BELGRADE WASTE PPP

Design-Build-Finance-Operate of Modern Waste Management Infrastructure in an Emerging Market

SMi 13th Energy from Waste Conference

December 1st, 2020

Project Background: Serbia and Belgrade

- 7.2 m population, of which **1.7m in Belgrade greater area** (40% of national GDP)
- EU **candidate** country with on-going accession negotiations (currently 18/34 chapters opened, 2 closed, special chapter on relations with Kosovo being problematic)
- Upper middle-income country, **GDP per capita 2019: $7,020 [source World Bank]**
- City of Belgrade rated Ba3 by Moody's ➔ **below investment grade**

Why a Waste Management PPP in Belgrade ?

- Project site: Vinča dump, 15 km from city center - **42 ha in operation since 1977** - 700,000+ tons/year
- On ISWA's list of the world's 50 largest active dumpsites**. 120 scavengers** living on/from the dumpsite
- **No containment of pollution** with substantial impact on air, soil and Danube water quality
- Fires in May-June 2017 increased the general awareness that **the issue must be addressed**

Why a Waste Management PPP in Belgrade ?
City's Objectives and Challenges

- **Close Vinča dumpsite** and ensure **long-term aftercare**
- Develop a **closed-loop** waste management solution based on **thermal treatment**
- Substitute waste heat for natural gas in **district heating system**
- Tap into private sector's expertise and finance for **cost efficiency** and **long-term performance**
- Achieve an **affordable solution for end-users**
- Landfill remediation is **not commercially viable**
- Manage the risks of **pollution legacy**
- Achieve a flexible system with enough **headroom for MSW recycling** in the future
- **Avoid reliance on third parties** without long term commitment (eg. RDF to cement kilns)
- Develop a **bankable** Design-Build-Finance-Operate scheme with **City as sole counterparty**
- Baseline **household charge (2019)** for waste collection + treatment: **2.9€/mth** (0.4% of budget)

Shaping Waste PPP using Competitive Dialogue

- EfW PPPs are complex projects involving **multiple revenues sources** as well as some **technological** risk.
- Complexity further increases when **combining EfW with a landfill and remediation** components
- Like many transition economies, Serbia is a jurisdiction with **limited PPP background** and practice
- **Public procurement** with **competitive dialogue** suits well the challenges of developing a bankable PPP project
  - **City secured PPP transaction advisory services from IFC** (World Bank Group) throughout the procedure
  - **5 consortia prequalified** in November 2015
  - **4 competitive dialogue meetings** with each bidder to develop a **bankable allocation of risks**
  - **Multiple iterations of PPP Contract** and key project documents
  - Bid submission in July 2017, with **lowest availability payment offered** as main tender criteria
  - **PPP Contract signed in September 2017** between City and SPV formed by SUEZ, Itochu and Marguerite)
  - Overall **2-year process**

Achieving an Affordable and Flexible Waste Treatment Mix

ENERGY-FROM-WASTE

340,000 tpa MSW

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

1 line, 103 MW - steam cycle 58 bar / 396°C

Condensing – extraction turbine with ACC

Max gross electricity output: 30 MWe

Max heat output to district heating: 56 MWth

IBA recovery facility

APC residues solidification plant to non-hazardous waste criteria (to landfill)

MSW 510+ ktpa

ENGINEERED LANDFILL

170,000 tpa MSW

7.5 million m^3 capacity

Leachate treatment plant : R/O + evapo-concentration (90,000 m3/y)

Biogas engines 3MW

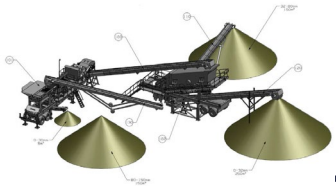
CONSTRUCTION & DEMOLITION WASTE RECYCLING

