

The impact of RES regulations on EDF Poland investment / business decisions

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Polish regulations

Green certificates

- ◆ Tradable Certificates of Origin of RES (green certificates) were introduced in Energy Law in 2005 to strengthen development of RES. It is applicable until 2017.
- ◆ Regulatory framework after 2017 is not defined yet but works on modification of regulation are carried on.
- ◆ Energy company dealing with electricity production or electricity trading and selling this electricity to the final customers connected to the grid in Poland is obliged to get and to submit to the President of Energy Regulatory Office (ERO) application for redemption of the Green Certificates of Origin of the electricity from RES Units or to pay a substitute fee

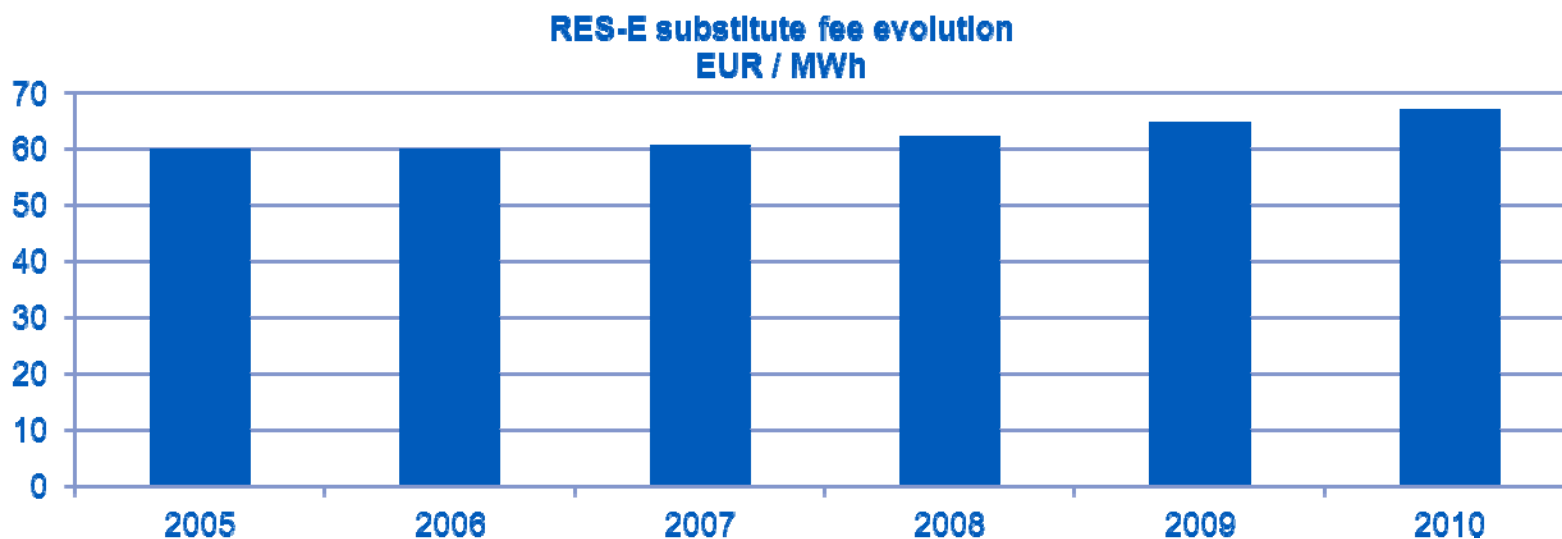
Required minimum share of RES based electricity sold to the final customers by a given energy company:

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
Min. RES-E share	8.7%	10.4%	10.4%	10.4%	10.9%	11.4%	11.9%	12.4%	12.9%

Polish regulations

RES-E substitute fee evolution

- ◆ Green Certificates of Origin are issued by President of Regulatory Office (ERO) on the motion of the producer of green electricity through the mediation of the electricity distribution company to which RES unit is connected. President of URE issues certificates in 14 days from the day of receiving motion.
- ◆ President of ERO publishes the unit substitute fee up to 31 of March each year in Bulletin of ERO.
- ◆ The unit substitute fee determined in the Energy Law is a subject to every year valorization by the inflation rate.
- ◆ The market value is in reality highly influenced by the regulation. It is unlikely to decrease until RES targets are fulfilled.
- ◆ The RES-E substitute fee is paid additionally to the price of the energy sold

