

How the first WtE plant in Serbia was developed to foster Circular Economy in the Balkans?

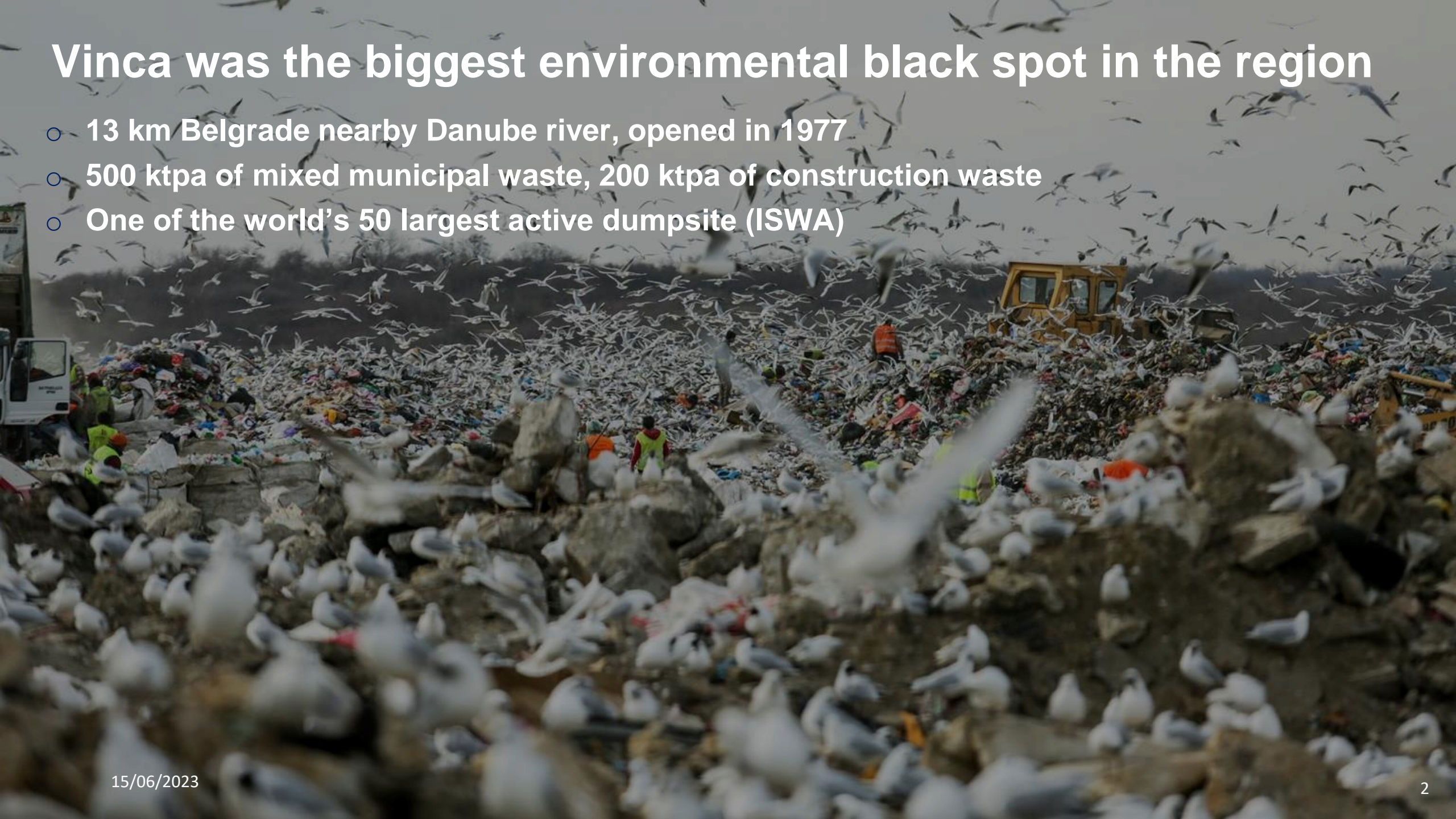
10th CEWEP Waste-to-Energy Congress 2023
Berlin, 15th June 2023

