

Renewable sources of energy in Poland

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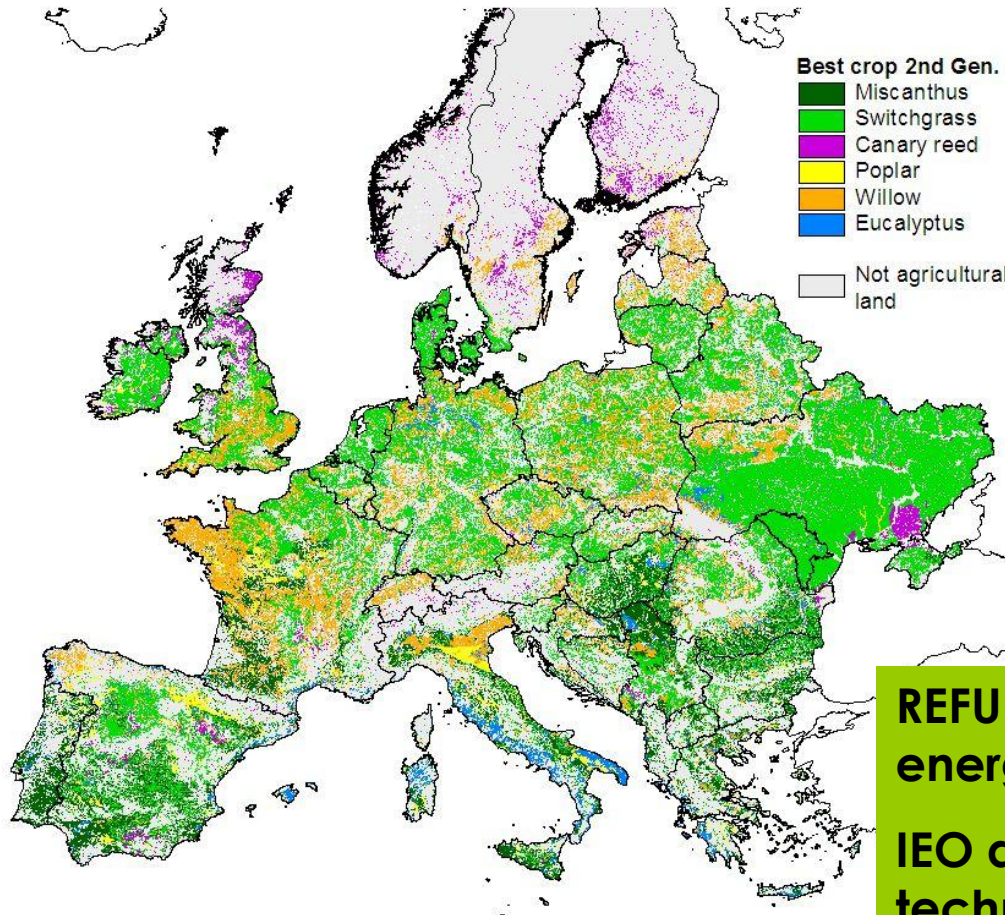
Institute for Renewable Energy

2020 RES potential for Poland: resources&use

Renewable energy resource potential	Theoretical potential	Gross technical potential	Actual technical potential	Actual economic potential-final energy	Market potential 2020
Types of renewable energy resources	[E]	[T]	[T]	[T]	[T]
Solar energy, including:	1 123	27 187 920	761 262	83 312	19 422
thermal, of which:				83 153	19 263
domestic hot water supply				36 492	14 597
district heating				46 661	4 666
photovoltaics				159	159
Geothermal energy, including:	387 000	3 870 000	348 300	12 367	12 217
deep				4 200	4 050
shallow				8 167	8 167
Biomass, including:	11	2 709 493	929 564	600 167	409 700
dry solid waste		237 044	237 044	165 930	74 669
biogas (wet waste)		178 422	178 422	123 066	72 609
firewood (forests)		34 931	34 931	24 452	24 452
energy crops, of which:	11	2 259 096	479 167	286 719	237 970
cellulose			208 000	145 600	116 480
sugar- and starch-bio-ethanol			81 027	21 501	14 406
canola-biodiesel			73 514	37 980	25 447
corn silage-biogas			116 626	81 638	81 638
Hydro energy		30 600	17 974	17 974	11 144
Wind energy, including:	9	8 724 876	2 582 355	444 648	119 913
on shore		7 376 775	2 514 950	377 242	113 173
off shore		1 348 101	67 405	67 405	6 740
Total	388 143	42 522 889	4 639 455	1 158 469	572 397

In 2010 the market potential '2020 was used in 18,5% only; dry wood & waste in 100%

Energy crops potential in Europe Poland as a „biomass country”?



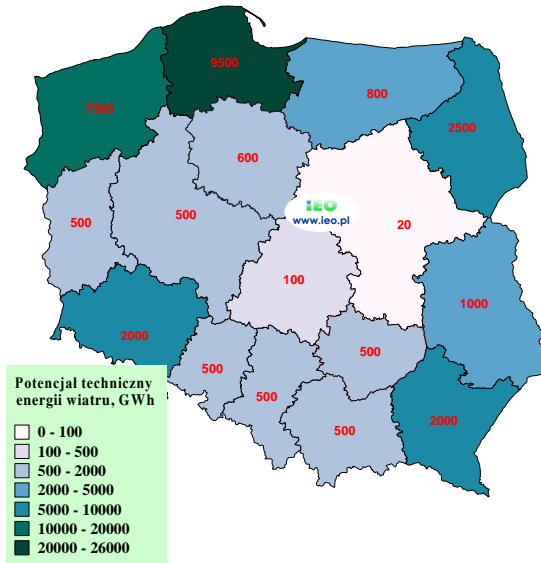
- sustainability (growth of intensity of agriculture), monocultures
- food supply security (landuse competitiveness)
- unknown risks of large scale development of plantations
- current incentives not attractive enough, especially for lignocelulose biomass

REFUEL – 11 Mio ha available for energy crops

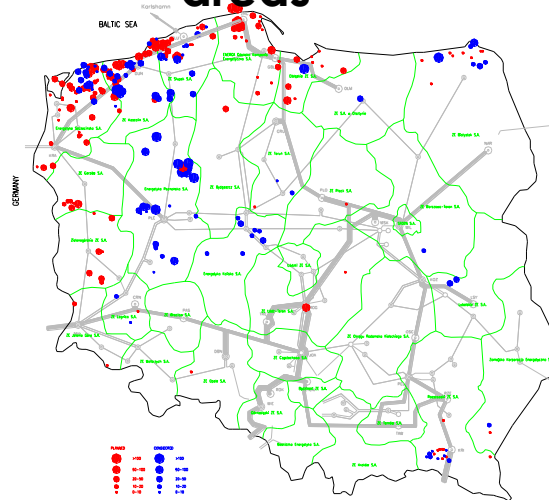
IEO assumptions, 2007 – real technical potential available for sustainable use – 3,3 Mio ha; after cancellation of support to energy crops potential reduced to minimum level

Technical potential limitations – case study wind energy

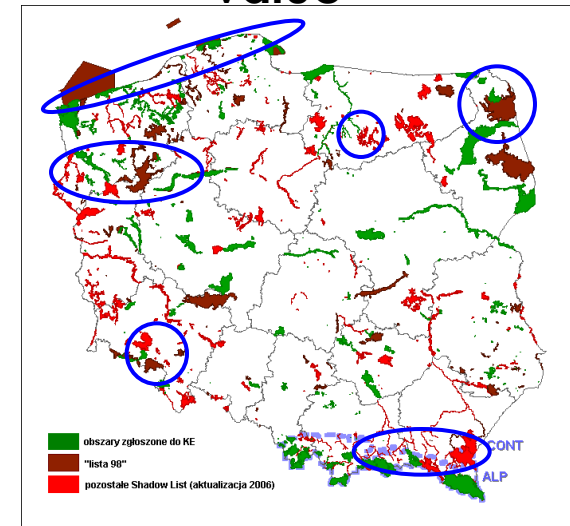
Diversified
distribution of
potential on
country area