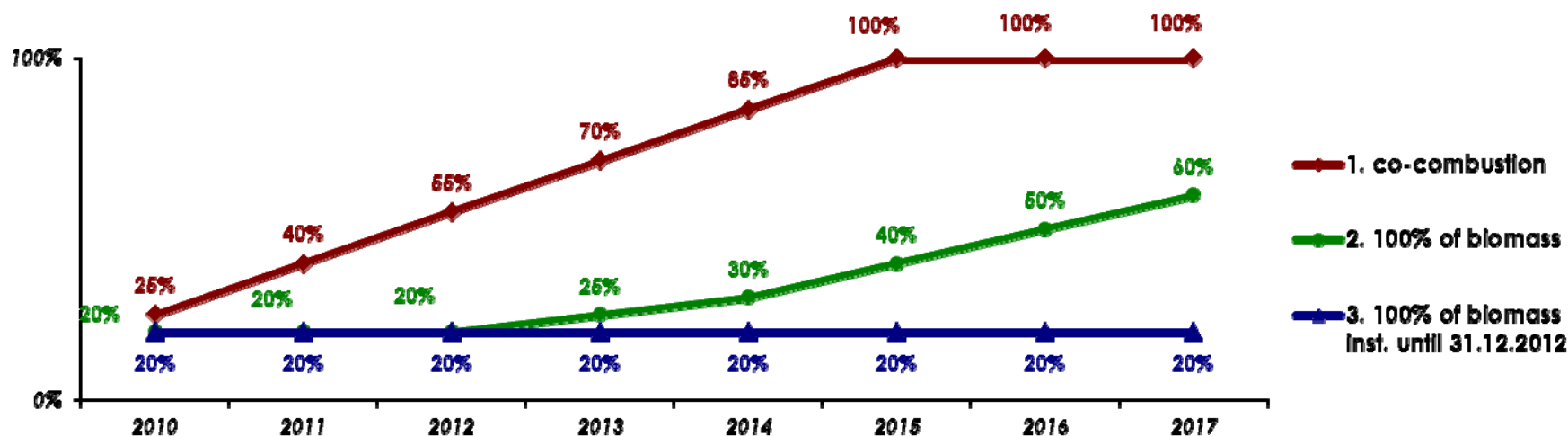


Polish regulations for biomass based RES-E

Challenges

- ◆ Green certificates are to be obtained differently according to combustion technique and type of biomass used (wooden or agro-based)
- ◆ Non-wooden biomass share requirements: the resolution of the Ministry of Economy dated August 2008 defines the minimum share of non-wooden biomass in the overall volume of biomass burnt, whereas 3 different cases have been defined:
 - Combustion of biomass with other fuels (co-combustion)
 - Combustion of biomass only (100% of biomass)
 - Combustion of 100% biomass – installation that were classified as operational before 31.12.2012

Necessary share of non-wooden biomass



CO₂ savings

▶ Burning biomass causes no CO₂ emissions according to the legislation :

- CO₂ emissions = measured volume of fuel burnt x CO₂ emission factor of fuel x oxidation coefficient
- Biomass burnt is not counted as fuel burnt

