Heat Roadmap Europe 2050

A low-carbon heating and cooling strategy

Poland's heating country profile: breaking down the context for recommendations

Cele strategiczne sektora ciepłownictwa w Polsce

George Stiff, ICLEI Europe

Centrum Zielna, Warszawa
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Energy context of Poland

Energy demand

- **Total final energy demand (FED)** *[1]*:

  724 TWh (**5.7% of EU28**)

  - ***6th highest*** *among 14 HRE target countries (and EU28)*
- **FED from renewables** *[2]* :

  85.3 TWh (11.8% of total FED)

  - *11th highest of 14HRE (**21st** of EU28)*
- **FED-H&C from renewables** *[2]*:

  57.5 TWh (14.3% of total H&C)

  - *10th highest of 14HRE (**20th** of EU28)*

***Heat Demand Density**, only for residential and service sectors, from Peta4 showing major population centres [HRE4, 2017]*

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1. Eurostat's 2015 data on annual energy quantities in Poland
2. Eurostat's RES Shares 2015 results

Climate and emissions

- Poland has committed to increase its GHG emissions by **no more than 14%** by 2020 as compared with 2005 levels [3]
  - 382 mil. tons CO_2-e (8.6% of EU28, ***5th highest***) [4]

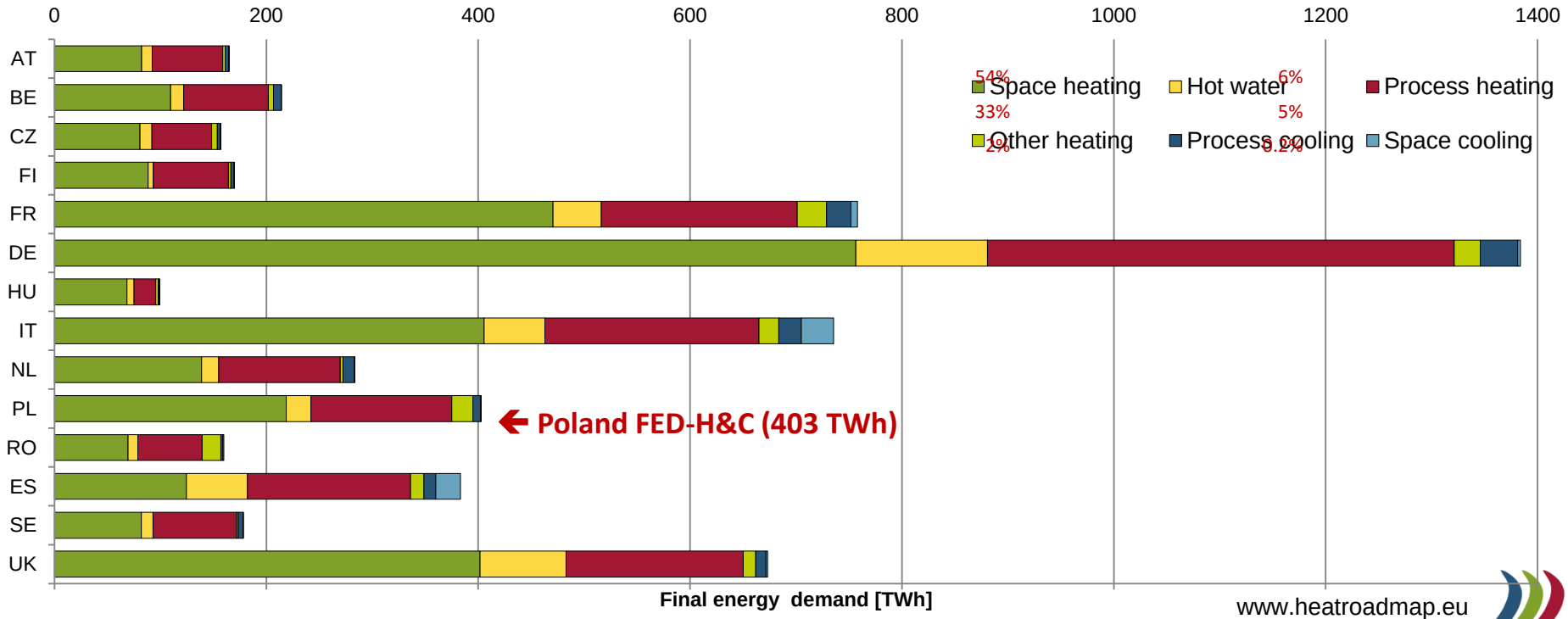
CO_2-e per capita [kg CO_2-e/person]	**CO_2-e per GDP** [tons CO_2-e/billion EUR]	**Carbon intensity (CO_2-e per ton of energy carrier)** [kg CO_2-e/toe]
8,221	775	3,314
6th highest among the 14 HRE	***The highest among the 14 HRE***	***The highest among the 14 HRE***
2014 data [4]		

3. Official Journal of the European Union, Decision No 406 (2009)
4. DG Energy's 2014 data from the Poland datasheet (2016)

Current national H&C situation

H&C in Poland and 14 HRE countries

- Among EU28 countries, Poland has the **5th highest** FED-H&C (403 TWh)
  - **56%** of Poland's total FED (724 TWh)
- As with most countries, Poland's H&C is dominated by **space and process heating**, and **little cooling demand** at the moment, but this is rising across the EU, probably also in Poland



