Utility scale renewable energy
promotion in Lithuania

17 October 2019

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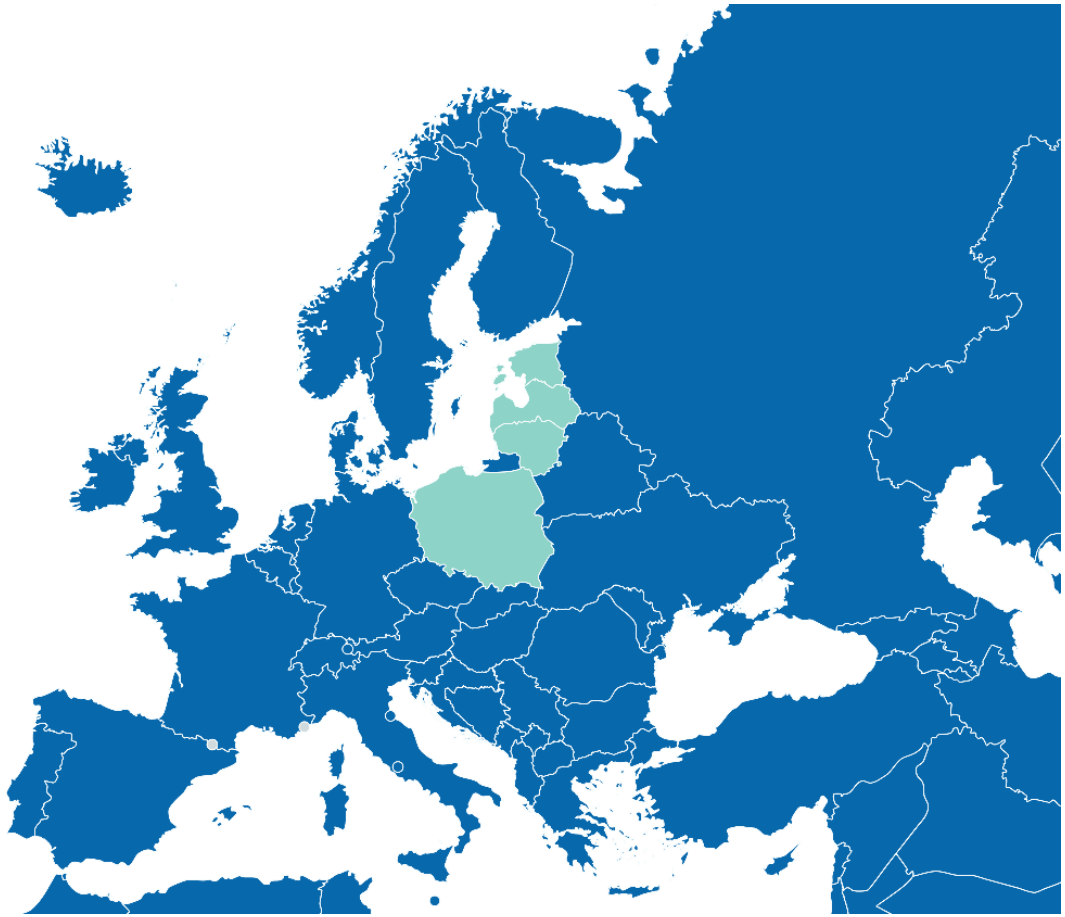
Ignitis Group at a glance