Investment
activities not
uniform –
challenge for
grid on specific
areas

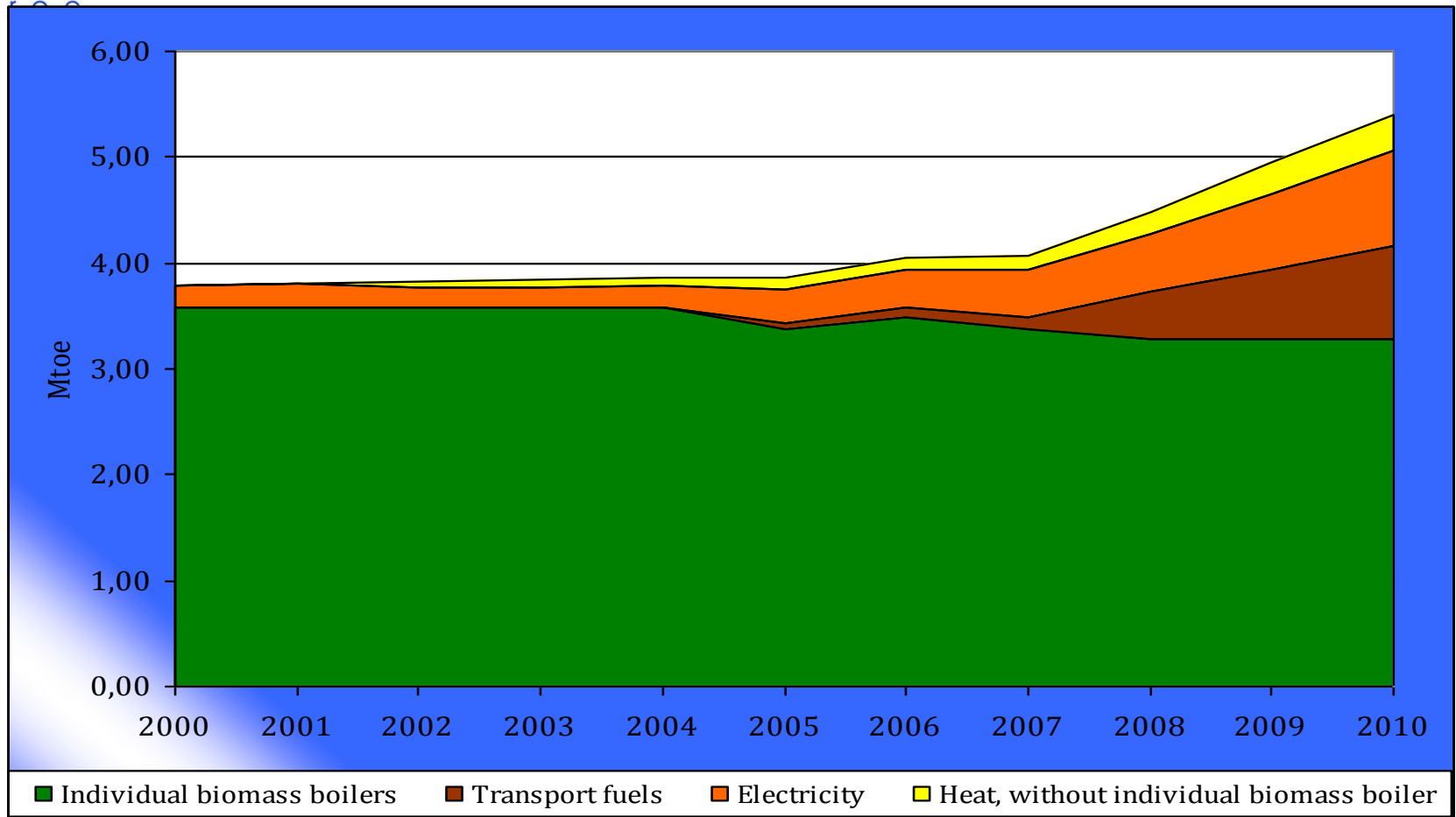


Potential
concentrated
on areas of
highest
environmental
value



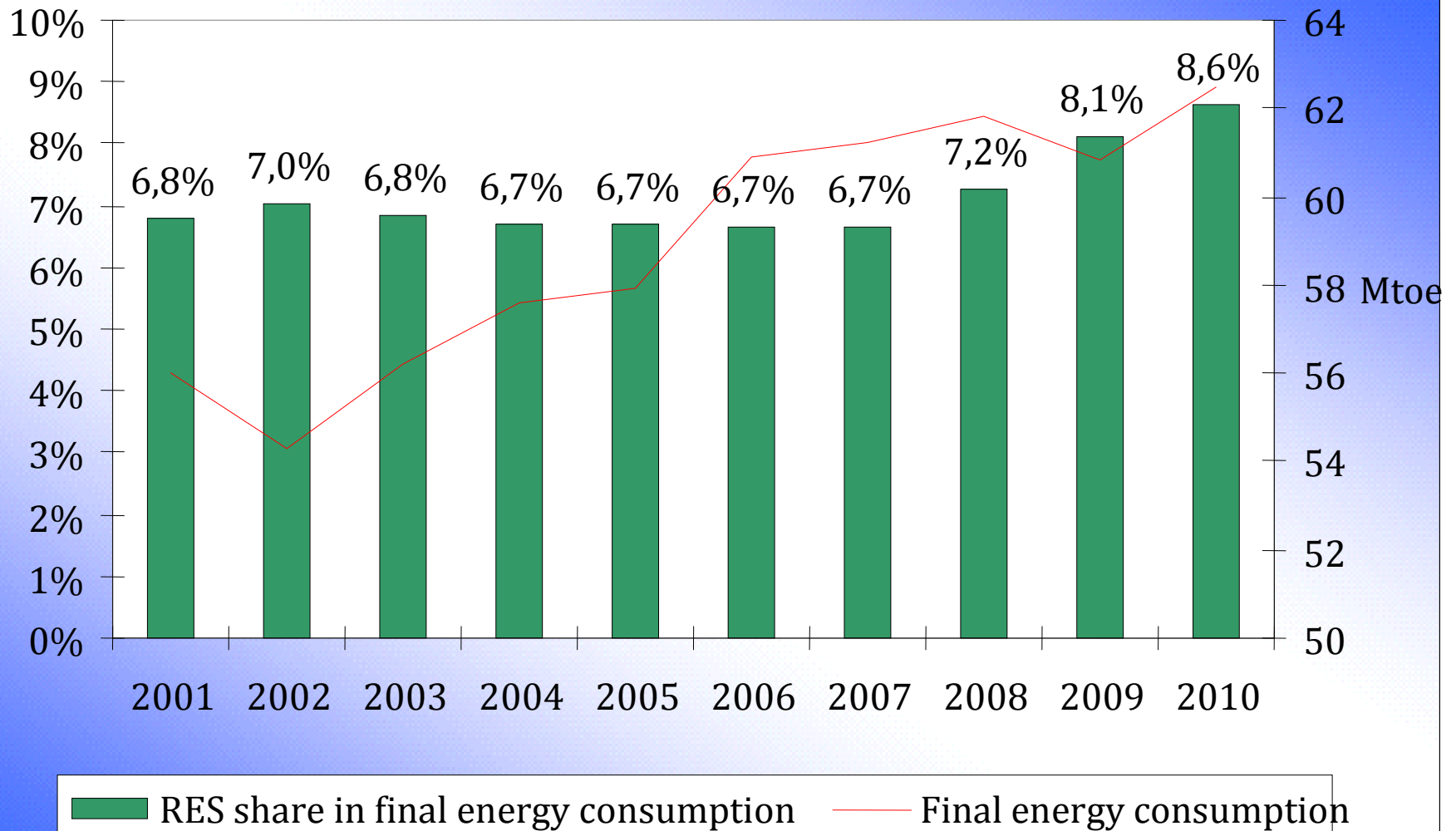
Overlapping of NATURA 2000 with areas of highest potential and concentration of investment activities

