ **Sustainability and circular energy use** – applying geothermal and thermal-water heat recovery to lower operating costs and emissions, fully aligned with European green priorities.

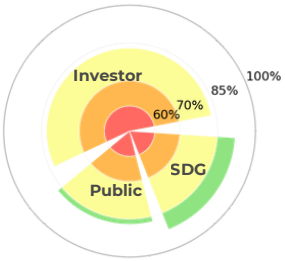
SDG addressed:

SANITIZATION AND REHABILITATION OF WILD LANDFILLS AND ILLEGAL DUMPSITES

Aligned with IOA 7. Waste Management Services

PROJECT SCORE

The project demonstrates **excellent overall performance**, positioned in the green range, with outstanding results under the Public and SDG perspectives and strong performance in the Investor perspective.



LEGEND

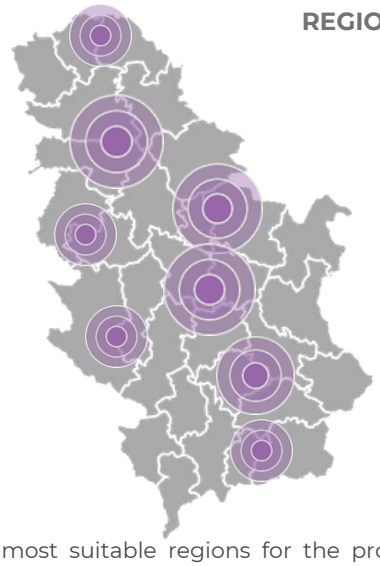
85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Serbia currently has **2,526 active wild dumpsites** and over **129 non-sanitary municipal landfills** that fail to meet minimum environmental or technical standards. In 2023, the country generated around **10.8 million tons of non-hazardous waste,** including **3.07 million tons of municipal waste** that largely ends up in unsanitary landfills or wild dumps. Of this volume, only 1.2 million tons is disposed of at sanitary landfills, while about 1.26 million tons goes to non-sanitary municipal landfills and over 600,000 tons (around 20%) is assumed to be illegally dumped. Most local landfills are already overfilled, lacking leachate or gas control systems, and pose severe risks to air, soil, groundwater, and surrounding communities. Monitoring data show that among 129 non-sanitary landfills, remediation projects were prepared for about 64% of sites, but works were implemented on only 13% which creates a significant gap. Wild dumpsites remain a persistent issue, with 1,617 locations never cleaned during 2023.

To achieve the objectives of Serbia's Waste Management Program, it is necessary to close non-sanitary landfills and eliminate wild dumpsites, including the recultivation of closed sites and remediation of illegal dumps in regions already served by sanitary landfills. With substantial funding available from the EU, EBRD, IFC, KfW, and national programs, and multiple sites requiring intervention, the business model has a high market potential.

REGION



The most suitable regions for the project are those with the highest number of wild dumpsites and non-sanitary landfills.

SUCCESSFUL STORY

Vinča Landfill Remediation is one of the largest landfill closure projects in Southeast Europe, located near Belgrade. As part of a public-private partnership with Beo Čista Energija, the old 40-hectare dumpsite was sealed, reshaped, and equipped with leachate and gas management systems. The closure was completed in 2021, eliminating severe environmental risks and improving safety for nearby communities. In addition, the remediation created conditions for further development of waste-to-energy and recycling facilities.

In Europe, the **Interreg projects** showcase successful landfill rehabilitation practices, where obsolete dumpsites were closed, excavated or capped, and transformed into safe green spaces

Others: Duisterweg in Amersfoort (Netherlands), Qortin Landfill in Gozo (Malta), Boissy-Puiseux Dumpsite in Paris (France)

BUSINESS MODEL

Closure and remediation of wild landfills and illegal dumpsites, eliminating environmental and health risks while restoring land for safe future use. It involves excavating and safely removing accumulated waste, transporting non-recyclables to licensed facilities, recovering any recyclable fractions, and then reshaping and sealing the site with protective layers to prevent further pollution.

The closure and remediation of wild landfills can be structured as a public-private partnership, with municipalities providing financing and oversight, and the private partner delivering equipment, expertise, and execution of landfill closure. **Investor's activities** cover the identification of contaminated sites, removal and transport of waste to licensed facilities, and restoration of the land through soil remediation or greening.

Revenues are generated primarily through publicly funded remediation contracts with municipalities or state authorities, often supported by EU and international environmental funds. The model is scalable to multiple landfill sites across the country.

KEY NUMBERS

>€10M
CAPEX

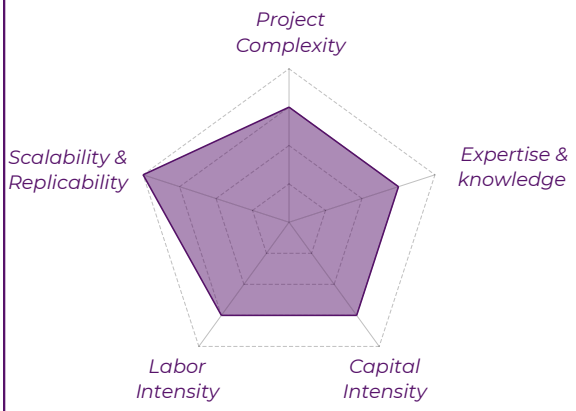
10-15%
return on investment

7-10 years
payback period

PROJECTS MILESTONES

- Identified site for potential remediation
- Carried out environmental and technical assessment
- Secured community and institutional support
- Obtained all neccessary permits
- Secured financing and co-funding (PPP)
- Procured EPC contractor and technology
- Prepared site for remediation
- Executed closure and remediation works

PROJECT OVERVIEW



Moderate complexity: While the remediation steps are standardized, complexity varies mostly based on the location and waste composition

Moderate expertise: Implementation requires engineers, with technical oversight in waste management and environmental protection, while the operational phase involves many manual, low-complexity tasks.

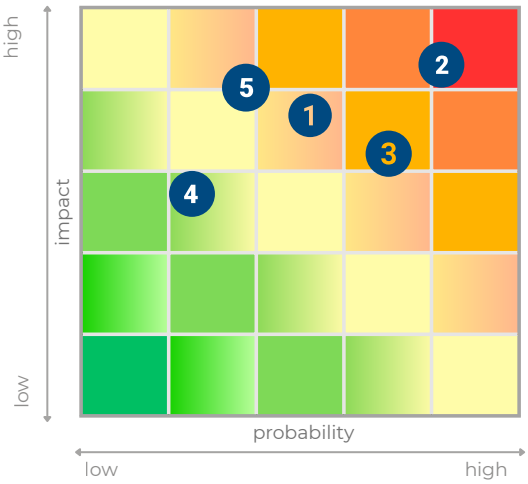
Capital intensity: Upfront investment is needed for earthworks, sealing materials, infrastructure, and equipment rental. Long-term operating costs are limited to periodic maintenance and environmental monitoring.

Labor intensity: During excavation, sorting, sealing, and reshaping, significant manual **and machinery-assisted labor** is required.

The project is **moderately to highly scalable** and replicable across Serbia, given the high number of wild and non-compliant landfills. Similar methodologies can be applied to different sites with only minor adaptations.

RISK MATRIX

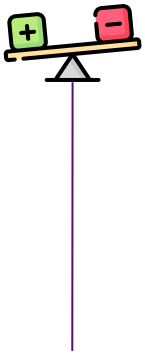
No.	Risk	Description
1	Permit Approvals Delays	Extended environmental review processes for sensitive sites can postpone project start and disrupt funding timelines. Risk can be mitigated by engaging early with regulatory authorities and preparing complete documentation in advance.
2	Inaccurate Waste Volume Estimates	Wrong estimation of the waste quantity or hazardous content can lead to cost overruns and schedule delays, highlighting the need for accurate assessment and a well-prepared management plan.
3	Unexpected Hazardous Waste Presence	Discovery of hazardous waste (i.e. asbestos, industrial sludge, or toxic soil) during works can require costly specialized handling. Contingency budget should be prepared in order to mitigate risk.
4	Community Resistance	Local resistance to landfill rehabilitation, driven by misinformation or distrust in authorities, can delay approvals and mobilization. Risk can be reduced through transparent public consultations.
5	System Underperformance	Post-closure failure of leachate or gas control systems can cause continued environmental pollution and trigger regulatory penalties. Risk can be prevented by implementing continuous monitoring.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces methane emissions, which make up about 50% of landfill gas and have 84–87× higher global warming potential than CO_2.
- Prevents uncontrolled gas release through installation of capture and treatment systems.
- Protects groundwater and surface water through leachate collection and treatment.
- Eliminates open burning and spontaneous fires, improving air quality and reducing toxic emissions.
- Improves public health by lowering exposure to harmful gases, smoke, and contaminated water.
- Reduces fire and explosion risks in peri-urban.
- Creates local jobs in waste removal, remediation, and environmental monitoring.
- Aligns with Serbia's Waste Management Strategy (2022–2031) and EU landfill rehabilitation standards.



Potential negative impacts

- Excavation, sorting, and reshaping can generate temporary dust, noise, odor, and localized air and soil pollution.
- Mishandling of hazardous fractions such as industrial sludge or asbestos may endanger workers and nearby residents.
- Use of heavy machinery and fuel-intensive processes increases the short-term carbon footprint.
- Inadequate post-closure maintenance may lead to recontamination or reactivation of remediated sites.

Applying strict safety protocols for hazardous materials, using low-emission machinery, ensuring dust and odor control, and maintaining continuous post-closure monitoring can reduce long-term environmental impacts.

HOW DOES THIS PROJECT SUPPORT WASTE MANAGEMENT IN SERBIA?

Serbia faces significant environmental threats from more than 2,500 wild dumpsites and over 150 non-compliant municipal landfills, which continue to pollute soil, air, and groundwater.

The project addresses the issue by enabling:

- ✔ **Sanitary landfill rehabilitation,** by sealing and stabilizing dumpsites, installing leachate and installing gas management systems.
- ✔ **Environmental protection,** through the closure of high-risk sites, reduction of methane and toxic emissions, and prevention of soil and water contamination.
- ✔ **Public health improvement,** by eliminating exposure to hazardous substances, smoke from open burning, and polluted groundwater near populated areas.

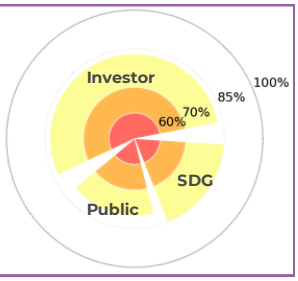
SDG addressed:

SPA TOURISM DEVELOPMENT

Aligned with IOA 10. Hospitality Facilities

PROJECT SCORE

The project demonstrates **solid overall performance**, positioned in the upper yellow range, with consistently high results across all perspectives, particularly under the SDG perspective.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
Up to 60%	Below threshold

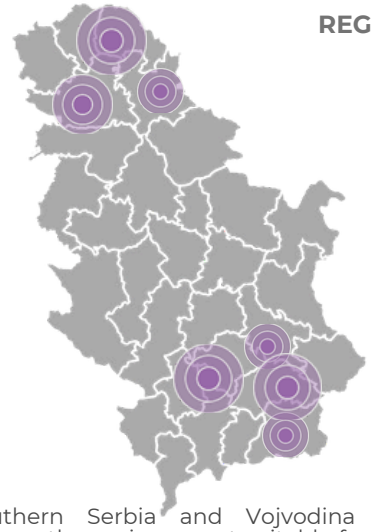
MARKET POTENTIAL

Serbia boasts a long tradition of spa and wellness tourism, founded on the use of mineral and thermal waters for health and leisure. With around **500 hot and cold mineral springs**, the country has abundant natural resources, yet only about 10% are currently utilized across approximately 50 spas and climatic centers. Consequently, spa tourism represents one of the most considerable potentials for Serbian tourism and regional economic development

In 2024, Serbian spas recorded approximately **2.6 million overnight stays**, representing a substantial share of the total 12.66 million overnight stays in the country that year. Notably, 82.6% of spa visitors were domestic tourists, while the remaining 17.4% were international guests, indicating clear room for growth in the inbound wellness segment.

Considering the combination of abundant and underutilized spa tourism potential, a strong domestic spa tradition, and relatively low international tourists presence, there is **significant potential** to increase the share of spa tourism within Serbia's overall tourism sector through more effective utilization of these natural resources.

REGION



Southern Serbia and Vojvodina are among the regions most suitable for spa tourism development in Serbia, due to abundance of mineral springs and existing spa tradition

SUCCESSFUL STORY

Fruške Terme (Mövenpick Resort & Spa) in Vrdnik, Serbia, is a leading example of a modern spa resort that successfully integrates geothermal energy. The resort uses thermal water (32-36 °C) to heat its pools and wellness facilities, supported by solar panels and energy-efficient systems to reduce operational costs. With 11 pools, 12 saunas, and extensive spa amenities, it has positioned itself as a sustainable wellness destination. By combining geothermal energy with advanced wellness infrastructure, Fruške Terme demonstrates how natural resources can be leveraged to boost tourism competitiveness.

Others: Tonanti Vrnjačka Banja, Aqua Dome Austria, Hotel Izvor (Bukovačka Banja)

BUSINESS MODEL

Development of spa and wellness resorts, including building of new accommodation capacities, creating modern wellness and medical facilities, and providing a wide range of recreational services through the sustainable use of mineral resources. The resorts will feature hotels with integrated spa and wellness centers, medical treatment areas, restaurants, conference spaces, and leisure amenities designed for year-round tourism.
The **investor's role** includes securing land, providing capital for infrastructure development, overseeing project implementation, and ensuring long-term returns through operational revenues. The project also includes managing partnerships with local authorities for natural resource access.
Revenue streams primarily include accommodation services, as well as spa and wellness services, generated from domestic and international tourists. Once the resort is operational, the model creates value through consistent revenues from accommodation, spa and wellness services, and complementary activities, while ensuring premium positioning in the growing medical and wellness tourism market.

KEY NUMBERS

€5-10M
CAPEX

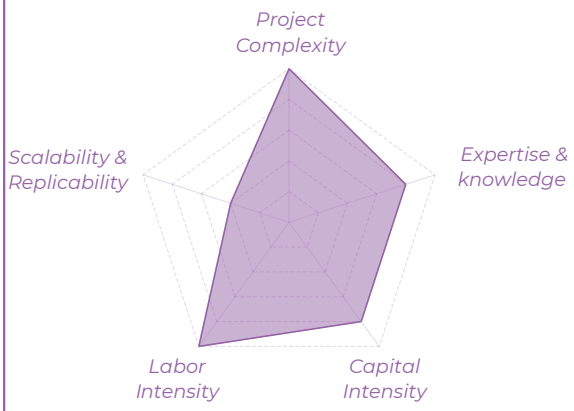
≥25%
return on investment

≤4 years
payback period

PROJECT MILESTONES

- Identified and secure spa location
- Obtained local stakeholder support
- Appointed EPC contractor
- Completed permitting approvals
- Secured financing and strategic partners
- Start of construction
- Recruited and trained staff
- Opened resort for full commercial operation

PROJECT OVERVIEW



High complexity: The project is complex due to the need for construction of spa facilities, and strict alignment with urban planning requirements

Moderate to high expertise: It requires specialized expertise in architecture, construction and hospitality.