4000

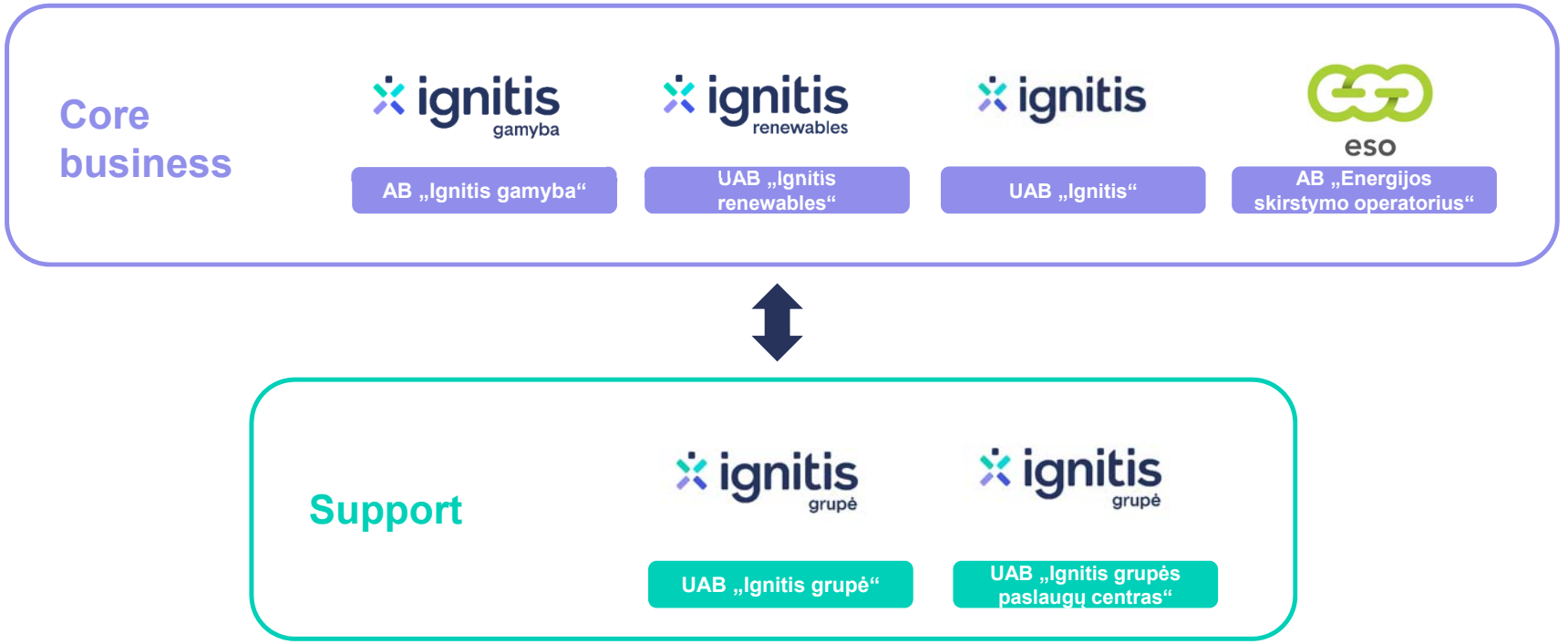
EMPLOYEES

EUR 1.3 bn

REVENUES (in 2018)



Ignitis Group



Strategy 2030

6
billion EUR

Investment

International growth

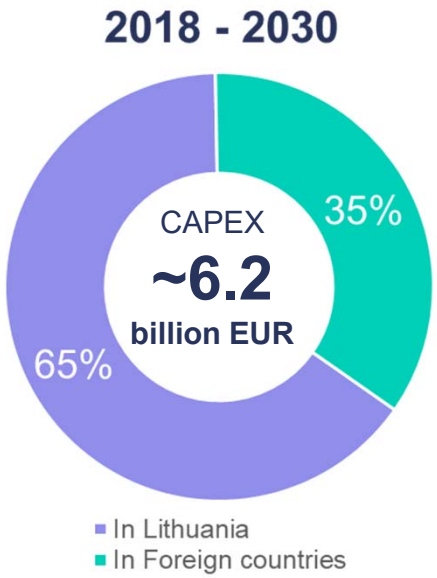
- Strategic power generation
- Green energy
- Commercial organisation
- New energy