▶ This regulation is sustainable

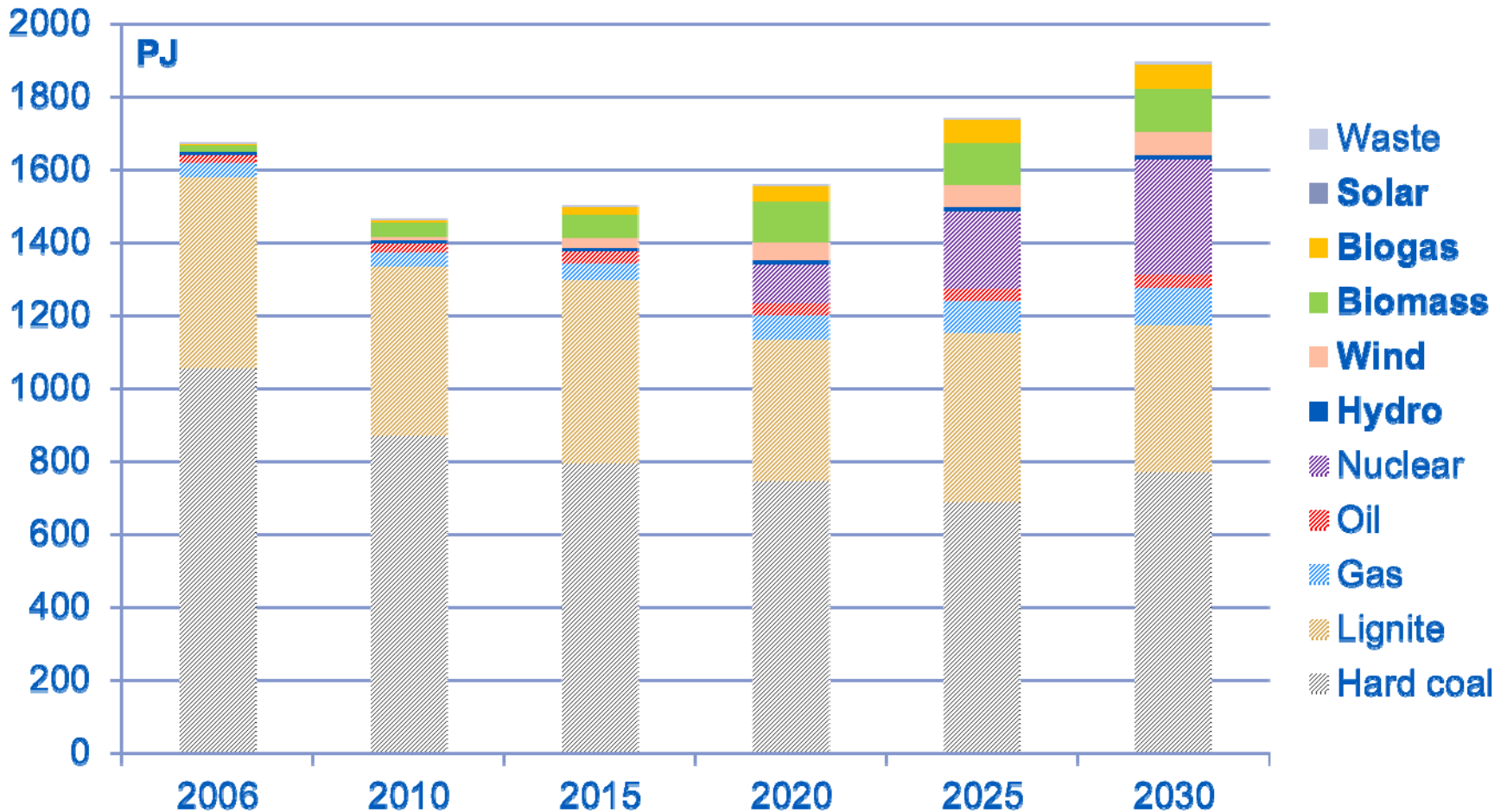
Biomass allows reduction of cost of CO₂ emissions

▶ Currently we save ~1,3 million CO₂ tons/year (ref. 2010)

▶ If the planned projects are realized we would save additional ~2,2 million CO₂ tons/year