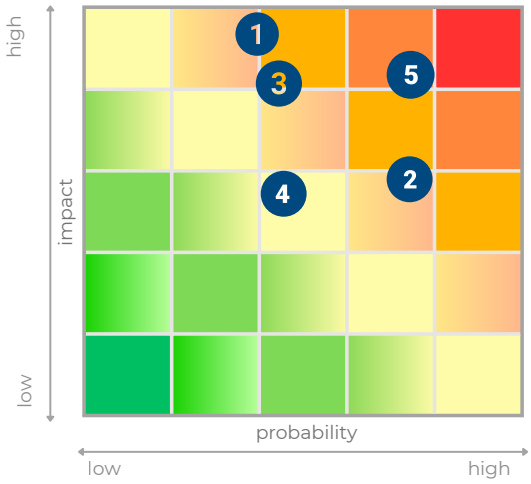
Capital intensity: The project requires **substantial upfront capital** for infrastructure, equipment, and energy systems.

Spa tourism projects are **labor-intensive**, both in the low-skilled and high-skilled sectors where medical knowledge is required.

Moderate to low scalability: The project can be replicated only in locations with similar spring water potential and sufficient tourism demand.

RISK MATRIX

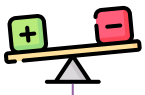
No.	Risk	Description
1	Permitting risk	Delays or complications in securing permits for construction, or environmental compliance can significantly postpone project timelines,, which can be mitigated by early engagement with authorities
2	Market Demand Risk	Visitor numbers may not reach projected levels due to insufficient marketing, strong competition, or shifts in tourism trends., affecting project revenues. Promotion strategies should be imple
3	Financing risk	The project may face challenges in securing sufficient capital, especially given its high upfront investment and longer return period. In order to prevent risk, detailed financial models and cost benefit analysis should be preapred.
4	Construction delays	Issues with construction scheduling, equipment lead times, or contractor coordination can lead to cost overruns and delays in operational launch, which can be prevented by strict project management and scheduling controls.
5	Operational Workforce Fluctuation	High employee turnover in the hospitality sector can lead to increased training costs, inconsistent service quality, and operational inefficiencies. Mitigation measures include competitive retention incentives



ESG IMPACT ASSESSMENT

Positive impacts

- Promotes sustainable use and protection of natural resources such as clean water, air, and natural landscapes.
- Reduces environmental footprint through low-emission heating, closed-loop water systems, and minimal land disturbance.
- Achieves 20–40% lower energy and water consumption than standard buildings, reducing greenhouse gas emissions.
- Creates diverse employment opportunities in hospitality, wellness, and medical services, supporting inclusive growth.
- Advances gender equality, as women represent over half of the tourism sector workforce globally.
- Aligns with the EU Green Agenda by promoting low-impact, renewable energy–powered tourism and rural revitalization.



Potential negative impacts

- Construction may cause temporary land degradation, vegetation loss, noise, and dust.
- Overextraction of geothermal or mineral water can deplete aquifers and affect ecosystems.
- Inadequate treatment of spa wastewater may result in thermal or chemical water pollution.
- Growing tourist inflows can strain local infrastructure and, if unmanaged, contribute to urban sprawl.

Applying controlled geothermal extraction, renewable energy use, and responsible spatial planning can reduce negative impacts and preserve the environmental quality of spa destinations.

HOW DOES THIS PROJECT SUPPORT SUSTAINABLE TOURISM?

With a wealth of mineral springs still largely unused, Serbia has significant opportunities for the expansion of spa tourism.

This project addresses the gap by enabling:

- ✔ **Sustainable development of spa tourism,** through investment in modern infrastructure, wellness services, and energy-efficient operations.
- ✔ **Utilization of mineral resources**, strengthening the spa and wellness offer and enhancing health-related tourism services.
- ✔ **Increase of both foreign and domestic tourists,** through expanding the offer of modern, sustainable spa resorts, aligned with global trends in wellness and green tourism.

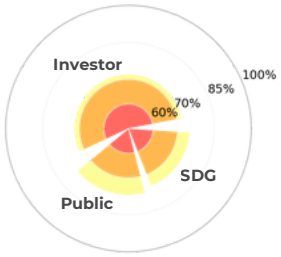
SDG addressed:

SUSTAINABLE PACKAGING SOLUTIONS

Aligned with IOA 7. Waste Management Services

PROJECT SCORE

The project demonstrates **solid overall performance**, with balanced results across all perspectives and slightly stronger outcomes under the public perspective.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

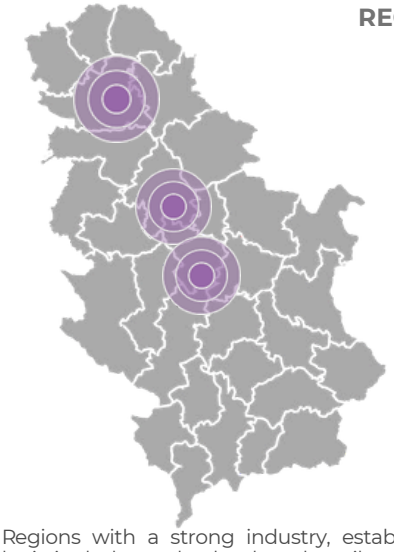
MARKET POTENTIAL

In 2023, a total of **401.8 thousand tonnes of packaging** was placed on the Serbian market from registered operators. Out of the total packaging waste collected, 264.3 thousand tonnes were recovered, and 251 thousand tonnes were recycled, which is equivalent to an **overall recycling rate of 62.5%**. Under Serbia's national targets, the recycling rate for total packaging waste **should reach 70% by 2030.** Current performance shows a notable gap in some materials, particularly in plastic packaging, where the recycling rate stands at only 44.3% (target 2030: 55%), and glass packaging with a current recycling rate of 49.6% compared to the 2030 goal of 75%. While paper and cardboard already achieve high recycling rates, the lower performance in other materials highlights the possible presence of packaging types that are not fully optimised for recyclability and therefore frequently end up landfilled or incinerated.

The importance of sustainable packaging solutions is further underscored by higher EU ambitions, with the **Packaging and Packaging Waste Regulation (PPWR)** setting the goal for all packaging to be recyclable in an economically viable way by 2030. This regulatory alignment, combined with corporate ESG commitments, creates strong demand for materials and designs that can replace low-recyclability packaging.

The gap between current performance and future targets presents a significant market opportunity for sustainable packaging solutions that enhance recyclability, reduce environmental impact, and support the transition towards a circular economy.

REGION



Regions with a strong industry, established logistics hubs, and a developed retail network, like Vojvodina, Belgrade and Šumadija.

BUSINESS MODEL

Production of **biodegradable and recyclable packaging**, using both natural and other certified eco-friendly materials, like FSC-certified paper and cardboard, bioplastics (PLA, PHA) from renewable sources, starch-based blends, cellulose films, bagasse (sugarcane fiber), and recycled PET (rPET) as a replacement for plastic packaging. The project includes design, testing, and scaling up recyclable materials, with established production lines for efficient mass manufacturing. Emphasis is on reducing environmental footprint through renewable raw materials and optimized packaging processes suitable for diverse products. The investor finances production capacity and technology, supports certification and regulatory compliance, and drives market growth.

The project creates **value** by providing sustainable alternatives to conventional plastic packaging, enabling clients to meet both national and EU regulatory targets while significantly reducing their environmental footprint. **Revenue** is generated through direct sales of biodegradable and recyclable packaging products, contract manufacturing for custom solutions, and licensing of proprietary designs and materials.

KEY NUMBERS

€5M-10M
CAPEX

15%-25%
return on investment

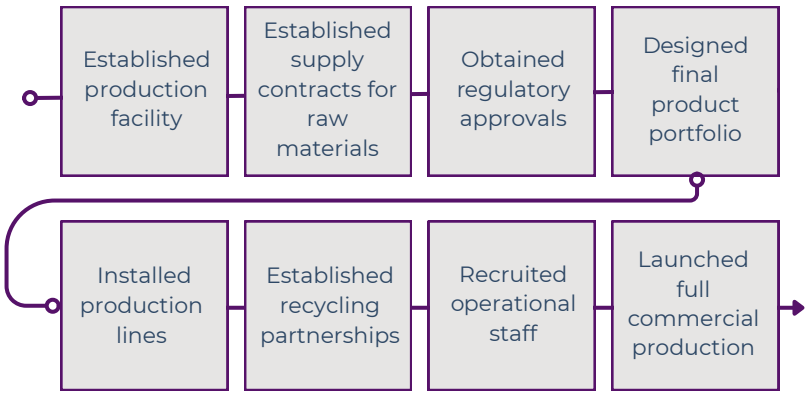
4-7 years
payback period

SUCCESSFUL STORY

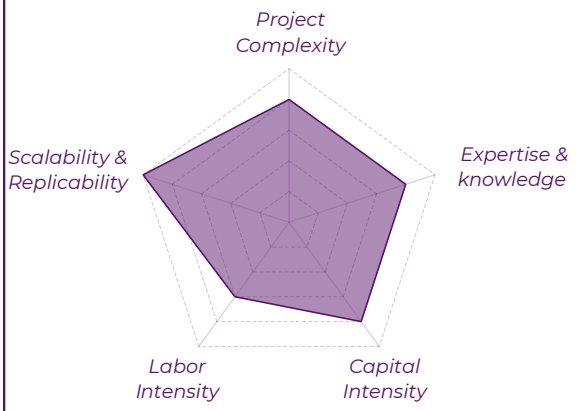
Tetra Pak Serbia, based in Gornji Milanovac, operates as a leading producer of carton-based food packaging for the Balkan region, with a strong commitment to sustainability. The company has introduced plant-based polymers derived from sugarcane to replace fossil-based plastics, and continuously increases the share of renewable and recyclable materials in its packaging. Through partnerships with local recycling facilities, Tetra Pak has improved the collection and recycling of used cartons, supporting the development of Serbia's circular economy.

Others: DS Smith, Litopapir

PROJECTS MILESTONES



PROJECT OVERVIEW



Project complexity: Involves established manufacturing technologies but requires integration of eco-friendly materials and compliance with environmental regulations.

Capital intensity: Moderate to high investment is needed for production lines, material processing equipment, and quality testing facilities.

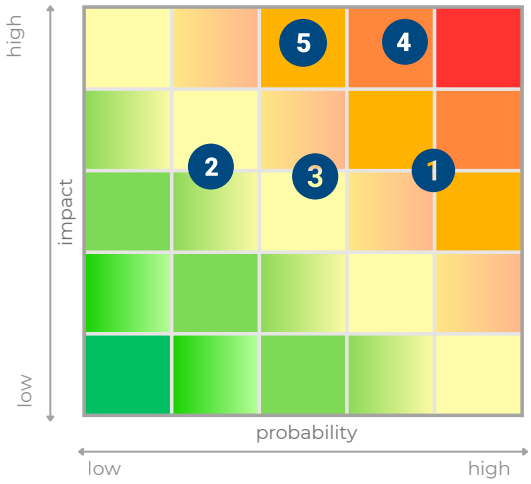
Labor intensity: Production processes require skilled operators and quality control, but automation reduces overall labor needs.

Required expertise: Demands specialized knowledge in sustainable materials, engineering, and regulatory compliance.

High scalability: Once established, the model can be replicated across other industrial hubs in Serbia and adapted to regional markets with similar infrastructure.

RISK MATRIX

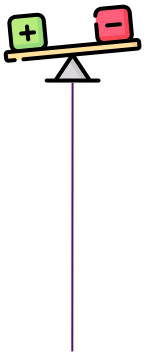
No.	Risk	Description
1	Fluctuations in Raw Material Availability	Limited supply or price volatility of certified biodegradable and recyclable materials could disrupt production schedules and increase costs. Risk can be mitigated by diversifying suppliers and securing long-term contracts.
2	Delays in Compliance Certification	Prolonged procedures for obtaining certifications for packaging materials could postpone market entry and disrupt planned sales timelines. This risk is reduced through early engagement with certification bodies.
3	Technical Failures in Production Lines	Malfunctions or inefficiencies in new material processing equipment could reduce product quality and output capacity. Mitigation comes from careful selection of proven and reliable technology
4	Client Conversion Resistance	Hesitation from potential clients to transition from cheaper non-recyclable packaging due to higher upfront costs. The risk can be addressed by cost optimization and emphasize the health and environmental benefits of sustainable packaging.
5	Quality Control Failures	Defects in packaging (e.g., inadequate durability or sealing) could lead to client dissatisfaction and reputational damage. This risk is mitigated through strict quality control protocols, in-line testing, and continuous improvements.



ESG IMPACT ASSESSMENT

Positive impacts

- Replaces conventional plastics with biodegradable, compostable, and recyclable materials, reducing landfill waste and associated CO_2 emissions.
- Uses recycled and renewable inputs to cut resource consumption, eliminate petrochemical plastics, and lower fossil fuel dependence.
- Optimized packaging design decreases material use, shipping weight, and energy demand across the supply chain.
- Provides food-grade, non-toxic packaging that reduces consumer exposure to microplastics and harmful additives.
- Stimulates job creation in material innovation, certification, recycling, and sustainable logistics, strengthening the circular economy.
- Supports Serbia's goal of achieving 70% packaging waste recycling by 2030 and aligns with EU regulatory and sustainability frameworks.



Potential negative impacts

- Bioplastic and paper-based material production can require high water and energy consumption.
- Sourcing bio-based feedstock may compete with agricultural land used for food production.
- Inadequate composting infrastructure can cause biodegradable waste to end up in landfills, releasing methane during decomposition.
- Additives used to improve durability may increase pollution risks during manufacturing or recycling.

Adopting renewable energy in production, ensuring sustainable biomass sourcing, developing composting and recycling infrastructure, and encouraging additive-free material design can reduce negative impacts and improve overall environmental sustainability.

HOW DOES THIS PROJECT SUPPORT WASTE MANAGEMENT IN SERBIA?