200,000 tpa

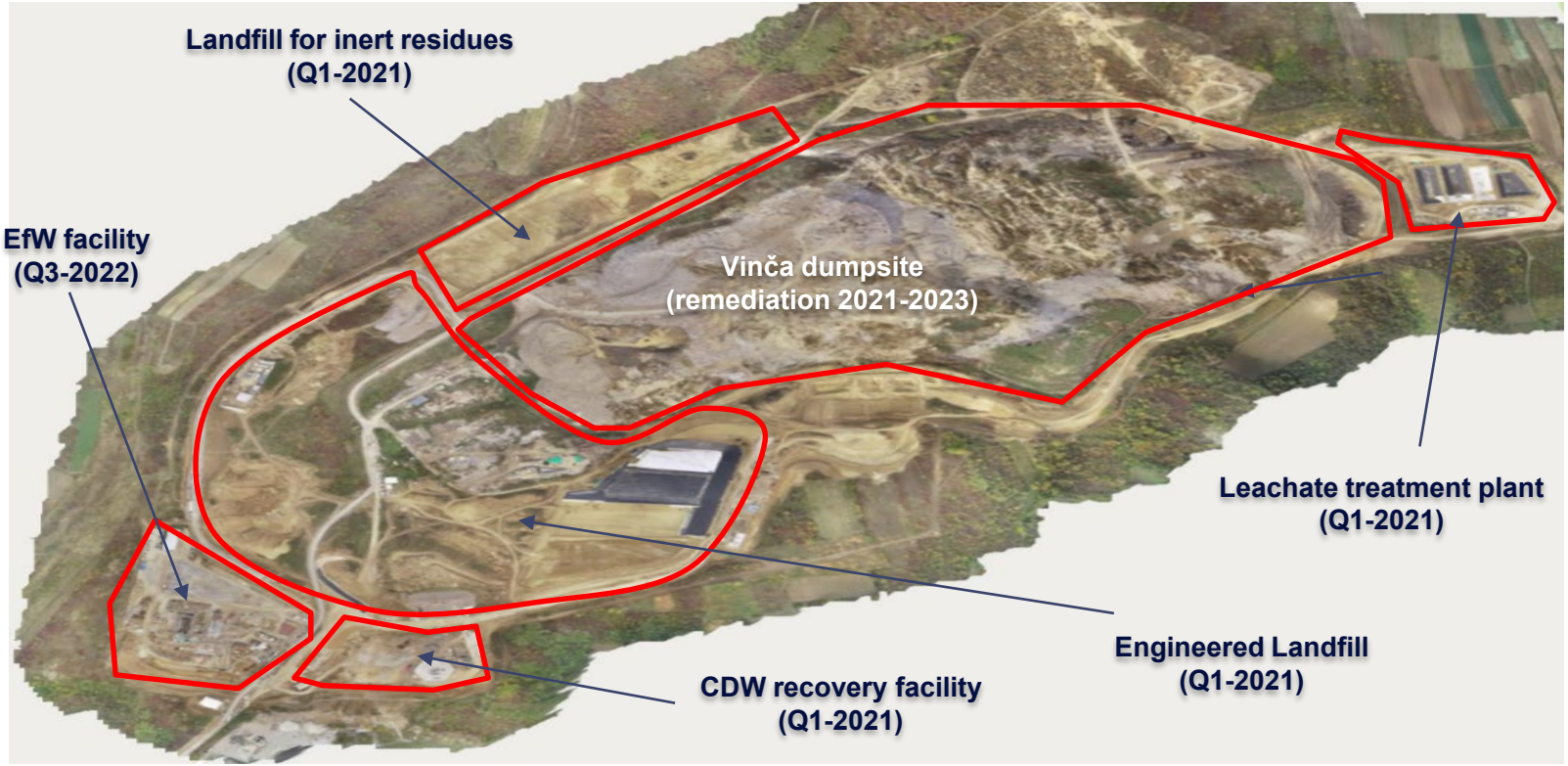
removal of contaminants, crushing, sieving (0-30mm, 30-80mm, 80-150mm)

70% CDW recovery target (roadworks, backfills, landfill covers)