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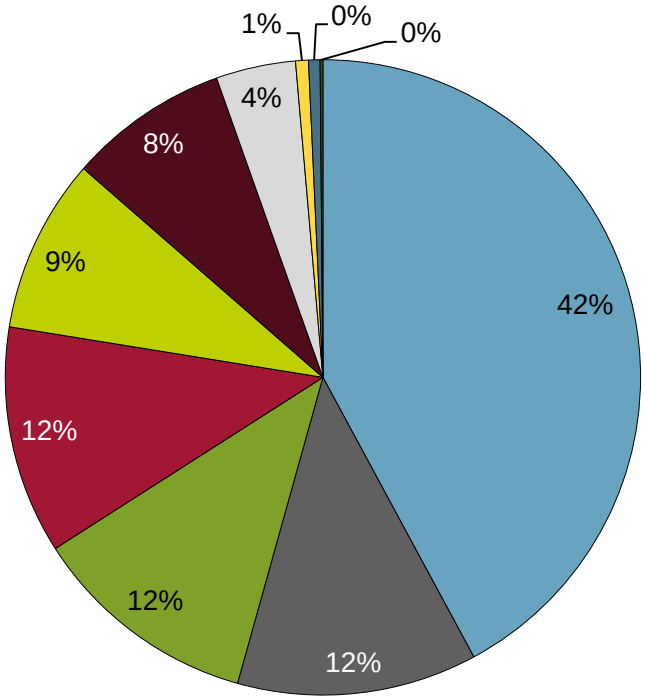
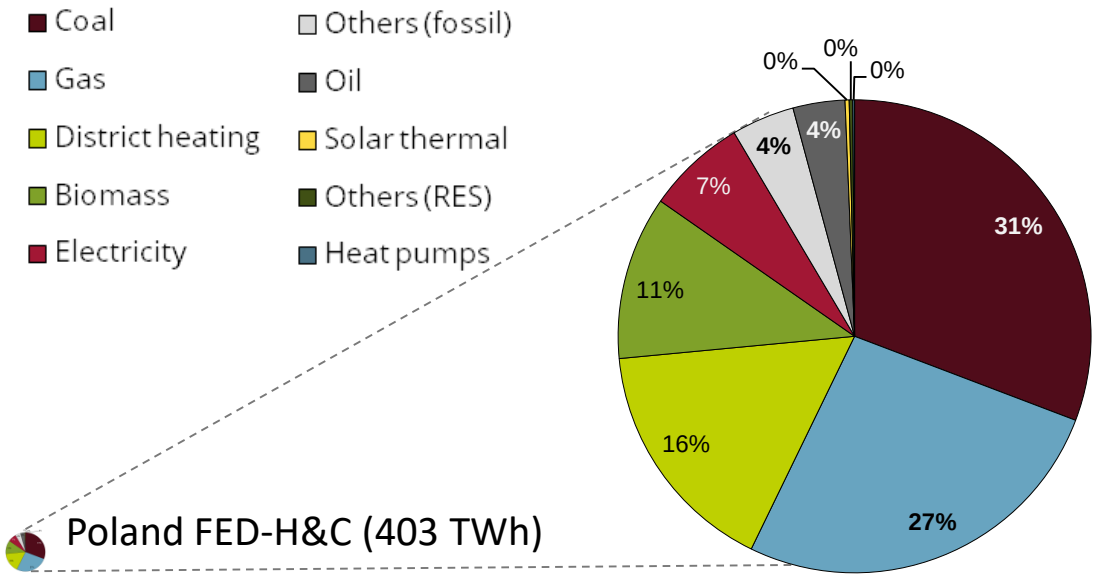
Polish H&C energy carriers

- Poland accounts for 6.3% of the EU28's total delivered H&C demand
- Compared to the EU28, it uses **less gas and oil**, but almost **4x more coal**, and **more DH**