By 2030, Serbia aims to achieve a 70% recycling rate for packaging waste, while the current rate stands at 62.5%.

This sustainable packaging project addresses the challenge by enabling:

- ✔ **Improved recyclability and waste diversion**, replacing low-recyclability plastics with biodegradable, compostable, and recyclable materials
- ✔ **CO_2 emissions reduction,** preventing landfill-related greenhouse gas emissions
- ✔ **Health benefits**, reducing consumer exposure to microplastics, toxins, and allergens

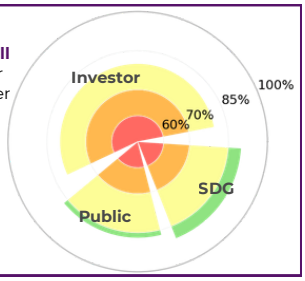
SDG addressed:

TREATMENT OF MUNICIPAL WASTE

Aligned with IOA 7. Waste Management Services

PROJECT SCORE

The project demonstrates **solid overall performance**, positioned in the upper yellow range, with strong results under the SDG and public perspectives, and stable performance in the Investor perspective, but under 85%.



LEGEND

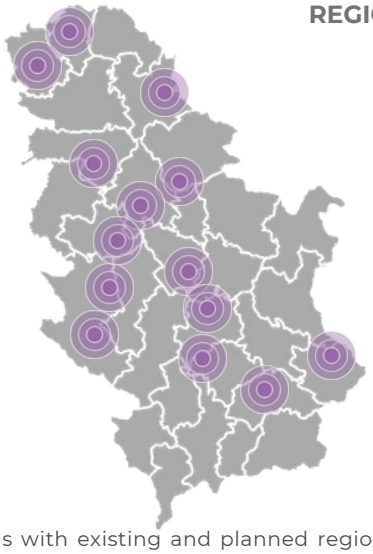
85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Serbia generated a **total of 3.07 million tons of municipal waste** in 2023, of which around 1.2 million tons were deposited at sanitary landfills, while the remainder largely ended up in unsanitary landfills or wild dumps. Serbia currently operates 10 regional waste management centers, with 7 additional centers announced as part of future development plans. Serbia currently has **10 regional and 2 local waste management centers,** with 7 additional regional centers announced as part of future development plans. Under the national Waste Management Program, the construction of 26 regional sanitary landfills equipped with recycling separation centers and transfer stations is foreseen. This highlights a substantial gap in infrastructure, as only 42% of the population currently has access to sanitary landfills, and the majority of waste is disposed without any preliminary treatment. Most critically, the vast majority of collected waste is disposed of directly, without any preliminary sorting, recycling, or treatment.

With a **recycling rate of just 15.5%,** the untapped potential for waste recovery is significant across the entire waste stream, both from sanitary and unsanitary sites. **National policy targets aim to increase the municipal waste recycling rate to 35%** by 2030, creating strong demand for new regional treatment facilities that integrate disposal with sorting, recycling, and resource recovery.
This highlights the significant gap in advanced waste recovery capacity and the need to align with circular economy objectives. Therefore, there is **strong market potential** for developing new regional waste management centers focused on the treatment of municipal waste, while public-private partnerships with municipalities can play a key role in bringing these solutions to life.

REGION



Areas with existing and planned regional waste management centers, as well as in regions currently lacking adequate waste management infrastructure plans.

SUCCESSFUL STORY

The Vinča regional waste management facility, developed through a landmark PPP between the City of Belgrade and a private consortium, is the largest integrated waste management project in Serbia, designed to process over 500,000 tons of municipal waste annually The facility is one of the first in Southeast Europe to integrate large-scale waste treatment with energy recovery. It combines mechanical sorting for the recovery of recyclables (plastics, metals, paper) with biological stabilization of organics, while producing a high-calorific fraction suitable for RDF. Non-recoverable residues are disposed of in a newly built sanitary landfill, fully aligned with EU standards.
Others: Lübeck MBT Facility (Germany), Chania MBT Facility, Enigerloh (Germany)

BUSINESS MODEL

Development and operation of **waste treatment facilities that process municipal solid waste.** The facilities receive mixed waste as their primary input, sourced from households, commerce, and institutions through municipal utility services. A significant share of collected waste undergoes advanced mechanical and biological treatment, resulting in the recovery of recyclables (plastics, metals, paper) and the production of Refuse Derived Fuel (RDF), while the residual fraction is safely disposed of in line with environmental standards. The project is best implemented through public-private partnerships, where municipalities provide long-term contracts and secure delivery of collected waste to the facility, while the **investor's role** is to finance construction, introduce technology and manage operations.
The **revenue streams** come from gate fees paid by municipalities for each ton of waste processed, complemented by the sale of secondary raw materials and Refuse Derived Fuel (RDF) to cement plants and the energy sector.
The model is highly scalable across Serbia, where modern regional treatment infrastructure is largely missing, **creating value** by reducing landfill dependency, enabling resource recovery, and aligning local waste management practices with EU standards.

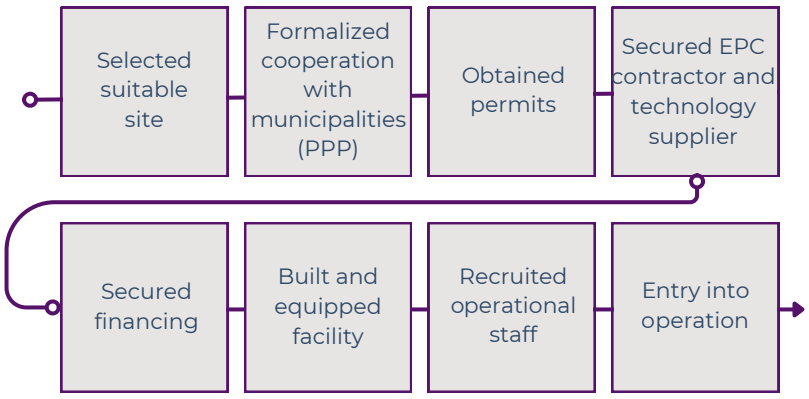
KEY NUMBERS

>€10M
CAPEX

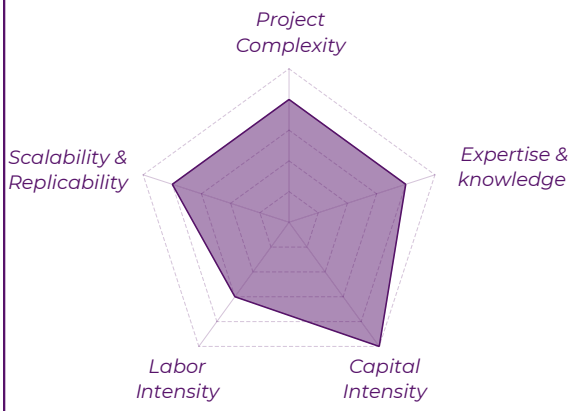
≥25%
return on investment

≤4 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



Moderate to high complexity: Requires integration of a complex MBT, RDF/SRF, and recycling technologies, strict environmental permitting, and coordination with multiple municipalities.

Moderate to high expertise: During implementation the project involves technical knowledge in waste treatment technologies and environmental management. In the operational phase, the required expertise is moderate, centered on routine processing tasks.

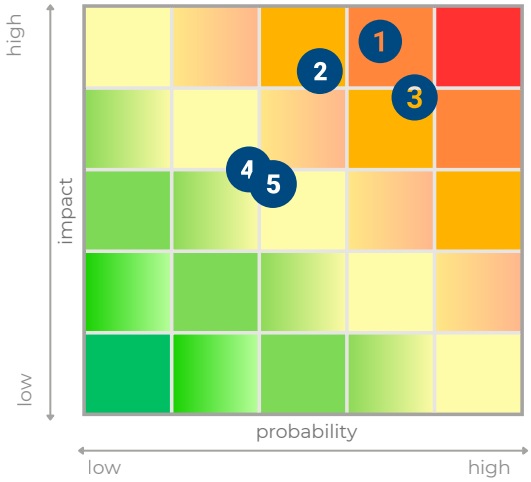
Capital intensity: Requires significant investment in infrastructure and equipment

Moderate labor intensity: Demands operational personnel for sorting, and maintenance, especially in early stages.

Project scalability is high, as Serbia lacks modern regional treatment infrastructure, allowing the model to be replicated across multiple underserved regions.

RISK MATRIX

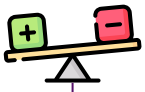
No.	Risk	Description
1	Delays in Permitting	Prolonged negotiations with municipalities combined with slow and construction permit approvals can postpone facility launch.. Risk can be mitigated by engaging early with municipalities and regulatory bodies.
2	Fluctuations in Secondary Material Prices	Regulatory shifts, or reduced demand for recyclables can lower their value, creating revenue instability and potential storage costs, which can be reduced by securing long-term supply agreements with industrial off-takers
3	Technology Performance Issues	Sorting and treatment systems may face reduced efficiency if equipment is not properly adapted to local waste characteristics. This risk can be prevented by selecting proven, adaptable technologies.
4	High Initial Operating Costs	Operational expenses during the early stages, before achieving optimal output, may strain cash flow and delay profitability. It can be managed through structured financial planning, including PPP arrangements with municipalities
5	Community Opposition to Facility Location	Local resistance to siting waste treatment plants, due to perceived health or environmental concerns, can cause project delays or require relocation. Risk can be mitigated by transparent stakeholder engagement and communication on environmental and health safeguards.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces greenhouse gas emissions by diverting waste from landfills, where 1 t typically generates around 300 kg CO_2-equivalent through methane release.
- Minimizes soil and groundwater contamination by reducing leachate formation and ensuring controlled waste treatment.
- Improves public health and living conditions by lowering exposure to unmanaged waste, pollution, and disease risks.
- Creates employment in waste collection, processing, and recycling, particularly for lower-skilled workers.
- Aligns with Serbia's Waste Management Program (2022–2031) and EU Waste Framework Directive, supporting circular economy goals.
- Introduces integrated recovery operations focused on recycling, energy recovery, and reduced landfill dependency.



Potential negative impacts

- Construction of the facility may generate temporary noise, dust, and traffic from heavy machinery.
- Earthworks can cause localized soil erosion or contamination if poorly managed.
- Potential operational impacts include odors, leachate leakage, and emissions from waste processing.
- Improper waste handling may lead to secondary pollution, while nearby communities could experience discomfort due to noise, odors, or visual disturbance.

Applying advanced odor and emission control technologies, ensuring safe waste handling, and maintaining regular monitoring and community engagement can reduce negative impacts and support sustainable urban waste management.

HOW DOES THIS PROJECT SUPPORT WASTE MANAGEMENT IN SERBIA?

Serbia continues to face major challenges in the waste management sector, with a recycling rate of only 15.5%, leaving a significant environmental and public health impact.

This municipal waste treatment project contributes by enabling:

- ✔ **Reduction of environmental impact,** by significantly lowering greenhouse gas emissions, soil and groundwater contamination.
- ✔ **Increase in material recovery**, through mechanical sorting of metals, plastics, paper, and production of RDF/SRF fractions for industrial use.
- ✔ **Improvement of public health,** by reducing exposure to unmanaged waste

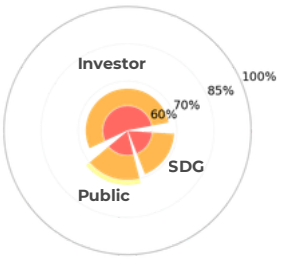
SDG addressed:

URBAN HOTEL DEVELOPMENT

Aligned with IOA 10. Hospitality Faacilities

PROJECT SCORE

The project demonstrates **moderate overall performance**, with the strongest results under the public perspective and lower scores in the other two perspectives,.



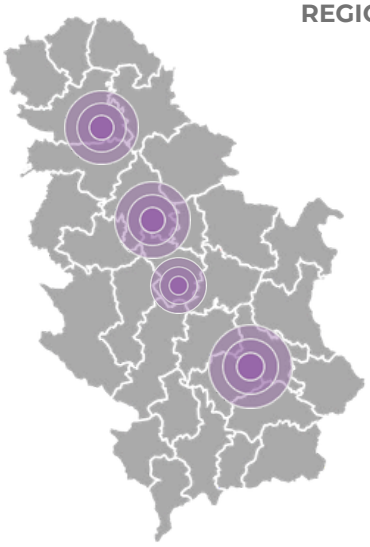
LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

In 2024, urban destinations in Serbia saw substantial tourist activity: **Belgrade alone recorded approximately 3.7 million overnight stays,** followed by Novi Sad, Niš and Subotica. Most of these visitors are foreign tourists, and comprise both business travelers driven by conferences, corporate events, and the MICE sector, and leisure tourists attending cultural attractions and festivals.
Moreover, sustainability is becoming one of the key decision factors for modern travelers. Corporate guests, especially in the MICE and business segments, increasingly favor accommodations that combine high service standards with transparent, eco-conscious operations. For business travelers in particular, **demand is strongest for higher-category accommodation** that offers premium comfort, reliable amenities, and a professional environment.
Despite this demand, the market suffers from a **shortage of high-quality accommodation**, particularly in the upscale segment. In Belgrade alone, the estimated demand gap suggests there is room for at least 10 new premium, high-end hotels. This deficiency is also pronounced in other major Serbian cities, where the supply of high-standard accommodation is limited and cannot meet rising expectations. Urban hotels that combine superior quality with strong sustainability standards can directly address this demand.

REGION



Urban centers with high tourism and business activity are most suitable for the project development.

BUSINESS MODEL

The project covers the **construction, operation, and management of modern mid-to-high-end hotels** in key urban locations to meet the growing demand from business travelers, tourists, and event participants. Facilities include accommodation, conference rooms, rooftop restaurants, co-working areas, and wellness zones, ensuring a diversified offer that attracts multiple market segments. Strategic positioning near transportation hubs, cultural attractions, or business districts secures strong year-round demand.
Investors provide capital for property acquisition and hotel development in prime urban areas, securing returns through operational cash flows. Beyond financing, investors play a role in governance, brand positioning, and scaling the hotel portfolio across cities.
Value is created through stable occupancy rates, premium guest experiences, and diversified **revenue streams** from accommodation, food and beverage services, event hosting, co-working space rentals and wellness programs. The design incorporates sustainable building practices and resource-efficient systems, reducing operational costs and strengthening the hotel's market positioning.