Structure of final renewable energy consumption in Poland in 2000-2010

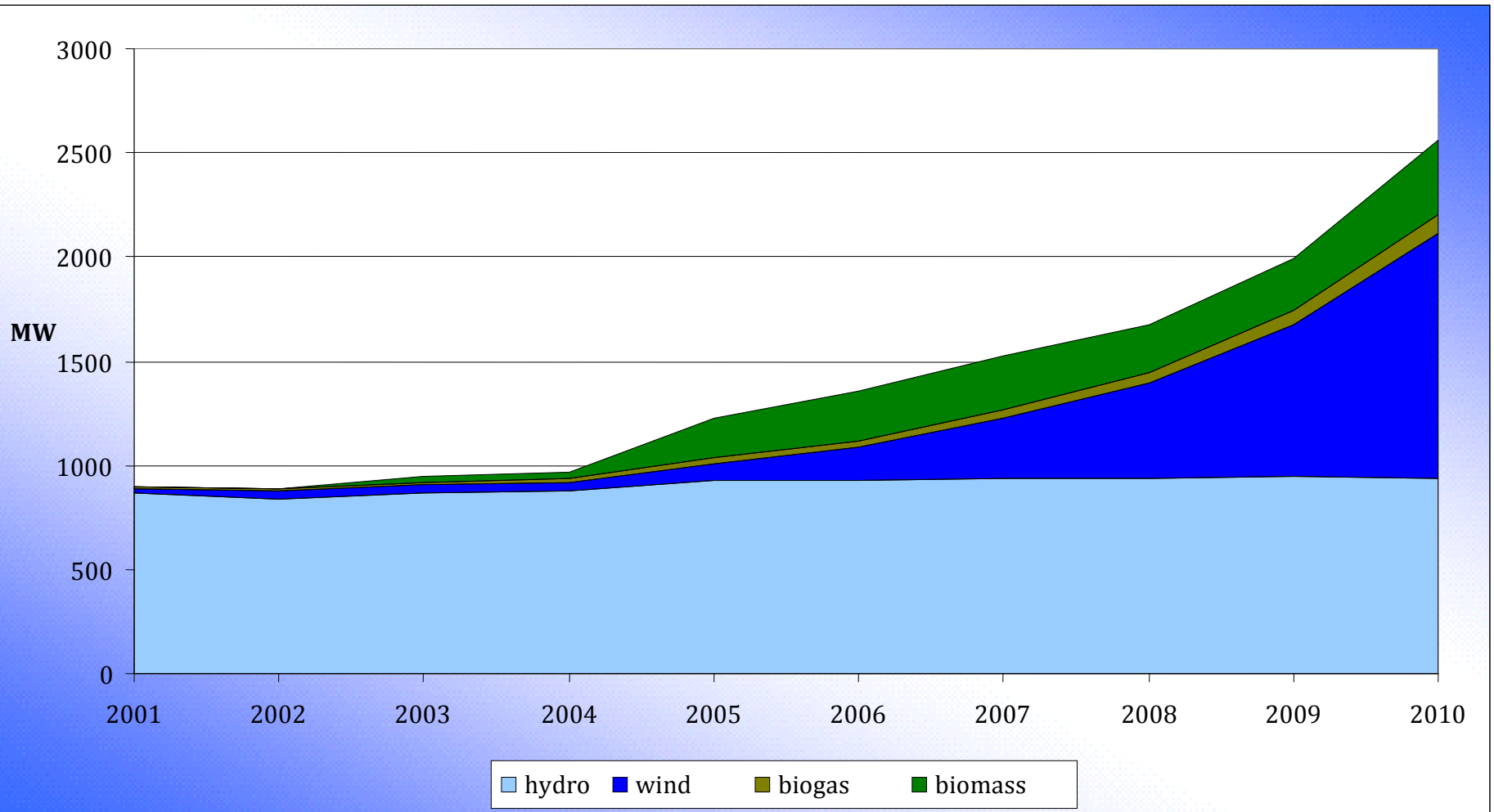


RES development after joining the EU -**2004** - was shaped due to the implementation of the EU green electricity and biofuels directives; no green heat directive;

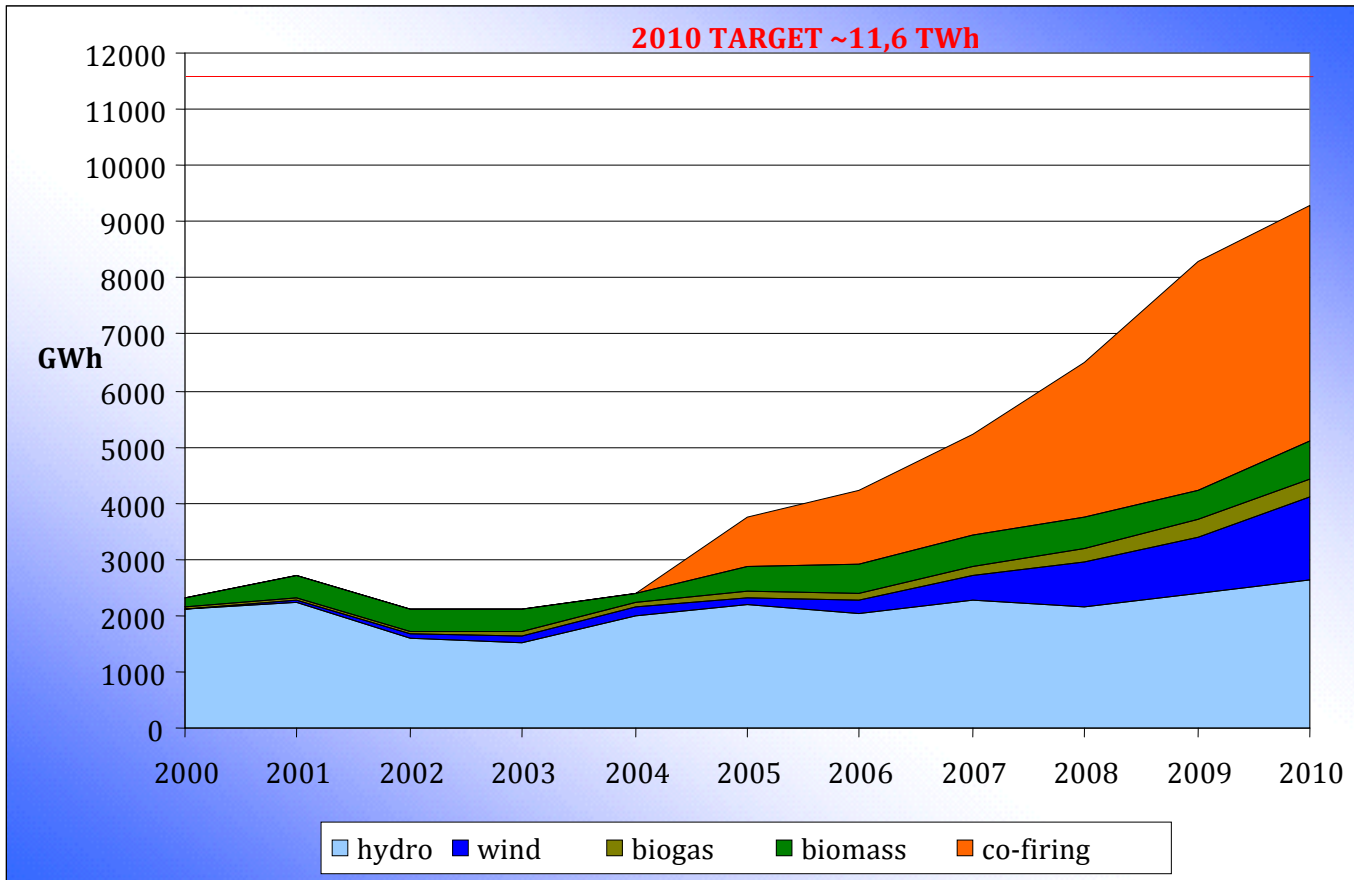
- Main support for green electricity; quotas + green certificates (total income \approx €100/MWh)
- Main support for biofuels: quota obligation and excise tax exemption
- Green heat supported by national environmental funds and the EU funds