Philippe Thiel
Veolia Country Manager Serbia
BCE Managing Director



Vinca was the biggest environmental black spot in the region

- 13 km Belgrade nearby Danube river, opened in 1977
- 500 ktpa of mixed municipal waste, 200 ktpa of construction waste
- One of the world's 50 largest active dumpsite (ISWA)



Fires



Waste Pickers



**Vinca
dumpsite**

Leachate



Landslide



Project strategy and objectives

A strategy driven by recovery targets to converge with European standards and affordability to treat 510 ktpa of mixed Municipal Solid Waste and 200 ktpa of Construction & Demolition waste:

- **Objective 1:** As a matter of **emergency**, remediate Vinca dumpsite and build a sustainable solution on site
- **Objective 2:** Serbia being a candidate to join the EU, the project must introduce **energy recovery and recycling** solutions to build the future of local waste management
- **Objective 3:** Save the city's investment capacities by implementing **BOT contract model**. Therefore, need to design **a solution with proven technologies that the private sector and the banks accept to finance**
- **Objective 4:** The solution must be **affordable**, i.e. the citizen of Belgrade can bear the monthly waste treatment tax on their **budget**

Achieving an affordable and flexible waste treatment mix and dumpsite remediation

400M€ project costs financed by private partner

ENERGY-FROM-WASTE

340,000 TONS/YEAR

$X_{mcr} = 43.6$ tons/hour @ 8.5 MJ/kg

- 1 line, 103 MW - steam cycle 58 bar / 396°C
- Condensing – extraction turbine with Air Cooled Condenser
- Max gross electricity output: **30 MW_e**
- Max heat output to district heating: **56 MW_{th}**
- Incinerated Bottom Ash recovery facility
- Air Pollution Control Residues solidification plant to non-hazardous waste criteria (to landfill)

Municipal Solid Waste
710+ kt/y

ENGINEERED LANDFILL

170,000 TONS/YEAR

7.5 million m³ capacity

- Leachate treatment plant: Reverse Osmosis + evapo-concentration (90,000 m³/y)
- Biogas engines 3MW