KEY NUMBERS

>€10M
CAPEX

15%-25%
return on investment

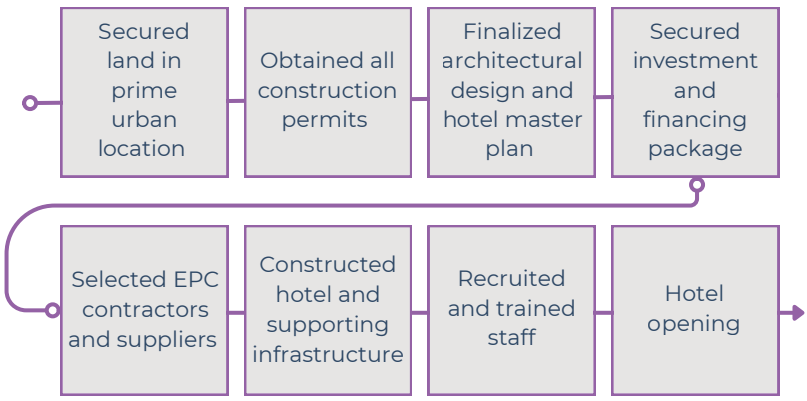
4-7 years
payback period

SUCCESSFUL STORY

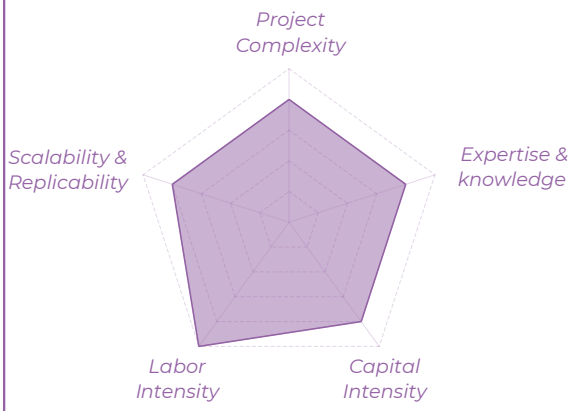
Radisson Collection Hotel, Old Mill Belgrade is one of the first in Serbia to achieve LEED Gold certification for sustainable building. Housed in a renovated 1901 historic mill, it combines preserved industrial architecture with contemporary design and energy-efficient systems. Its central location near business districts and cultural attractions ensures strong year-round occupancy, while its green profile appeals to environmentally conscious business and leisure travelers. The property offers 236 guest rooms and suites, a fine-dining restaurant and bar, conference and meeting facilities, a fitness and wellness center, and underground parking.

Others: Hilton Belgrade, Boutiquehotel Stadthalle Vienna

PROJECT MILESTONES



PROJECT OVERVIEW



Moderate to high complexity: Involves large-scale construction, integration of modern amenities, and compliance with urban planning and sustainability standards.

Required expertise: Requires experienced architects, hospitality consultants and engineers for the development phase

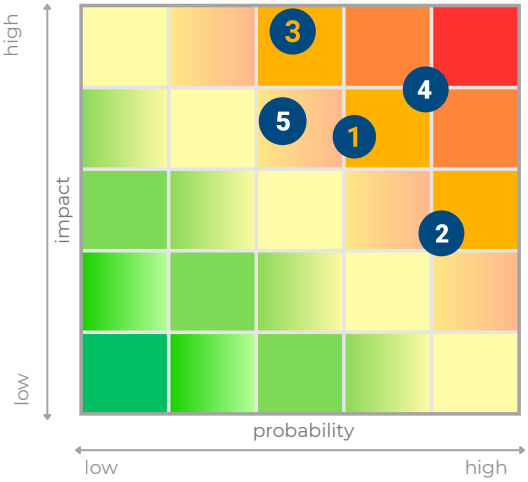
Capital intensity: Significant upfront investment is needed for land acquisition, construction, interior fit-out.

Labor intensity: Tourism and hospitality sectors are labor-intensive, requiring a diverse workforce for both construction and operational phase..

Moderate to high scalability: The model is adaptable to other urban centers, but location-specific demand and high capital requirements can limit replication speed.

RISK MATRIX

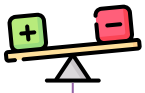
No.	Risk	Description
1	Permit and Regulatory Approval Challenges	Complex approval processes for construction, and other permits in central urban areas can cause significant delays, especially if the site involves protected architecture or is located near culturally sensitive zones. This can be mitigated by early engagement with regular authorities
2	. Construction Cost Overruns	Urban sites face higher costs from limited space, traffic management, and premium labor and materials, which can strain budgets and impact project returns. Fixed-price contracts can reduce this risk.
3	Demand Volatility	External shocks, such as economic downturns, geopolitical instability, or pandemics, can cause sharp declines in hotel occupancy.
4	Operational Workforce Fluctuation	High employee turnover in the hospitality sector can lead to increased training costs, inconsistent service quality, and operational inefficiencies. The risk can be reduced by offering competitive compensation.
5	Competition from New or Upgraded Hotels	The entrance of new hotels or the renovation of existing ones in strategic urban locations can intensify competition, putting downward pressure on room rates and occupancy levels. This risk can be mitigated by strengthening customer loyalty .



ESG IMPACT ASSESSMENT

Positive impacts

- Green building design cuts energy and water use by 20–40%, reducing emissions and costs.
- Applies waste measures such as recycling 30% of solid waste, reusing linens, and cutting food waste through portion control.
- Promotes sustainable hospitality aligned with climate goals and responsible consumption.
- Creates stable jobs across hospitality and maintenance sectors, strengthening local economic resilience.
- Builds partnerships with nearby businesses and cultural institutions, enhancing community ties.
- Supports gender equality, with women making up over half of the global tourism workforce.
- Complies with Serbian tourism and construction laws, ensuring safety and regulatory consistency.



Potential negative impacts

- Construction may increase local air and noise pollution or generate unmanaged waste.
- Operational sustainability could decline if energy systems rely on fossil fuels or maintenance is neglected.
- Urban expansion without careful spatial planning may raise traffic congestion and strain local infrastructure.

Using renewable energy systems, enforcing strict waste and noise control during construction, and applying sustainable urban planning can reduce negative impacts and strengthen the project's overall ESG performance.

HOW DOES THIS PROJECT SUPPORT SERBIA'S HOSPITALITY SECTOR

Serbia's major cities have limited availability of premium, high-end, sustainable hotels.

This project addresses the gap by:

- ✔ **Expanding premium accommodation supply** in major Serbian cities to meet rising demand from business and leisure travelers
- ✔ **Integrating sustainability into design and operations** to attract environmentally conscious guests and meet emerging market expectations
- ✔ **Boosting local economic activity** through stable employment creation and partnerships with surrounding businesses and service providers

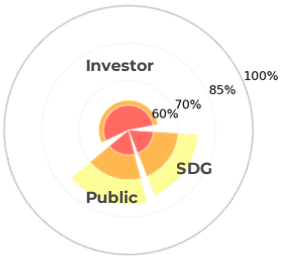
SDG addressed:

WASTEWATER TREATMENT FACILITY

Aligned with IOA 7. Waste Management Services

PROJECT SCORE

The project demonstrates **moderate overall performance**, with stronger results under the public and SDG perspectives and notably lower performance in the Investor perspective.



LEGEND

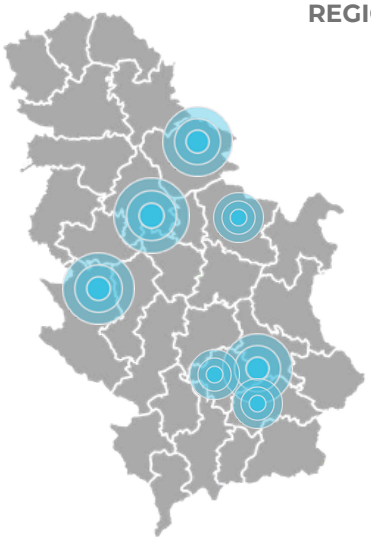
85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Serbia faces a critical wastewater treatment gap, with over **86% of municipal wastewater discharged untreated**, which is equivalent to about 363 million m³ annually. **High nutrient loads** remain a major issue, with 16,182 tons of nitrogen and 1,660 tons of phosphorus released through municipal and industrial wastewater in 2023 alone, contributing to water pollution and eutrophication. Additionally, wastewater contains significant levels of heavy metals, including 94.5 tons of zinc and 52.3 tons of copper, indicating the need for advanced treatment technologies. These challenges are amplified by tightening regulatory pressures and Serbia's alignment with EU directives, driving demand for modern, circular water treatment infrastructure.

Serbia currently operates 54 wastewater treatment plants, of which 12 are non-functional, with an average age of 22 years. According to NALED, an **additional €1.3 billion** will need to be invested in wastewater treatment plants in the coming years, underscoring the scale of the challenge and the opportunity for investors. The construction of **140 new plants is planned**, mainly under the Serbian–Chinese Clean Serbia program, with additional financing from KfW, EU funds, EBRD, and local budgets. While this pipeline is promising, most projects remain in early stages, with technology choices yet to be defined. This leaves a significant **untapped potential for private investment** or PPP model in modern wastewater treatment solutions.

REGION



The regions with the highest share of untreated wastewater such as Nišava, Belgrade, Zlatibor, Toplica, Jablanica, Braničevo, and Central Banat.

SUCCESSFUL STORY

The city of Mława in Poland replaced its outdated wastewater facility through a 33-year PPP with SUEZ, signed in 2016. The project involved financing, designing, and building a completely new treatment plant with modern capacity to serve the municipality, while also operating the old plant during construction. With a CAPEX of around €11.8 million, the facility was commissioned in 2019, securing stable tariff-based revenues for the investor and guaranteeing long-term EU compliance for the city, with ownership reverting to the municipality at the end of the contract.

Others: WWTF Kruševac, Žibel Bačka Topola

BUSINESS MODEL

Design, construction, and operation of closed-loop systems that process wastewater. The facility receives wastewater as its primary input, sourced mainly from municipalities through utility networks, with additional streams from industrial plants or farms. Through advanced treatment processes, the output includes clean, reusable water that reduces freshwater demand, as well as recovered materials such as nitrogen, phosphorus, and organic by-products, which can be further used in agriculture, industry, or as energy feedstock. Given the nature of the service, collaboration with municipalities is essential, and the project is most effectively implemented through public-private partnerships (PPPs) with municipalities or public institutions, ensuring both regulatory compliance and sustainable service provision. **The investor's role** is to provide the capital for development, ensure the technology and expertise required for construction and operation, secure long-term contracts that guarantee stable cash flows, and establish the PPP framework in cooperation with local authorities.

The primary **revenue stream** comes from long-term wastewater treatment contracts with municipalities, complemented by agreements with industrial clients, while additional revenues may be generated from treated water, nutrients, and organic by-products. The project offers scalability potential across regions in Serbia facing wastewater treatment gaps and stricter compliance requirements.

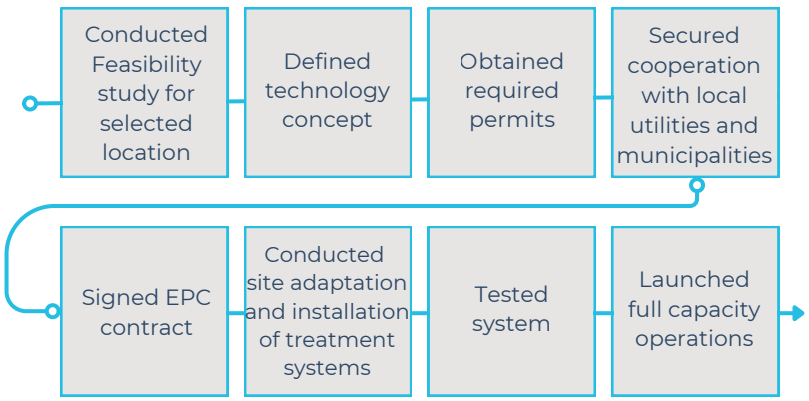
KEY NUMBERS

>€10M
CAPEX

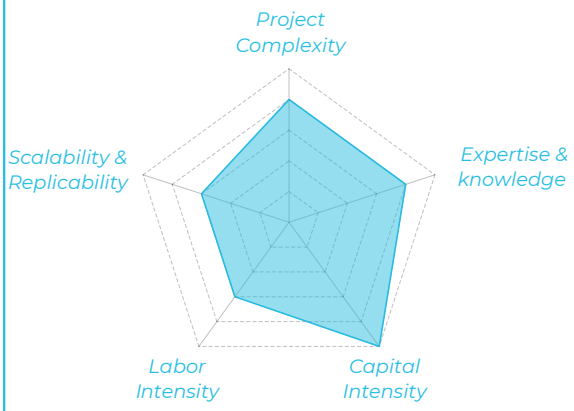
10-15%
return on investment

7-10 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



High complexity: Involves integration of established treatment technologies, but requires tailored system design, infrastructure adaptation, and coordination with local public utility companies

High expertise: Requires advanced expertise in process engineering, environmental protection, water quality monitoring.

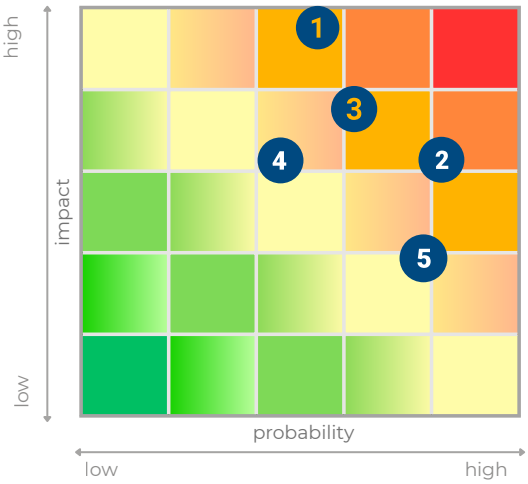
Capital intensity: Substantial investment is required for advanced treatment systems, automation, and reuse infrastructure.

Labor intensity: Construction involves civil works and installation; operations require qualified staff for monitoring, system control, and maintenance.

Moderate scalability: While the facility can be replicated in Serbian municipalities with outdated or missing sanitation systems, wastewater treatment projects are inherently location-specific and cannot be scaled indefinitely.