RES-E capacity installed in Poland, 2001-2010

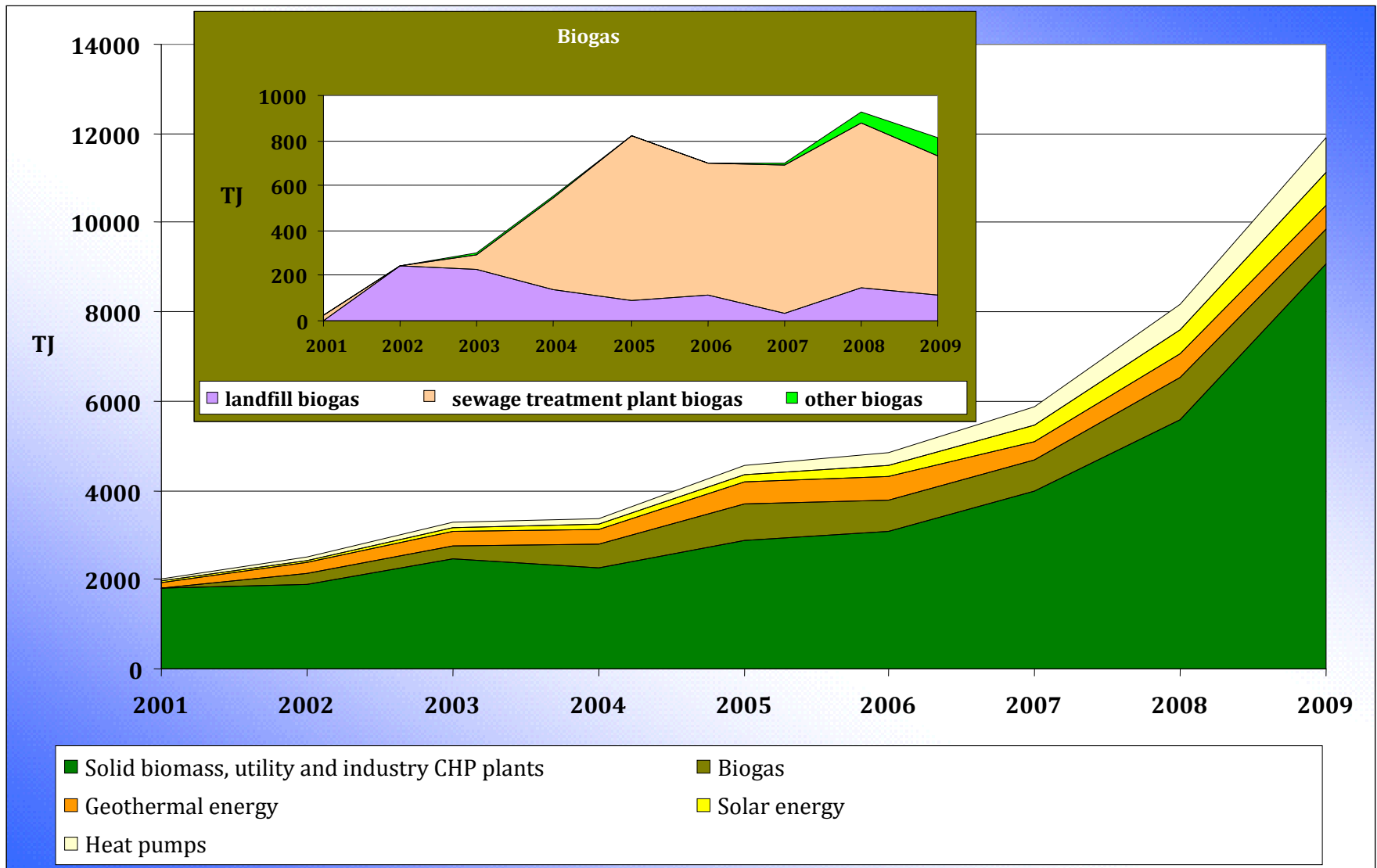


Electricity generation from RES in Poland, 2001-2010

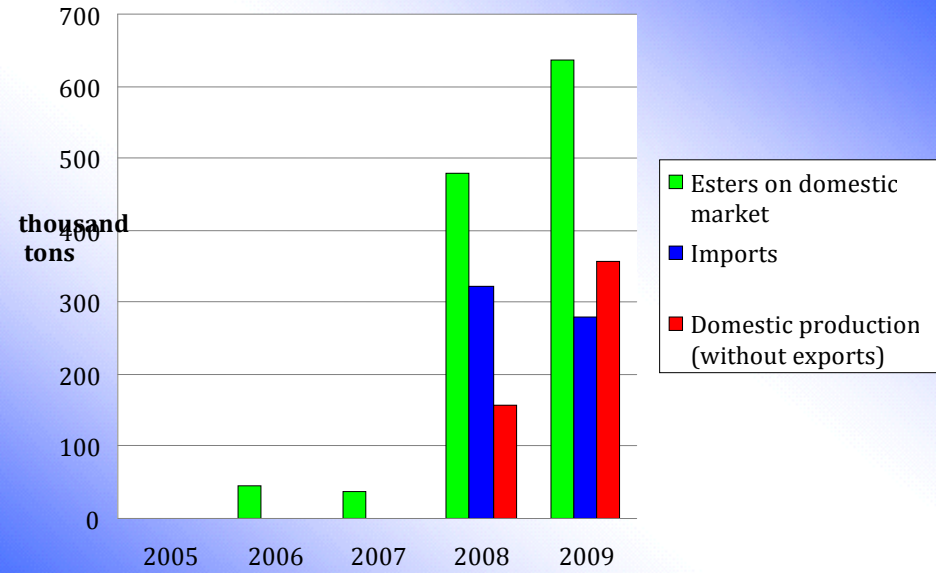
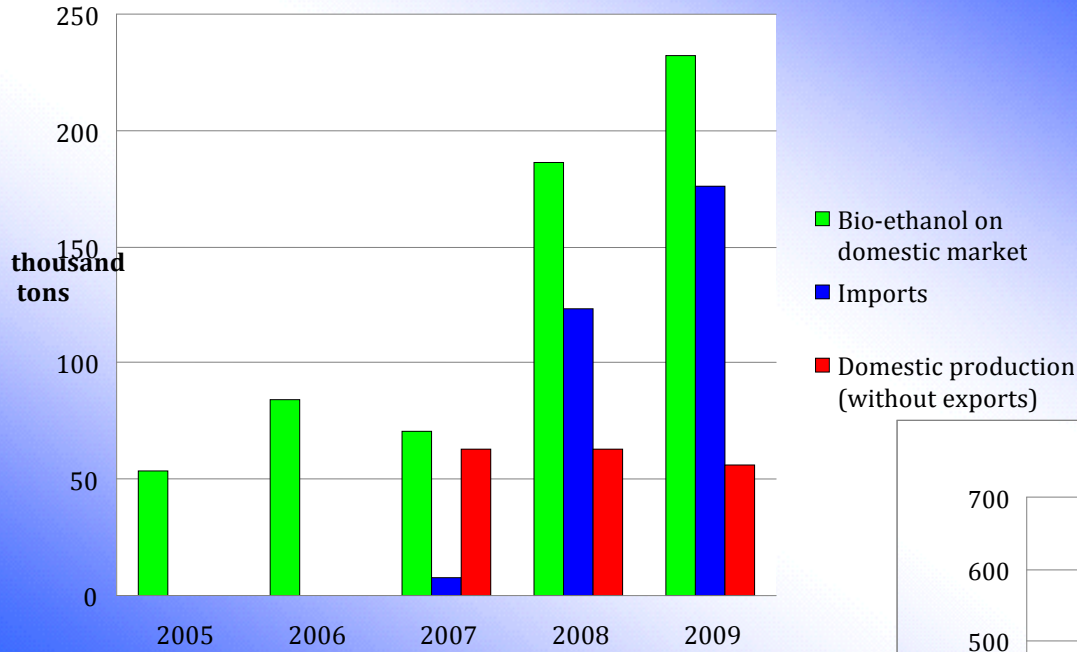