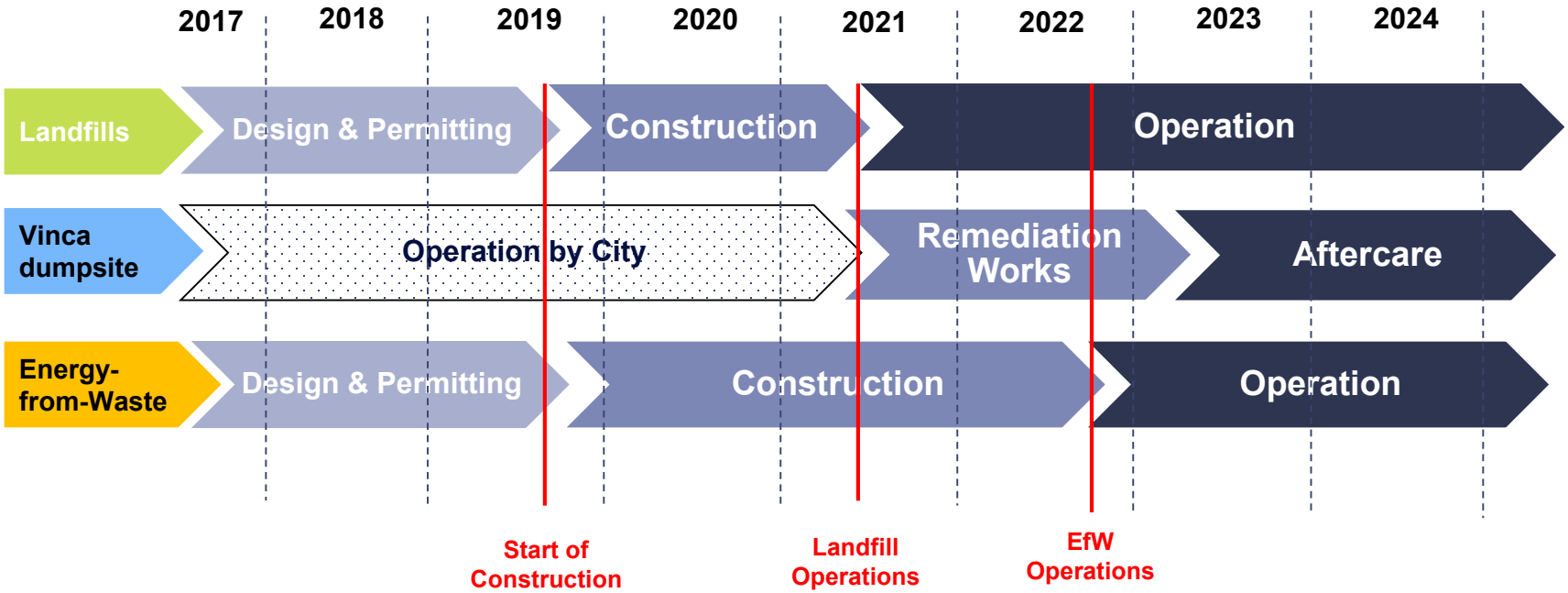
EfW facility downsized *from 510kt to 340kt during competitive dialogue to make the project more* ***affordable*** *and allow* ***headroom for recycling*** *in future*



