



2050

Heat Roadmap Europe  
A low-carbon heating and cooling strategy

# Heat Roadmap Europe – the Main Pillars to Decarbonise Heating and Cooling

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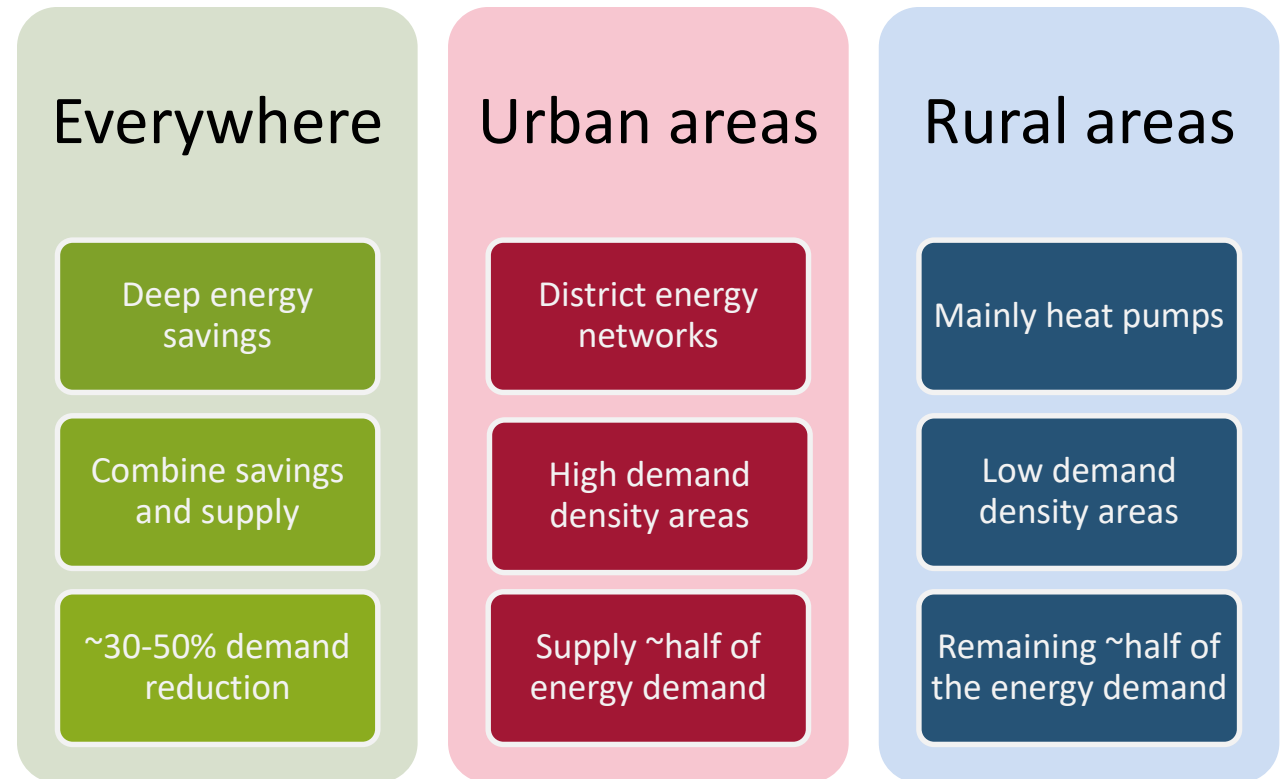
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# Heat Roadmaps for transitions