➡ biomass co-firing with the fine coal in power plants dominating the green electricity mix (45%)

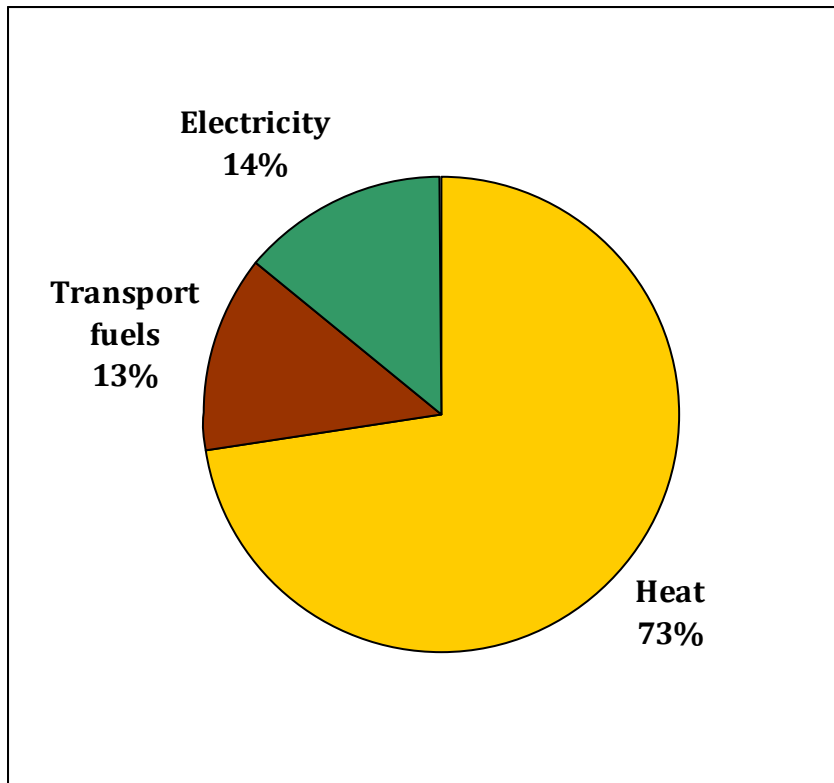
Renewable heat production, 2001-2009, according to GUS+solar thermal IEO; 2009 IEO estimate



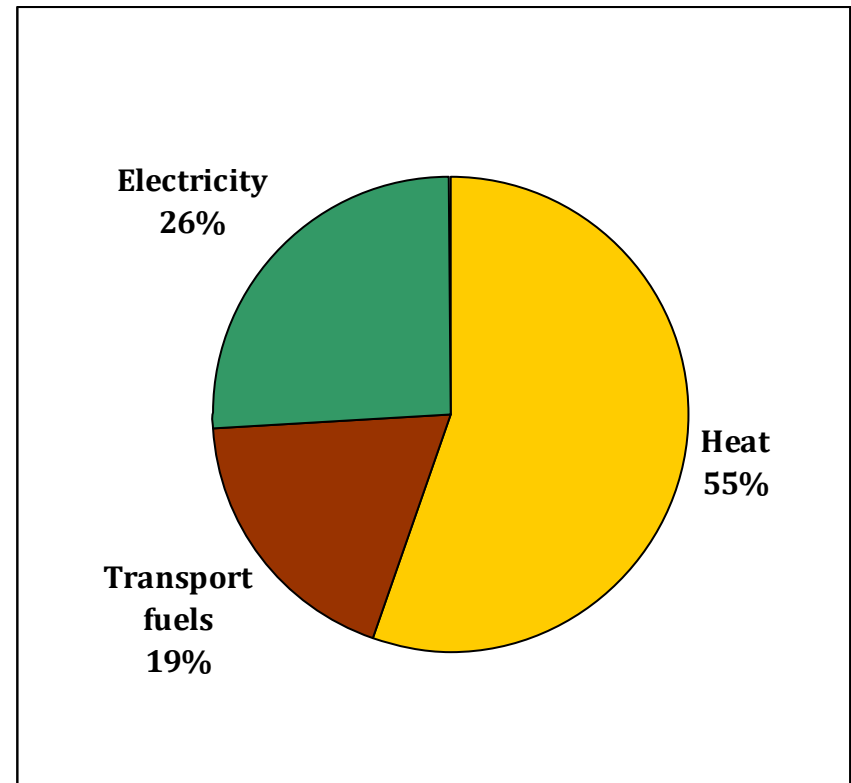
Bio-ethanol & biodiesel market, 2005-2009



Structure of generation of final RES energy in 2010 and 2020 (NREAP)



