



2050

Heat Roadmap Europe
A low-carbon heating and cooling strategy

Heat Roadmap Europe – a Vision for 2050

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 695989.

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Our purpose in HRE4

- Creating scientific **evidence** to support long-term energy strategies at local, national, and EU level and empower the transition to a **low-carbon** energy system
- By **quantifying** the impact of various alternatives for addressing the heating and cooling sectors



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HRE1, 2, 3, 4

- Study 1 (2012): will **district heating** play a role in the decarbonisation of the European energy system?
- Study 2 (2013): what is the balance between **heat savings and heat supply** at an EU level?
- Study 3 (2015, STRATEGO WP2): low-carbon **heating and cooling strategies** for 5 member states
- Study 4 (2016-2019): integrated low-carbon **heating and cooling strategies** for 14 member states



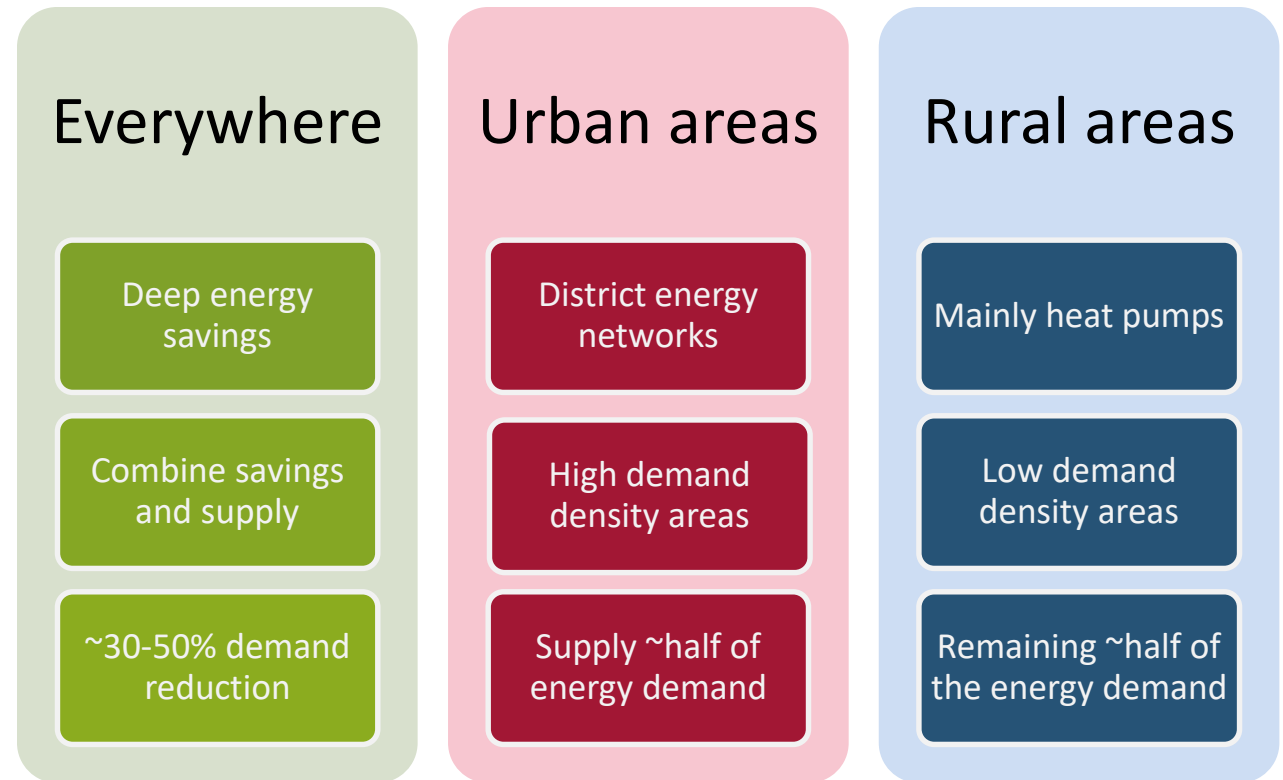
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Heat Roadmaps for transitions

- Decarbonise in line with Paris Agreement
- Technically possible, socio-economically feasible
- Consider local nature of heating and cooling
- Consider the wider energy system