Project Facilities



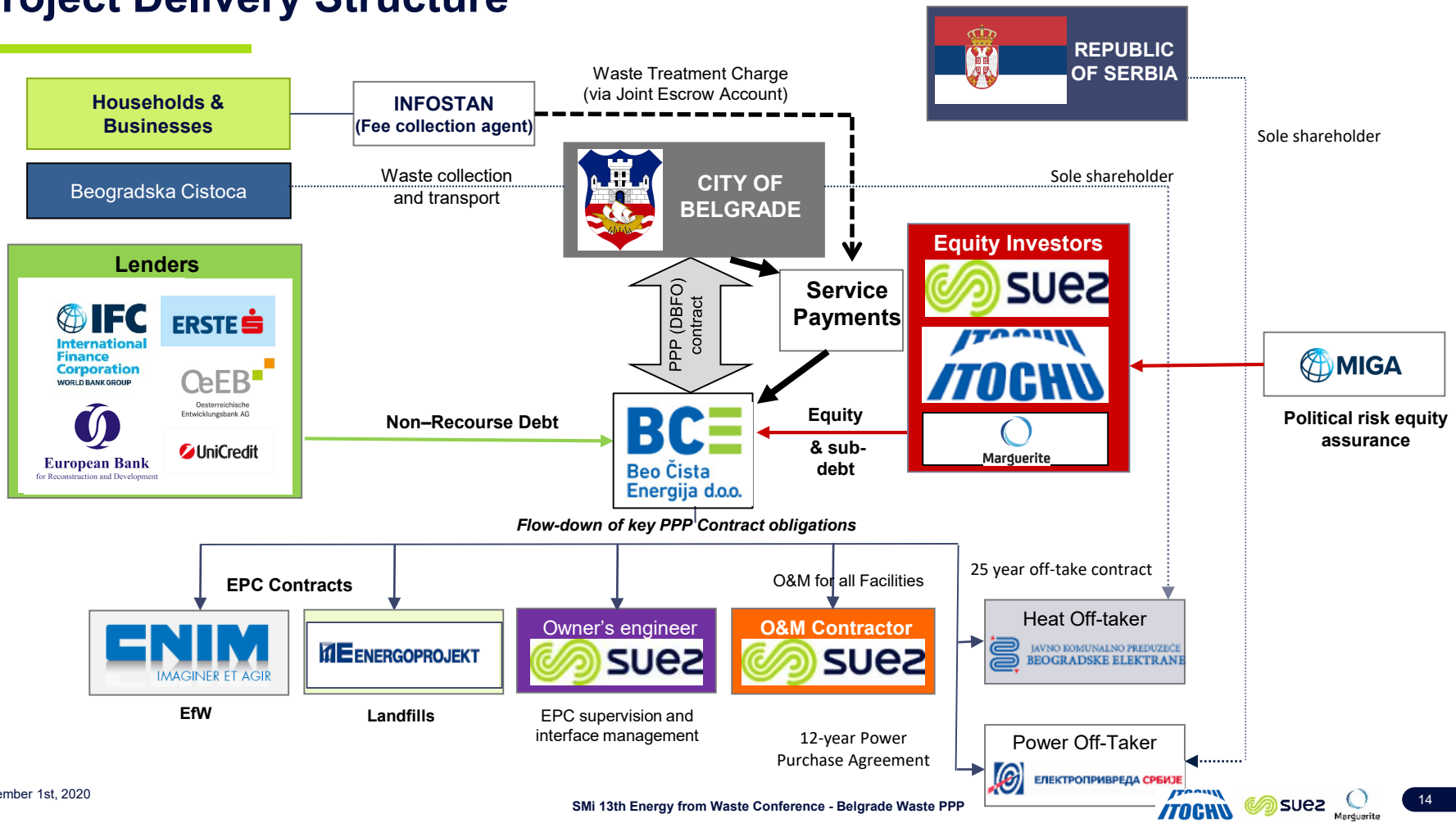
Project Timeline



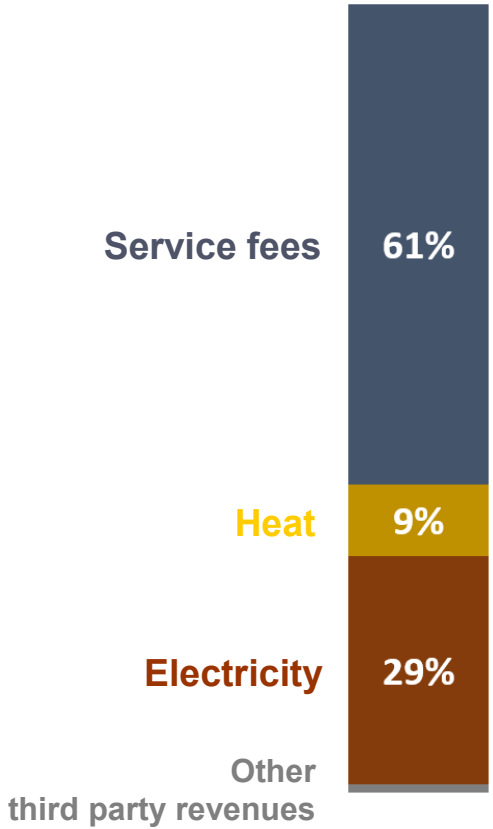
PPP Contract - Allocation of Key Risks

- SPV's fixed costs (financing and operation) are covered by a **fixed availability fee in EUR** : no forex risk, no volume risk, no third-party waste. Variable costs (operation) are covered by a **variable fee per ton**
- City's payments (60% of project revenues) are funded by a new earmarked **waste treatment charge** levied from residents and businesses and transferred to an escrow account
- LCV risk is mitigated by the **flexibility of EfW combustion diagram** (from 340kt @8.5 MJ/kg to 385 kt @7,5 MJ/kg) and waste availability (total waste envelope is about 510 ktpa)
- Feed-in tariff of 85.7 €/MWh guaranteed under **12-year PPA with national power company EPS**
- Heat offtake volume and price of 30 €/MWh are guaranteed under **25-year take-or-pay Heat Offtake Agreement**
- Urban Plan to be updated by City but all other **construction and environmental permits to secured by SPV**
- **Tentative financing conditions by IFIs set at bid stage** with an upside/downside sharing mechanism on Financial Close depending on the final loan conditions
- Ground Contamination, Protestor Actions and Change in Law are **Compensation Events**
- **Bankable regime of compensation on Termination** with 90% of Senior Debt repaid in case of SPV default

Project Delivery Structure