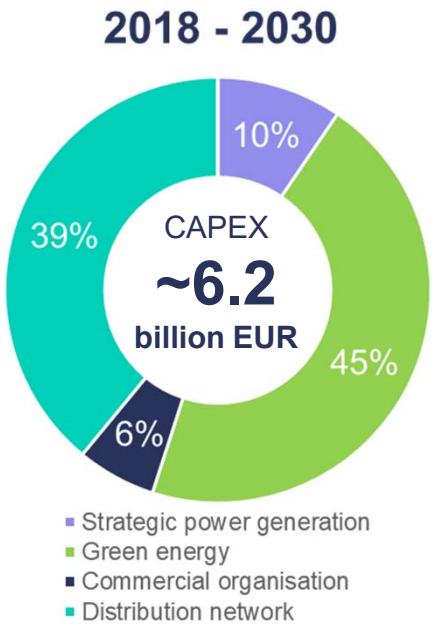
Focus areas

Levelized cost of electricity

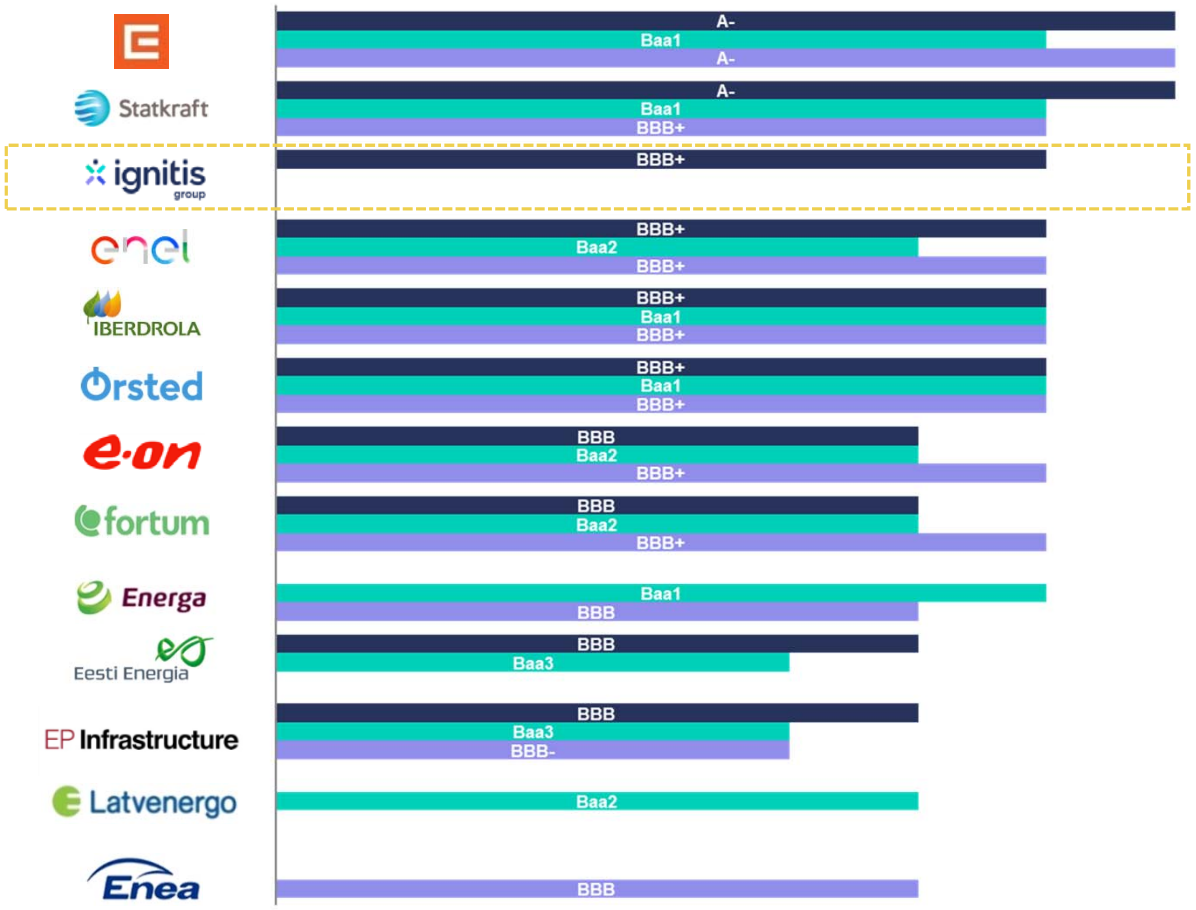
Strategic focus: renewable energy

Investments





Balance sheet strength

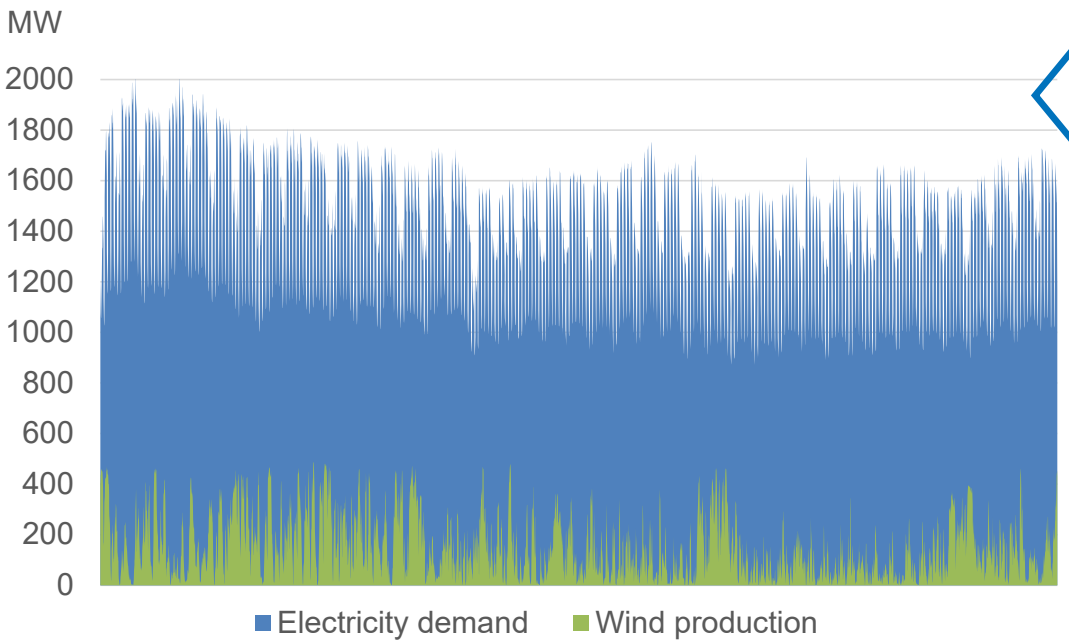


- *The group was established in 2008 by **consolidating majority of Lithuania's energy assets** for the purpose of building EUR 5 bn nuclear power plant.*
- *After the referendum in 2012 the plans to build nuclear were cancelled, however, **financial capacity of the group remained**.*
- *The group strategy is to use that capacity to **develop renewable energy**.*