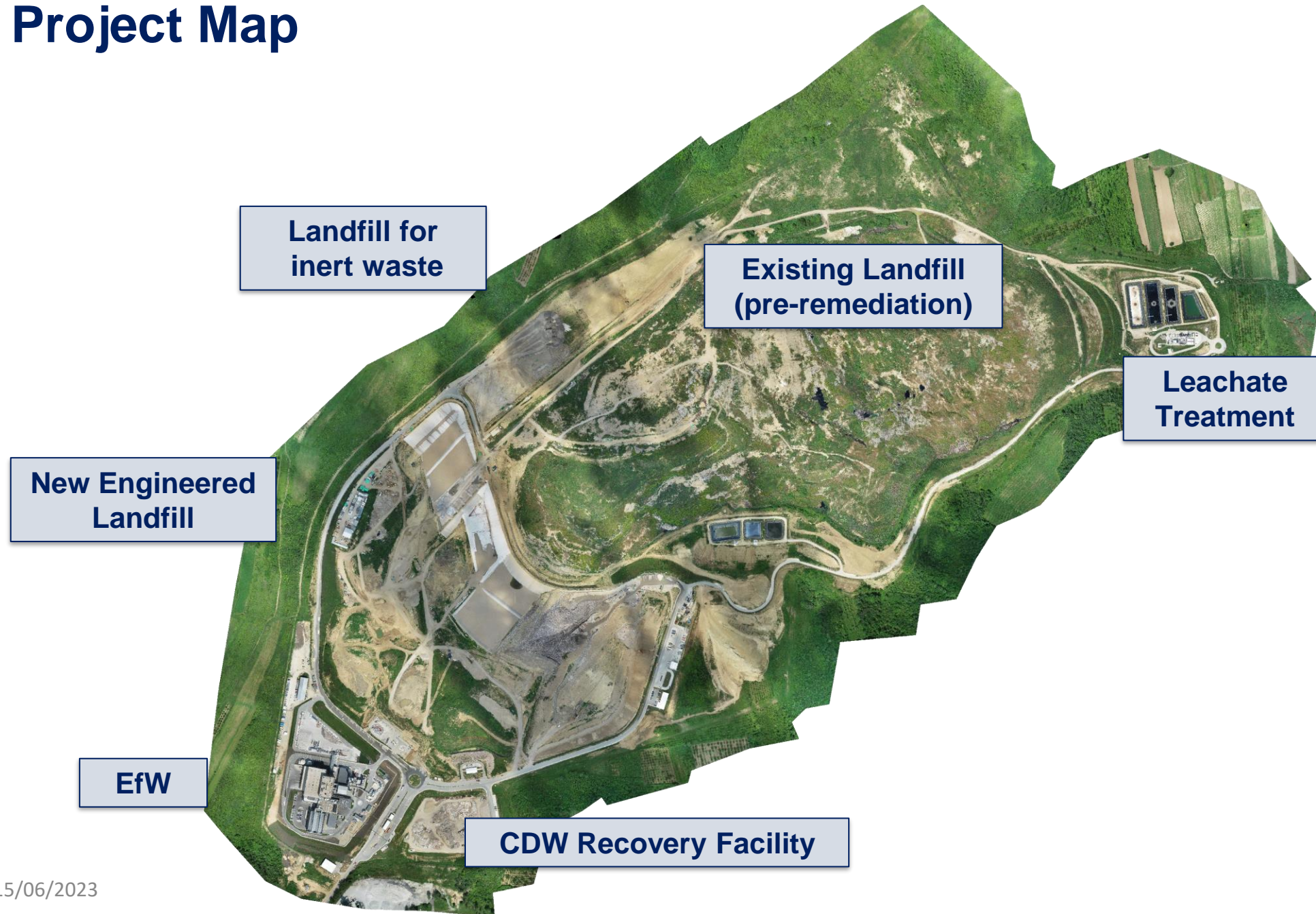
CONSTRUCTION & DEMOLITION WASTE RECYCLING

200,000 TONS/YEAR

- Removal of contaminants, crushing, sieving (0-30mm, 30-80mm, 80-150mm)
- **70% Construction & Demolition Waste recovery target** (roadworks, backfills, landfill covers)