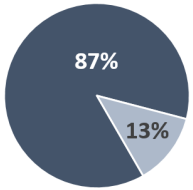


SPV Revenue Structure



25 years

PPP Contract – City of Belgrade



Fixed
Availability based, EUR

Variable
Per tonne of waste

Underpinned by Waste Treatment Charge collected by City's agent

25 years

Heat Offtake Contract – Municipal DH Company

12 years

PPA / FIT – State owned utility

13 years

Other PPAs / Merchant

Stable revenue streams secured under long term contracts with reputable counterparties

Non-recourse project financing with long tenors, high leverage

Investments and Financing Plan

- **Total design and construction capex: € 310m**
  - EfW, New Landfills, Leachate Plant, Biogas Recovery Facility, CDW facility, Remediation of Vinča Dumpsite
- **Total funding requirement** (including capitalized interests): **€ 373m**
- **Equity: € 93m**
  - SUEZ (40%), Itochu (40%), Marguerite Fund (20%)
  - Financed through **Equity Bridge Loans during construction** for IRR optimization and bid competitiveness
  - **Covered by MIGA political risk insurance** (currency inconvertibility and transfer restriction, expropriation, war, civil disturbance, arbitral award default)
- **Non-recourse senior loans** from IFIs**: € 280m**
  - **A-loan - EBRD, IFC, OeEB -** 18 years door-to-door (including subsidized tranches from EBRD's Green Energy Special Fund (GESF) and the Canada-IFC Blended Climate Finance Program)
  - **B-loan - Unicredit, Erste Bank -** 15 years door-to-door