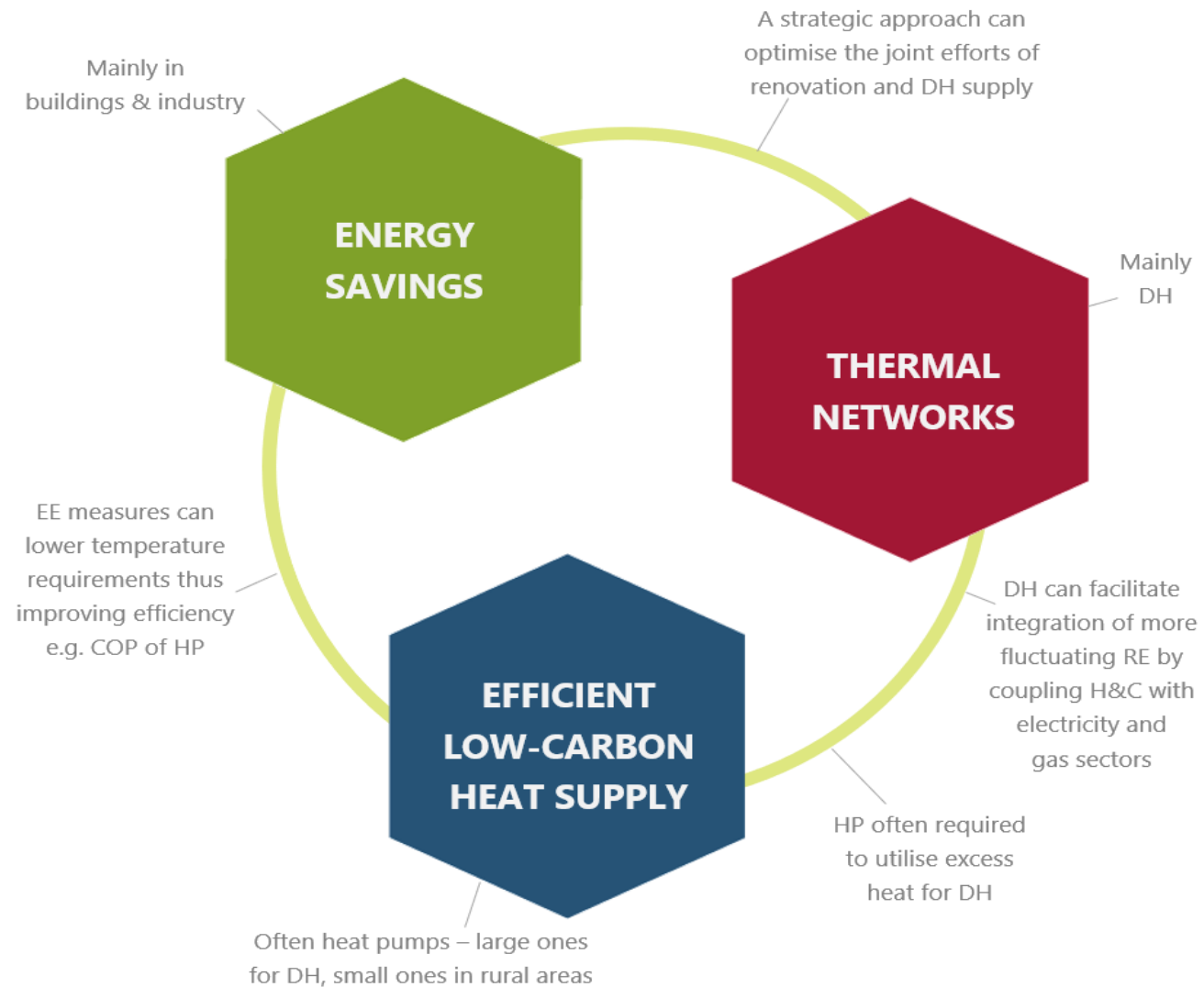


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Heat Roadmaps for transitions

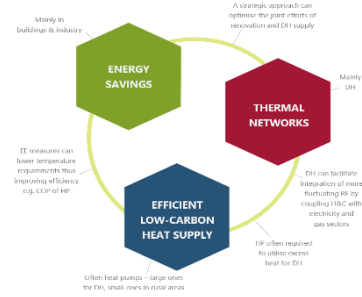


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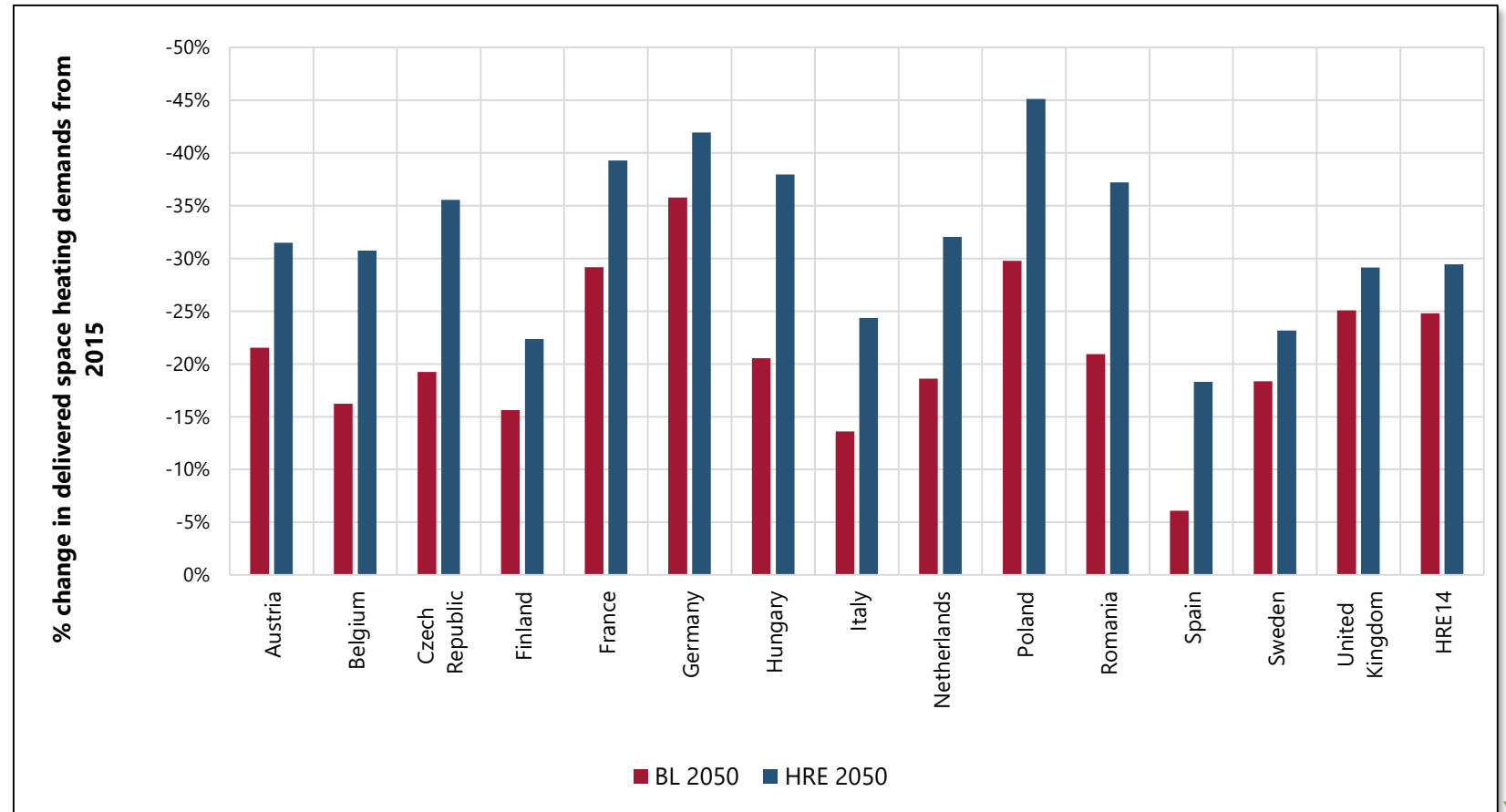
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Energy savings