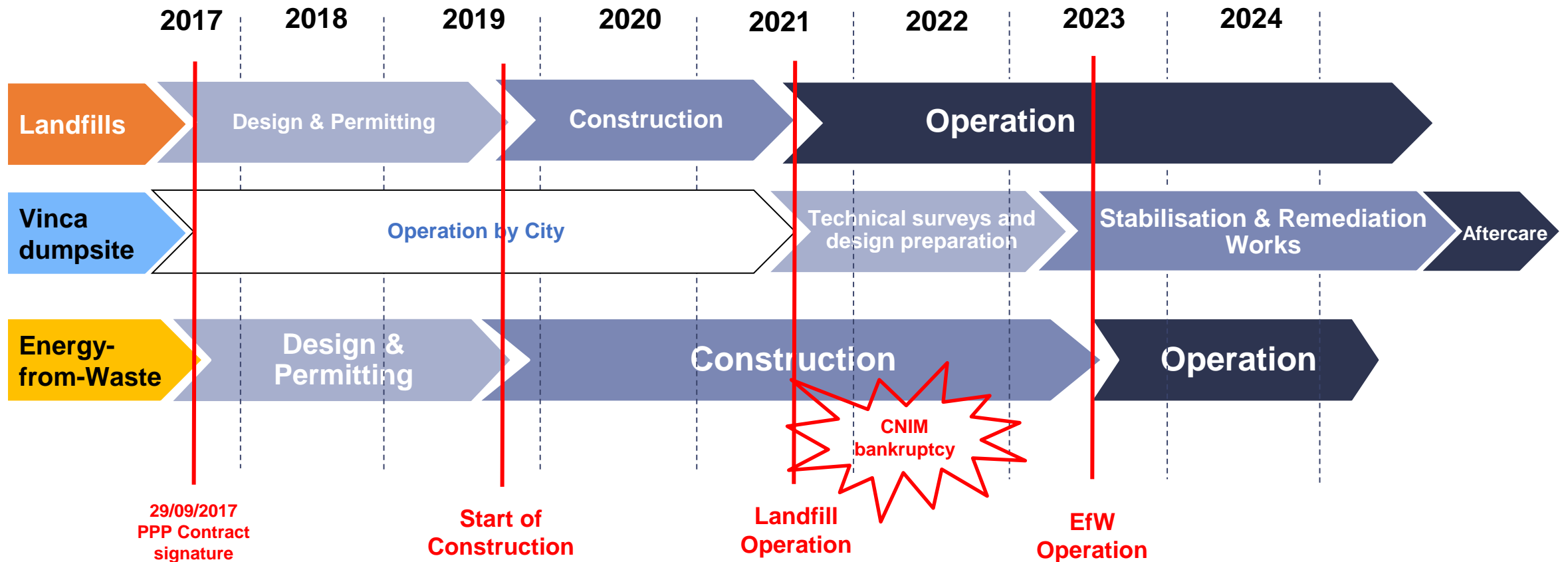
EXISTING DUMPSITE REMEDIATION

Project Map

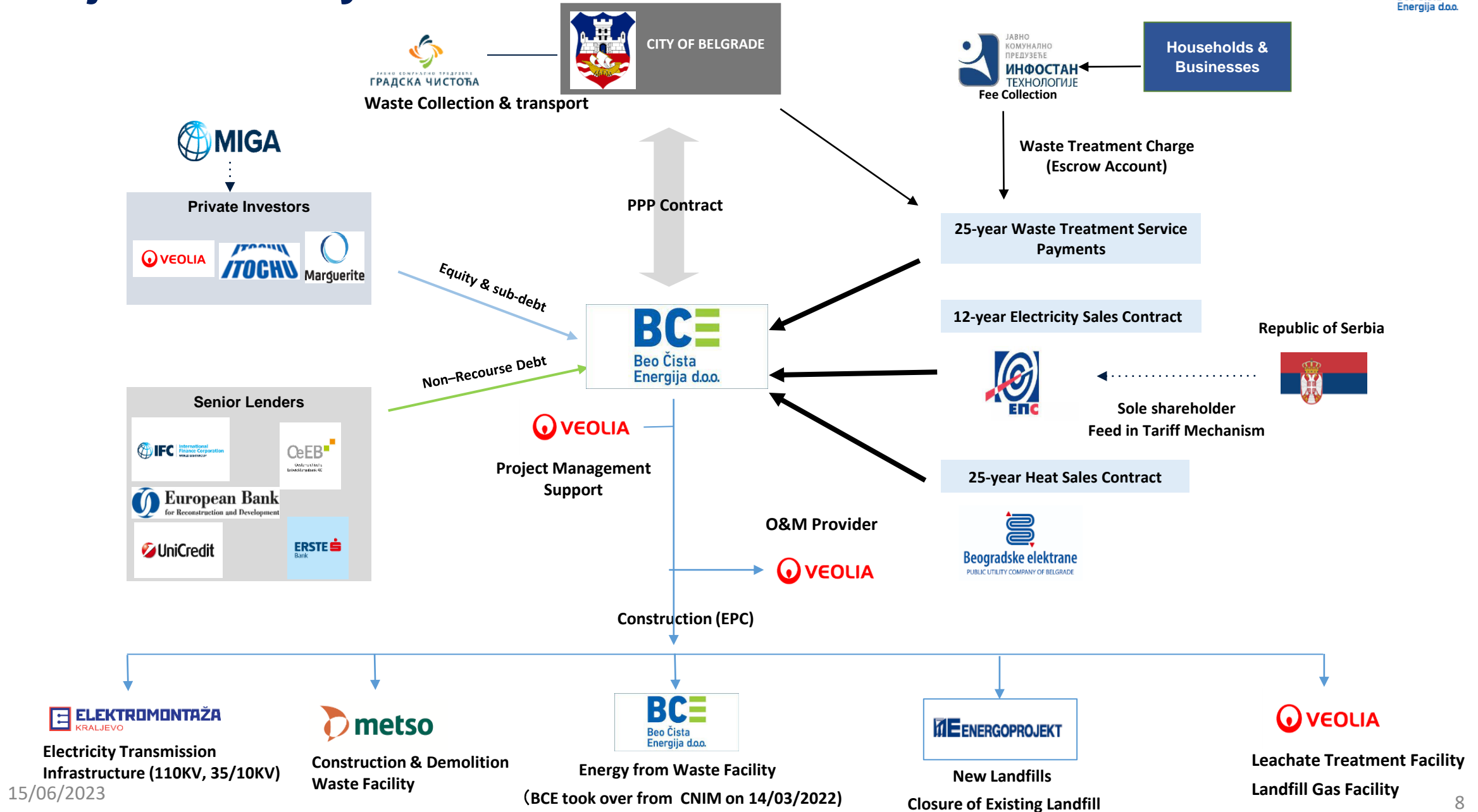


Project Schedule

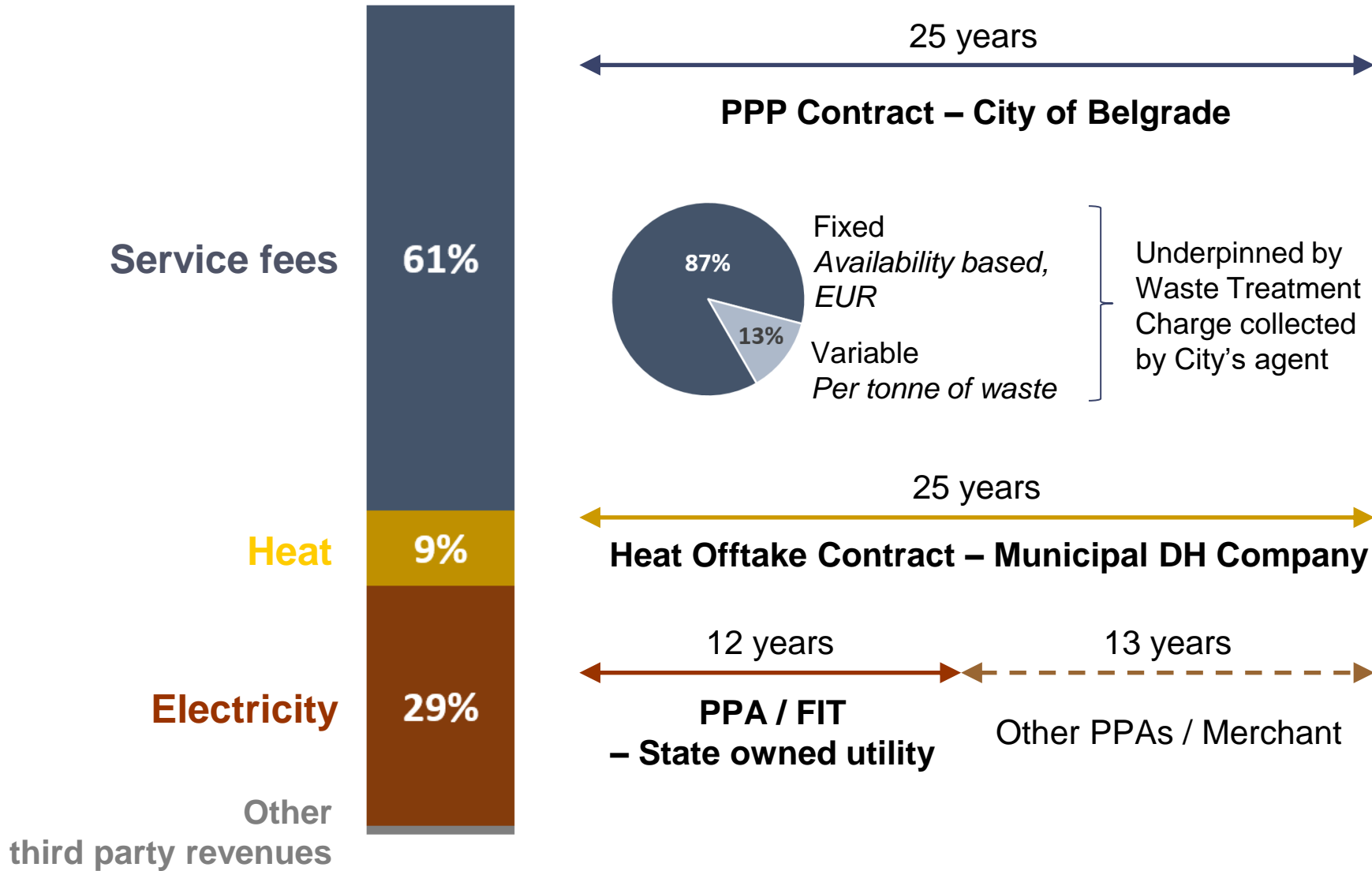
- 2015-2017 PPP Procurement
- Interim Service Commencement: 02/08/2021
- EfW Construction Completion and Service Commencement Date : Q3 2023
- 25 years of Operation and Maintenance from Service Commencement Date