S&P Global Ratings · Moody's · FitchRatings

Wind energy

Status Quo of wind energy

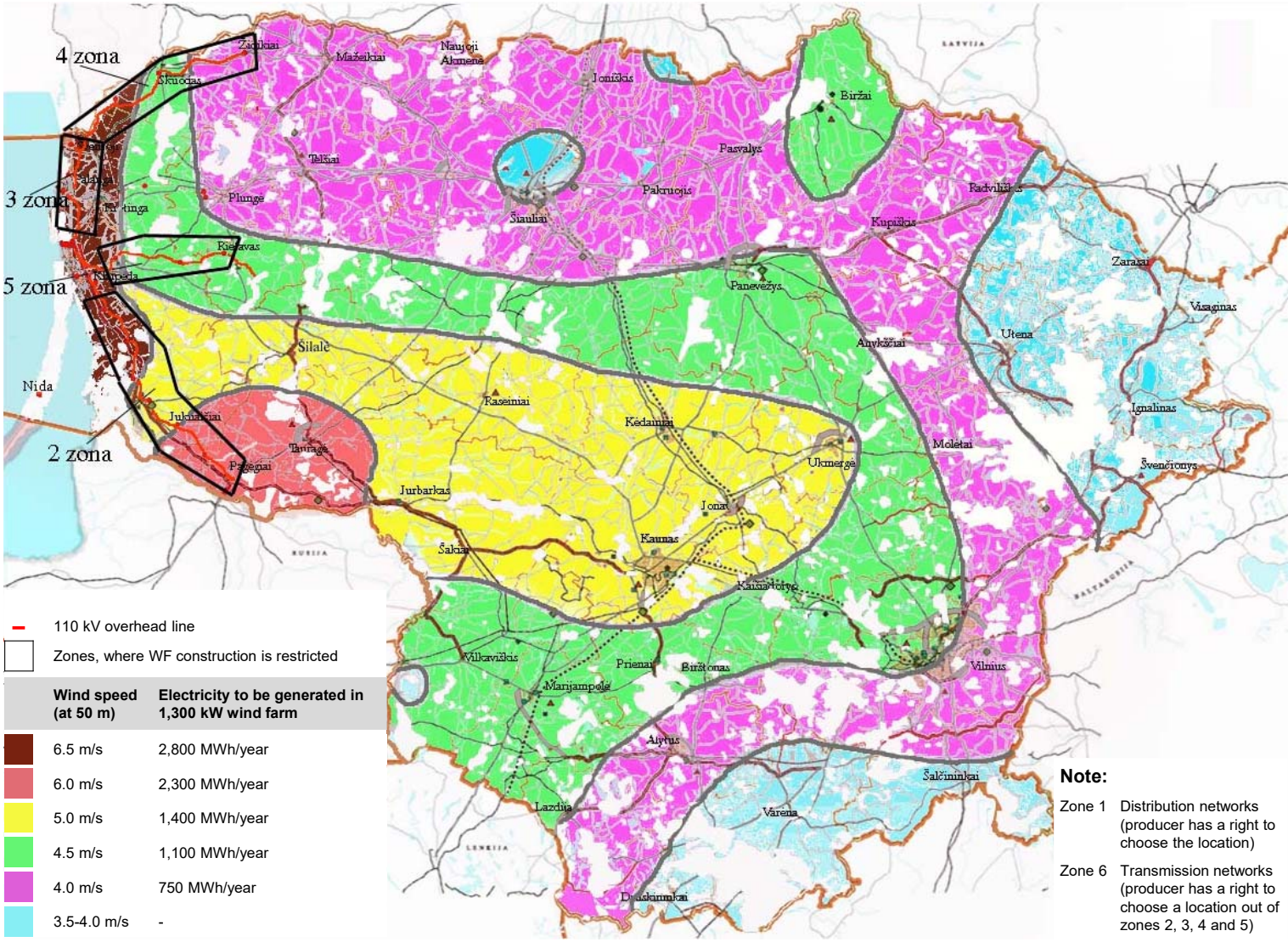


Installed capacity	~539 MW
Wind parks	~ 23
Annual production	1,1 TWh (2018) 1,0 TWh (2019-09)
Wind energy in electricity demand	~10-11%

TSO data: 2019-01-01 : 2019-10-11

Wind power in Lithuania

Lithuania has substantial wind resource, however there are limitations.