- Current policy: 35% reduction in space heating
- HRE: 40% reduction in space heating
- Current policy: annual refurbishment rate between 0,7% and 1,0%
- HRE: annual refurbishment rate at 1,5% to 2%, and deeper renovations when they occur

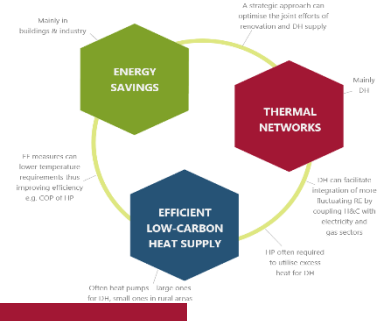


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Energy savings



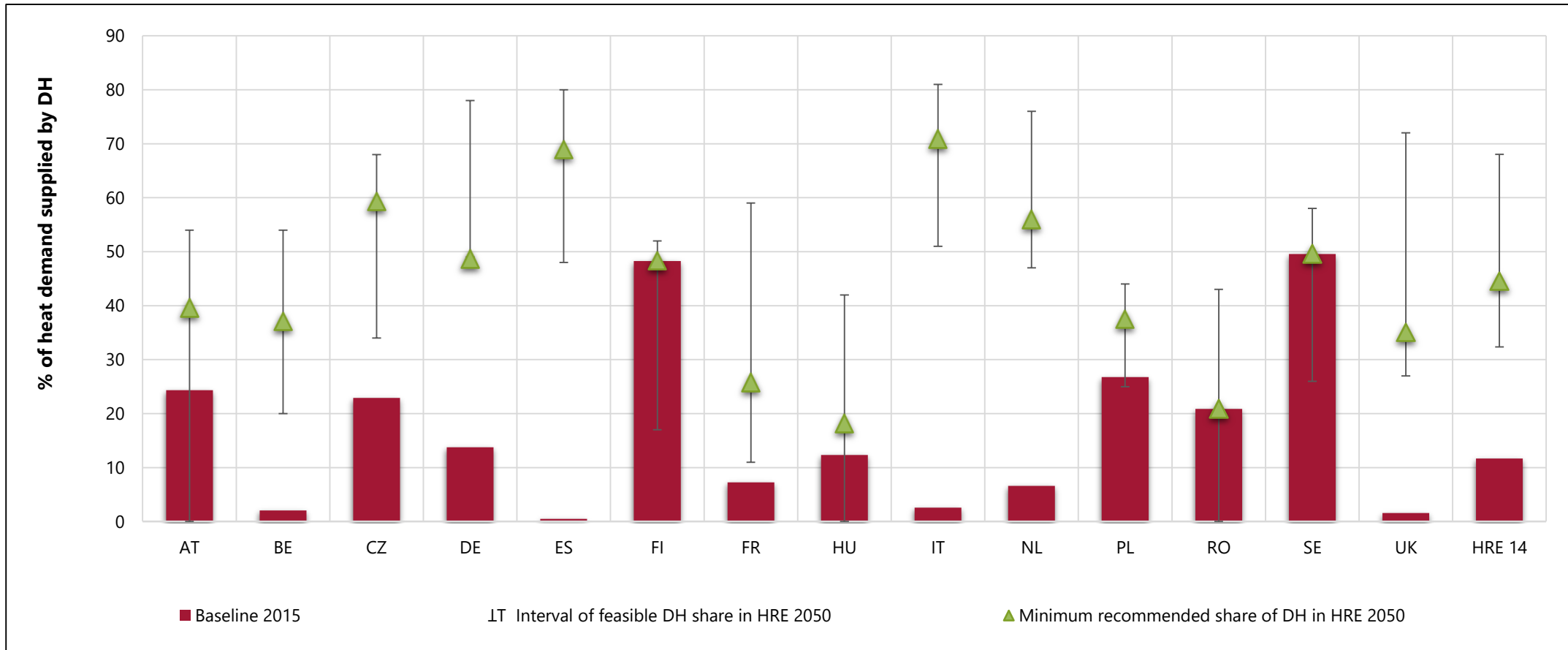
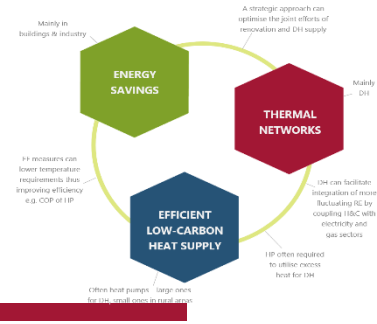
- This is no evidence of a trade-off!
- Industry and service sector are highly feasible
- Tipping points