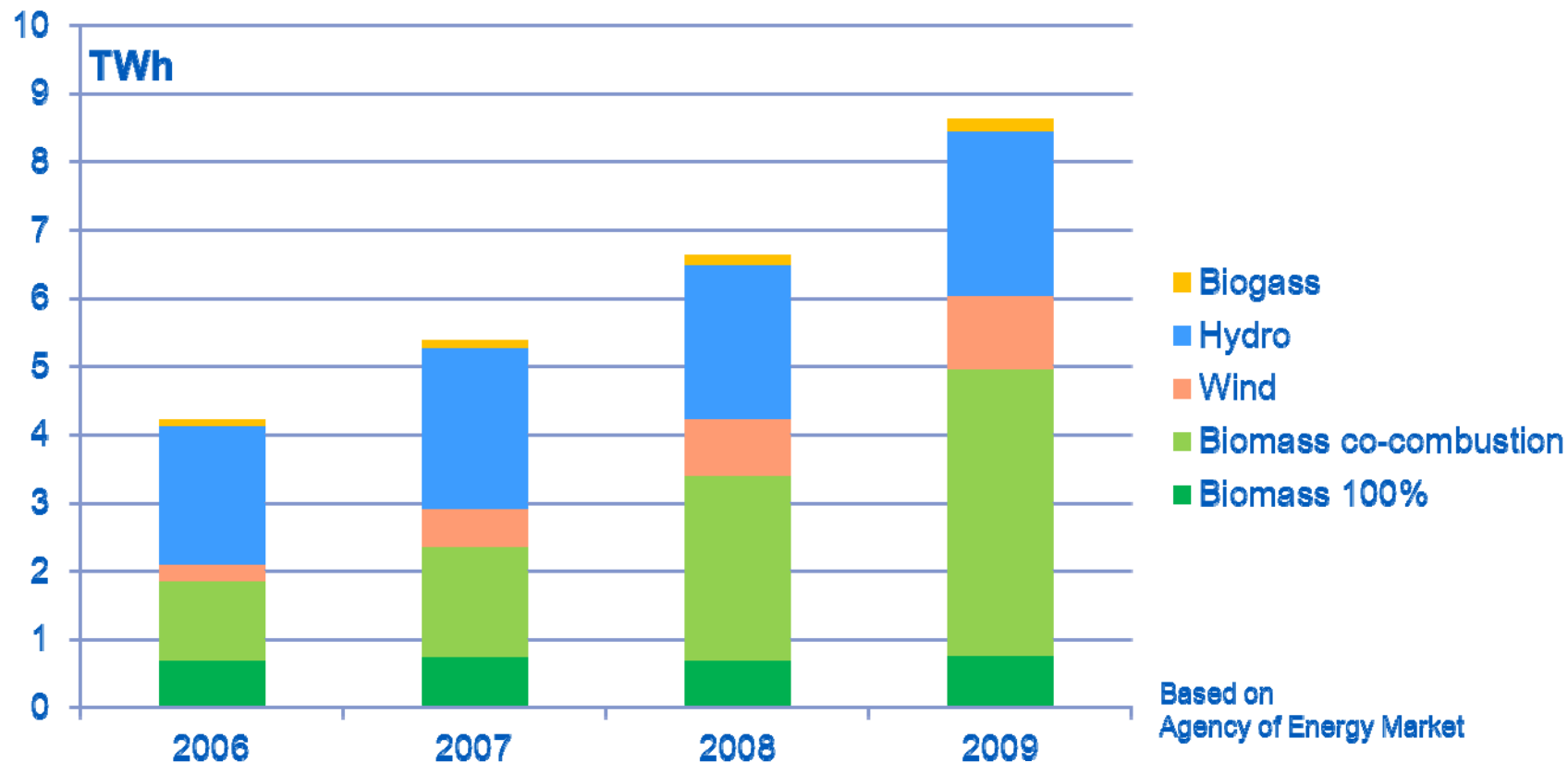
Primary fuel structure for electricity generation Polish Energy Policy till 2030