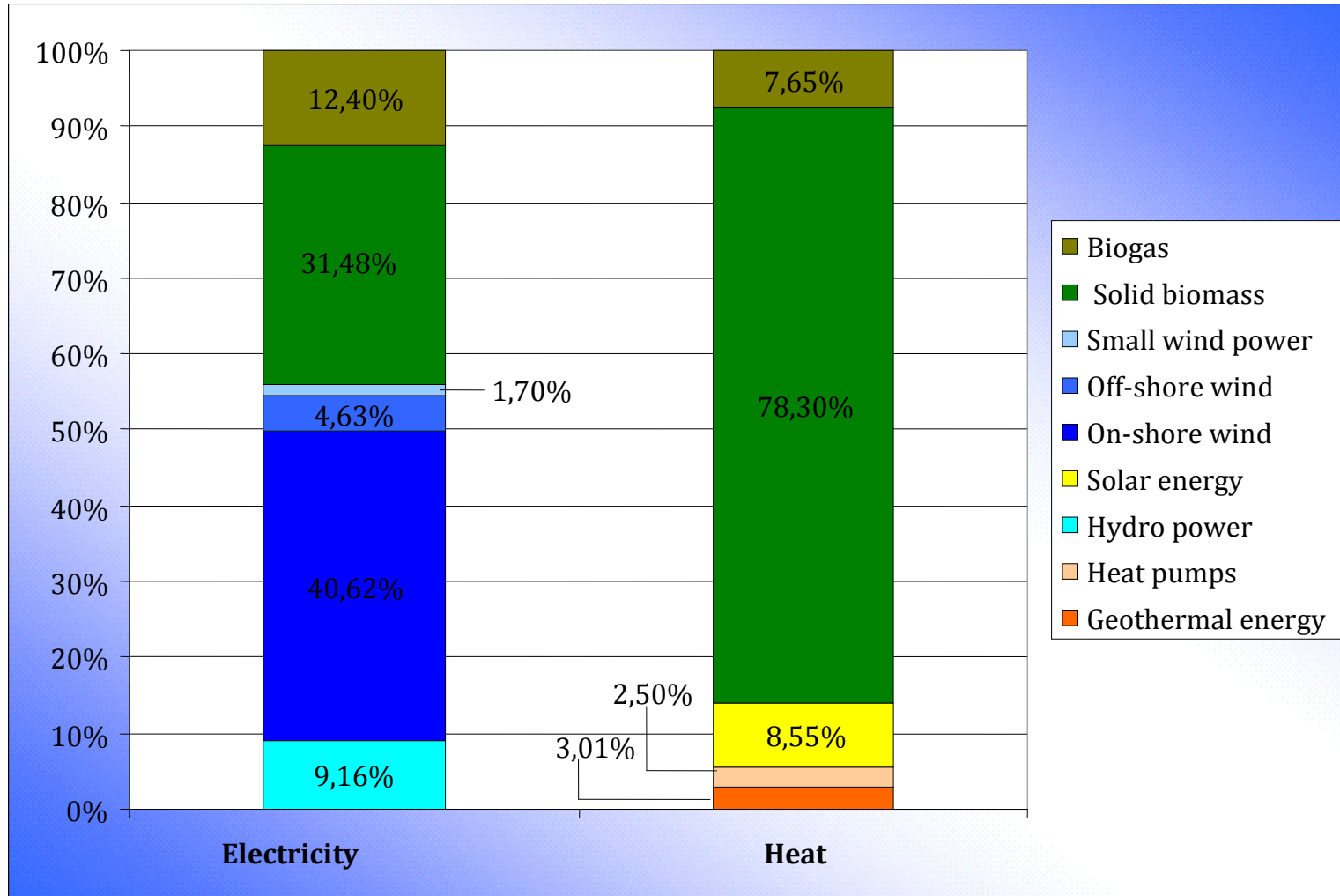
2009



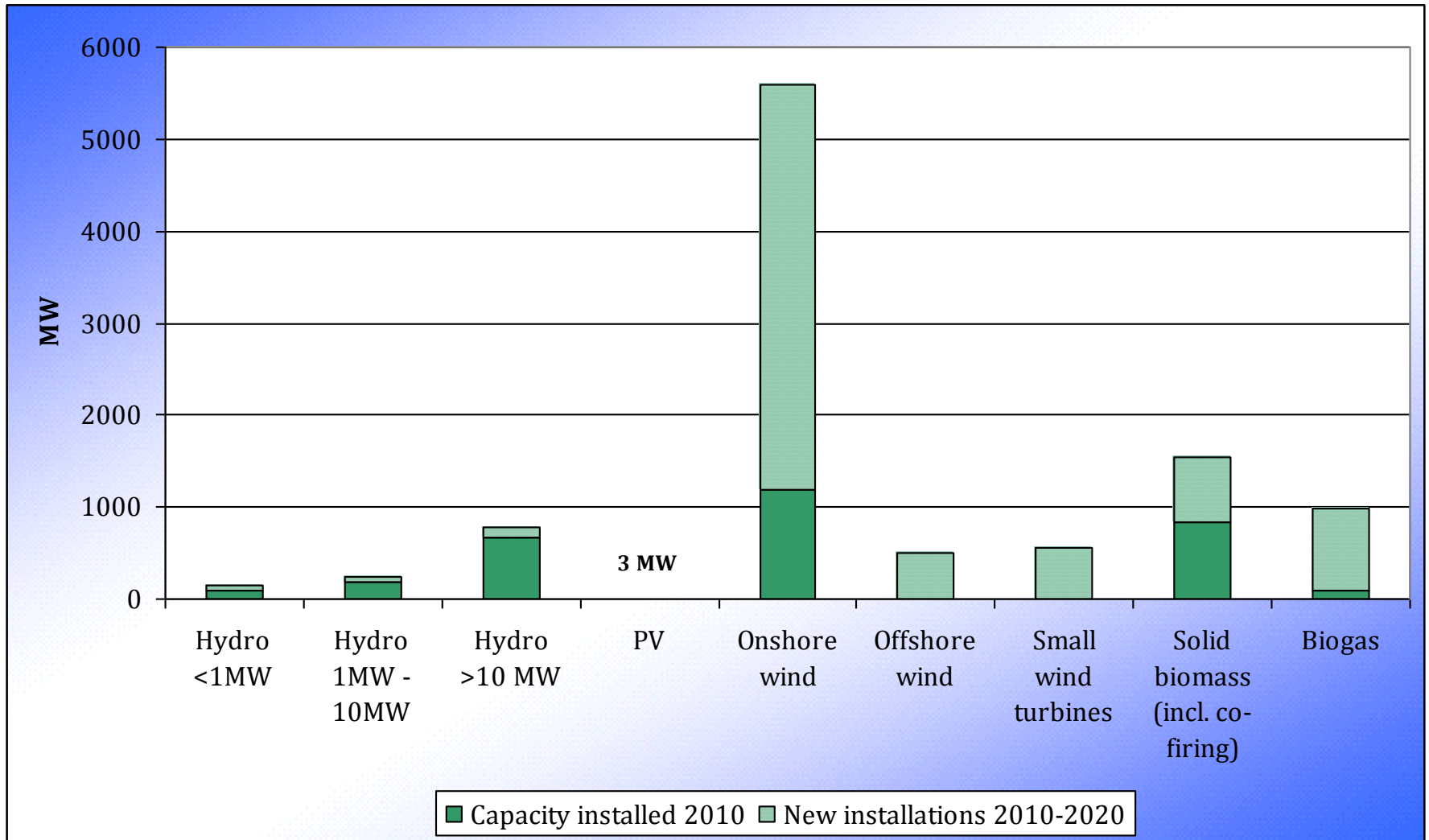
2020

Structure of electricity and heat generation from RES in 2020, according to National Renewable Energy Action Plan (NREP)

new technology options: biogas, solar collectors, heat pumps, small wind and offshore wind (large scale)