Total energy system costs (M€/year)		Residential sector savings additional to the Baseline					
		0	5%	10%	15%	20%	25%
Percentage of market share covered by DH	0%	221608	221671	222003	222533	223992	227082
	5%	221380	221418	221725	222232	223671	226733
	12%	220943	220960	221243	221726	223138	226182
	20%	220418	220413	220671	221135	222521	225543
	30%	219899	219872	220106	220546	221908	224906
	39%	219550	219497	219710	220130	221465	224441
	49%	219420	219342	219542	219930	221250	224198
	58%	219551	219446	219625	219987	221290	224209
	68%	220202	220072	220226	220563	221844	224740
	78%	221693	221540	221669	221982	223237	226110
	90%	231543	231366	231462	231757	232981	235837



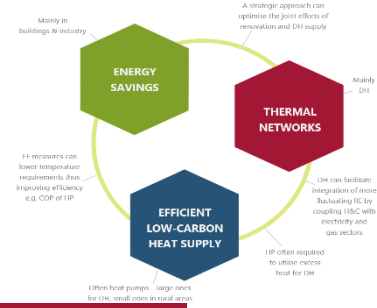
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Total heat supply

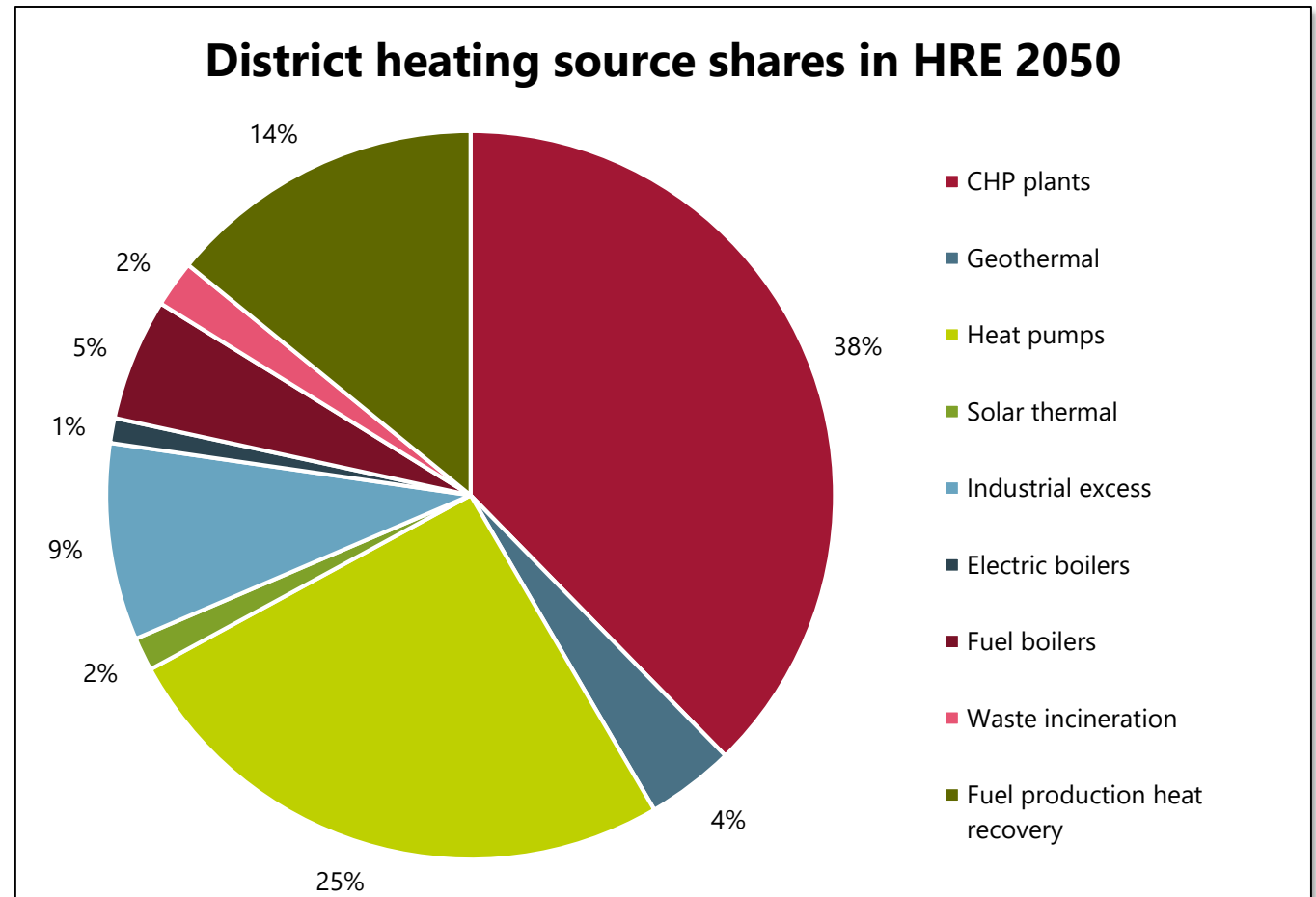


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District heat supply

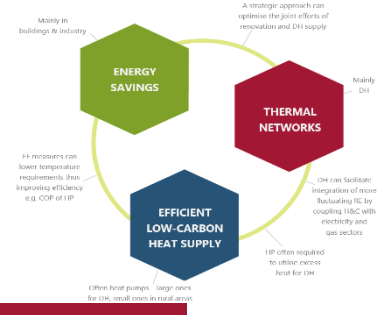


- Different types of heat start to play a different role
- CHPs operate to the electricity markets and ‘pair’ with large heat pumps
 - HPs combined: ~75%
- Boilers are almost irrelevant
- The constraints are mostly temporal and geographic