	Wind speed (at 50 m)	Electricity to be generated in 1,300 kW wind farm
	6.5 m/s	2,800 MWh/year
	6.0 m/s	2,300 MWh/year
	5.0 m/s	1,400 MWh/year
	4.5 m/s	1,100 MWh/year
	4.0 m/s	750 MWh/year
	3.5-4.0 m/s	-

110 kV overhead line

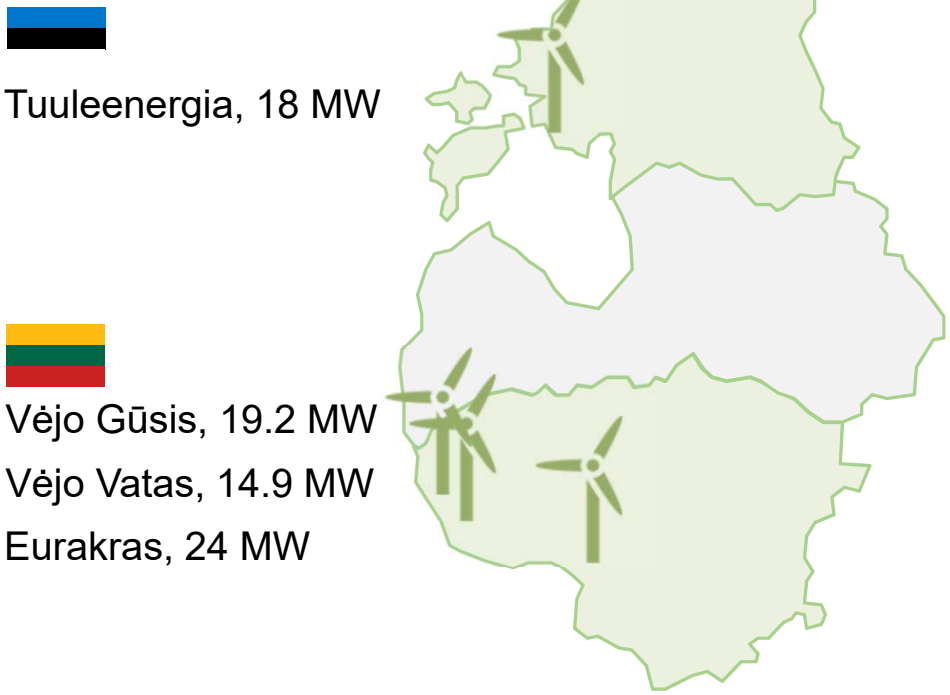
Zones, where WF construction is restricted

Note:

Zone 1 Distribution networks (producer has a right to choose the location)

Zone 6 Transmission networks (producer has a right to choose a location out of zones 2, 3, 4 and 5)

Picture: Zoning scheme for construction of wind power plants in Lithuania. *Source: Lithuanian Energy Institute.*