RISK MATRIX

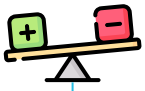
No.	Risk	Description
1	Regulatory Risks	Changes in national legislation or delays in obtaining permits for handling hazardous byproducts (e.g., sludge containing heavy metals) may postpone project commissioning. Risk can be reduced by early engagement with regulators and local authorities to clarify permitting requirements
2	Construction delays	Delays and budget overruns may arise due to the complexity of civil works, inadequate planning, or insufficiently qualified contractors. uUe of experienced EPC contractors with proven track records can prevent the risk.
3	Lower performance of Treatment Technology	Inadequate filtration of microplastics, heavy metals, or nutrients may lead to incomplete removal of chemicals or pathogens during treatment, affecting both project credibility and operational outcomes. Technology selection should based on international best practices to prevent risk.
4	Local Community Resistance	User acceptance of resources recovered from wastewater may be low due to fears or misconceptions about their safety Risk can be mitigated by stakeholder engagement during early planning stages
5	Sludge Disposal Constraints	Limited regional solutions for processing or safely disposing of contaminated sludge can create operational bottlenecks and drive up costs. Establishment of long-term agreements with regional disposal or treatment facilities can reduce the risk.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces freshwater use by reusing treated water for irrigation, industry, and environmental restoration.
- Recovers 45–90% of phosphorus and 5–15% of nitrogen, lowering fertilizer demand and related emissions.
- Prevents microplastic, heavy metal, and pathogen release through controlled sludge treatment.
- Improves public health by lowering exposure to untreated wastewater and reducing risks of waterborne diseases.
- Supports agriculture by providing reliable water sources during dry periods.
- Aligns with the EU Urban Waste Water Treatment Directive and ensures advanced pollutant removal.
- Strengthens governance and accountability through a transparent PPP model.



Potential negative impacts

- Residual sludge and by-products may reduce circularity if not reused.
- Energy-intensive operations powered by non-renewables increase emissions.
- Incomplete nutrient removal may limit ecosystem recovery downstream.

Integrating renewable energy, optimizing treatment efficiency, and enabling safe reuse of sludge and recovered nutrients can reduce negative impacts and improve overall sustainability.

HOW DOES THIS PROJECT SUPPORT WASTE MANAGEMENT IN SERBIA?

The high share of untreated wastewater in Serbia places significant pressure on the environment.

The circular water treatmant facility addresses the problem by:

- ✔ **Enabling wastewater reuse,** which significantly reduces freshwater demand in agriculture, industry, and urban systems
- ✔ **Recovering nutrients** like phosphorus of nitrogen, decreasing reliance on synthetic fertilizers and mitigating greenhouse gas emissions from conventional nitrogen removal processes
- ✔ **Eliminating heavy metals and hazardous pollutants from wastewater, t**hereby contributing to better public health.

HEALTHCARE

- Elderly Care Homes
- High-Precision Pharma Packaging Facility
- Medical Device Component Production Center
- Personalized Medicine Manufacturing Hub
- Sustainable Pharmaceutical Manufacturing Hub

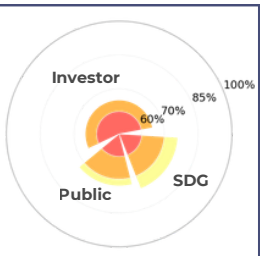
SDG addressed:

ELDERLY CARE HOMES

New potential area

PROJECT SCORE

The project demonstrates **moderate overall performance**, positioned in the orange to lower yellow range, with stronger results under the Public and SDG perspectives.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

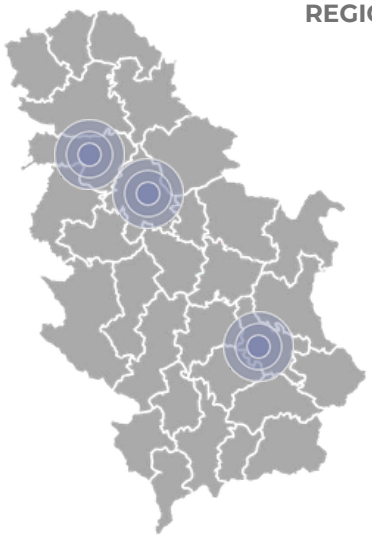
MARKET POTENTIAL

Serbia is ageing rapidly, raising long-term demand for institutional care, with EU projections showing the 65+ share rising steadily through 2040 and already among the highest in southern and eastern regions.

In 2018, the elderly care sector had 249 licensed providers with 16,444 places, **covering just 1.4% of those aged 65+**. Capacity is heavily concentrated in Belgrade and Vojvodina (91%), while 1,163 people were on waiting lists and staffing stood at only 0.54 care workers per 100 residents, versus an EU average of 3.8. Monthly costs range from €280–€514 in public homes and €300–€1,200 in private homes, against an average pension of €215. Day-care services reach just 0.28% of older people, while **Serbia counts around 1.25 million over 65, more than one third living alone, with many left without support as younger family members reside abroad.** In addition, **by 2053,** the share of the population aged 65 and above is expected to **increase by 6.6 percentage points compared to 2022**.

With coverage at only 1.4% and persistent waiting lists, there is a **strong scope to expand and modernize facilities**, especially in underserved rural and southern regions. Lack of affordable options creates room for tiered pricing, public–private partnerships, and specialized dementia or palliative units. Extremely low day-care and home-care coverage further opens opportunities for integrated models aligned with EU strategies, while demographic ageing ensures sustained demand growth for decades.

REGION



Demand exists nationwide, with priority in major cities (Belgrade, Novi Sad, Niš) and municipalities with a higher 65+ share, hospital proximity, limited bed capacity, and available qualified staff.

BUSINESS MODEL

Develop, license, and operate long-term residential care homes offering 24/7 accommodation, nursing, and social support for older adults, with optional dementia units and respite care.

Facilities integrate rehabilitation services such as physiotherapy, psychological support, and addiction recovery, while wellness and spa programs are designed for individuals recovering from injury, illness, or living with chronic conditions. Revenue streams include resident fees (private pay/insurance), municipal or social-care co-funding, and value-added services like rehabilitation, wellness, and premium hospitality tiers. The investor role covers financing and facility development in line with licensing rules, implementing clinical governance and quality systems, and managing multi-site operations with centralized HR and procurement.

KEY NUMBERS

~€5M
CAPEX

15%-25%
return on investment

4-7 years
payback period

SUCCESSFUL STORY

Alexander Senior Living (Sopot, Serbia) combines elderly care with rehabilitation services such as physiotherapy, hydrotherapy, and medical supervision. It is more advanced than typical Serbian homes, yet remains a premium residence rather than a specialized medical center.

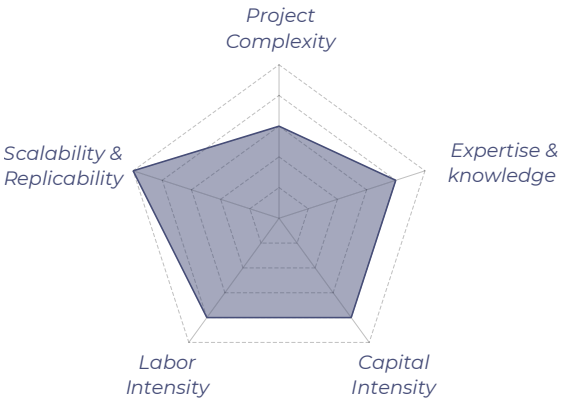
Loveday & Co (London, UK) is dementia-focused, offering nearly 1:1 staffing, 24/7 nursing, physiotherapy, VR-based staff training, and lifestyle amenities. It earned an "Outstanding" rating from the UK Care Quality Commission, awarded to less than 1% of providers.

Other Serbian private homes include Agape Nursing Home, and Villa Košuta, which are mostly focused on accommodation and basic nursing.

PROJECTS MILESTONES

- Assessment and site selection
- Licensing pathway and preliminary design
- Permits and secured financing
- Final design and technical documentation
- Construction and equipment installation
- Staffing model and clinical governance setup
- Licensing approvals and inspections
- Full operations and regular quality audits

PROJECT OVERVIEW



Moderate-high complexity — Requires healthcare-adjacent licensing, clinical governance, and continuous inspections.

Complex, multidisciplinary services (care, safety, infection control, diet, mobility) but standardized and proven in practice.

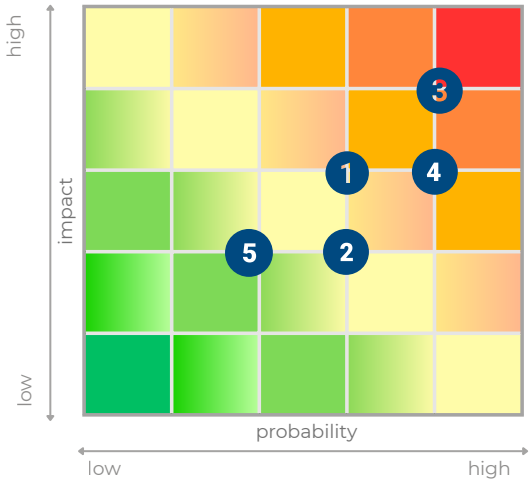
High upfront CAPEX (real estate, medical equipment, safety systems); OPEX stable but staffing dominates.

High demand for nurses, caregivers, allied health, hospitality, and admin; staffing is the key challenge and largest cost.

The model is **highly scalable**, enabling economies of scale and specialization across locations.

RISK MATRIX

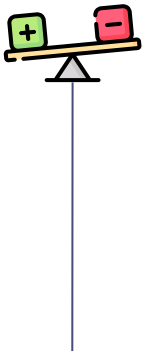
No.	Risk	Description
1	Regulatory and Certification	Delays in the licensing process or non-compliance with long-term care regulations can postpone opening or limit occupancy. Early engagement with the relevant Ministry and the use of standard operating procedures help mitigate this.
2	Construction and Equipment	Cost overruns or design deficiencies (accessibility, fire safety, medical areas) can increase capital expenditure and require rework.
3	Operational and Clinical	Shortages of qualified staff, incidents in the quality of care, or outbreaks of infection can threaten safety and reputation. Strong clinical governance and continuous training are essential.
4	Revenue and Occupancy	Shocks in demand or limited affordability may reduce occupancy. Diversification of sources of income and differentiated service packages help mitigate this.
5	Community and Social Acceptance	Local concerns about traffic or land use may slow down project implementation. Proactive engagement with stakeholders and clear communication of benefitsreduce this risk.



ESG IMPACT ASSESSMENT

Positive impacts

- Promotes sustainable construction using eco-friendly materials, efficient resource use, and green spaces that improve residents' health and well-being.
- Addresses Serbia's elderly care gap by professionalizing the sector, creating stable local jobs (especially for women), and improving seniors' quality of life.
- Generates measurable social impact while meeting growing market demand, enhancing long-term asset value and investor reputation.
- Strengthens governance and transparency by aligning with national laws, EU standards, and independent audit frameworks for ethical and responsible management.



Potential negative impacts

- High construction costs and energy use if sustainability standards are not effectively implemented.
- Unequal service accessibility or affordability for lower-income elderly populations.
- Potential staff burnout or turnover if working conditions are not adequately managed.

These aspects could be addressed through energy-efficient design, financial models ensuring service affordability, and responsible workforce management that prioritizes fair wages and staff well-being.

HOW DOES THIS PROJECT STRENGTHEN SERBIA'S HEALTHCARE SECTOR?

Serbia's ageing trend is accelerating, placing growing pressure on families, healthcare providers, and public services, while exposing gaps in safe, modern long-term care.

This elderly care homes project strengthens the system by:

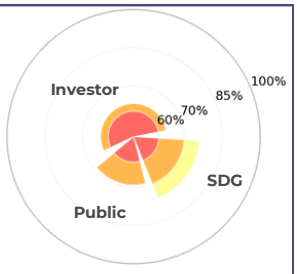
- ✔ **Expanding access to dignified, continuous care**, adding licensed, quality-assured capacity that reduces hospital overuse and relieves pressure on acute-care facilities.
- ✔ **Professionalizing the elder-care workforce**, creating trained teams and stable local jobs that complement health services and raise standards across regions.
- ✔ **Aligning with national and EU priorities**, supporting Serbia's social-protection and healthcare objectives by improving quality, safety, and community integration in long-term care.

HIGH-PRECISION PHARMA PACKAGING FACILITY

Aligned with IOA 11. Medicine Production and Delivery

PROJECT SCORE

The project demonstrates **moderate overall performance**, positioned in the orange range, with the strongest results under the SDG, while showing lower performance in both the Investor and Public perspectives.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

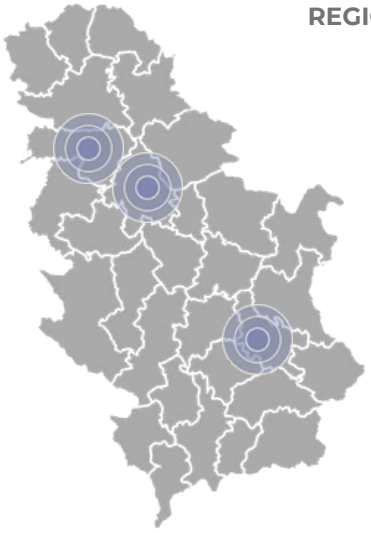
MARKET POTENTIAL

Serbia sells heavily into the EU. Germany is the #1 export market (≈15% of exports in 2024), so a packaging plant positioned for EU compliance and short lead times can plug straight into EU pharma value chains. **Near shoring** and **lower operating costs** improve competitiveness vs. distant suppliers. The competitive landscape includes both local and international players, which can create a dynamic market environment.

Opportunities exist in the growing demand for sustainable and eco-friendly packaging, driven by both consumer preferences and regulatory pressures. Companies must differentiate themselves through unique value propositions, such as advanced technology or innovative designs. Additionally, **Serbia's strategic location** in Southeast Europe provides access to broader markets, enhancing its relevance in the global pharmaceutical supply chain.

The European market shows strong growth in demand for high-quality pharmaceutical packaging, particularly for injectable and biologic therapies. Expected long-term growth and current supply shortages create an opportunity for a new facility in the Balkans to position itself as a strategic supplier to European pharmaceutical companies.

REGION



Novi Sad (engineering talent), Belgrade (regulatory & logistics), and Niš (low-cost manufacturing) all benefit from Serbia's strong EU export links, especially with Germany.

SUCCESSFUL STORY

Gerresheimer opened its facility in Skopje, North Macedonia, in 2020.

The site features ISO-classified cleanrooms and manufactures a broad range of pharmaceutical packaging like glass and plastic vials, ampoules, cartridges, and syringes, primarily for injectable and other medicines. An ongoing expansion will add 7,600 m² of production space and increase the workforce from around 250 to 500 employees by 2025.
This example illustrates the potential for high-precision pharmaceutical packaging production in the Balkans, meeting European standards and serving the needs of global pharmaceutical companies.

BUSINESS MODEL

Construction and operation of a **facility for high-quality pharmaceutical packaging** (vials, ampoules, cartridges, syringes) and related secondary packaging. The plant is fully aligned with European standards of quality and safety.

Revenues stem from contracts with EU and regional pharmaceutical companies, complemented by services such as sterilization and supply of ready-to-use components.

The investor provides financing and equipment, ensures strict quality controls, secures long-term offtake agreements, and expands capacity in line with growing European demand.