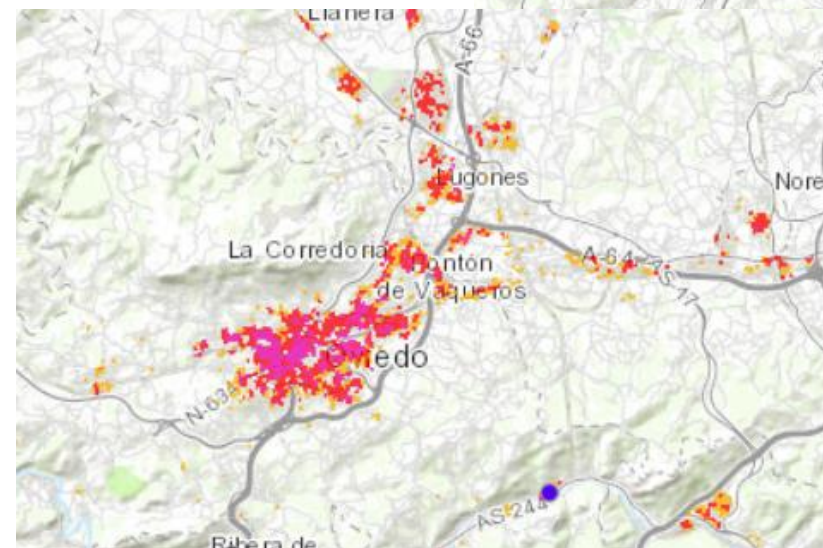
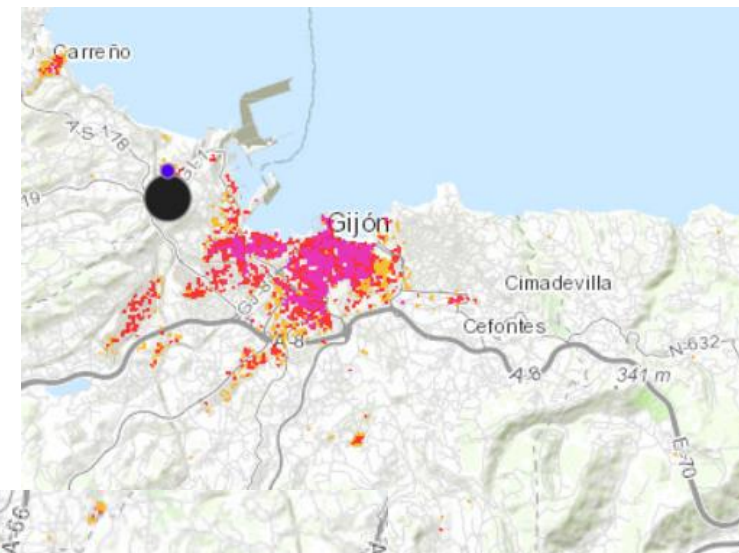


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Role of local resources



- Energy efficiency first principle!
- Understanding of temporality and spatial dimension are necessary here:
 - Variety of baseload sources
 - Geographic availability
 - Development of infrastructure
- Requires planning and strategic development of RES