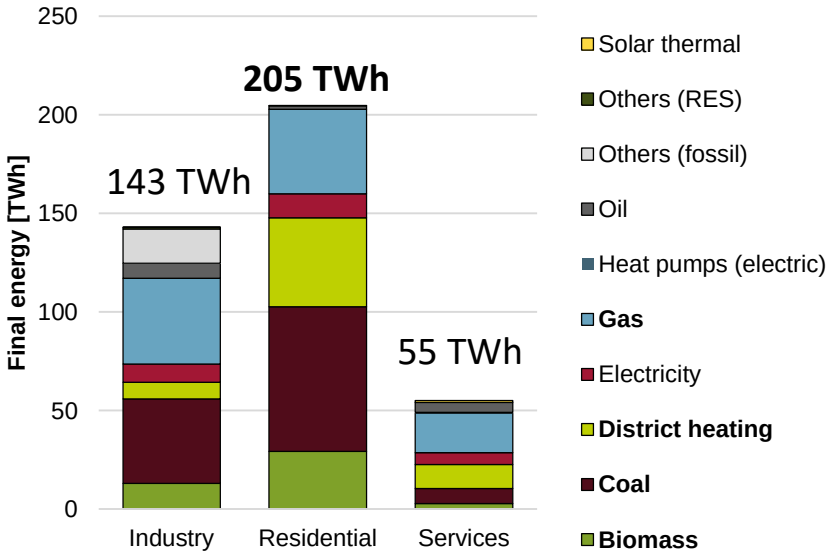


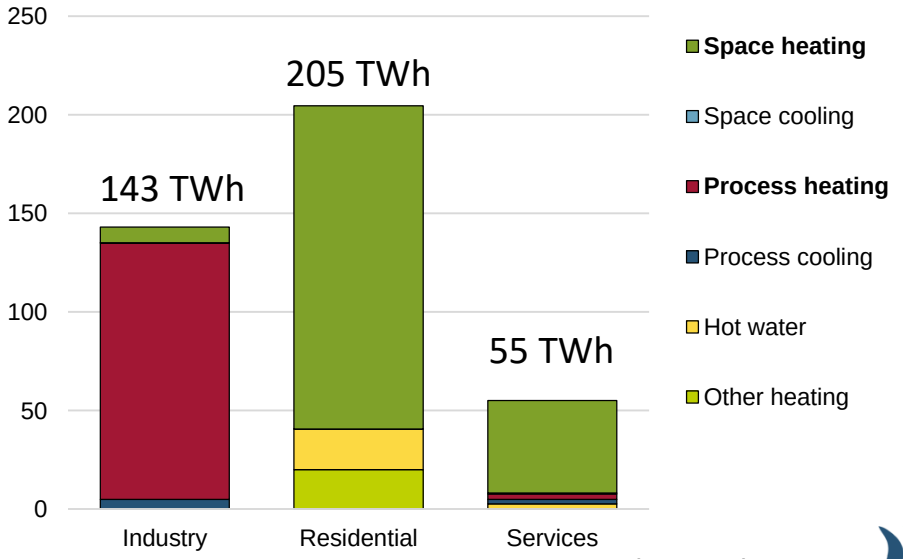
EU28 FED-H&C (6352 TWh)



H&C breakdown among sectors

- All sectors rely (too) much on fossil fuels for H&C, especially **coal** and **gas**
  - while the **residential** sector (**largest demand**) also relies significantly on **district heating** and **biomass**
- Polish **industries** are overwhelmingly dominated by **process heating**, other sectors by **space heating**





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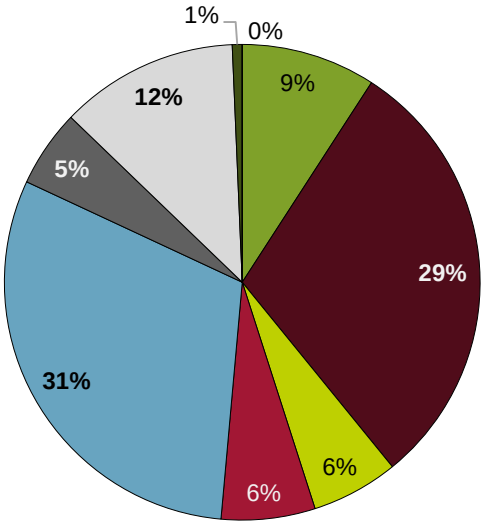
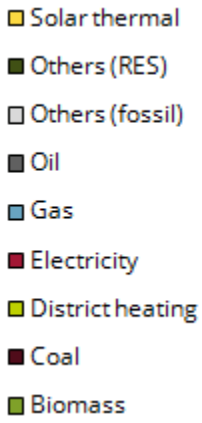
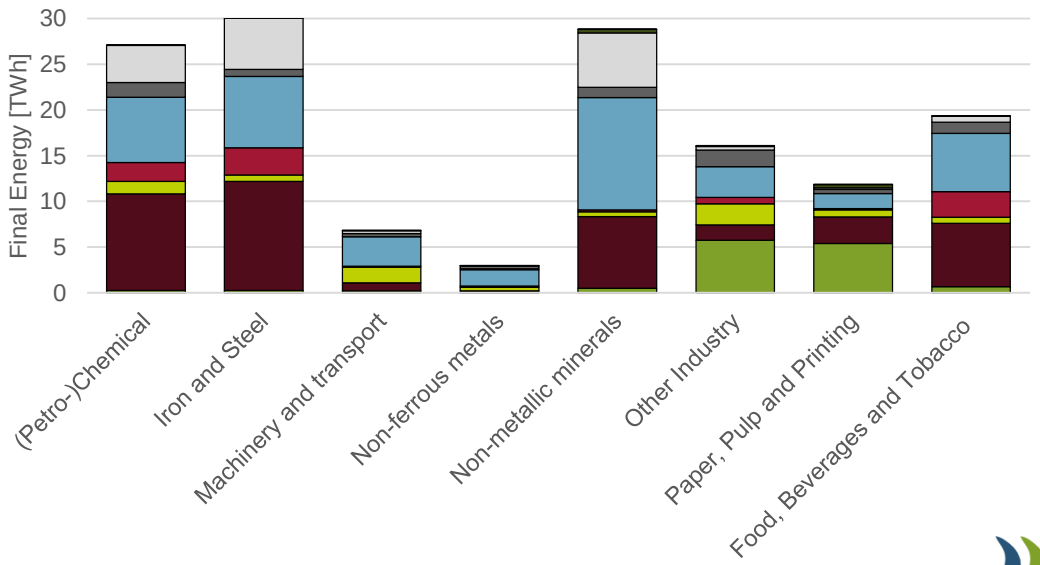
Industrial H&C in Poland

- Industry relies **77%** on **fossil fuels**, mainly (64%) for high temp. (>200°)
- The **metals**, **non-metallic minerals**, (petro-)**chemicals** and **food/ beverages/tobacco** industries rely (too) much on coal and gas
  - *Why does the **Food** industry rely so much on fossil fuels, if it's mainly making use of **low-temperature** processes?*
  - *Which more **sustainable alternatives** could **decarbonise** Polish industries, make them operate more **energy-efficiently** and **reduce waste**?*



Polish industry
(205 TWh)