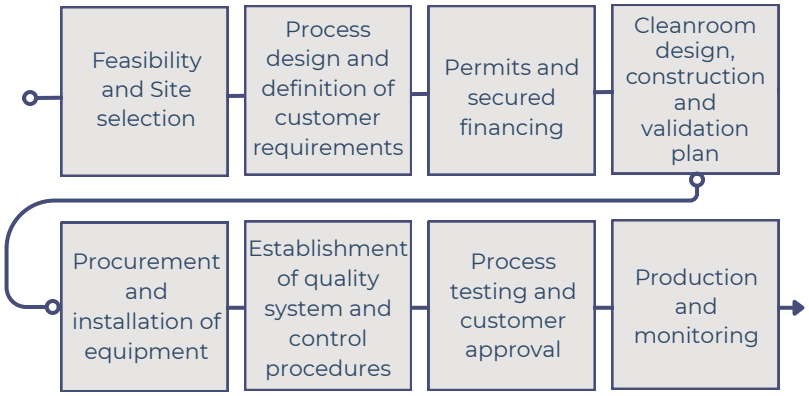
KEY NUMBERS

≥€20-50M
CAPEX

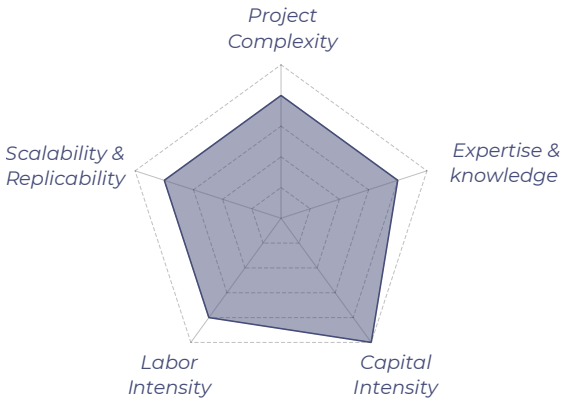
10%-15%
return on investment

7-10 years
payback period

CRITICAL SUCCESS FACTORS



PROJECT OVERVIEW



Moderate-High complexity: Requires cleanrooms, specialized systems, and compliance with European quality standards.

Skilled technicians and quality inspectors are needed, supported by continuous training and customer audits.

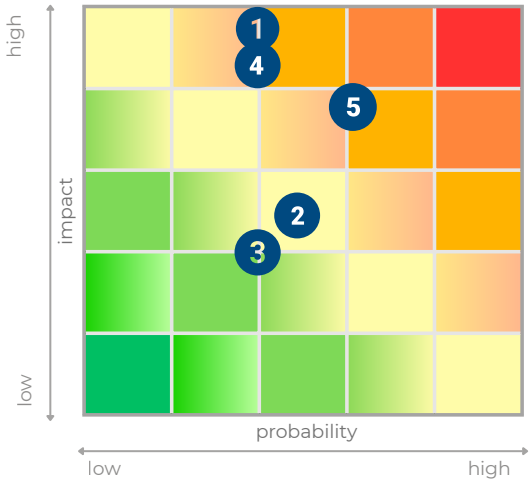
High upfront investment in infrastructure and equipment, offset by lower labor costs and EU proximity.

Sterile production **requires disciplined work, with workforce expanding** alongside contract growth.

Modular lines provide **scalability** by expanding capacity and adapting formats, while the proven model ensures **replicability** in other locations.

RISK MATRIX

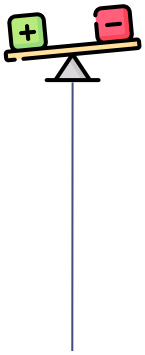
No.	Risk	Description
1	Regulatory and Certification	Delays in certification and compliance with international standards may block exports. This risk can be mitigated by establishing a quality management system early and conducting trial internal audits.
2	Construction and Equipment	Long lead times for cleanrooms, ventilation systems, or specialized equipment can delay launch. Engaging experienced contractors and suppliers reduces this risk.
3	Market and Revenue	Heavy reliance on a small number of clients can endanger revenue stability. Diversifying products and EU buyers helps mitigate this exposure.
4	Operational and Technical	Issues in particle control, packaging treatment, or visual inspections can affect quality. Continuous process analytics and regular maintenance lower this risk.
5	Supply Chain	Shortages or delays in glass and polymer supply may disrupt production. Dual sourcing and safety stocks are required as mitigation.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces carbon footprint through energy-efficient cleanrooms, heat recovery systems, and circular packaging, aligning with EU sustainability goals.
- Strengthens Serbia's integration into the European healthcare value chain, supporting export growth and access to green financing.
- Creates skilled, long-term employment and promotes gender inclusion through training and leadership opportunities for women.
- Ensures compliance with international ISO, WHO, and national regulatory standards, lowering risks and enhancing investor credibility.



Potential negative impacts

- High initial CAPEX and energy demand during construction and equipment installation.
- Potential generation of industrial waste or chemical residues if waste streams are not properly managed.
- Occupational health issues due to strict cleanroom conditions and repetitive technical processes.

These aspects could be addressed through circular waste management systems, renewable energy integration, continuous staff training on occupational safety, and adherence to ISO environmental and health standards.

HOW DOES THIS PROJECT STRENGTHEN SERBIA'S HEALTHCARE SECTOR?

Serbia's pharma supply chain is exposed to import dependencies for critical containers and sterile components—creating lead-time, quality, and cost risks.

This packaging facility addresses the problem by enabling:

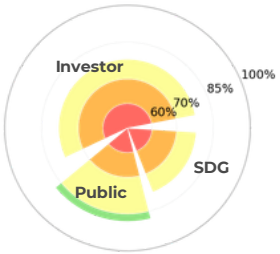
- ✔ **Supply security and quality**, by producing vials, syringes, and cartridges domestically to European standards, ensuring reliable availability of medicines.
- ✔ **Export diversification**, integrating Serbia into European pharmaceutical value chains and leveraging its strongest trade corridors, particularly with Germany and other EU partners.
- ✔ **Regulatory and sustainability alignment**, operating under international quality standards and advancing resource-efficient production in line with European market expectations.

MEDICAL DEVICE COMPONENT PRODUCTION CENTER

Aligned with IOA 11. Medicine Production and Delivery

PROJECT SCORE

The project demonstrates **solid overall performance**, with best results under the public perspective and slightly lower results under the investor and SDG perspectives.



LEGEND

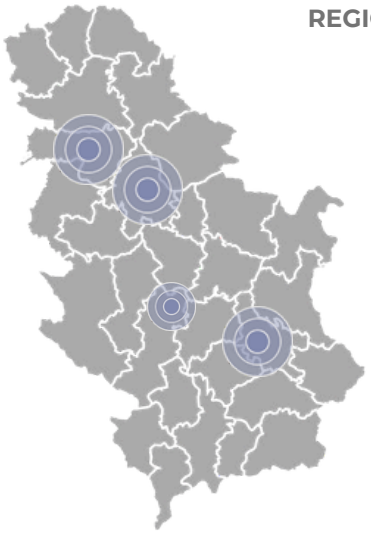
85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Serbia's medical and dental instruments sector is projected to generate about **EUR 170.6 million in revenues in 2025**, with **149 companies** employing around **2,358 people**. However, most existing firms operate in low-tech manufacturing, and Serbia still imports roughly 88% of its medical equipment requirements.

Meanwhile, the European telemedicine market was valued at approximately **EUR 41.45 billion in 2025, and is expected to grow to around EUR 98.08 billion by 2030**, at a CAGR of ~18.8%. This sharp growth underscores rising demand for wearable sensors, remote patient monitoring, and diagnostic tools—areas directly relevant to component manufacturing. Serbia already has digital health infrastructure (eHealth, teleconsultations), which can be leveraged as telemedicine adoption increases.

REGION



Novi Sad stands out with skilled labor and EU access, while Belgrade leads in research links, Niš in manufacturing and logistics, and Čačak in low-cost production.

BUSINESS MODEL

Establish a high-precision facility for producing **components and subassemblies for telemedicine solutions** such as remote monitoring kits, diagnostic tools, and wearable sensors. These outputs are supplied through long-term B2B contracts with European and regional med-tech companies.

The facility operates under cleanroom standards and advanced quality systems, ensuring compliance with EU Medical Device Regulation (MDR) and enabling integration into CE-marked final devices. Value is created through export contracts, operational efficiency, and scalability into related med-tech segments.

The investor finances equipment, certification, and operations, while Serbia's strategic EU access, trade agreements, and skilled engineering workforce strengthen competitiveness and attract financing from both local banks and international institutions.

KEY NUMBERS

~€10M
CAPEX

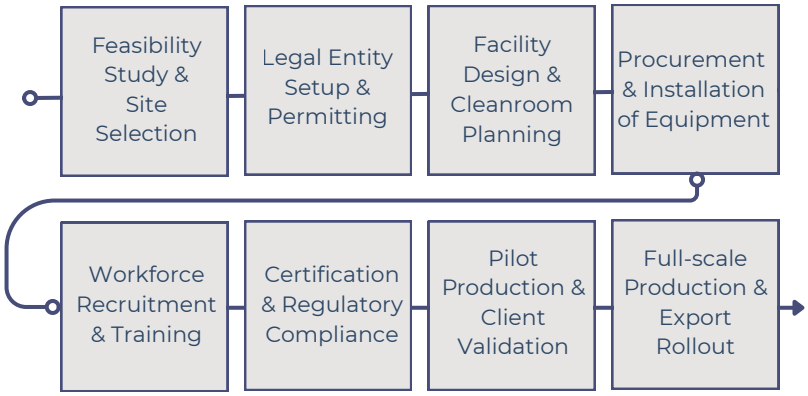
>25%
return on investment

≤4 years
payback period

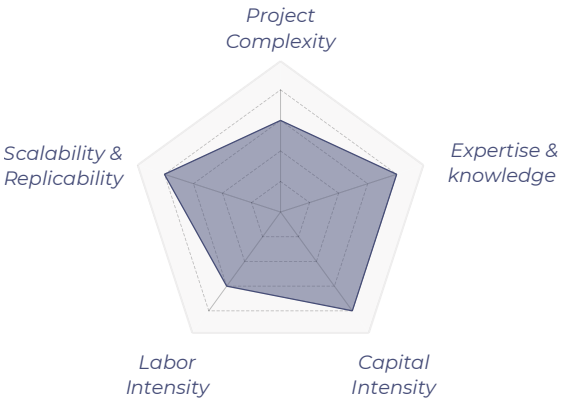
SUCCESSFUL STORY

Serbia is building a reputation in digital health innovation. **Humeds** created a wearable ECG device for early arrhythmia detection, using mobile apps and AI analytics, and secured EU certification, showing export readiness. **Vinaver Medical** is advancing AI-based oncology software, attracting foreign investment and proving scalability. Meanwhile, Serbian hospitals introduced **HoloLens technology** to support diagnostics and surgery, demonstrating openness to digital transformation. These examples highlight how local innovators and institutions are shaping Serbia as a competitive hub for telemedicine and high-tech healthcare solutions.

PROJECTS MILESTONES



PROJECT OVERVIEW



Requires site selection, permits, environmental compliance, and dual alignment with Serbian and EU rules. **Complexity** increases when targeting telemedicine components.

Telemedicine requires strong expertise in cleanroom production, electronics integration, and digital health compliance. Training and partnerships can fill current gaps.

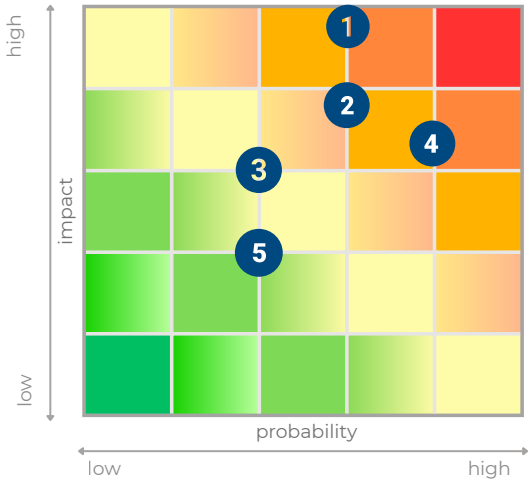
High upfront investment in precision lines, cleanrooms, and quality control, plus training and certification. Serbia's lower operating costs still support long-term margins.

Skilled engineers and operators exist, but limited experience in telemedicine components means training and re-skilling are necessary.

Production can expand into new component types and telemedicine subassemblies, with export orientation strengthening growth.

RISK MATRIX

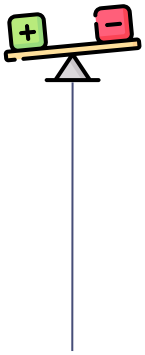
No.	Risk	Description
1	Regulatory and Certification	Delays in meeting EU directives and regulations or in achieving ISO compliance can block exports. Strong regulatory planning is essential.
2	Construction and Equipment Procurement	Cost overruns or delays in cleanroom construction can slow market entry. Experienced engineering, procurement, and construction partners helps avoid this.
3	Technology and Equipment	Equipment failures may disrupt production. High-quality machinery and strict maintenance lower the risk.
4	Workforce and Skills Gap	Lack of trained staff in cleanroom production can harm efficiency. Training and retention programs build capacity.
5	Market Access and Revenue Volatility	Export sales face global competition and pricing pressure. Long-term contracts and differentiation secure stability.



ESG IMPACT ASSESSMENT

Positive impacts

- Implements eco-design principles and recyclable or biodegradable materials, reducing waste and supporting a circular economy.
- Lowers emissions and resource consumption through design-for-manufacturing and energy-efficient production processes, aligning with the EU Green Deal.
- Creates skilled, high-quality jobs in cleanroom operations and precision engineering, contributing to inclusive industrial growth.
- Promotes gender equality through targeted recruitment, training, and mentorship programs for women in technical and managerial positions.
- Strengthens governance and transparency through certified quality systems, ESG risk monitoring, and compliance with EU medical device directives.



Potential negative impacts

- Energy-intensive manufacturing and cleanroom operations could increase carbon emissions if not optimized.
- Improper disposal of materials or process waste may cause environmental harm.
- Unequal access to technical training and advancement opportunities within the workforce.

These aspects could be addressed through renewable energy integration, closed-loop waste management, continuous environmental performance monitoring, and inclusive workforce development programs.

HOW DOES THIS PROJECT STRENGTHEN SERBIA'S HEALTHCARE SECTOR?

Serbia's medical device market is still largely dependent on imports, limiting domestic value creation and exposing the healthcare sector to supply chain disruptions.