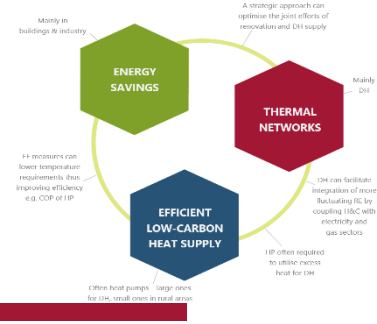


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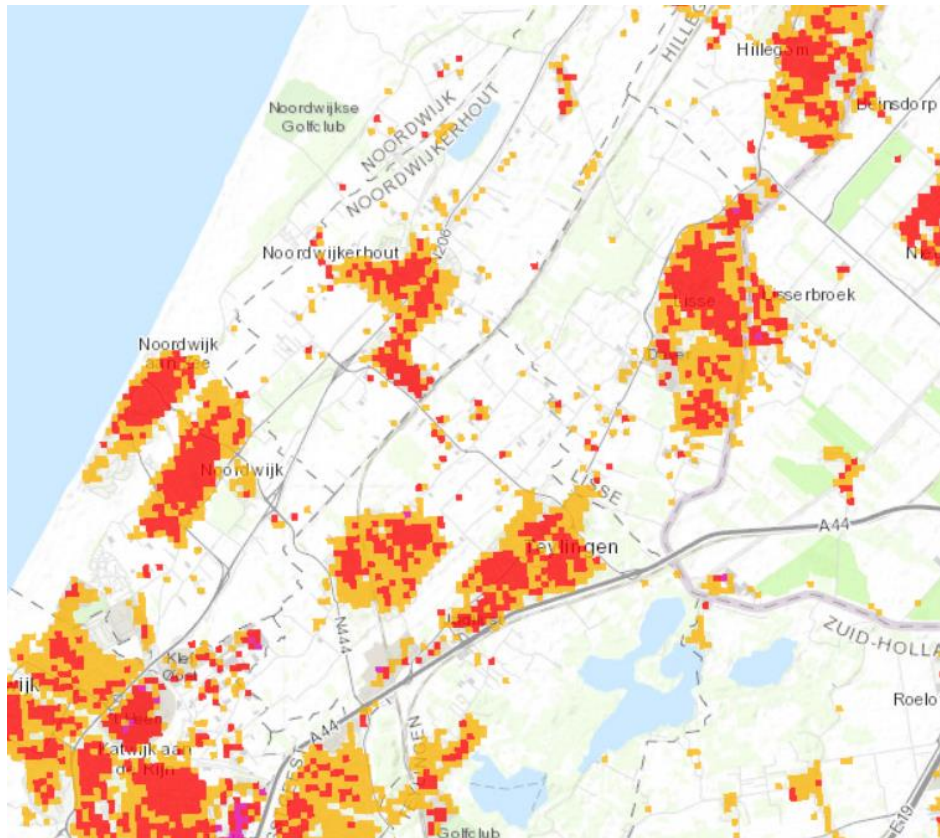
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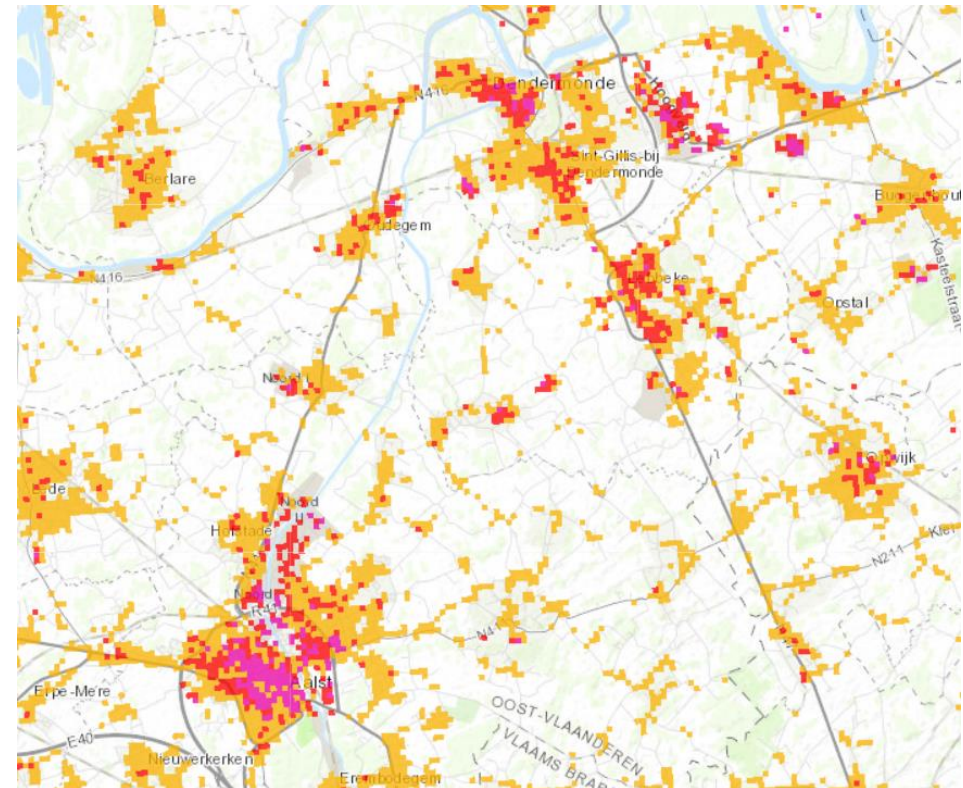
Local planning



Bollenstreek (NL)



Aalst/Denderleeuw (BE)

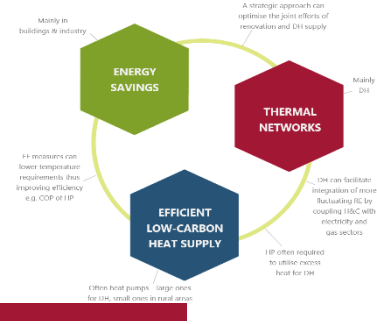


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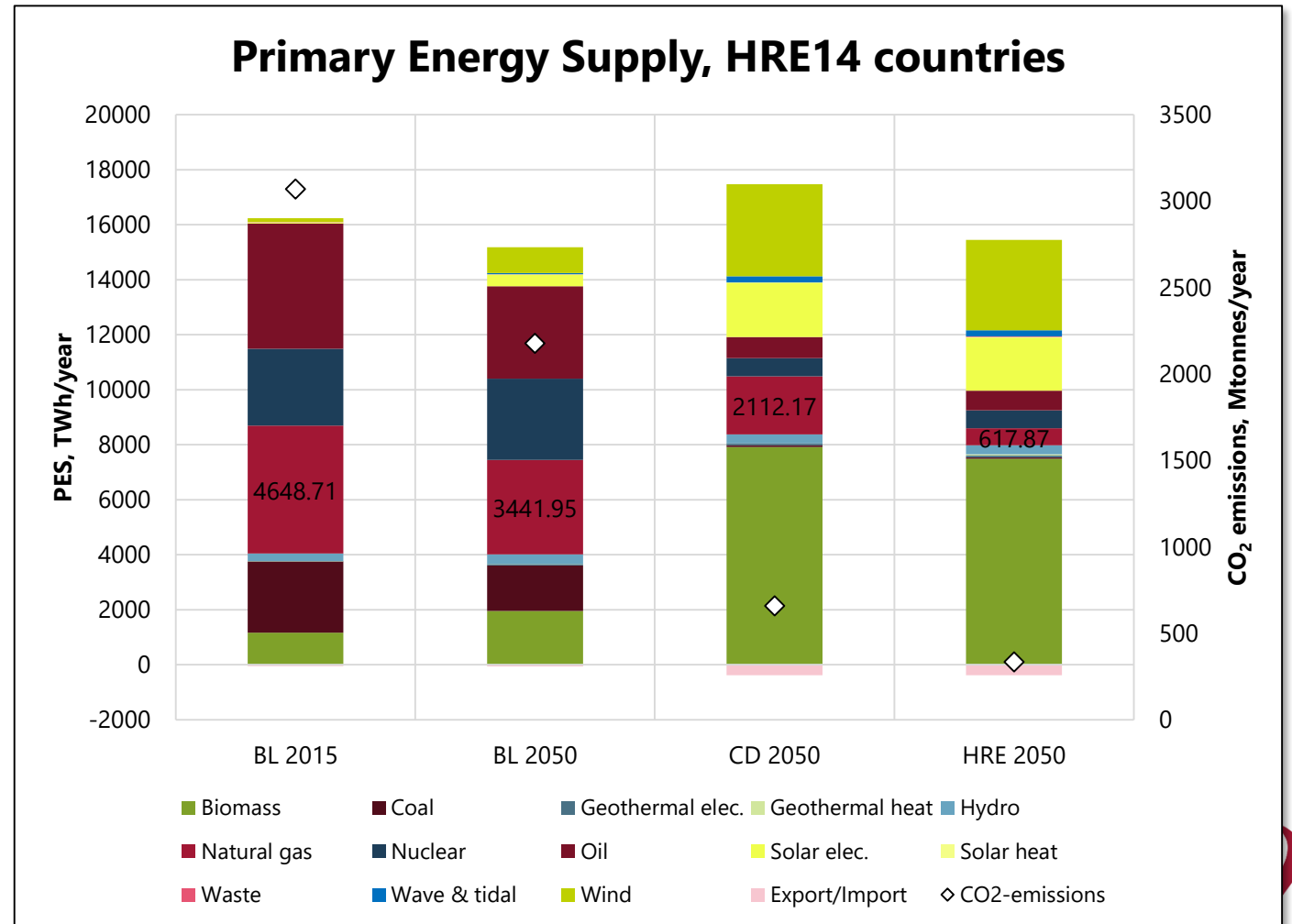
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Energy system coherency