Tuuleenergia, 18 MW

Vėjo Gūsis, 19.2 MW

Vėjo Vatas, 14.9 MW

Eurakras, 24 MW

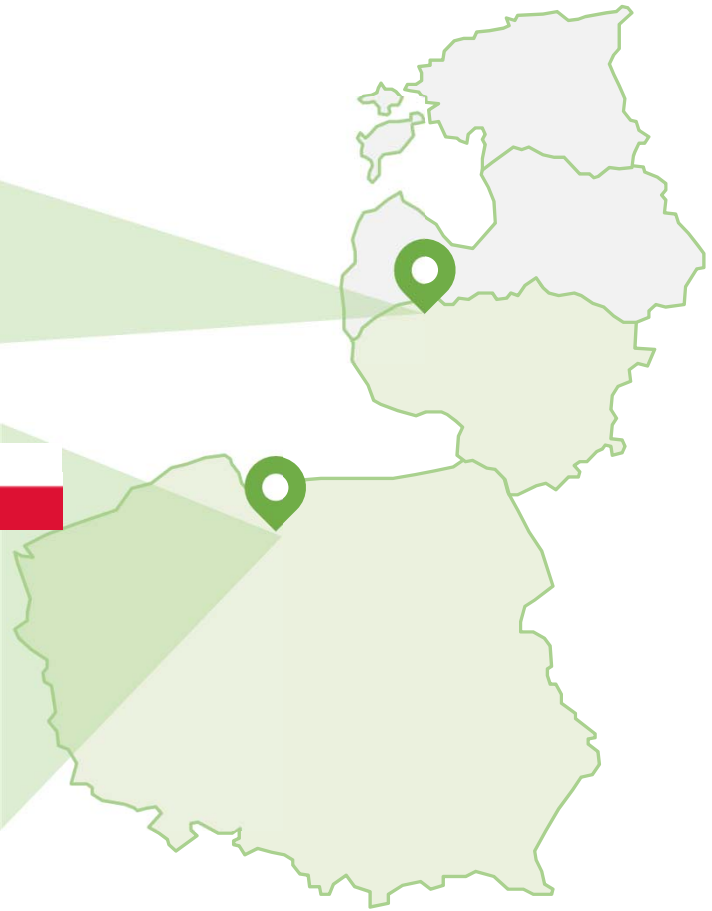
Constructions

Mažeikiai Wind Farm

Planned capacity – **60-63 MW**
Expected first MWh – **2022**

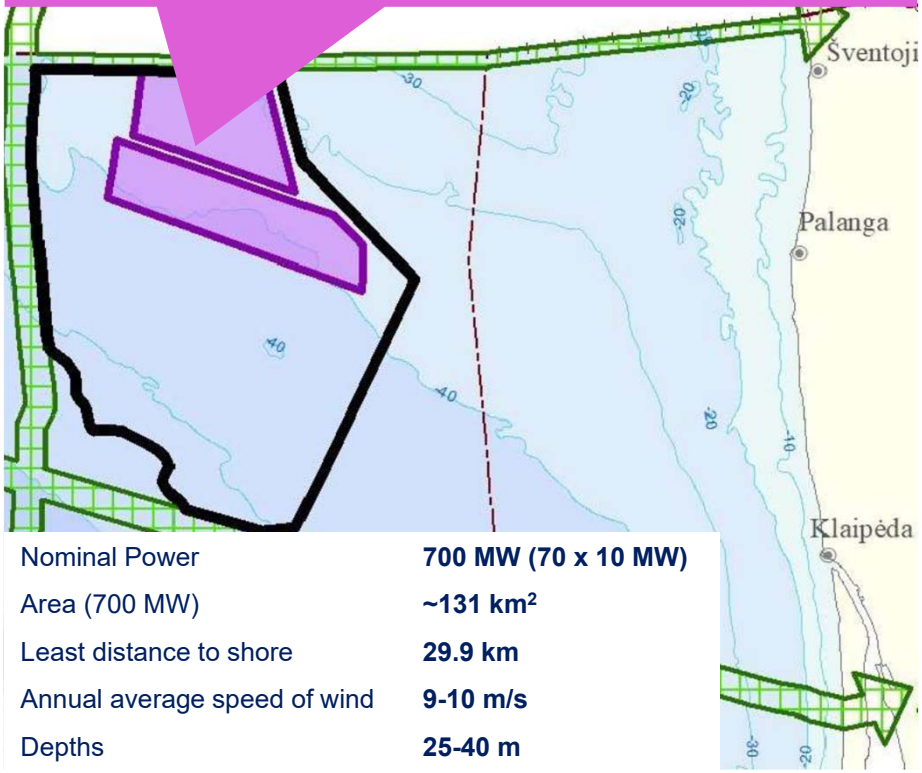
Pomerania Wind Farm

Planned capacity – **94 MW**
CfD – **215 PLZ / MWh**
Expected first MWh – **2021**
Total project value – **€ 127 M**
(including project acquisition with feed-in-tarrif)



Offshore wind farms in Lithuania

Recomended for start: 2 x 350 MW areas*



Nominal Power	**700 MW (70 x 10 MW)**
Area (700 MW)	**~131 km²**
Least distance to shore	**29.9 km**
Annual average speed of wind	**9-10 m/s**
Depths	**25-40 m**

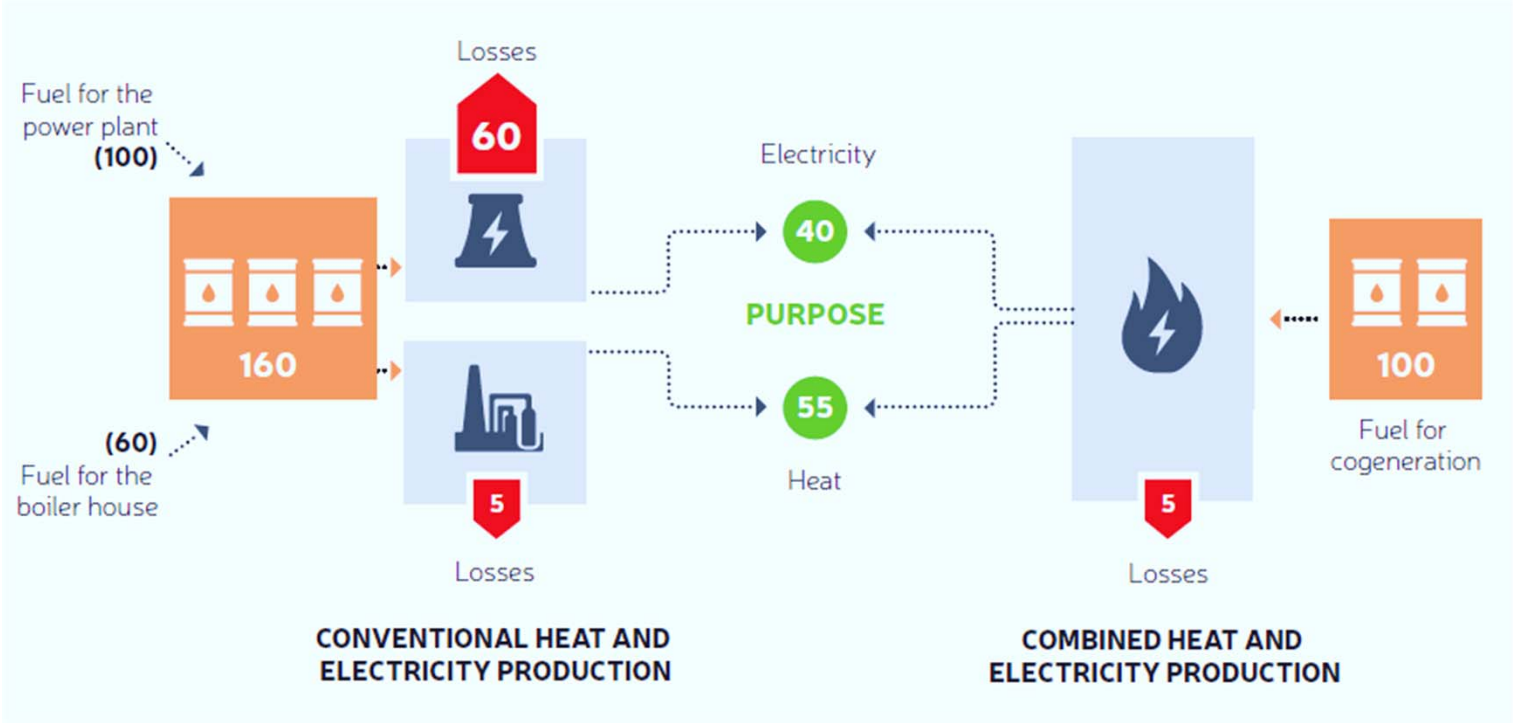
- Total potential – **3,350 MW**
- Spatial planning and necessary environmental procedures planned to start by the **end of 4Q 2019**.
- Tenders for development, conditions for connection and permits – **planned in 2022**.