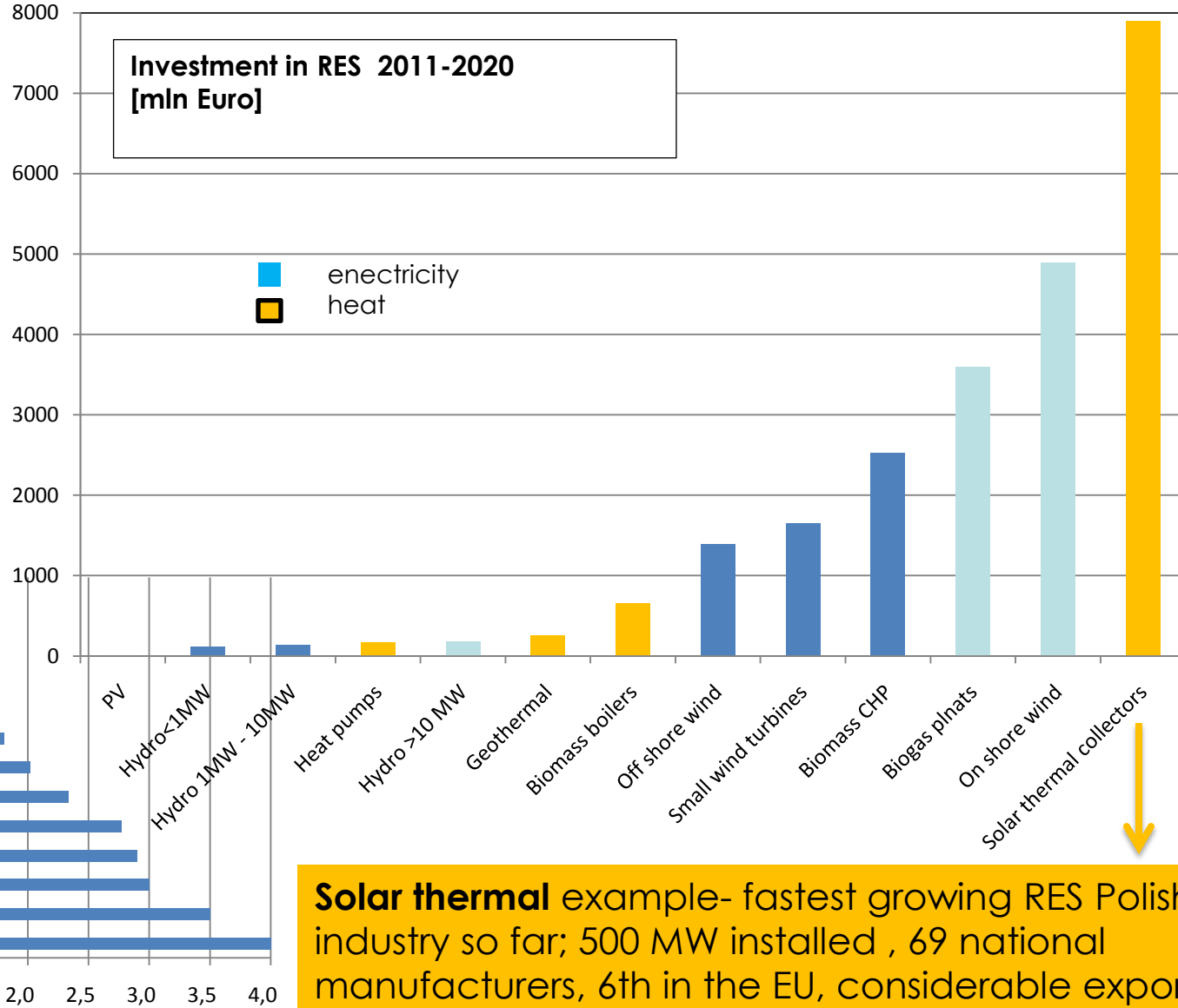
Electric power installed capacity according to NREAP, until 2020



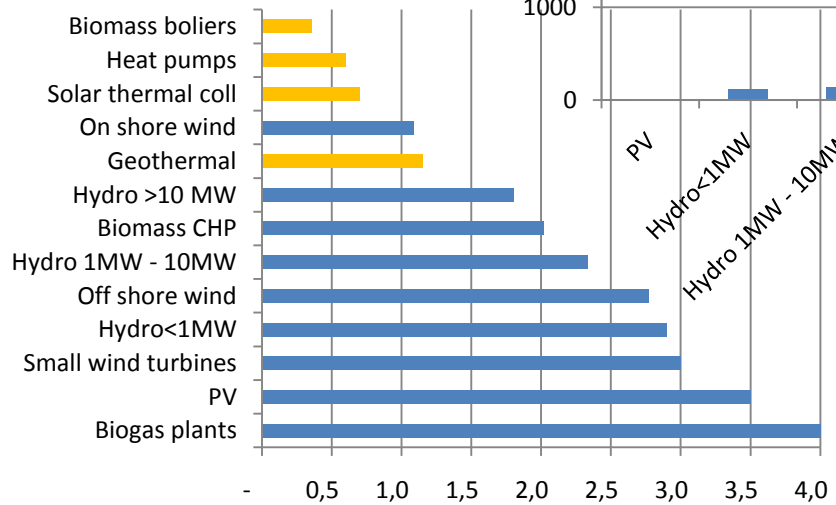
Green investment in Poland by 2020

Source: Polish National Renewable Action Plan up to 2020
(NREAP'2010, IEO assessment '2011)

Euro 26 bln for smart investment
≠ „just cost”