Project Delivery Structure



SPV Revenue Structure



Stable revenue streams secured under long term contracts with reputable counterparties

Non-recourse project financing with long tenors, high leverage

Key success factors: a bankable risk allocation

- Land secured, shared permit risks
- SPV is paid an **availability payment** in EUR : no forex / volume risk, no third-party waste
- **Waste LCV risk** is fully mitigated by the flexibility of EfW combustion diagram (from 340kt @8.5 MJ/kg to 385 kt @7,5 MJ/kg) and availability of Surplus Waste (total waste envelope is about **620 ktpa**).
- City's payments (60% of SPV revenues) are substantially funded from a **new, earmarked waste treatment tax** (with an escrow account mechanism) topped-up by City's general budget. **Total cost for Belgrade citizen is equivalent to 1% of the monthly average household budget.**
- **Power prices are guaranteed in EUR under 12-year PPA** with national power company EPS (85.7 €/MWh)
- **Heat prices (30 €/MWh) and volume are guaranteed under 25-year take-or-pay Heat Offtake Agreement** with municipal district heating company
- **Ground Contamination and Protestor Action are Compensation Events**
- Bankable regime of compensation on Termination with **90% of Senior Debt repaid in case of SPV default**

Key success factors: stakeholder's management

- First waste PPP project in the Balkan region
 - Constant exchanges with public partner and Serbian authorities
 - Beo Cista Energija is supporting / contributing implementation of relevant new law/regulation, national waste management strategy,...
- Environmental and social dimensions are integral components of the project
 - Regular dialogue with NGOs
 - Beo Cista Energija is supporting the City of Belgrade to adequately implement Resettlement Action Plan and Livelihood Restoration Plan for resettled families and workers.
Recognized as a good practice at the EBRD 2023 annual meeting.
 - Biodiversity protection measures and regular on-site monitoring




...Commissioning in progress

- Anticipation: early preparation of a back-up plan
- Improve assessment of progress, risks,...: audit by a third party
- Agility and swift decision process by SPV, Sponsors and Lenders
- Key staff identified and secured to the extent possible
- Pull of performance bond
- Termination of EPC Contract for EPC Contractor default
- Advanced construction stage
- Subcontractors: activation of step-in rights (circa 50 over 100+)

Achievements

Modern waste treatment of municipal waste for 1,7 million inhab.

- **EfW allows to reach 62% diversion of biodegradable waste** from landfill (620 kt of mixed municipal waste in 2022)
- EfW Emission technology **compliant with 2019 EU Best Available Techniques reference document**
- **GHG reduction - 210,000 t CO₂eq/y** -  **Gold Standard** for the Global Goals **Carbon Credit certified**
- **60.000 households heated and 30.000 powered** from renewable energy
- **Closure of non sanitary dumpsite** with trans-boundary impacts
- Recovery and improvement of **environmental condition and biodiversity**
- **7 SDGs** addressed
- **120 direct permanent and qualified jobs**





Vinca Resource Recovery Center, March 2023