Ignitis Group is well positioned to take part in the upcoming offshore tender and has already launched a parallel process of **finding a suitable partner for offshore wind development.**

** Source: Study on identification of the priority areas for development of RES power plants. Performed in 2019 by Klaipeda University, Institute for Marine Research.*

BioCHP and Waste to Energy

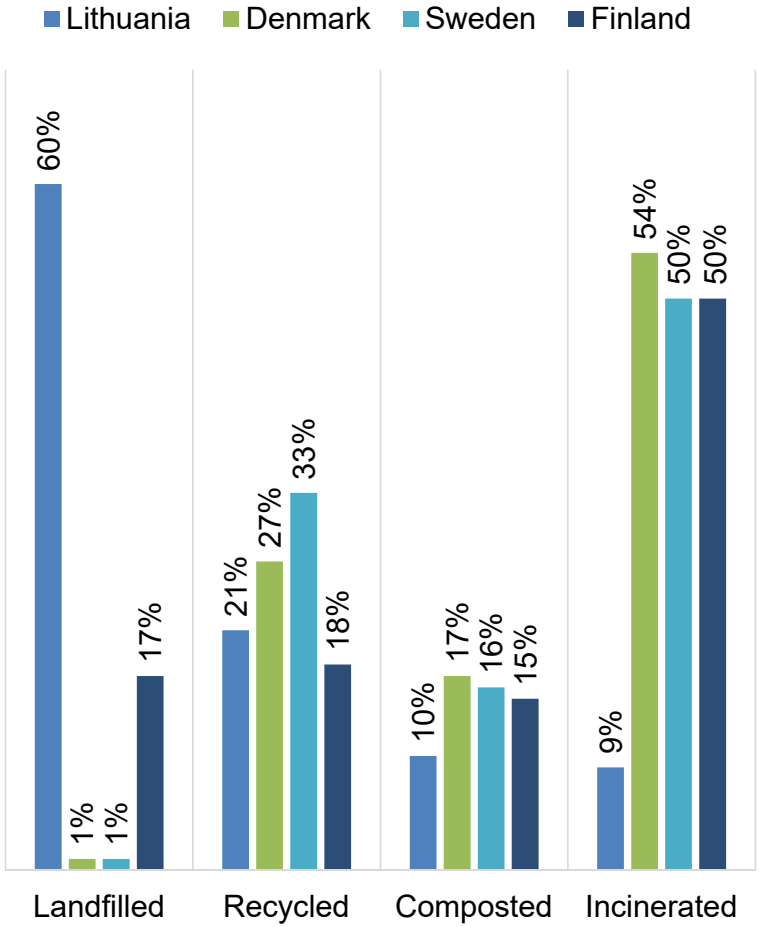
High efficiency cogeneration – first …



It has ~ 40% **higher primary energy utilization** rate compared to separate conventional energy (electricity and heat) production

Country's **energy dependency can be significantly reduced** by the use of local municipal waste (RDF/SRF) and renewable fuel