Even if wind capacity is developed, biomass will remain crucial in the RES mix

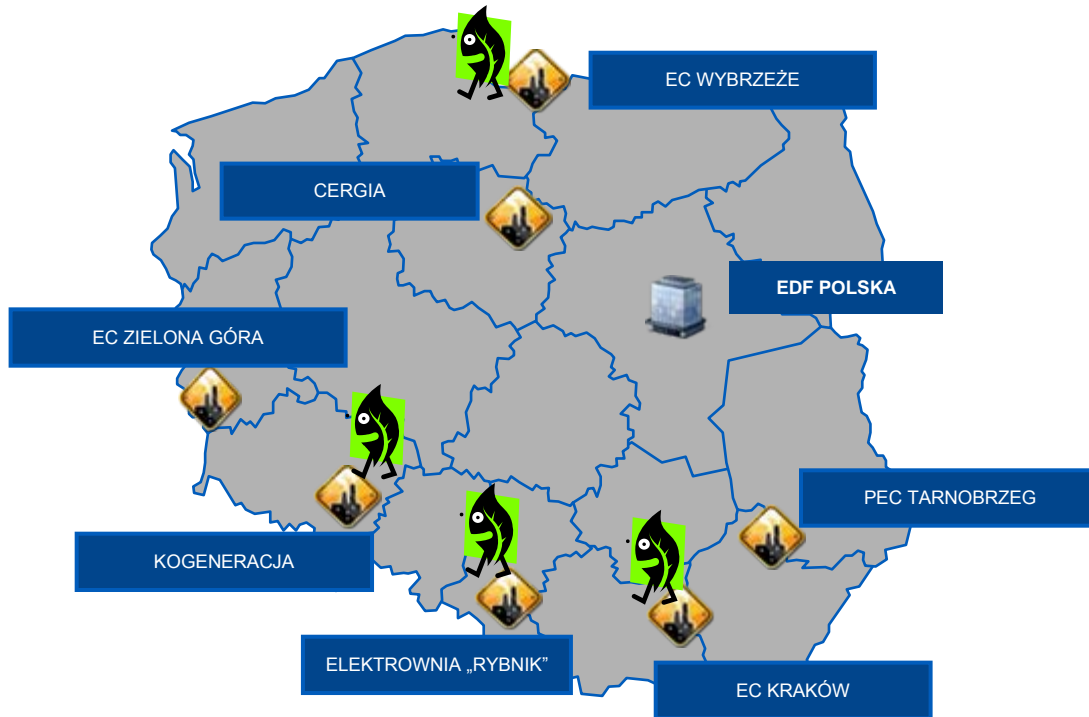


RES-E market in Poland

All resources



EDF Poland Group Production assets

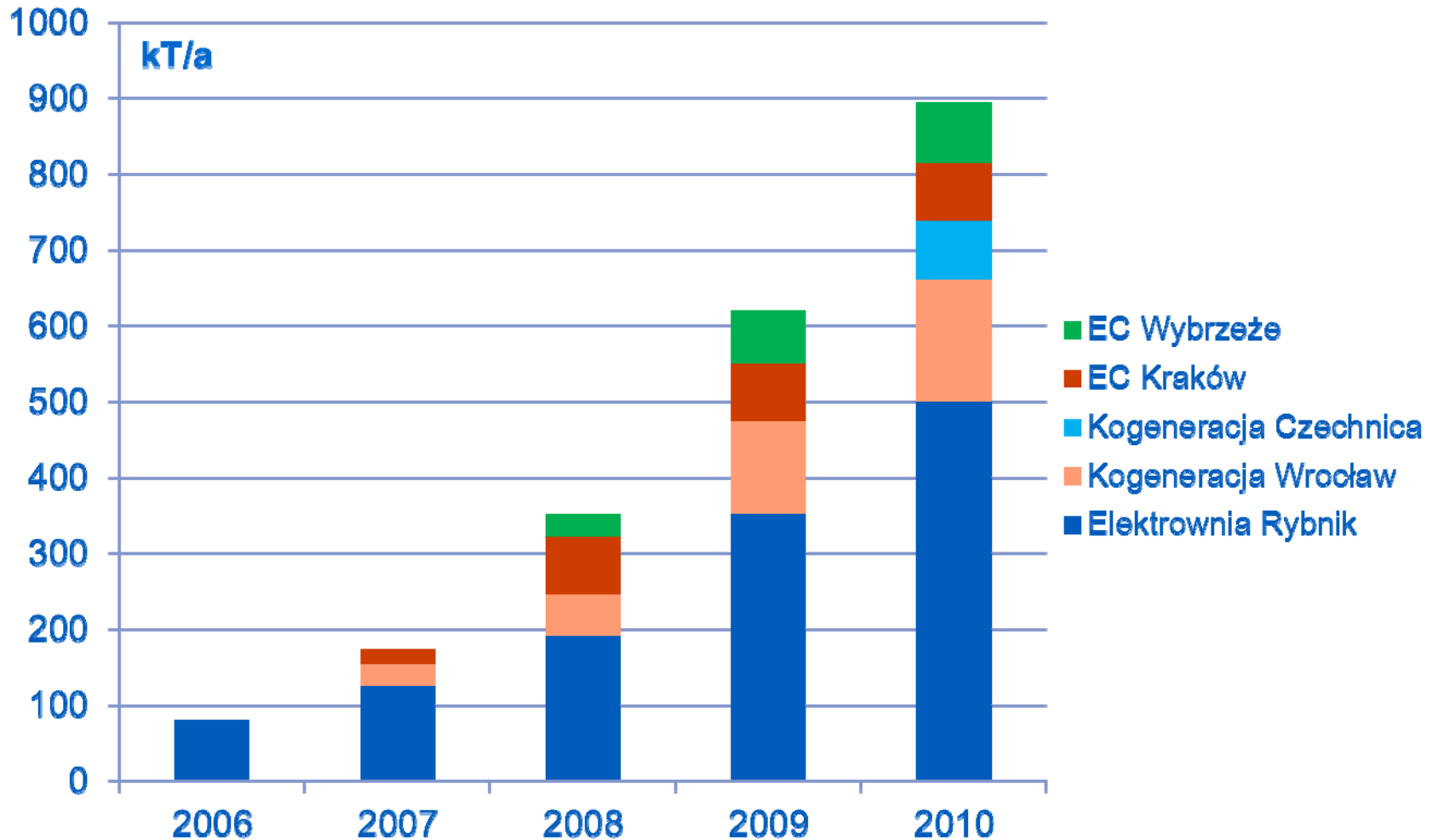


