

**KSE**

Kyiv  
School of  
Economics

# **THE EXTRACTION AND PROCESSING PROJECTS OF CRITICAL RAW MATERIALS**



# 1. TITANIUM ORE MINING & PROCESSING (DEVELOPMENT & CONSTRUCTION) (1/2)

## New Velta SPV, Ukraine | 100% owned by Velta Holding

- **Brief Description:** The Project considers extension of Velta's 1st class ilmenite resource base by the development of the second Titanium ore deposit in Kropyvnytskyi region, Ukraine, and construction of mining and processing plant
- **Target Market:** Holding 2% of global titanium feedstock market share and long-term Off-Take agreements with industry leaders we plan to start export of titanium production with high added value to U.S. and EU
- **Products/Services:** High grade titanium feedstock with up to 60% TiO<sub>2</sub> and low impurities, a intermediary source for the production of high added value titanium powders and finished products
- **Technologies and Innovations:** Velta R&D invented Velta TI Process, a technology which revolutionizes titanium production and replaces conventional "Kroll Process" with remarkably efficient, lower-carbon emission, low-cost metal powder production
- **Unique Selling Proposition:** In 2018 titanium receives the official status of a critical mineral in the USA. In 2020 the EU issued a Critical Minerals List Investigation with 30 items, including titanium. Titanium is identified as the most critical material for Defense, Aerospace, Healthcare, Renewable energy, Automotive.

Location: Ukraine, Kropyvnytskyi region

Titanium

### Projects Highlights<sup>1</sup>

**Required financing** – Total \$ 97 mln

**Type of financing** – equity, project finance, working capital

**Financing structure:** Debt – 70% / Equity – 30%

Expected Financial Indicators:

**NPV** – \$ 100 mln (9 years)

**IRR** – 56%

**DPP (years)** – 6

**Project launch period** – 1.5 year

**Avg. 5Y Revenue** – \$ 57 mln

**Avg. 5Y EBITDA** – \$ 24 mln

- **Project Status:** In 2019 Velta received commercial development license for the second Titanium ore deposit in Kropyvnytskyi region, Ukraine, and aims to conduct resources and reserves estimation according to international standards (JORC or CIM) with CPR and Feasibility study obtained in H1 2025.

# 1. TITANIUM ORE MINING & PROCESSING (DEVELOPMENT & CONSTRUCTION) (2/2)

## Business model

**Velta**, founded by Andriy Brodsky in 2006 and headquartered in Dnipro, Ukraine, commenced first production at Byrzulivske deposit in 2012. Since 2012 we retained 2% of titanium feedstock global market share, continuing ilmenite deliveries during the Russian-Ukrainian War in 2022-2024.

We target to expand our recourse base with a new ilmenite deposit and double annual production. The ilmenite feedstock produced by Velta can be naturally embedded in the Titanium Powders and Finished products Manufacturing with high value added titanium production.

## Key figures

**2006**

year of foundation

**17**

years of intensive growth

**up to 60%**

TiO<sub>2</sub> contained in Velta's ilmenite

**650 +**

employees

**19**

years ahead with a sufficient resource base

**2%**

of the titanium feedstock market share

### Implementation of the project

2025 – 2026 - increase in mining and processing capacities



## 2. TITANIUM POWDERS AND FINISHED PRODUCTS MANUFACTURING FACILITY (1/2)

### New Velta SPV, Ukraine | 100% owned by Velta Holding

- Brief Description:** The Project will continue Velta's vertical integration strategy from a titanium feedstock provider, holding extensive 19 years resource base, to a high added value titanium producer and exporter
- Target Market:** Possessing a strong market position and being well-recognized worldwide, Velta targets to complete vertical integration and start export of high added value titanium production to U.S. and EU for industrial Off-Takers
- Products/Services:**
  - 1st stage** construction of facilities for the production of titanium metal powders with high added value
  - 2d stage** construction of facilities for the production of finished parts, demanded by pivotal sectors such as Aerospace & Defense, Medical and Automotive
- Technologies and Innovations:** Technologies and Innovations: Velta R&D invented Velta Ti Process, a technology and replaces conventional "Kroll Process" with remarkably efficient, low-cost metal powder production
- Unique Selling Proposition:** Titanium powder market, including Additive Manufacturing, is poised for a substantial growth with CAGR of 15% and market value USD 4.5 billion reached by 2032.