Waste as a source for energy



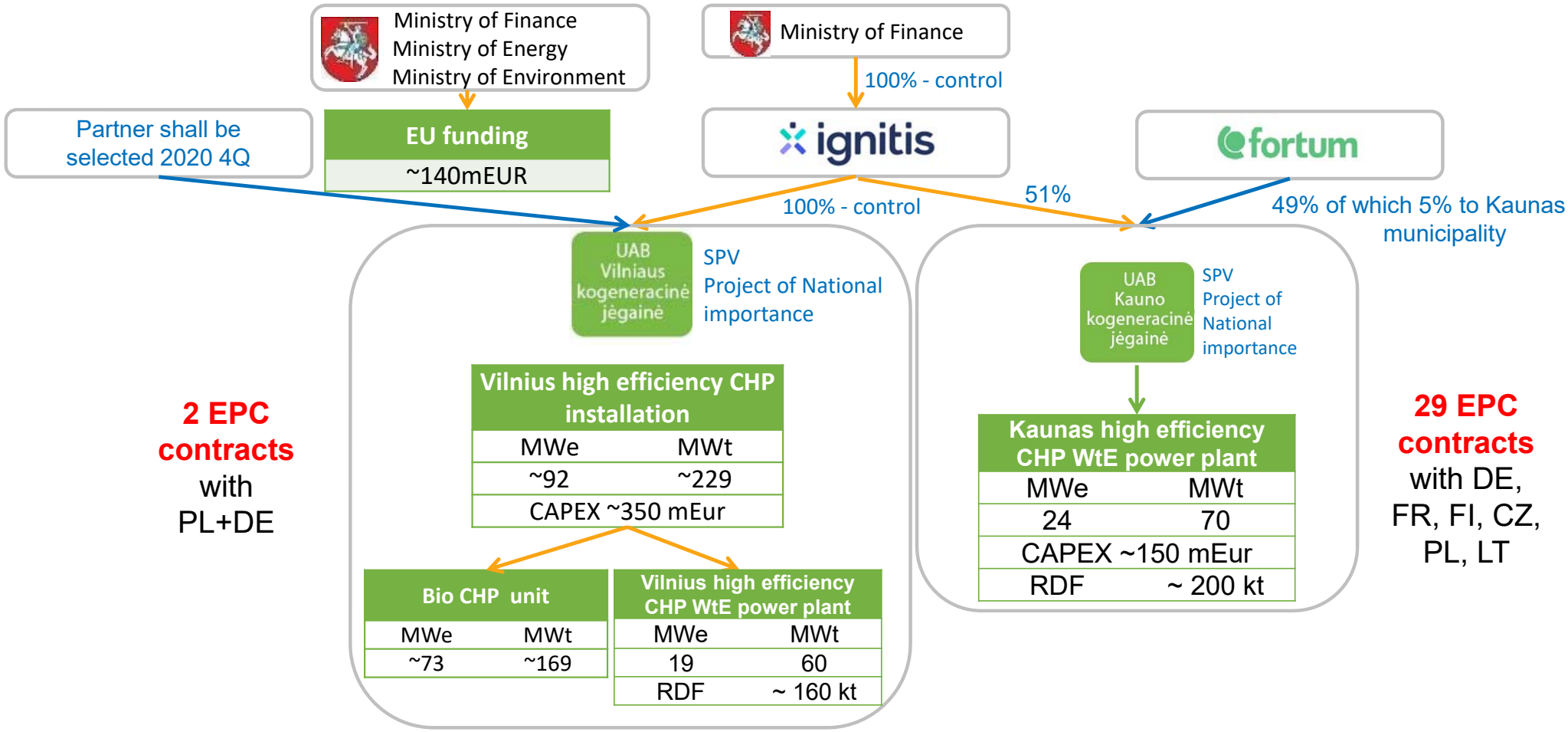
Eurostat (2014)

Ineffective waste management - 60% of waste containing energy value was landfilled

Lack of WtE capacities to incinerate RDF/SRF locally produced by MBTs (mechanical biological treatment plants)

EC ambitions for recycling (65%, 2035) push to optimize WtE capacities in the conservative manner

Ownership of the KOGEN project



Kaunas CHP (KKJ)

- „First fire“ – December 2019
- First waste – January 2020
- Taking over – May 2020
- Team – 35 KKJ employs and additionally 200 indirect working places

Vilnius CHP (VKJ)

- „First fire“ – June 2020
- First waste – July 2020
- Complex trial (WtE + BioCHP) October/November 2020
- Taking over – December 2020
- Team – 97 VKJ employs and additionally 300 indirect working places

Virtual visit

Expected results

	Vilnius CHP	Kaunas CHP
Electricity production, GWh/yr. (increase production from waste and RES comp. to 2016 m.)	400 (20%)	175 (9%)
Heat production, GWh/yr. (market share)	1 240 (~50%)	500 (~40%)
Decrease of heat production price	>20 %	>20 %
Decrease of CO_2 emissions , t/yr.	~230-436 000	~70-107 000
Primary energy savings	~40 %	~46 %

Future strategy

Wind

Biomass & WtE

Utility scale PV

Community solar solutions

Key requirements:

- > 20 MW
- Pre construction phase, after/before auctions
- Access to grid
- Credible and transparent counterparties

Geography:

- **Central and Eastern Europe**

#EnergySmart

ignitis group