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

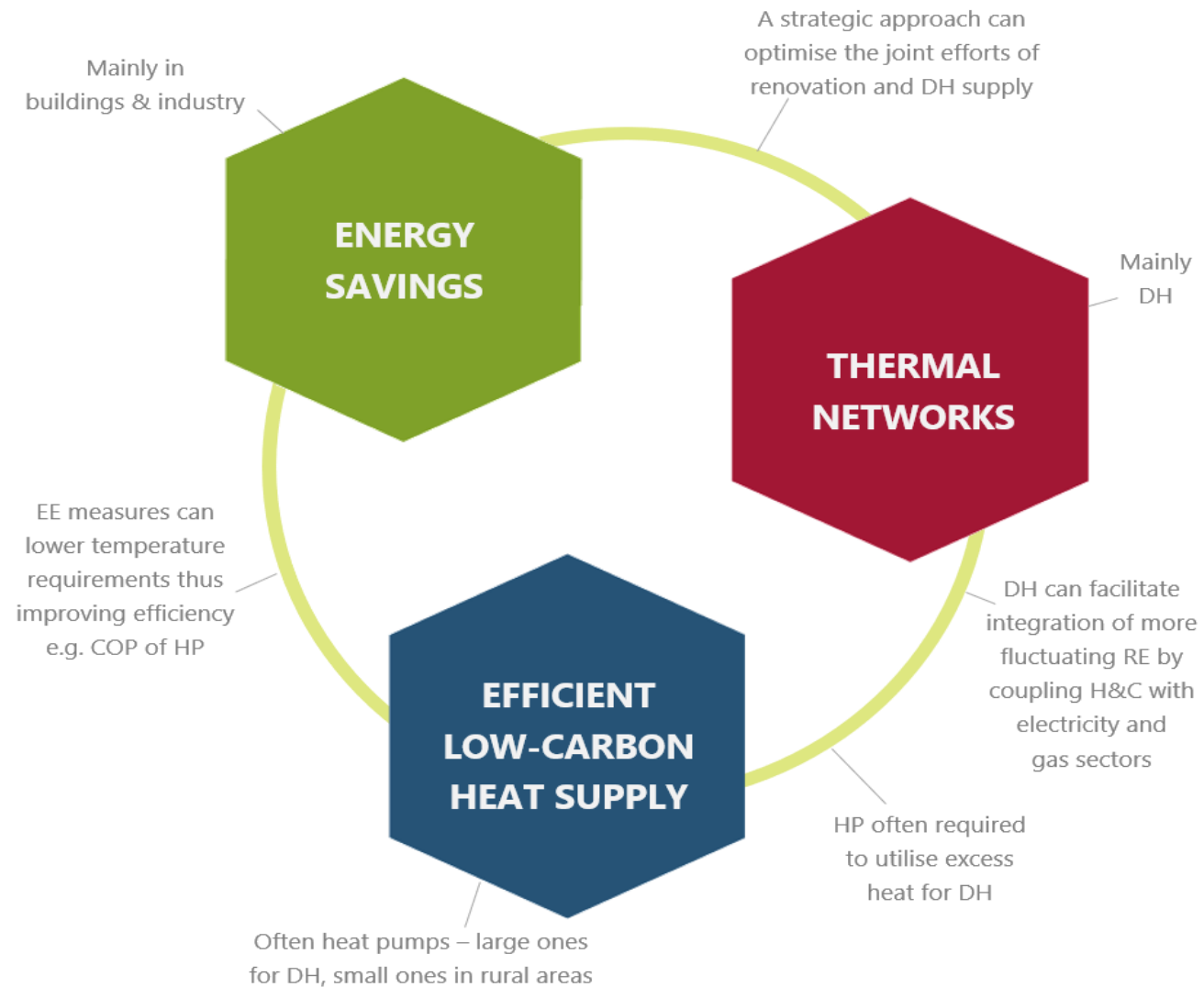


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# Heat Roadmaps for transitions