- 10% of national electricity production
- 20% of national district heating production

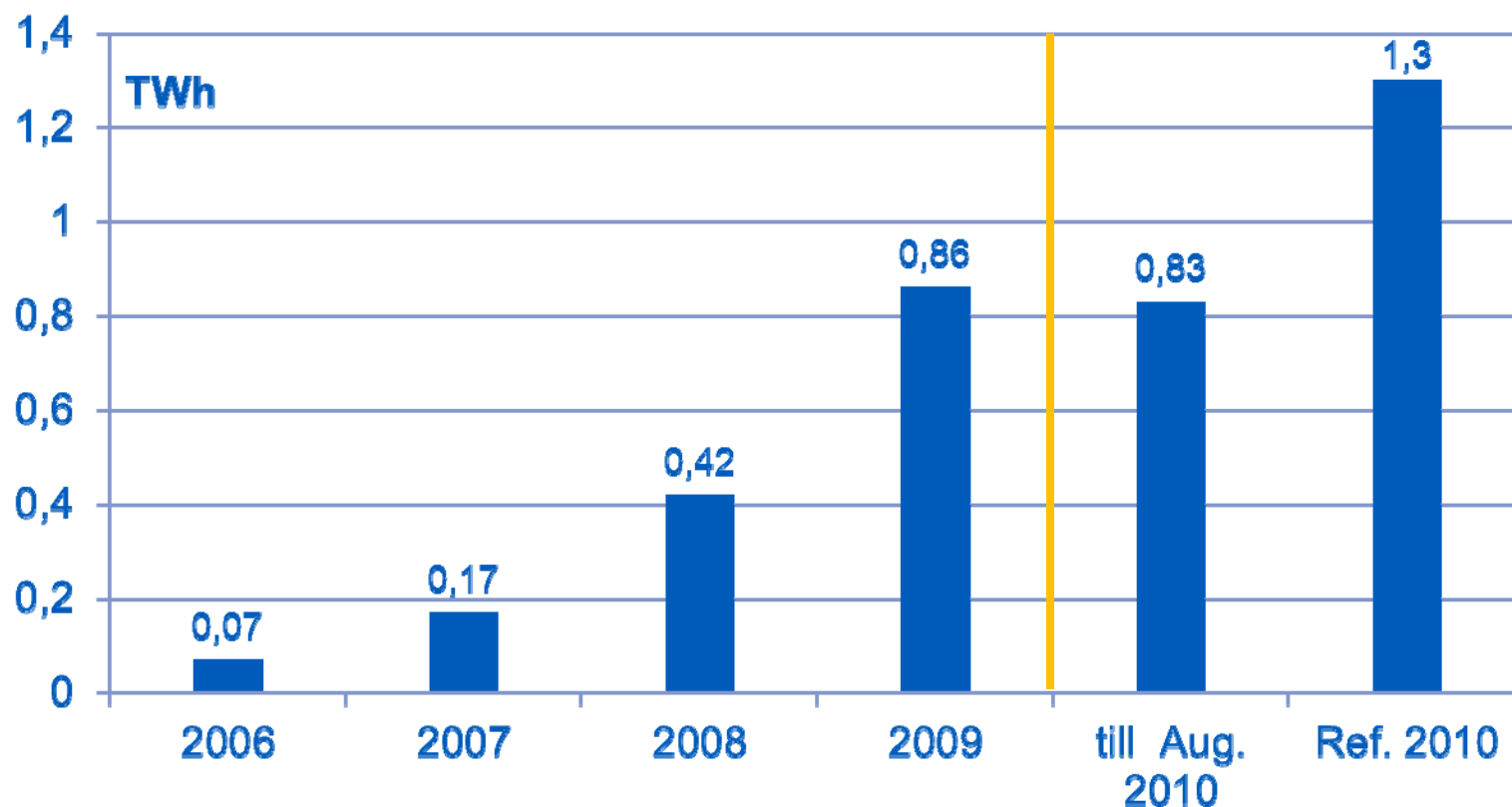
EDF's portfolio is mostly coal-fired and is facing new environment challenges