Location: Ukraine, Kropyvnytskyi region

Titanium

#### Projects Highlights for the 1<sup>st</sup> stage<sup>1</sup>

**Required financing** – Total \$ 592 mln  
**1st stage** \$ 328 mln Capex / \$ 104 mln OpEx  
**2d stage** \$ 160 mln CapEx

**Type of financing** – equity, project finance, working capital

**Financing structure:** Debt – 70% / Equity – 30%

Expected Financial Indicators:

**NPV** – \$ 774 mln (9 years)

**IRR** – 54%

**DPP (years)** – 6.9

**Project launch period** – 2 years

**Avg. 5Y Revenue** – \$ 507 mln

**Avg. 5Y EBITDA** – \$ 240 mln

*1 - The project information and financial indicators are provided by company-initiator of the project.*

- Project Status:** Velta patented unique Velta Ti Process, underlying the manufacturing process. Base on the technology assessment and commercial test-runs well-known EU Institutes confirmed titanium powder's suitability for a range of additive manufacturing applications. The Project will start after second Titanium ore Mine commencement.

## 2. TITANIUM POWDERS AND FINISHED PRODUCTS MANUFACTURING FACILITY (2/2)



### Business model

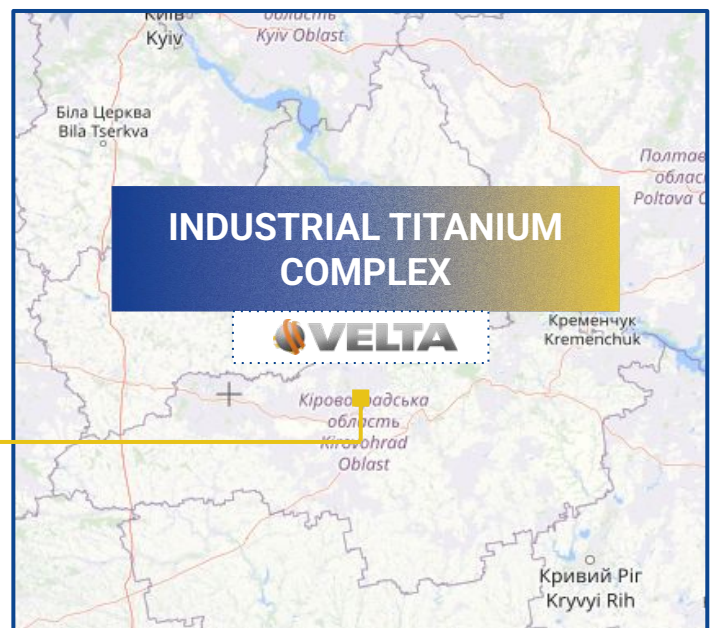
The industrial titanium site targets to revitalize an industrial enterprise closed 25 years ago. Located 20 km away from raw material deposits operating and developing by Velta the site geography provides logistics benefits to lock-up high added value titanium production in Ukraine. At the 1st stage we target to start 5 thousand tones annual production of titanium powders & alloys and at the 2d stage to expand with manufacturing titanium finished parts & end-products.

Bolstered by the vertical integration strategy, Velta invented a unique technology to convert titanium feedstock into titanium powders and alloys. The technology has been patented in Ukraine and vetted by widely-respected EU institutions. Velta's Ti Process complies with sustainable standards, with no solid waste, full circularity and significantly lower carbon footprint. It reduces the cost of end-products within Powder metallurgy, Additive manufacturing and Metal Injection Molding.

### Implementation of the project

2025 – 2027 - 1<sup>st</sup> stage

2027 – 2028 - 2<sup>d</sup> stage





# 3. DEVELOPMENT OF THE BGV GRAPHITE – UPSTREAM STAGE 1 (1/3)

## BGV Group Management LLC

- **Brief Description:** The project focuses on developing the Balakhivske graphite deposit in Central Ukraine, which has 44Mt reserves estimated by NI 43-101 in the licensed area with extension possibilities (185Mt of explored reserves in total).
- The project contemplates construction of a mine with 29-year lifetime in the licensed area (with prolongation priority) and a graphite concentrate plant with 50K tpa of basic production volume.
- **Target Market:** European Union countries, North America
- **Products/Services:** Graphite concentrate above 95% TGC
- **Technologies and Innovations:** Technology for graphite concentrate production developed by ANZAPLAN Dorfner Group (Germany) with application of EU standards.
- **Unique Selling Proposition:** Large proven reserves with 44Mt of graphite ore available in the most productive Southern area. High-quality graphite suitable for anode material: 73% fine flake graphite produced (-150µm, -100 mesh for SPG production) shows above-average performance in the test Li-ion batteries. Advantageous location for EU customers with good immediate highway and railway links.