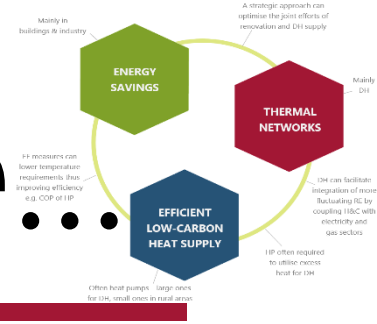


- Use electrification of key sectors
 - Heat pumps and chillers are key!
- Use flexibility and synergies to enable further decarbonisation
 - Better use of variable RES
 - Better use of grid capacity
 - Avoid peak capacity

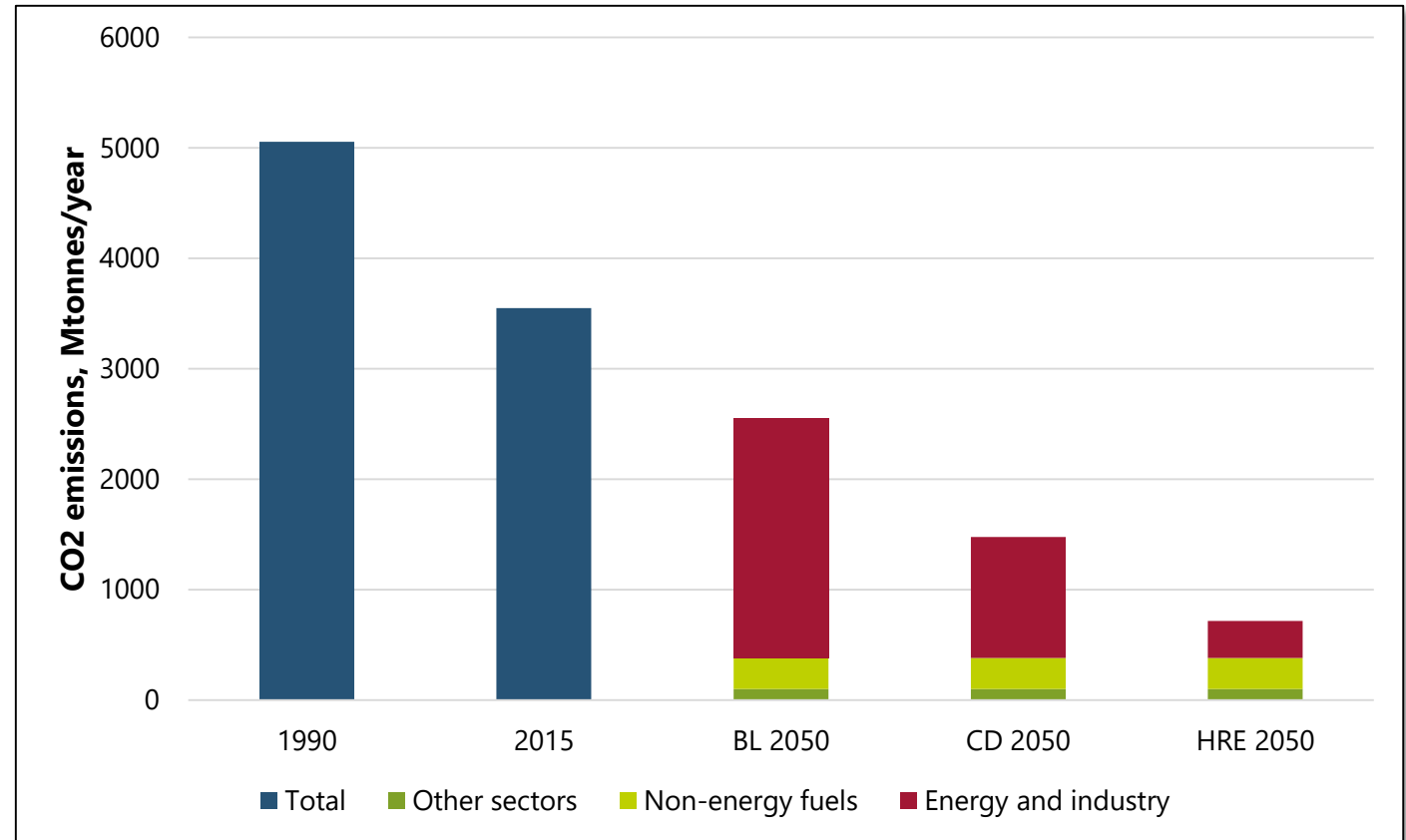


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Decarbonisation is possible...