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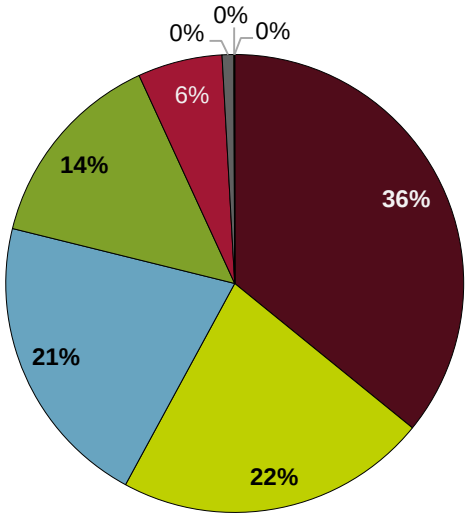
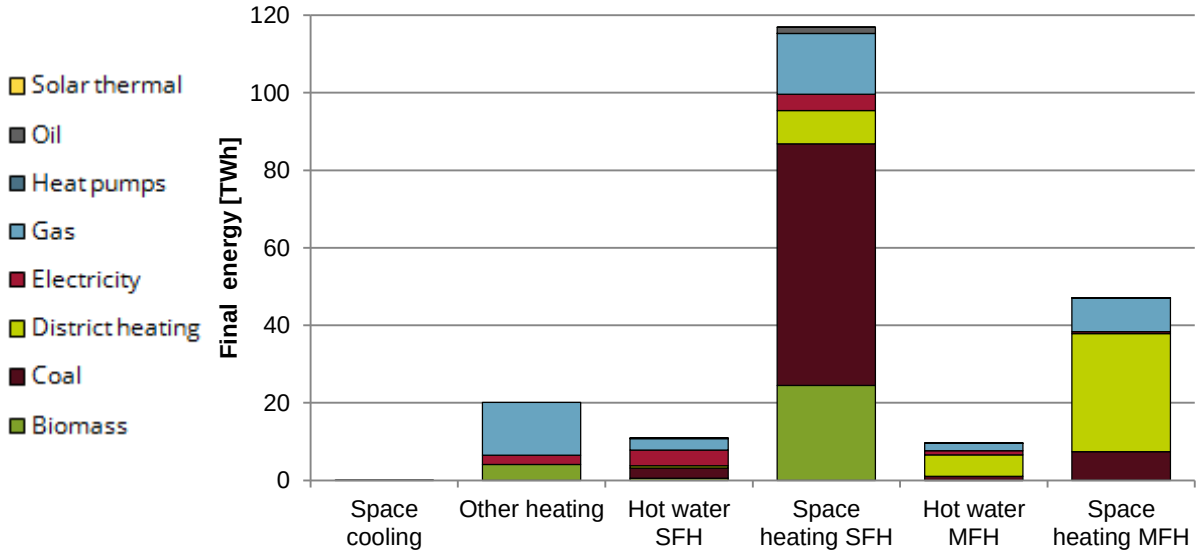
Residential H&C in Poland

- Polish households use mostly (**57%**) fossil fuels (**coal** and **gas**) for H&C but there is also a significant use of **district heating** and **biomass**
- **Space heating** dominates (80%), especially **single-family homes** (SFHs)
  - **Multi-family homes** (MFHs) are the primary market for **district heating**
  - *What other options could be found to **decarbonise**, especially in (**decentralised**) SFHs?*

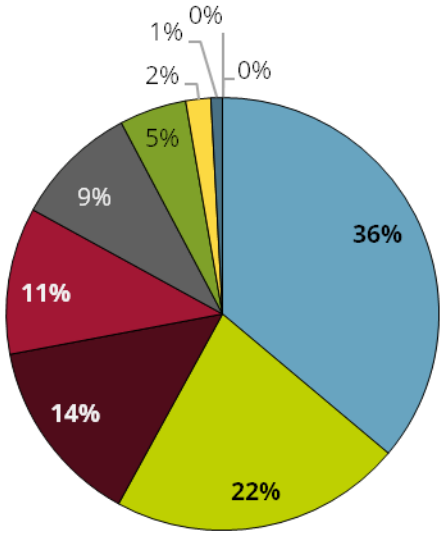


Polish households
(205 TWh)

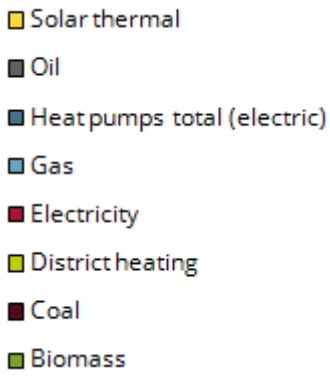


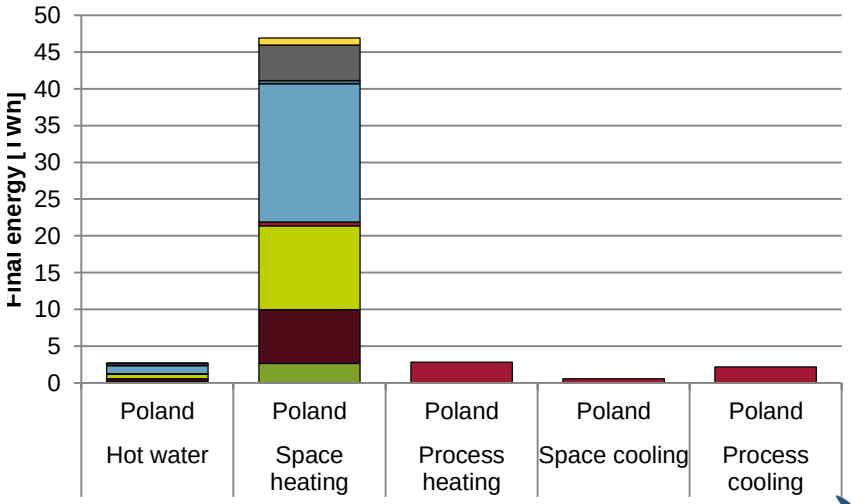
Services' H&C in Poland

- **Space heating** also dominates (**85%**) Poland's service sector
  - For **cooling** , only **wholesale/retail**, and some hotels, etc.
- Poland's service sector relies mostly on **gas** and **district heating**, with significant use of **coal** and **electricity**, too
  - All **cooling** and process heating exclusively powered by **electricity**
  - *Might there be a **better way** to deal with the service sector's H&C needs?*



Polish services
(55 TWh)





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EU‘s H&C challenges valid in Poland?