### Kropyvnytsky region

### Graphite

#### Projects Highlights<sup>1, 2</sup>

Required financing – \$ 87 mln

Total CAPEX – \$ 87 mln

Type of financing – 60%/40% (debt/equity)

Expected Financial Indicators:

NPV –\$ 129 mln

IRR – 29%

DPP (months) – 53<sup>3</sup>

Project launch period – 2029

Revenue – \$ 55 mln (per year)

EBITDA >60% (per year)

1 - The project information and financial indicators are provided by company-initiator of the project.

2 - These numbers given with consideration of potential debt financing

3 - After the start of operations

- **Project Status:** accomplished PEA, PFS and updated PFS in 2023, successfully finalized pilot tests for the concentrator plant and started Basic Engineering in 2024.
- Currently project is in the FS stage according to Ukrainian standards (1st stage – Technical-Economic Assessment; 2nd stage - Design)

# 3. DEVELOPMENT OF THE BGV GRAPHITE – MIDSTREAM STAGE 2 (2/3)

## BGV Group Management LLC

- **Brief Description:** Construction of a spherical graphite plant to lock in full graphite value chain.
- Production of 19,000 tons of SPG (basic scenario) for Li-ion battery anodes
- **Target Market:** European Union countries, North America
- **Products/Services:** Spherical Purified Graphite (SPG) for Li-ion battery anodes and Active Anode Material (AAM/CSPG), highly purified micronized graphite.
- **Technologies and Innovations:** Technology for SPG production developed by German and USA companies as more ecological alternative to the existing conventional SPG technology.
- **Unique Selling Proposition:** strategic European SPG and AAM supplier with advantageous location and good immediate highway and railway links for EU Gigafactories, ESS and anode producers.
- Basic supply volume 19K tons SPG with scaling possibilities up to 38K tons at further project stages

**Location: Ukraine, Kropyvnytskyi region**

**Titanium**

### Projects Highlights<sup>1, 2</sup>

**Required financing** – \$ 316 mln

**Total CAPEX** – \$ 316 mln

**Type of financing** – 60/40 (debt/equity)

**Financing structure:** CAPEX – 316 / OPEX – 12

Expected Financial Indicators:

**NPV** – \$ 299 mln

**IRR** – 18%

**DPP (months)** – 84

**Project launch period** – 2028

**Revenue** – \$ 89 mln (per year)

**EBITDA** >50% (per year)

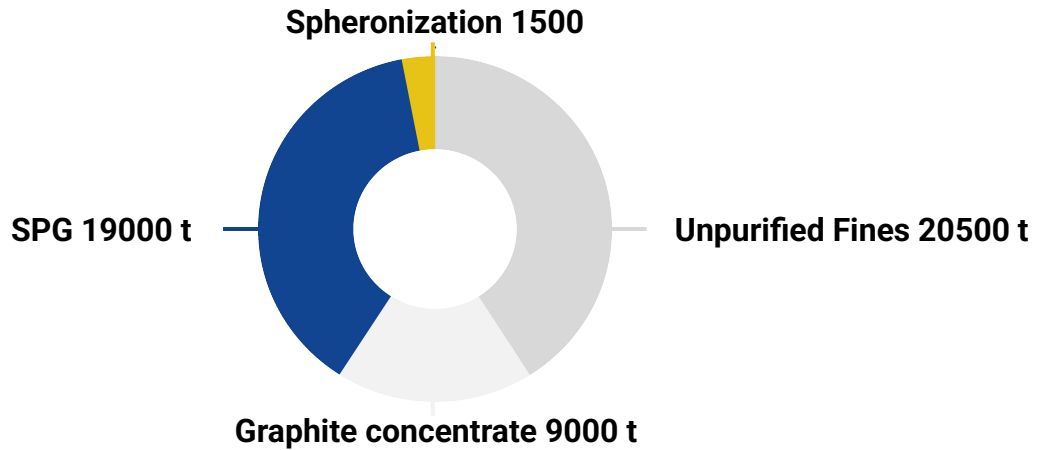
*The model includes production of graphite concentrate 50,000 tpa, max. 41,000 tpa out of which goes for SPG production*