This Medical Device Component Production Center addresses the problem by enabling:

- ✔ **Import substitution and export growth**, replacing reliance on foreign suppliers with locally manufactured, high-quality device components and opening access to EU and regional healthcare markets.
- ✔ **Industrial diversification**, integrating Serbia into the global med-tech value chain and strengthening its manufacturing base in high-value, technology-driven sectors.
- ✔ **Regulatory and innovation alignment**, meeting stringent EU medical-grade standards while fostering advanced engineering, quality assurance, and cleanroom expertise to position Serbia as a competitive, trusted supplier.

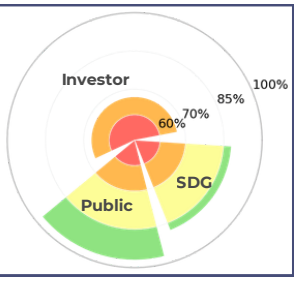
SDG addressed:

PERSONALIZED MEDICINE MANUFACTURING HUB

Aligned with IOA 13. Biotechnology Development

PROJECT SCORE

The project **demonstrates solid overall performance**, with outstanding results under the Public and SDG perspectives and lower performance in the Investor perspective.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

MARKET POTENTIAL

Serbia is **actively building an integrated biotechnology ecosystem** by strengthening collaboration between academia, industry, and regulatory bodies. This coordinated development is creating favorable conditions for investment in personalized medicine, supported by the existing pharmaceutical infrastructure and sector know-how that enable rapid scaling and export orientation.

Serbia is building a competitive edge in biotech through public investment in innovation infrastructure, including **the C4IR center and the BIO4 campus**, both aimed at advancing biotechnology and AI in healthcare BIO4 Campus has already established multiple Memorandums of Understanding with industry leaders and research institutions (including Pfizer, Arexpo S.p.A. & FITT, and Merck, among others) to strengthen innovation, commercial applications, and international cooperation.

Germany is **Serbia's main export market**, with its personalized medicine sector projected to grow at a 9.4% CAGR from 2025 to 2033. This growth offers Serbian manufacturers strong opportunities, especially in gene therapies and advanced diagnostics.

REGION

Belgrade leads with its ecosystem and BIO4 Campus link, while Novi Sad, Kragujevac, and Niš offer potential for satellites or expansion.

BUSINESS MODEL

The model integrates Good Manufacturing Practice - compliant biomanufacturing, diagnostics, and clinical services into a unified system. It covers **gene therapies and treatments** for both rare and common diseases, including certain cancers, autoimmune conditions, and metabolic disorders, **supported by AI-driven bioinformatics and modular infrastructure**. Activities span cell sourcing, biobanking, production, and application, with embedded quality control and data traceability.

Revenue is generated through exports, licensing, contract manufacturing, and treatment provision for international and domestic patients. Patient access may occur through formal agreements with foreign health systems, reimbursement by national health insurance, or out-of-pocket payment, depending on the therapy type and regulatory pathway.

KEY NUMBERS

~€10M
CAPEX

10%-15%
return on investment

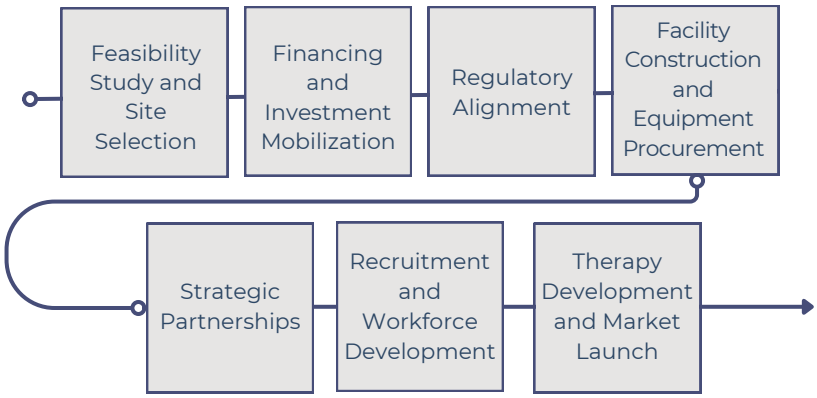
7-10 years
payback period

SUCCESSFUL STORY

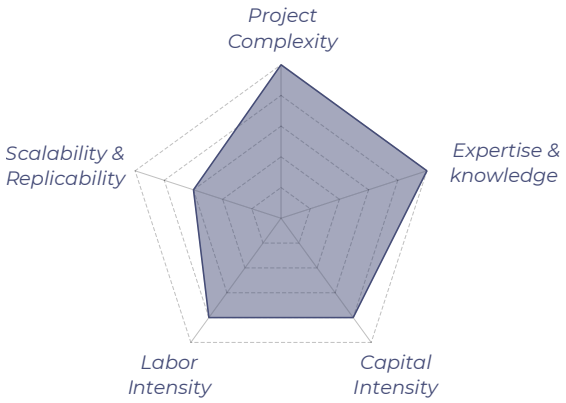
GaiaCell is a private biotech company focused on cell and gene therapies and regenerative medicine, with therapeutic applications in orthopedics, autoimmune conditions, pulmonology, dermatology, and chronic wound care. It also functions as a Contract Development and Manufacturing Organization (CDMO) for mesenchymal stromal cell-based products, supporting clinical and commercial partners in therapy development.

In collaboration with EU and U.S. tissue banks, GaiaCell ensures reliable access to allograft materials for orthopedic and reconstructive procedures, reinforcing its integrated therapeutic model.

PROJECTS MILESTONES



PROJECT OVERVIEW



Requires strict compliance with pharmaceutical standards, advanced cleanroom infrastructure, and regulatory oversight. However, modular production lines and AI-assisted bioinformatics can streamline R&D timelines.

Requires cross-disciplinary expertise in biotechnology, pharmaceuticals, artificial intelligence, and regulatory affairs. Partnerships with universities and targeted training programs are essential.

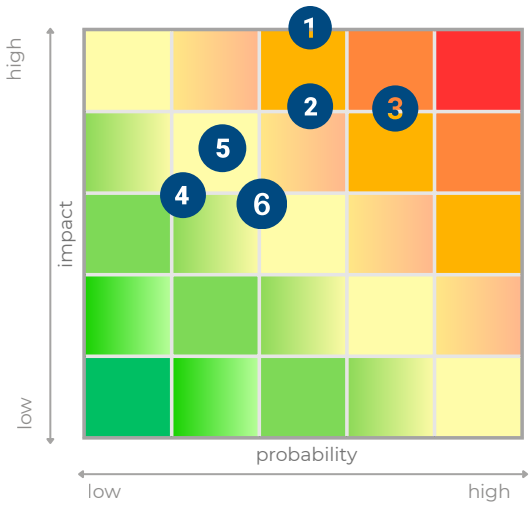
Significant CAPEX for construction, specialized laboratory and production equipment, and regulatory validation. However, ROI is strengthened through high-margin exports and IP licensing.

High-value job creation - Roles include molecular biologists, data scientists, QA specialists, and clinical researchers—supporting brain gain and youth retention.

Due to the highly tailored design, **replication is nearly impossible**, though certain elements may be adapted to other therapeutic fields.

RISK MATRIX

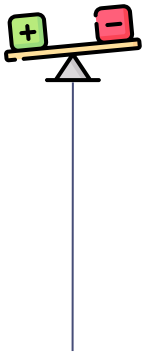
No.	Risk	Description
1	Regulatory and Compliance	Delays in obtaining essential certification, clinical trials, etc., can hinder exports. Mitigated through regulatory experts and strong QA systems.
2	Construction and Equipment Procurement	Biotech labs and cleanrooms require costly, precise setups. Delays or overruns are reduced by using experienced EPC contractors.
3	Operation and Maintenance	Shortages of skilled biotech professionals may limit growth. Addressed through university partnerships, return incentives, and training.
4	IP and Data Security	Weak IP or data protection risks competitive loss and fines. Managed with strong IP strategy, cybersecurity, and legal support.
5	Market Access and Revenue	Slow adoption and reimbursement delays may affect cash flow. Reduced through long-term contracts and EU-aligned products.
6	Innovation and Technology Obsolescence	Fast biotech and AI advances risk outdated processes. Continuous R&D and innovation partnerships are essential.



ESG IMPACT ASSESSMENT

Positive impacts

- Reduces environmental footprint through green chemistry, renewable energy, and efficient production processes, cutting GHG emissions by up to 30%.
- Aligns with EU Taxonomy and ESG financing frameworks, enhancing access to green and sustainable capital.
- Creates high-quality jobs in biotechnology, bioinformatics, and diagnostics, strengthening Serbia's innovation ecosystem.
- Promotes gender equality by increasing women's participation in biotech leadership and R&D through mentorship and academic collaboration.
- Ensures strong governance and transparency via compliance with GMP, GDPR, EMA, and FDA standards, supported by independent ESG oversight and annual impact reporting.



Potential negative impacts

- Energy-intensive production and chemical waste may pose environmental and health risks if not properly managed.
- Data security breaches due to high volumes of sensitive health information.
- Possible gender or skills imbalance if inclusion policies are not effectively implemented.

These aspects could be addressed through closed-loop production systems, renewable energy sourcing, robust waste treatment, strong data protection protocols, and continuous monitoring of gender equality and workforce development indicators.

HOW DOES THIS PROJECT STRENGTHEN SERBIA'S HEALTHCARE SECTOR?

This project supports Serbia's transformation into a regional innovation hub by enabling:

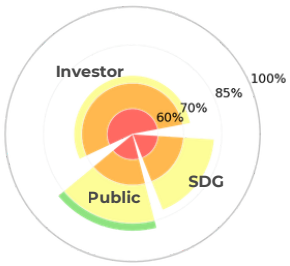
- ✔ **Resilient healthcare systems**, through domestic production of high-value, precision medicines (e.g., gene therapies, diagnostics), reduce reliance on imports and accelerate patient access to life-saving treatments
  Smart specialization and knowledge-driven growth, aligned with Serbia's innovation strategies and EU Horizon Europe health priorities, particularly in biotechnology and bioinformatics.
- ✔ **High-value job creation**, reversing brain drain by offering competitive roles for scientists, bioengineers, and data specialists—especially in underserved or emerging urban tech zones.
- ✔ **Export-oriented industrial development**, positioning Serbia as a reliable producer for EU-regulated markets, increasing foreign exchange inflows, and boosting national competitiveness in advanced therapies.
  Strategic alignment with EU and global innovation ecosystems, enhancing Serbia's role in cross-border health R&D, regulatory convergence, and biotech value chains.

SUSTAINABLE PHARMACEUTICAL MANUFACTURING HUB

Aligned with IOA 11. Medicine Production and Delivery

PROJECT SCORE

The project demonstrates **solid overall performance**, with strong results from the public and moderate performance from the SDG and investor perspectives.



LEGEND

85%-100%	Best-performing project
70%-85%	Solid performance
60%-70%	Moderate performance
up to 60%	Below threshold

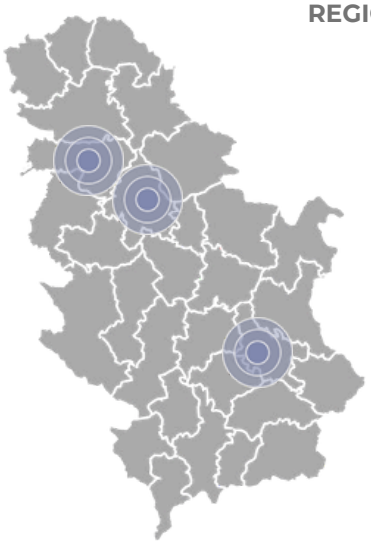
MARKET POTENTIAL

Serbia has a growing pharmaceutical base with a strategic position that secures access to EU and regional markets. **Already among the top exporters in the Western Balkans**, it maintains strong trade links with Germany, Italy, and other EU countries. Combined with **competitive production costs** and an **emerging life sciences ecosystem (BIO 4 Campus)**, this forms a strong platform for scaling sustainable pharmaceutical production.

The industry is led by several large producers but increasingly features SMEs in high-value niches such as biosimilars and advanced therapies. In 2024, Serbia exported **EUR 393 million worth of pharmaceutical products**. The domestic market reached **EUR 1.7 billion in value** in 2024, with generics holding the largest share alongside prescription and OTC products.

Looking ahead, **Serbia's pharmaceutical market is set to grow steadily**, from 12.46% in 2025 to about 13.84% in 2028. This creates major opportunities for sustainable facilities focused on generics and essential medicines to meet rising domestic demand and expand into neighboring EU markets.

REGION



Belgrade stands out due to its proximity to research, skilled labor, and export hubs, while Novi Sad and Niš add value with their strong academic institutions.

BUSINESS MODEL

Development and operation of a state-of-the-art facility for producing **generic and essential medicines** in priority therapeutic areas such as **cardiovascular, diabetes, oncology, CNS, antibiotics, and respiratory treatments**, manufactured through energy-efficient and environmentally sustainable processes. The facility targets both domestic healthcare providers and EU export markets, leveraging Serbia's strategic trade agreements. Products are distributed through long-term B2B contracts with pharmaceutical distributors and agreements with public health systems, ensuring predictable revenues.

The investor's role covers financing construction, advanced production lines, and quality control systems, as well as establishing efficient distribution channels. Value is created through strong demand for affordable, sustainable medicines, lower operating costs from resource efficiency, and broader EU market access through full compliance with strict regulatory frameworks.