Please *raise your hand*(*s*) if you think this applies to Poland:

1. Over-reliance on **fossil fuels**
2. Lack of **renewable** inputs
3. Too much **wasted heat**
4. Insufficient and/or unsustainable **district systems**
5. Inefficient **H&C systems** (supply-side management)
6. Inefficient **buildings** (demand-side)
7. Inadequate access to **tools and data** for strategies
8. Weak and/or counterproductive **policy** framework

Steps forward for Poland

1. Phase out fossil fuels!

- Remove **fossil fuel subsidies**, direct and indirect
- Fewer fossil fuels lead directly to **lower CO_2-e**, like the newer CoM-EU targets for 2030 [5]:
  - **40%** less CO_2-e
  - **27%*** more RES
  - **30%*** more efficiency

Signatories	Population	Commitments	Status
Bestwina, PL	10,315	2020	
Bielawa, PL	33,000	2020	
Bielsko-Biala, PL	178,000	2020	
Bydgoszcz, PL	363,020	2020	
Chorzele, PL	2,783	2020	
Częstochowa, PL	235,798	2020	
Dąbrowa Górnicza, PL	121,500	2020	
Dzierżoniów, PL	34,168	2020	
Ełk, PL	57,449	2020	
Gdynia, PL	247,428	2020	
Gniewino, PL	7,100	2020	
Grybów, PL	6,188	2020	
Jasienica, PL	20,807	2020	
Jaworze, PL	6,883	2020	
Kolbuszowa, PL	25,144	2020	
Kościerzyna, PL	23,138	2020	
Kozy, PL	12,000	2020	
Lubianka, PL	6,400	2020	
Miasto i Gmina Sztum, PL	17,999	2020	
Niepołomice, PL	23,952	2020	

Signatories	Population	Commitments	Status
Piaseczno, PL	66,000	2020	
Pilzno, PL	18,090	2020	
Porąbka, PL	15,140	2020	
Pruszcz Gdański/Miasto, PL	28,566	2020	
Płock, PL	122,000	2030 ADAPT	
Raciechowice, PL	6,000	2020	
Sopot, PL	37,550	2020	
Śrem, PL	31,500	2020	
Szczyrk, PL	5,860	2020	
Toruń, PL	191,276	2020	
Urząd Gminy Tryńcza, PL	8,426	2020	
Ustka, PL	16,467	2020	
Warsaw, PL	1,680,000	2020	
Wilamowice, PL	14,200	2020	
Wilkowice, PL	11,112	2020	
Wrocław, PL	634,487	2030 ADAPT	
Władysławowo, PL	14,892	2020	
Zarszyn, PL	9,286	2020	
Żyraków, PL	13,684	2020	
Łękawica, PL	4,375	2020	

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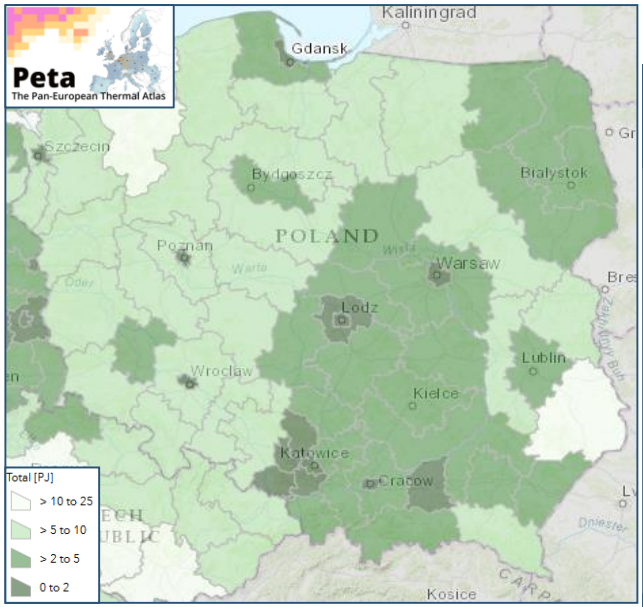
5. Covenant of Mayors (CoM signatories in Poland (2017)

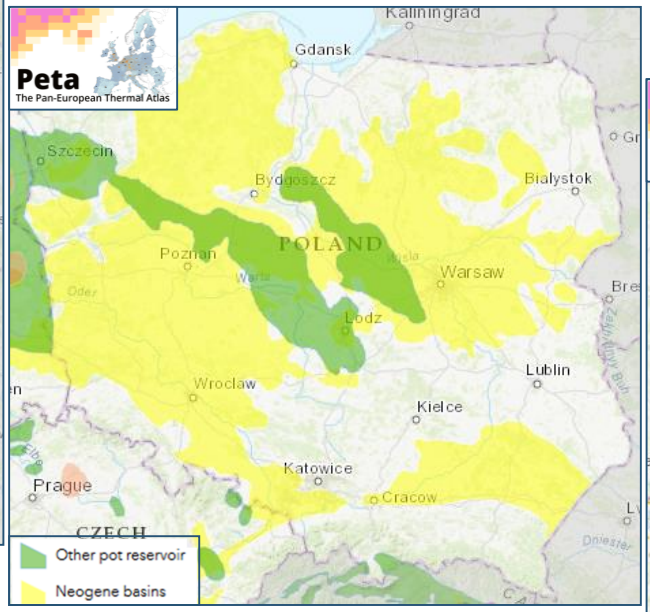
* EU Parliament is now considering more ambitious targets (35%) for more RES and more efficiency.