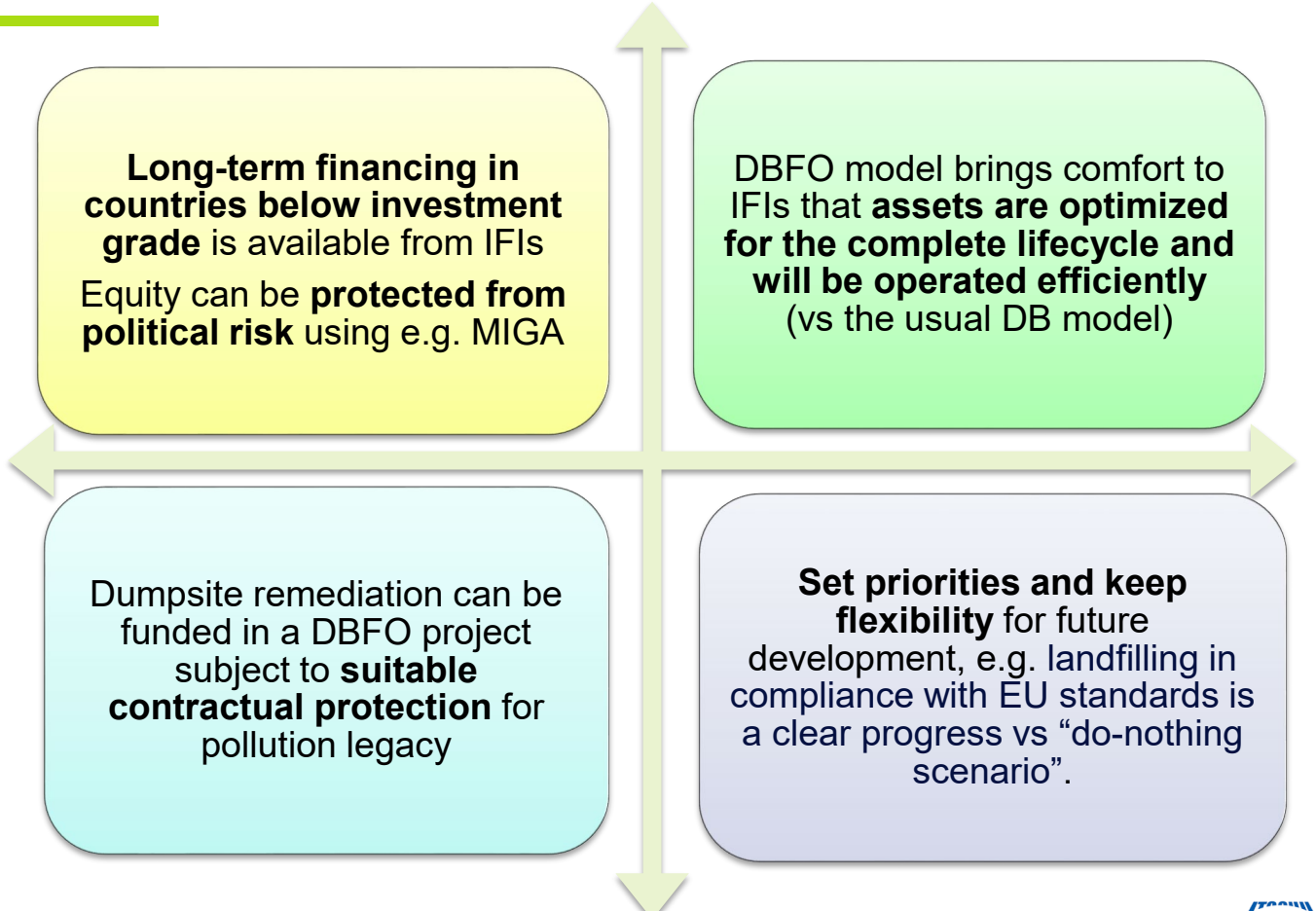
End-User Cost and Affordability

- **Key affordability drivers**
  - EfW capacity downsized to the max capacity for a single-line design to optimize capex (588 €/ton of capacity)
  - CHP operation to maximize energy recovery
  - 12-year feed-in tariff for electricity @85.7 €/MWh
  - 25-year guaranteed heat offtake @30 €/MWh
  - EfW energy revenues equivalent to approx. 70 €/ton processed
  - Direct landfilling of waste in excess of EfW capacity, no pre-treatment
  - High gearing 75/25
  - Competitive EPC and O&M packages

SPV Revenue stream - m€	2023 1st year of full services
Electricity Revenue	18,1
Heat Revenue	5,9
Other Third Party Revenues	0,9
City Base Payment	38,1
Total Revenues	**63,0**
City Base Payment	**38,1**
- Fix part	33,3
- Variable part	4,8

- **Annual SPV turnover** (from start of full operation) **is 63 M€ o/w 38 M€ (60%) paid by City**.
- Increase of waste tax for average household from **2.90 €/month** (current, without project impact) to **6.20 €/month** (from start of full operations) – still **within 1% of household budget.**

Belgrade PPP Project – A Replicable Model



Energy-from-Waste Facility, November 2020

New Landfill, November 2020

Leachate Treatment Plant, November 2020

Thank you for your attention - visit us at www.bcenergy.rs !

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ITOCHU

suez

Marguerite