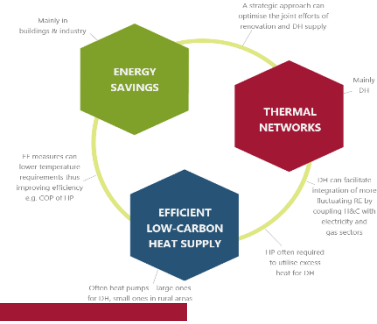


- Efficiency first
- Use renewable energy capacity better
 - Flexibility and storage
- Reducing pressure on the power sector compared to full electrification
 - Much more in peak capacity than in grid

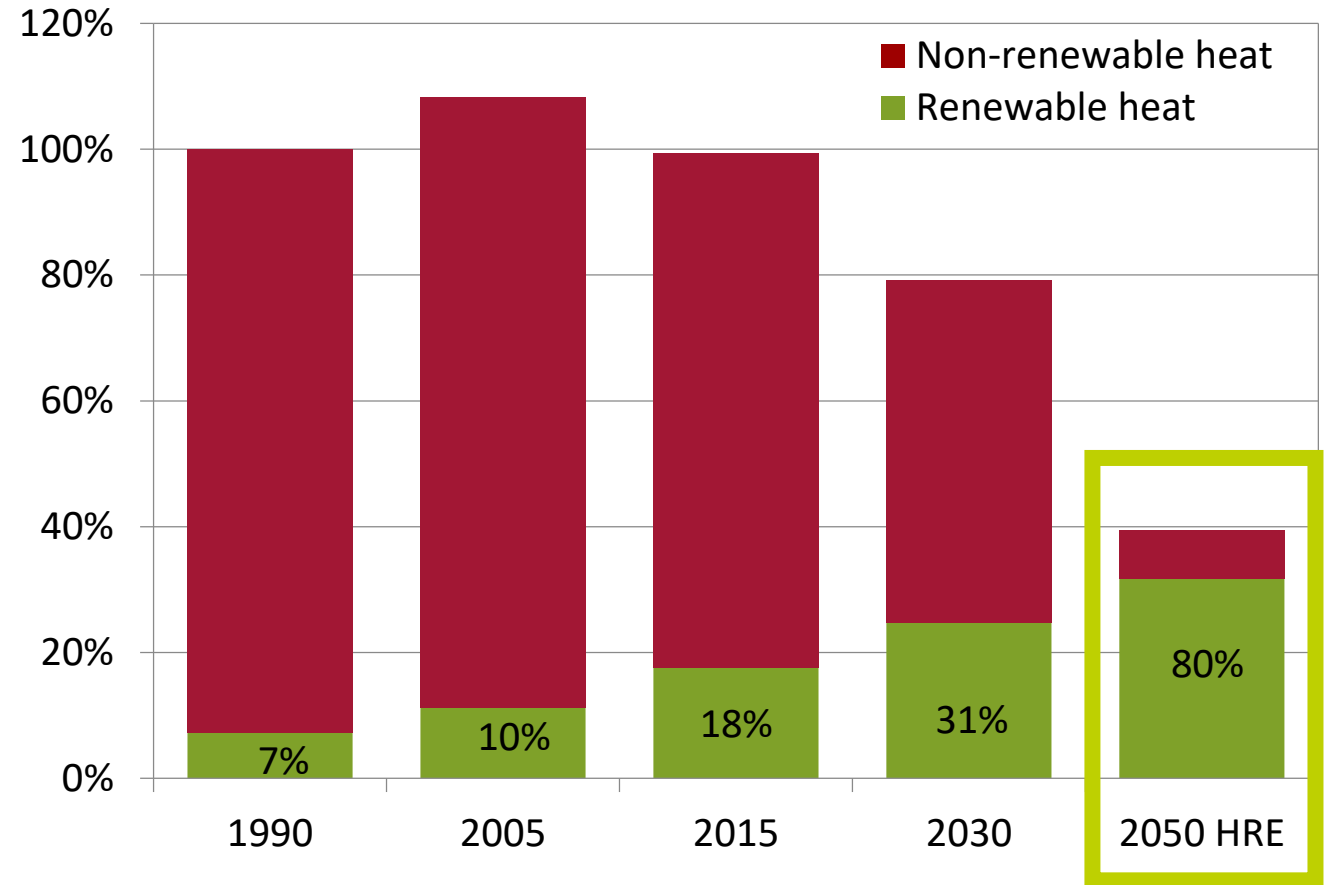


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...but change is required!



- This requires a radical change from past rates of change!
 - Implement savings
 - Construct infrastructure
 - Affect change in households
- Targets are in FED
- This requires regional infrastructure decisions and investments



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Thank you!

- Country and general Heat Roadmaps
- Guidelines
- Maps: Peta4.2
- Energy models
- Interactive spreadsheets
 - Profile of H/C
 - Baseline developments for H/C
 - Scenario results
- Factsheets, Webinars, Videos, etc...



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