2. Switch to renewables!

- Especially important for **decentralised** systems, as well as **district**-level scales



Biomass



Geothermal

Solar thermal

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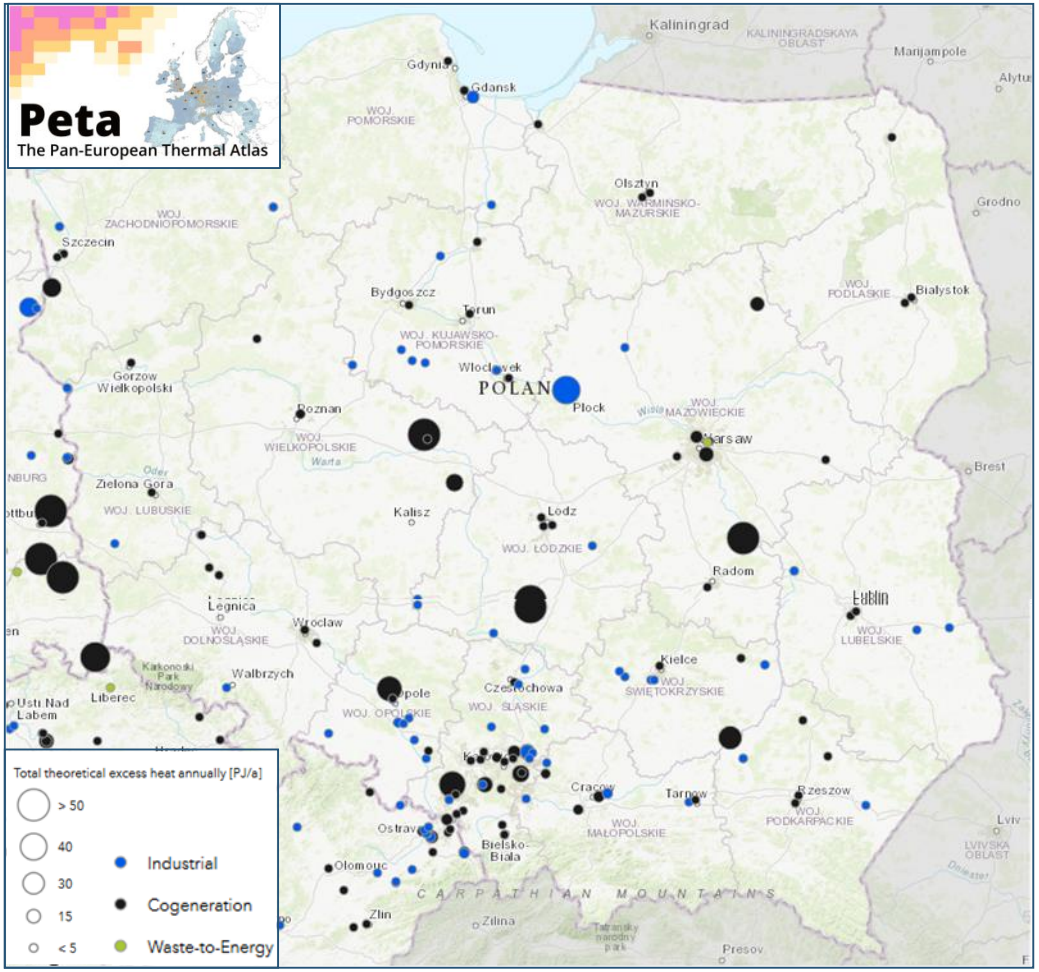
All maps from the Peta 4 online platform *[HRE4, 2017 – though biomass data (2015) from the Bioboost project] and data (2014) from the GeoDH project*

3. Utilise (low-carbon) excess heat!

- Peta4 shows **> 130** potential sources of to be exploited for excess heat:
  - Industrial
  - Cogeneration
  - Waste-to-energy
- Together ⇨ ~**290 TWh**
  - *> entire residential and service sectors' H&C demand* (260 TWh)
  - *However, should all really be exploited?*