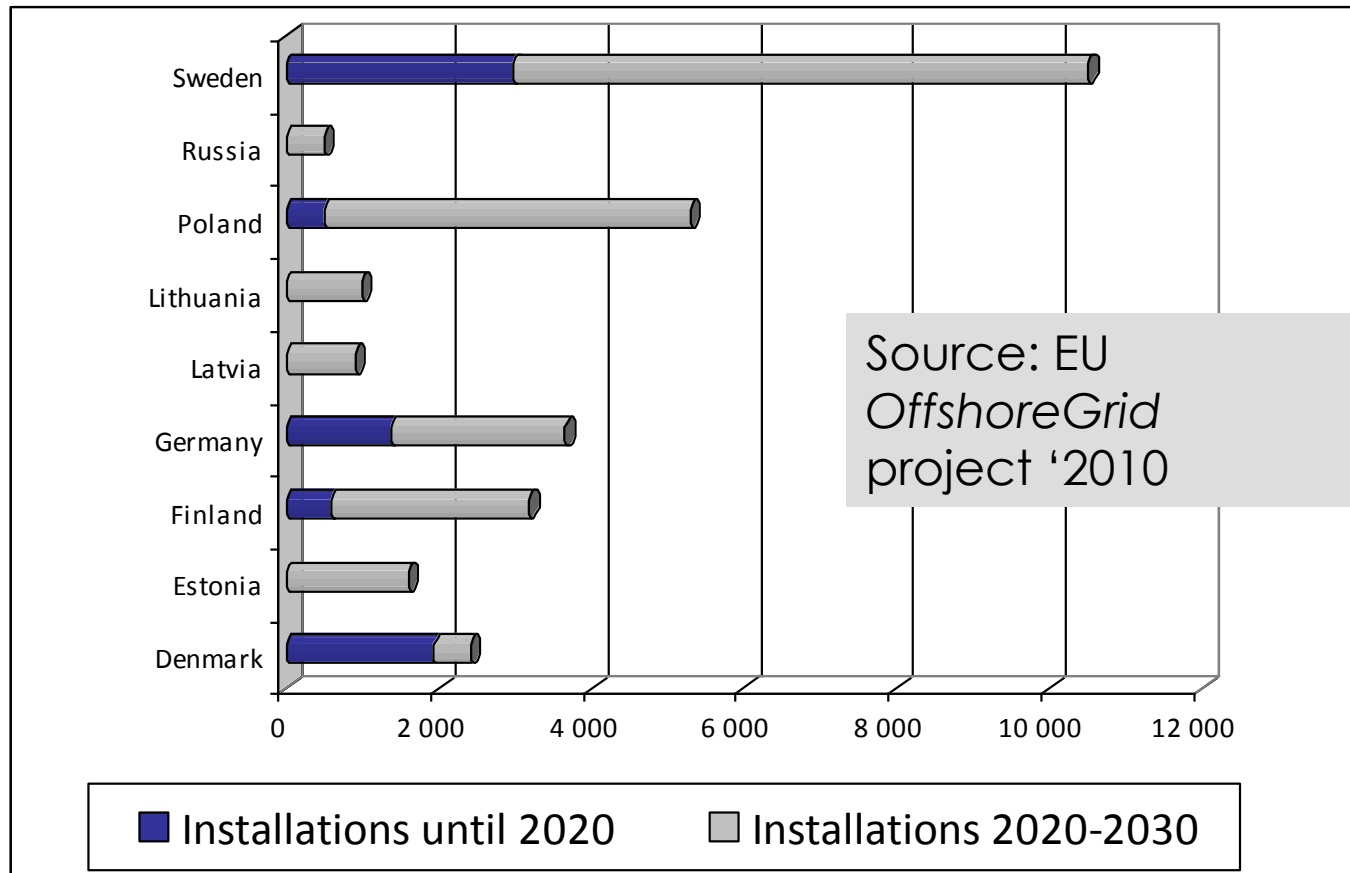


RES specific investment cost [mln Euro/MW]



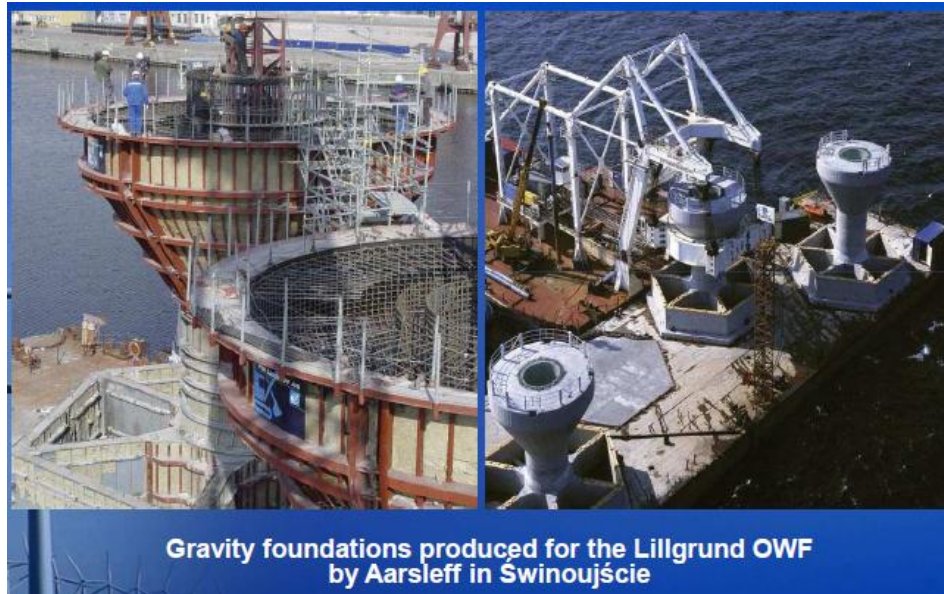
Solar thermal example- fastest growing RES Polish industry so far; 500 MW installed, 69 national manufacturers, 6th in the EU, considerable export

Example of new RES technology opportunity for Poland offshore wind energy on Baltic Sea: 2020&2030

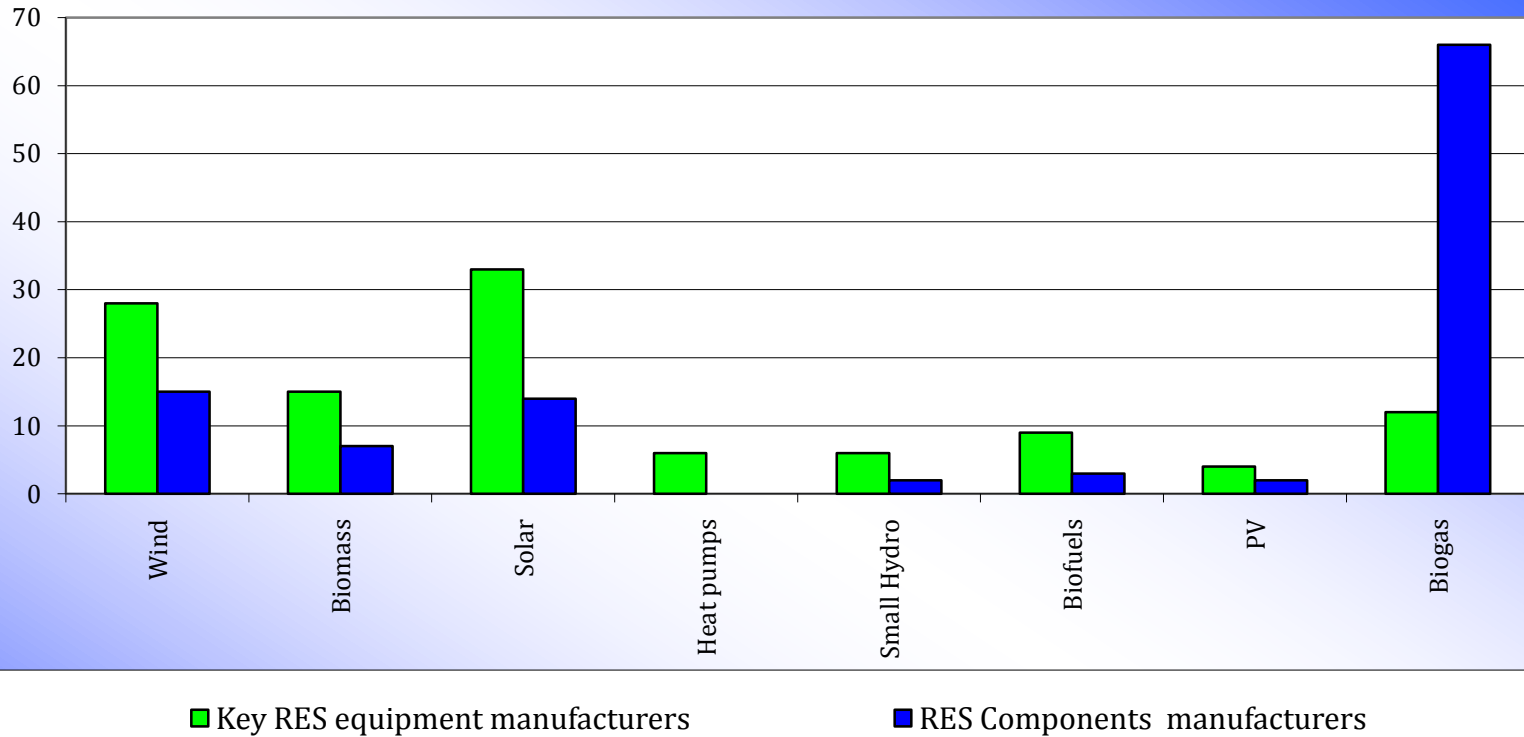


- Poland can be the offshore wind Baltic leader by 2030 (over 5 GW), with the overall potential up to 20 GW
- Opportunity for the Polish maritime and offshore industry

Equipment manufacturing – case offshore wind



National RES equipment manufacturers in Poland – a good starting point for RES technologies ‘2020?



Identified 250 fast growing , innovative national companies (mostly SMEs) , providing green technology for domestic market and exporting to all countries in the world (EU is the priority market, but the role East and African countries is growing)

Thank you for the attention!

More information:

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