*1 - The project information and financial indicators are provided by company-initiator of the project.*

*2 - These numbers are given without consideration of potential debt financing*

- **Project Status:** Updated PFS (accomplished), pilot tests with production of SPG finalized Q3 2024; SPG coating and by-products testing started in - in progress (Q4 2024)

# 3. DEVELOPMENT OF THE BGV GRAPHITE – 1ST AND 2ND STAGES (3/3)



## Business model

Construction of graphite mining and processing plant with further downstream production of SPG and potentially AAM for battery anodes to lock in full graphite value chain

Sale of Spherical Purified Graphite (SPG) for Li-ion battery anodes to the EU market (19,000 tons) and graphite concentrate.

Basic production capacity of the concentrator plant - 50K tons with upscaling possibilities to 100K tons, out of which SPG will make 38,000 tons.

## Key partners

European anode producers, Gigafactories, EV and ESS producers (strategic); EU industrials in metallurgy, refractory; IFIs (financial) for equity; discussions ongoing with off-takers, lenders and export finance on debt

## Key Points Of Project Implementation:

### Stage 1:

Pre-feasibility Q3 2023  
 Feasibility Q2 2027  
 Construction Q1 2029  
 Expected launch Q2 2029

### Stage 2:

Pre-feasibility Q3 2023  
 Feasibility Q3 2027  
 Construction Q4 2030  
 Expected launch Q4 2030





# 4. DEVELOPMENT OF THE BGV BERYLLIUM

(1/2)

## BGV Group Management LLC

- **Brief Description:** The project is focused on development of the complex Perzhanske Beryllium Deposit in Northern region of Ukraine. It's a highly explored deposit, which has 2.36M tons of ore reserves with 0.59% BeO content in the licensed area:
  - 4K tons of BeO (beryllium oxide) reserves, that is about 5'000 tons of beryllium in terms of metal
  - 39'698 tons of zinc will be extracted as one of by-products.
  - The project contemplates combined open pit and underground mining
- **Target Market:** European Union countries, North America and Pacific
- **Products/Services:** Beryllium oxide, Beryllium metal and alloys. By-products: zinc, rubidium, REE, and silver.
- **Technologies and Innovations:** there are scientific and technical opportunities in Ukraine to obtain ultrapure beryllium, as well as to produce finished products like beryllium foil, wire, powders for powder metallurgy and 3D printing technology.
- **Unique Selling Proposition:** European alternative for limited CRM supply  
Advantageous location for EU customers with good immediate highway and railway links.

Zhytomyr region

Beryllium, Zinc, Rubidium, REE

### Projects Highlights<sup>1</sup>

**Required financing for pilot tests** (concentrate and hydrometallurgy), **FS stage, Design documentation** – \$ 10 mln

**Total CAPEX** – \$ 155-300 mln  
(depending on the final products portfolio)

1 - The project information and financial indicators are provided by company-initiator of the project.

- **Stages accomplished:**
  - Several historical exploration campaigns (1888 boreholes) with verification drilling by BGV - 20 boreholes;
  - Resources estimation by NI43-101 (SGS Canada/SRK Consulting, USA)
  - 3D Geological Model of the deposit;
  - Detailed Mineralogical Analysis of the complex Beryllium Deposit (SGS)
  - Conceptual high-level Test Work Program and Flowsheet Development
  - Hydrometallurgical studies started in Q1 2024 and are in progress to receive end products as metals (Be, Zn, Rb, Ag)
- **Project Status and timeline:**
  - Currently the project is in the PFS stage, started in Q1 2024.
  - PFS accomplishment – Q3 2025
  - Pilot tests based on the proven technology for concentrator and hydrometallurgical plants – Q4 2025
  - FS start in Q1 2026