Excess Heat *sources from Peta4 showing major facilities [HRE4, 2017]*

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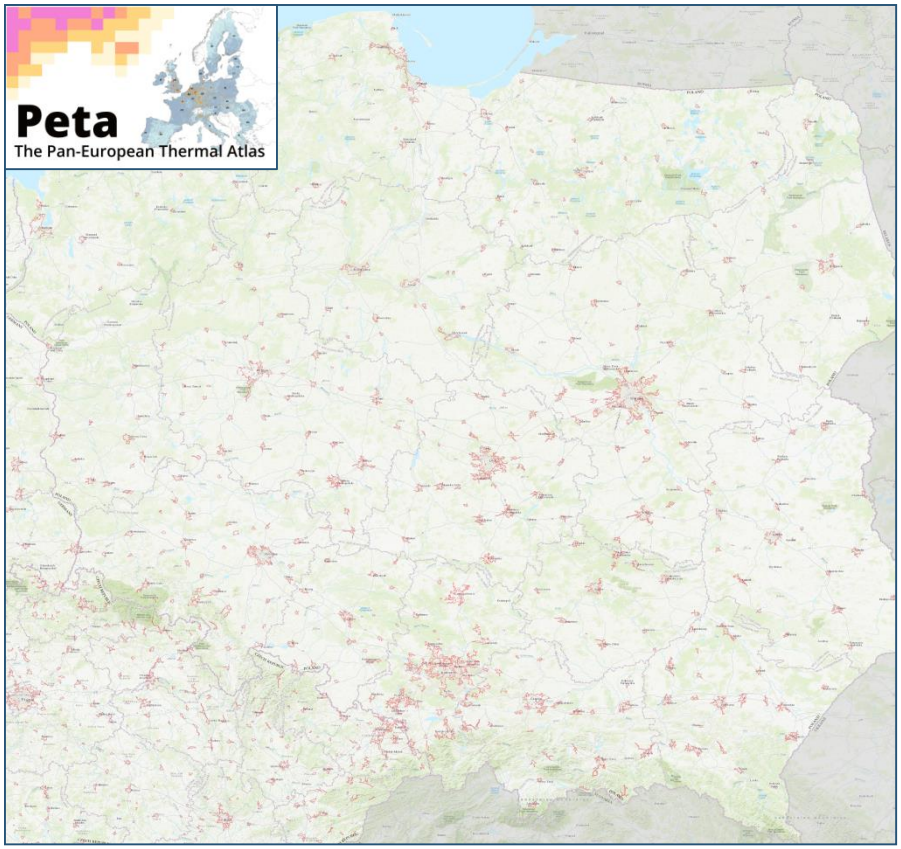
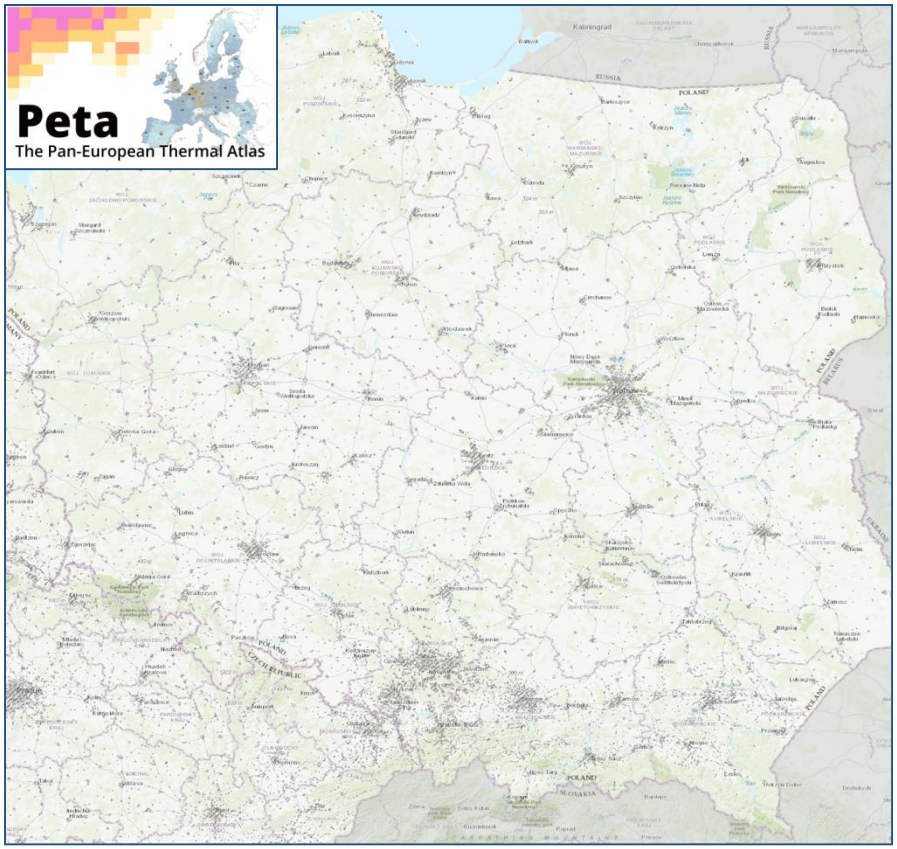
4. Expand existing DH systems!



*Already **existing DH** systems, from the Peta4 online platform [HRE4, 2017]*



***Prospective DH** systems, from the Peta4 online platform [HRE4, 2017]*

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5. Increase supply-side efficiency!