Company	Electricity MWe	Heat MWth
 EC KRAKÓW	460	1 258
 EC Wybrzeże	353	1 225
 ZEPÓŁ ELEKTROCIERNIWI WROCLAWSKICH KOGENERACJA SA	363	1 059
 cergia	2	409
PEC Tarnobrzeg	-	95
 ER	1 775	-
TOTAL	3 180	4 368

EDF Poland Group Biomass consumption



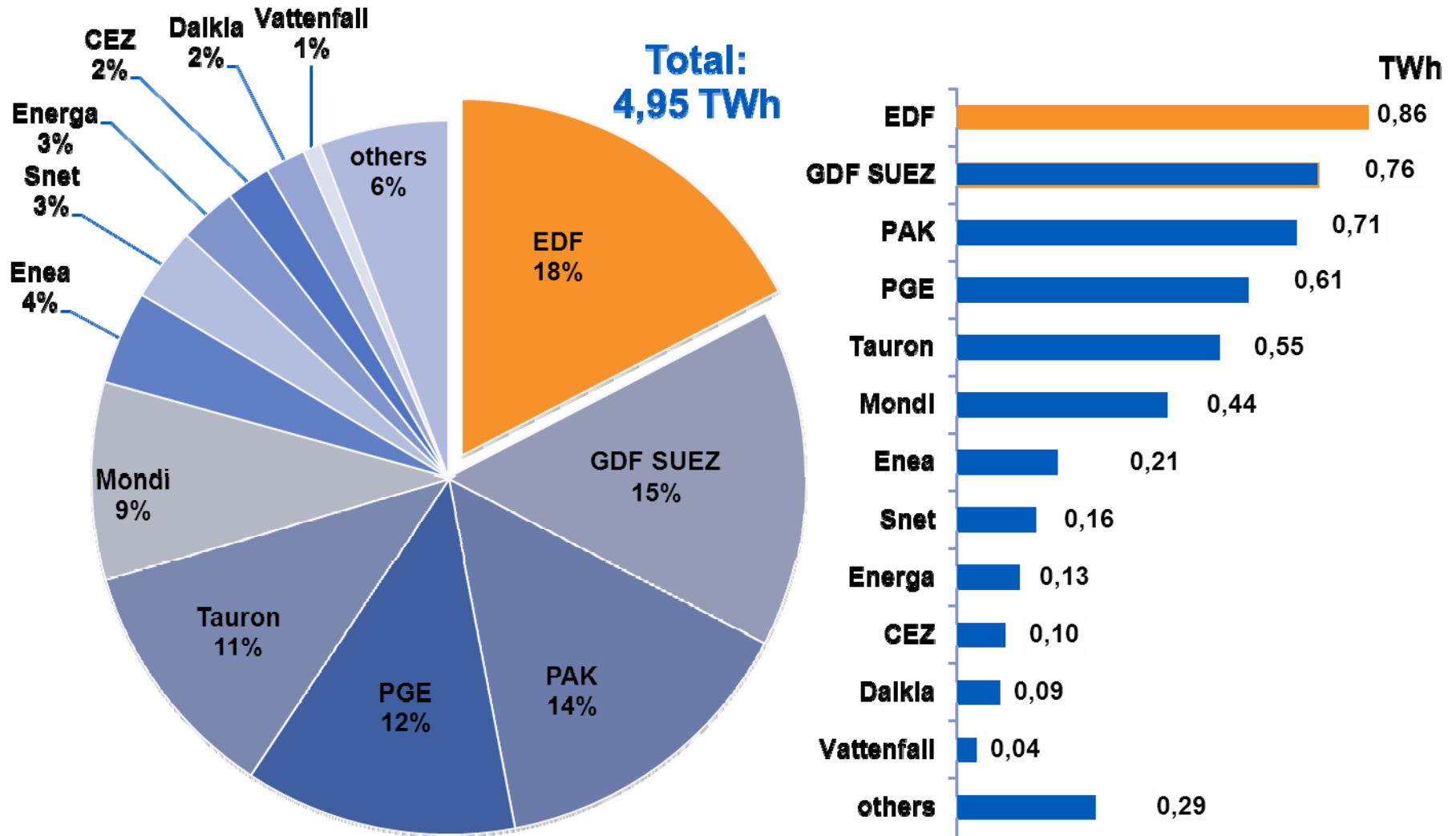
EDF Poland Group RES-E production figures