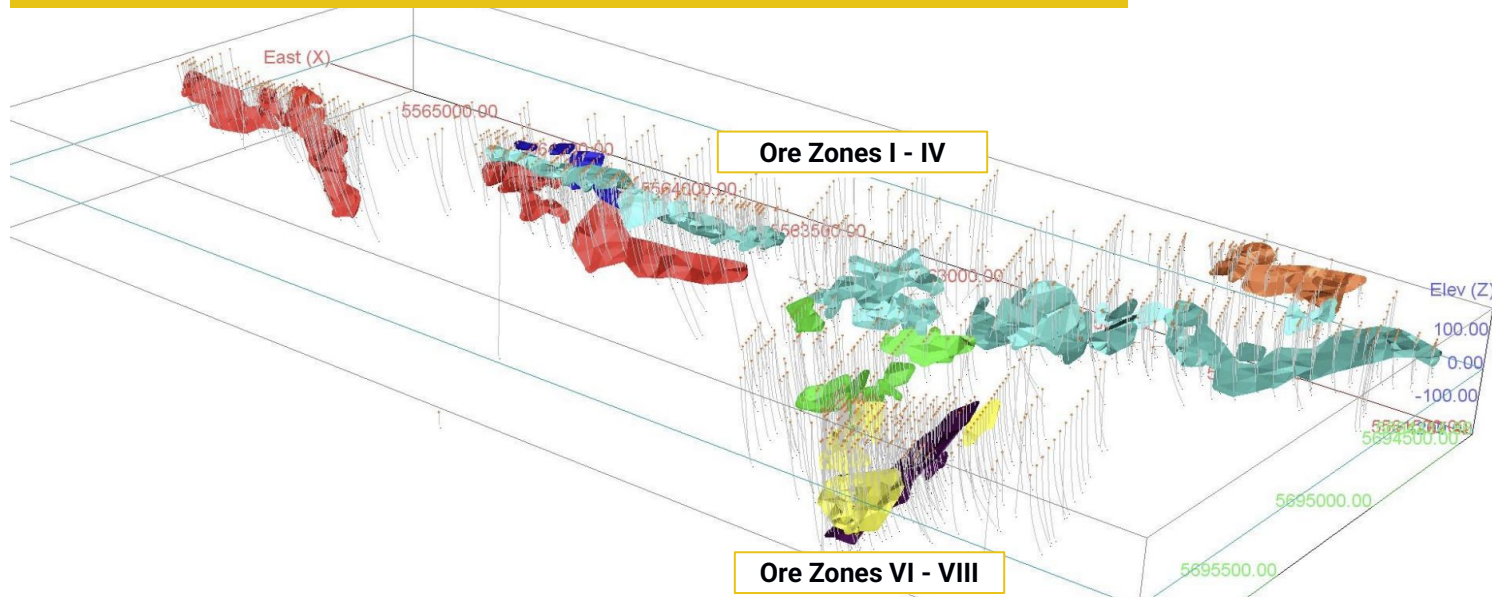
# 4. DEVELOPMENT OF THE BGV BERYLLIUM

(2/2)

BGV Group Management LLC

Additional illustration of the Perzhanske Deposit's ore bodies and drillholes net density (source - interim PFS report)

Drillholes and Resource domains – Isometric View Looking Southeast





# 5. DEVELOPMENT OF THE BGV ZIRCON-RARE-EARTH-FLUORITE PROJECT

## BGV Group Management LLC

- **Brief Description:** The project is focused on development of the **Yastrebitske deposit with zircon-rare-earth-fluorite ores**. The deposit is located in Zhytomyr region. Deposit area is connected with the district center Olevska by asphalted roads; railway lies in the near proximity.
- The main useful minerals in complex deposit are zircon, rare earth elements (parisite), fluorite and feldspars.

- **Products:**
  - Zirconium (62.1% ZrO<sub>2</sub>), recommended application in refractory and ceramic industries.
  - Rare earths (69% parisite, 9.6% zircon, other like feldspar, etc.)
  - Fluorite (fluorite 90%, zirconium – 1,5-2,5%, other – feldspar, calcite), application in the metallurgical industry.
  - Feldspar (yield – 47.73%), glass and ceramic industry.
  - Silver requires additional exploration.
  - Crushed stone, sand as accompanying products for applications in the construction industry.

- **Unique Selling Proposition:** European alternative for limited CRM supply. Advantageous location for EU customers with developed highway and railway links.