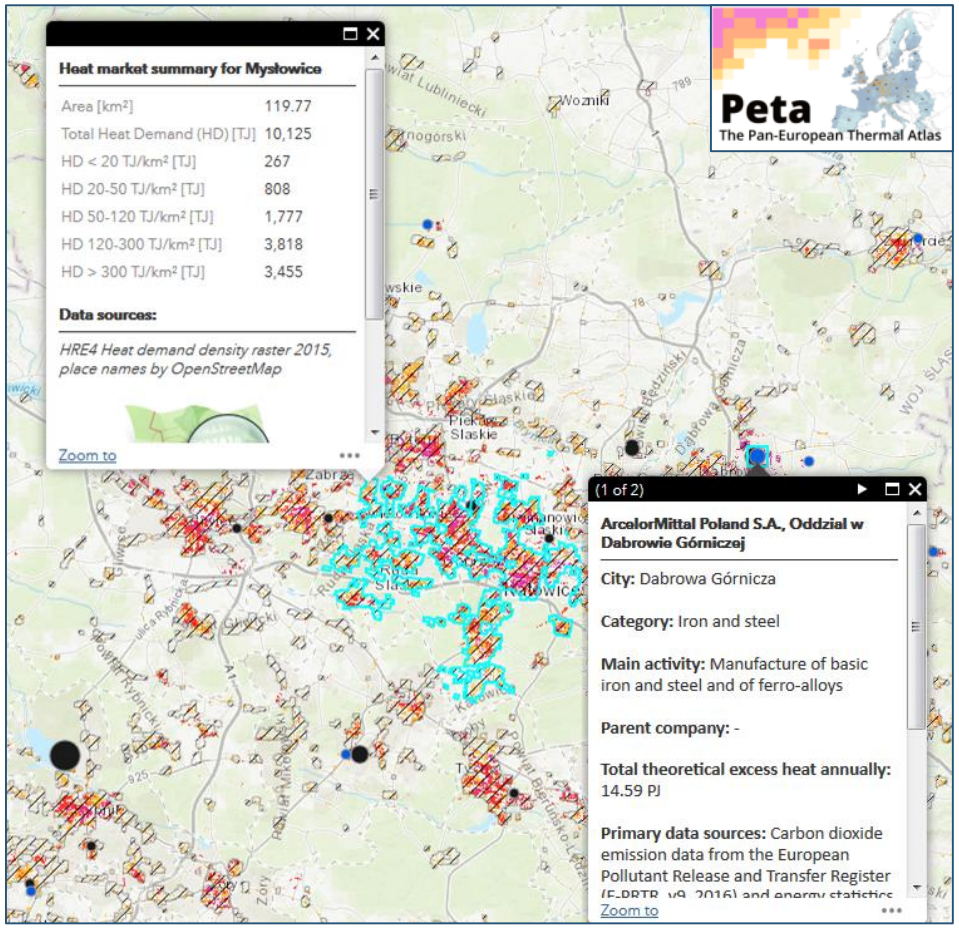
- Feed in more (proper) **investments**
- Improve **maintenance** and **management** practices (e.g. *ISO 50001*)

6. Accelerate demand-side savings!

- Incentivise **deep renovations of existing building** stock, not just improved **standards** for new ones
  - Occupants' *behaviours* (through smart solutions)

7. Facilitate data/tool exploitation!

- Make sure that the necessary **data** is generated and distributed:
  - It should be **verified** and **updated**
  - Put into **usable** tools/ formats for lead-users
  - Made **accessible** to those who need it for research and planning



*Comparing **Katowice**'s heat demand to excess heat, from the Peta4 online platform [HRE4, 2017]*

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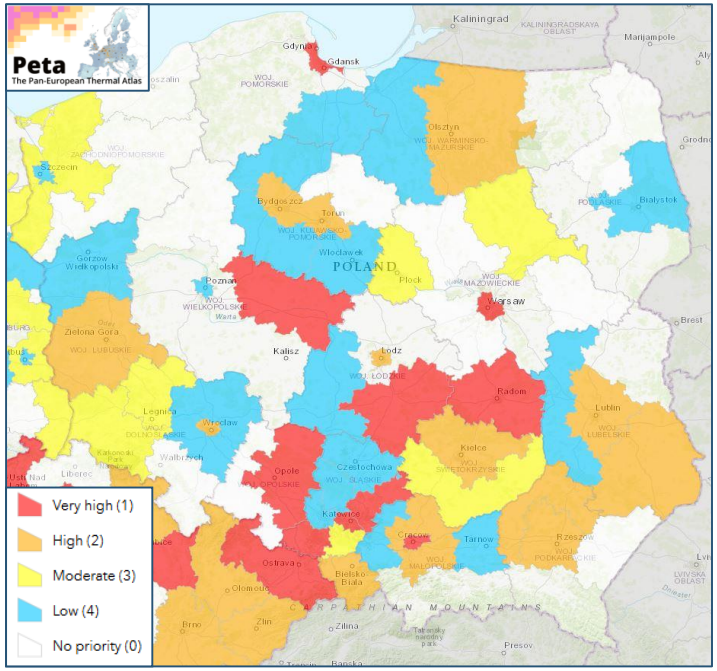
8. Develop enabling frameworks!

- Stimulate **RES** + **EE**, not the status quo (i.e. fossil fuels)
  - Remove **burdens** to homes and small businesses to innovate
  - **RES + EE support schemes**, both decentralised and DHC
- Strategically **plan RES, EE and DHC**
  - Demand- *and* supply-sides
  - Government and businesses' strategies



***Heat Synergy Regions** (NUTS33) from Peta4 [HRE4, 2017]*

- DHC should utilise (low-carbon) **excess heat**:
  - **Heat Synergy Regions**
  - *Cross-border collaborations*
- Take advantage of **data** and **tools**
  - We invite all of you to **use HRE** to not only develop policies, but also **bring them to life!**

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HRE can work for you!

- No matter which institution you represent, **HRE will benefit you**
  - **Local**, **regional** and **national** authorities
  - Energy **agencies** and consultants
  - H&C **providers**
  - Energy **technology** companies
- HRE resources can:
  - orient you towards **feasible solutions**
  - facilitate **cost-effective investments**
  - feed directly into your **planning processes**
  - apply scenarios for **long-term roadmaps**

Thank you! Questions?

Dziękuję! Pytania?

George Stiff

Sustainable Resources, Climate and Resilience team – Officer

george.stiff@iclei.org

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 695989. The sole responsibility for the content of this presentation lies with its author and in no way reflects the views of the European Union.