KEY NUMBERS

>€10M
CAPEX

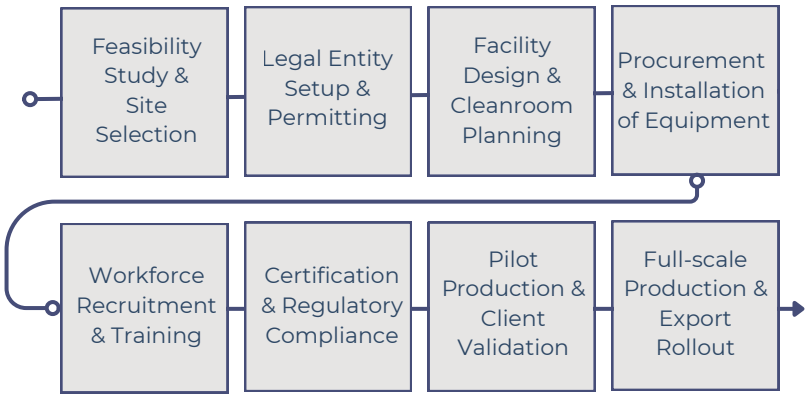
15%-25%
return on investment

4-7 years
payback period

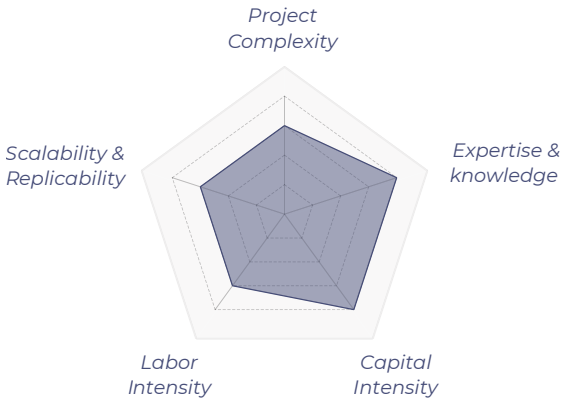
SUCCESSFUL STORY

Hemofarm is Serbia's leading generics producer that operates under Germany's STADA Group and specializes in Rx, OTC, and consumer health products. The company controls over 60% of Serbia's pharma exports, manufactures around 6.6 billion tablets and capsules annually, and serves 34 global markets with a workforce of 3,600. In 2024, STADA Group achieved EUR 3.73 billion in group sales, with EUR 808 million adjusted EBITDA (margin 21.8%). Recently, Hemofarm expanded its portfolio by acquiring the Fortacell supplement brand, enhancing its offerings in immunity and wellness products across five Balkan markets.

PROJECTS MILESTONES



PROJECT OVERVIEW



Moderate complexity reflects the need to meet Good Manufacturing Practice standards, environmental norms, and export regulations, while standardized facility designs and local experience help reduce implementation risk.

Expertise depends on highly skilled pharmacists, biotechnologists, quality assurance specialists, and engineers, with Serbia's academic base providing a solid pipeline of qualified professionals.

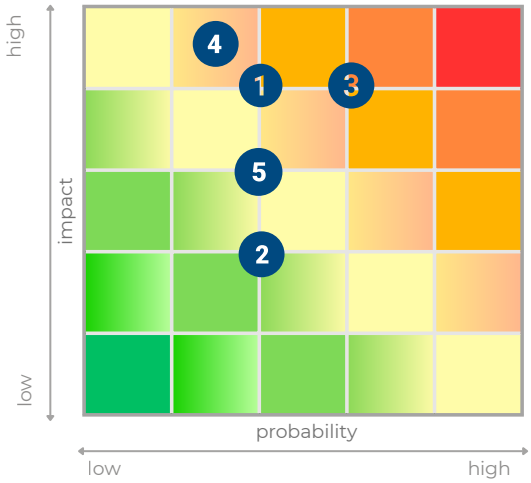
Capital intensity stems from significant upfront investments in cleanrooms, production lines, and laboratory equipment, while ongoing costs are eased by Serbia's comparatively lower labor and utility expenses.

Labor intensity involves the need for specialized teams to operate and maintain production lines, yet the sector remains less labor-intensive compared to industries such as textiles or agriculture.

Scalability is supported by the potential to expand capacity and diversify the product portfolio for export markets, though each step requires additional approvals and regulatory clearances.

RISK MATRIX

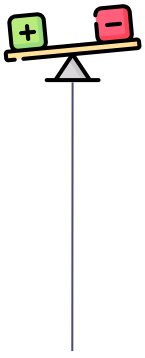
No.	Risk	Description
1	Regulatory and Complience	Delays in obtaining essential certification, export licenses, or international agencies' approvals can slow market entry; regulatory shifts may raise costs.
2	Construction and Equipment	Cost overruns or delays in cleanroom and line setup may affect timelines; mitigated by experienced engineering, procurement, and construction partners .
3	Supply Chain	Strong reliance on imported active pharmaceutical ingredients and materials leaves projects exposed to global volatility and transport bottlenecks.
4	Operational and Technical	Equipment failure or contamination can disrupt output; requires preventive maintenance and strict quality control.
5	Market and Revenue	Intense price competition and export dependence may pressure margins; long-term contracts help reduce exposure.



ESG IMPACT ASSESSMENT

Positive impacts

- Lowers carbon footprint through energy-efficient cleanroom design, renewable energy sourcing, and circular waste recycling systems, aligning with global decarbonization goals.
- Strengthens Serbia's position in sustainable pharmaceutical production and opens access to EU-aligned green financing instruments.
- Promotes gender equality and workforce diversity through targeted recruitment, training, and career advancement for women in STEM, supporting SDG 5 and inclusive economic growth.
- Ensures strong governance and accountability through compliance with EU GMP, ISO, and GDPR standards, reinforcing investor trust and operational transparency.



Potential negative impacts

- High initial energy demand and operational costs during facility setup.
- Improper waste or chemical management leading to localized environmental effects.
- Possible gender imbalance if inclusion measures are not effectively applied.

These aspects could be addressed through renewable energy integration, rigorous waste and emissions management, and consistent monitoring of gender equity and ESG performance indicators.

HOW DOES THIS PROJECT STRENGTHEN SERBIA'S HEALTHCARE SECTOR?

Serbia's pharmaceutical sector is heavily dependent on imports of high-value medicines and active pharmaceutical ingredients (APIs), creating supply vulnerabilities and trade imbalances.

This project addresses the challenge by enabling:

- ✔ **Domestic manufacturing capacity**, reducing reliance on imports, and improving resilience in the supply of essential medicines.
- ✔ **Export growth**, leveraging Serbia's strategic position and free trade agreements to access EU and regional markets.
- ✔ **Regulatory alignment**, meeting EU Good Manufacturing Practice (GMP) and other international quality standards, thereby supporting Serbia's integration into global pharmaceutical value chains and advancing its industrial and innovation strategies.

TRANSPORTATION

- Electric Vehicle Component Industrial Park

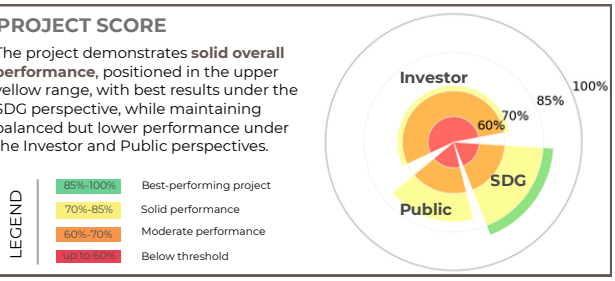
SDG addressed:

ELECTRIC VEHICLE COMPONENT INDUSTRIAL PARK

New potential area

PROJECT SCORE

The project demonstrates **solid overall performance**, positioned in the upper yellow range, with best results under the SDG perspective, while maintaining balanced but lower performance under the Investor and Public perspectives.



MARKET POTENTIAL

Serbia sits on the Western Balkans–Eastern Mediterranean corridor, linking Central Europe with Adriatic and East-Med ports. Through the Stabilization and Association Agreement with the EU and **multiple free trade agreements** (EFTA, Türkiye, UK, CEFTA, EAEU), it secures broad preferential market access. The country also provides a **skilled workforce**, supported by 14 technical faculties, 18 colleges, and 132 secondary schools.

The automotive sector employs around 100,000 people, with Stellantis in Kragujevac and supplier chains that make auto parts **nearly 50% of Serbia's top 20 exporters**. Industrial production growth is driven by automotive and transport components.

EU electric vehicle registrations reached 15.6% in mid-2025, up from 12.5% a year earlier, while global sales are projected to rise from 22 million in 2025 to **2.4 times that by 2030**. With EU rules on emissions, sustainability, and compliance, Serbia is positioned to capture part of this expanding market.

REGION

Šumadija (Kragujevac), Vojvodina (Novi Sad and surrounding zones), Belgrade, and Niš in Southern Serbia, combining industrial base, logistics, and workforce.

SUCCESSFUL STORY

Stellantis, one of the world's largest carmakers, operates its main Serbian facility in Kragujevac. In 2022, Stellantis and the Government of Serbia announced an investment to retool the plant for the production of electric vehicles, with serial production planned for 2024–2025. The factory has a capacity of around 85,000 vehicles per year, positioning Serbia as part of Stellantis' electrification strategy for the European market.

Other: *Key cases in Serbia include ZF Friedrichshafen, Bosch, Continental, and Lear Corporation; notable international examples are the Valeo, Magna, Siemens, Aptiv, etc.*

BUSINESS MODEL

Development, construction, and operation of an industrial park for **electric vehicle components**, such as **motors, electronic systems, and charging modules**. The park offers ready-to-use facilities, shared logistics, testing, and renewable energy integration, positioning Serbia within the European EV supply chain.

The investor's role includes securing land, permits, financing, and managing engineering, procurement and construction, as well as long-term operation through tenant acquisition, shared services, and compliance with EU standards.

The model is suitable for project financing and foreign direct investment, with revenues from leasing, services, and energy integration, supported by the experience of local banks and international financial institutions.

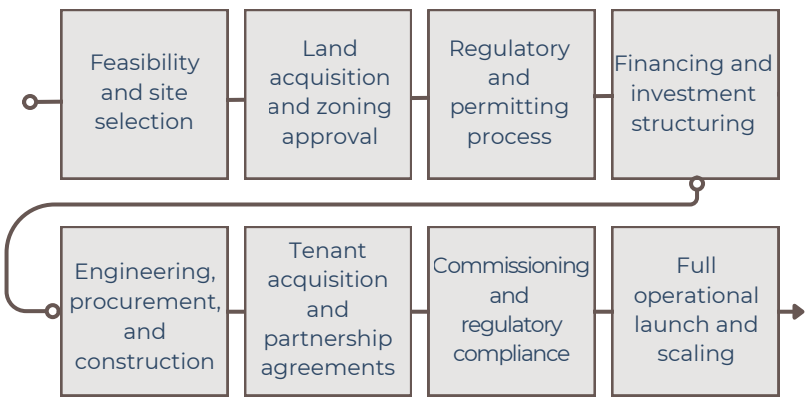
KEY NUMBERS

>€10M
CAPEX

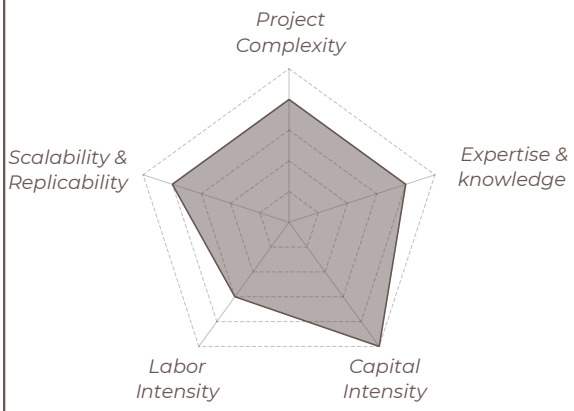
15%-25%
return on investment

4-7 years
payback period

PROJECTS MILESTONES



PROJECT OVERVIEW



High complexity due to integrating infrastructure, logistics, and compliance with EU standards, while accommodating diverse EV component production (motors, electronics, charging systems, structural parts).

Requires specialized know-how in industrial park management and engineering, combined with sector expertise for manufacturing EV motors, power electronics, and lightweight materials.

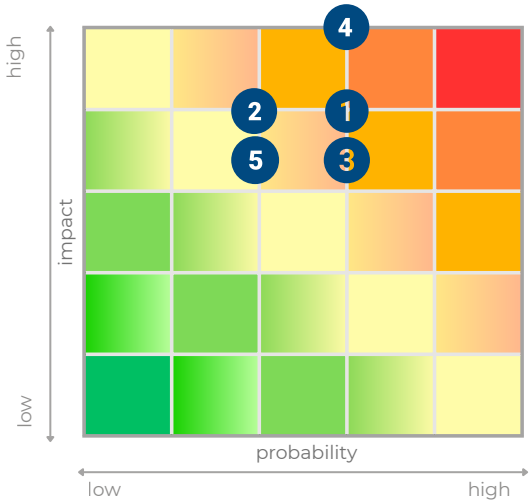
Very high upfront investment for factory shells, testing facilities, renewable energy integration, and equipment tailored for EV component producers.

Moderate labor needs, centered on skilled engineers and technicians for EV electronics, assembly of motors, and integration of charging modules.

Replicable in other Serbian industrial zones by expanding modular production units for specific EV components such as wiring systems or inverters.

RISK MATRIX

No.	Risk	Description
1	Regulatory and permitting	Delays in urban planning approvals, construction permits, or alignment with EU industrial standards can postpone development. Early engagement with regulators and specialized legal teams reduce this risk.
2	Infrastructure readiness	Delays in energy supply, logistics links, or utility networks can hinder tenants. Public–private coordination secures timely upgrades.
3	Workforce and skills gap	Shortages of engineers and technicians specialized in motors, electronics, and charging systems can limit production quality. Partnerships with universities, technical schools, and training programs mitigate this risk.
4	Tenant acquisition and market demand	Failure to attract anchor tenants or overdependence on one segment of EV components can reduce financial stability. Diversifying the tenant base across motors, electronics, charging modules, and structural parts ensures resilience.
5	Environmental and ESG compliance	Improper waste or emission management can trigger sanctions. Circular practices and continuous monitoring reduce the risk.



ESG IMPACT ASSESSMENT

Positive impacts

- Integrates renewable energy and circular production to reduce the environmental footprint of Serbia's EV supply chain.
- Aligns with the EU Green Agenda and attracts green finance through compliance with the IFC and ESG frameworks.
- Creates high-quality green jobs and fosters collaboration between industry, academia, and government.
- Promotes innovation, workforce upskilling, and inclusive participation for sustainable industrial growth.
- Ensures strong governance through EU-aligned transparency and sustainability standards, enhancing investor confidence.

Potential negative impacts

- High initial energy and resource demand during construction and facility setup.
- Possible industrial waste, emissions, and supply chain inefficiencies if circular practices are not strictly applied.
- Risk of social inequality if workforce benefits are not equitably distributed.

These aspects could be addressed through the strict application of circular economy standards, renewable energy integration, transparent ESG reporting, and inclusive workforce policies ensuring equitable participation and community benefits.

HOW DOES THIS PROJECT CONTRIBUTE TO SERBIA'S SUSTAINABLE INDUSTRIAL AND MOBILITY SECTOR?

Serbia's automotive base faces pressure to adapt to electrification, stricter EU standards, and integration into evolving value chains.

This project contributes by:

- ✔ **Green transition** – production of EV components (motors, electronics, charging systems) aligned with EU decarbonization goals.
- ✔ **Economic diversification** – strengthening Serbia's automotive exports and industrial resilience through new value chains.
- ✔ **Workforce and knowledge** – leveraging technical faculties and schools to create high-skilled jobs for sustainable industry.

QR code: SDG Investment pipeline