Zhytomyr region

Zirconium, REE, Fluorite, Feldspar

### Projects Highlights<sup>1</sup>

**Required financing 1<sup>st</sup> stage** – \$ 3 mln

Includes verification drilling to confirm historical exploration data and reserves estimation by NI43-101, processing technology upgrading and PFS Report

*1 - The project information and financial indicators are provided by company-initiator of the project.*

- **Stages accomplished:**
  - Historical exploration campaign and processing technology for production of standard zircon, fluorite, and rare-earth feldspar concentrates.
- **Target Market:** European Union countries, North America and Pacific
- **Project Status and timeline:**
  - Scoping Study
  - Verification drilling campaign planned for Q2 2025.
  - PFS and reserves estimation by NI43-101 start in Q4 2025

# 6. DEVELOPMENT OF THE ZAVALLIVSKE GRAPHITE DEPOSIT

## Zavallivskiy Graphite LLC | Volt Resources Ltd

- **Brief Description:** Volt Resources Ltd (Volt) and its Ukraine subsidiary, Zavallivskiy Graphite have developed a three-staged corporate development plan for the Zavallivske natural graphite mine and processing facility in Ukraine. Average graphite concentrate production of 7,300 TPA in 2017-2021.
  - **Stage 1:** for sustaining Zavallivskiy Graphite operations and upgrading the production
  - **Stage 2:** boosting production and modernising processing facilities up to 30k tpa. capacity (with the option to increase to 60 ktpa.)
  - **Stage 3:** for initial capacity; (6,000 USD/t, incl. 12% contingency), for building a CSPG facility
- 
- **Unique Selling Proposition:** The site (636ha) is adjacent to Zavallya, ~280 kms south of the Ukraine capital Kyiv, and 230 kms north of Odessa's main port.  
 Long life multi-decade producing graphite mine with exploration upside. Permits for subsoil use - mining licence equivalent - valid until November 2035.  
 According classification standard NAEN the Graphite mineralization estimate of 22.9mt @ 6.8% carbon. Is one of Europe's largest graphite resources.

### Kropyvnytsky region

### Graphite

#### Projects Highlights<sup>1</sup>

**Required financing** – \$ 95 mln  
**Stage 1:** \$ 5 mln  
**Stage 2:** \$ 10 mln  
**Stage 3:** \$ 80 mln

**Total budget** – \$ 95 mln

**Type of financing** – n/a

**Financing structure:** CAPEX –100%

Expected Financial Indicators:

**NPV** – n/a

**IRR** – n/a

**DPP (months)** – n/a

**Project launch period** – n/a

**Revenue** – n/a (n/a year)

**EBITDA** – n/a (n/a year)

- **Project Status:** Pre-feasibility



<sup>1</sup> - The project information and financial indicators are provided by company-initiator of the project.



# 7. POLOKHIVSKE LITHIUM PROJECT DEVELOPMENT

## UkrLithiumMining LLC

- **Brief Description:** The upstream component of the project involves construction of:
  - 1.5 Mtpa lithium ore mine with 15-year life of mine (current reserve based); and
  - concentrate plant with ~ 300 ktpa petalite concentrate production capacity
  - The project sponsor also considers lithium conversion
  - facility, which shall produce ~ 20 ktpa of lithium carbonate
- In 2024 the company conducted an Environmental Impact Assessment (EIA)
- **Target Market:** European Union, global markets
- **Products/Services:** Lithium concentrate/chemicals
- **Technologies and Innovations:** one of few large scale Ukraine projects with ESIA underway
- **Unique Selling Proposition:** Large and high-quality proven resource base with 22Mt confirmed reserves in licensed area and over 50Mt potential total resource; ~3,5% lithium grade in petalite concentrate

### Kropyvnytsky region

### Lithium

#### Projects Highlights<sup>1</sup>

**Required financing** – \$ 350 mln

**Total budget** – \$ 350 mln

**Type of financing** – 70/30 (debt/equity)

**Financing structure:** CAPEX – 95% / **working capital and development costs** – 5%

Expected Financial Indicators:

**NPV (post tax)** – \$ 800 mln

**IRR** – 50%

**DPP (months)** – 48

**Project launch period** – 2024

**Revenue** – \$ 400 mln per annum

**EBITDA** – \$ 250 mln per annum

- **Project Status:** Pre-feasibility completed/start of DFS (subject to financing)



<sup>1</sup> - The project information and financial indicators are provided by company-initiator of the project.