In 2010 avoided CO₂ emission would reach approximately 1.3 million T/a

Biomass RES-E market in Poland

EDF vs. competitors in 2009



Biomass utilization

Three-steps approach

- ▶ Co-combustion in the existing boilers
Biomass feeding through the existing coal lines
 - Biomass share up to 10-12% by weight
 - EDF - already applied in ERSA, ECW, ECK, KOG WRO

- ▶ Co-combustion in the existing boilers
Biomass direct injection to the combustion chambers
 - Biomass share up to 45% by weight
 - EDF - already applied in ERSA, KOG WRO, ECK

- ▶ Dedicated biomass solutions
 - EDF - 100% biomass boiler applied in KOG CZE (120 kt/a)

Biomass utilization

Further opportunities for EDF Poland

- ▶ Co-combustion in the existing boilers
Biomass feeding through the existing coal lines
 - Minor

- ▶ Co-combustion in the existing boilers
Biomass direct injection to the combustion chambers
 - ECK – increase of biomass consumption by 130 kt/a
 - ERSA – increase of biomass consumption by 200 kt/a

- ▶ Dedicated biomass solutions
 - 900MWe in Rybnik 10% biomass – increase of biomass consumption by 400 kt/a
 - CERGIA 100% biomass - increase of biomass consumption by 175 kt/a
 - Czechnica 30% biomass - increase of biomass consumption by 210 kt/a
 - Tarnobrzeg 100% biomass - increase of biomass consumption by 175 kt/a
 - ECW Gdynia 100% biomass - increase of biomass consumption by 215 kt/a

EDF Poland Group

Performance of biomass related investments

	As of 2010	Considered potential investments
Biomass used	900 kT/a	1.500 kT/a
RES-E produced	1,3 TWh/a	2,4 TWh/a
Avoided CO ₂ emission	1,3 million T/a	2,2 million T/a

RES-E sustainability challenges

- ▶ Stable, long-term defined regulations concerning biomass definition, required agro-forest biomass mix and validity period for RES incentives would further enhance investments in biomass based solutions.
- ▶ Predictability of the RES incentives validity period will cause an increase of development of the renewable projects and decrease of the required price for green certificates to justify the investment.
- ▶ Biomass based generation is competitive to wind based generation:
 - due to the independency from the weather conditions, thus ensuring full regulation of energy generation
 - due to the possibility of providing combined electricity and district heating generation
 - economically competitive source of RES-E



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