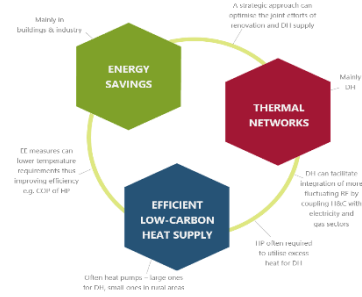


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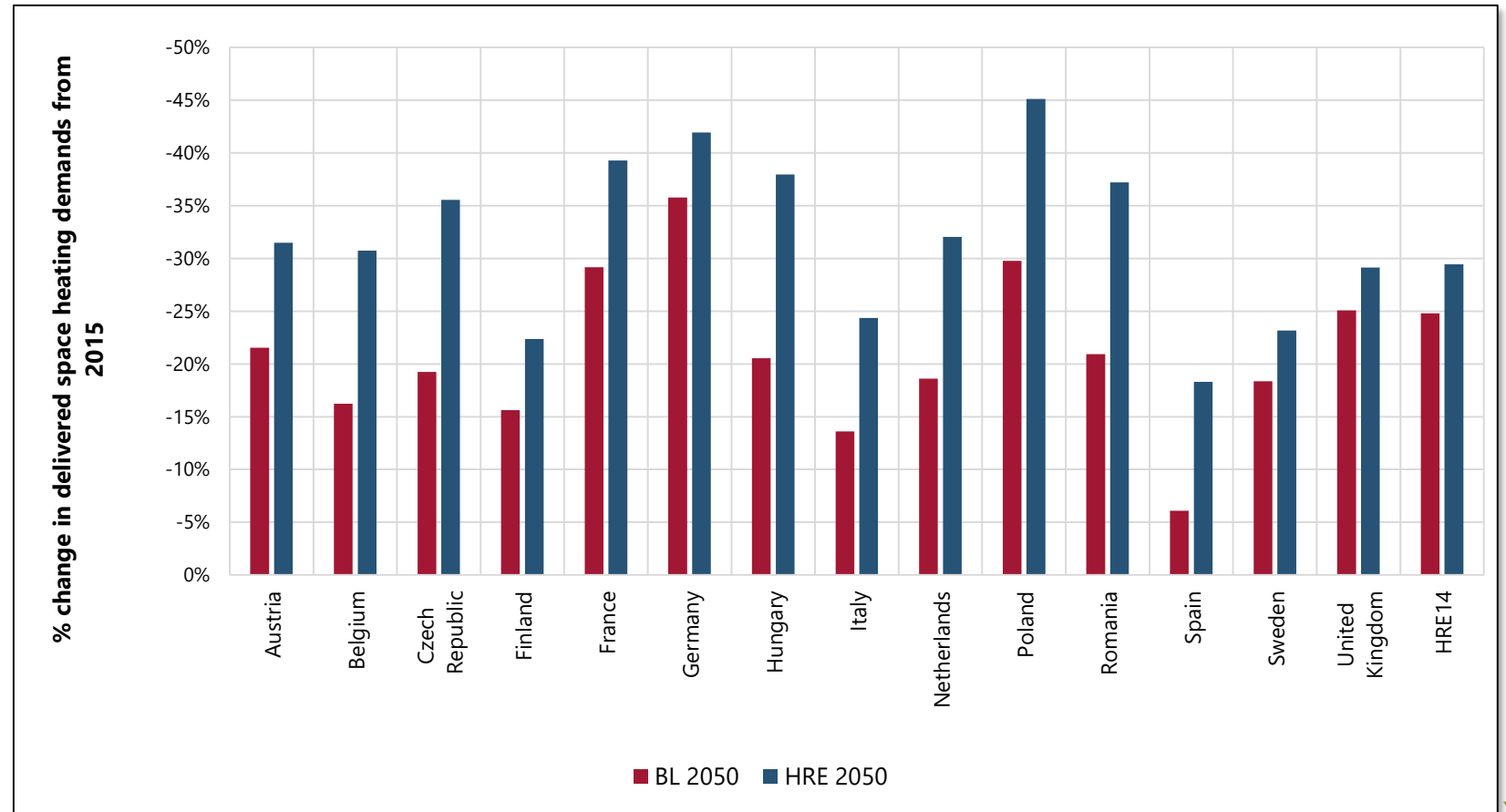
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# Energy savings



- 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

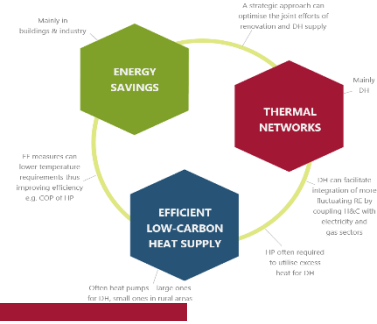


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# Energy savings



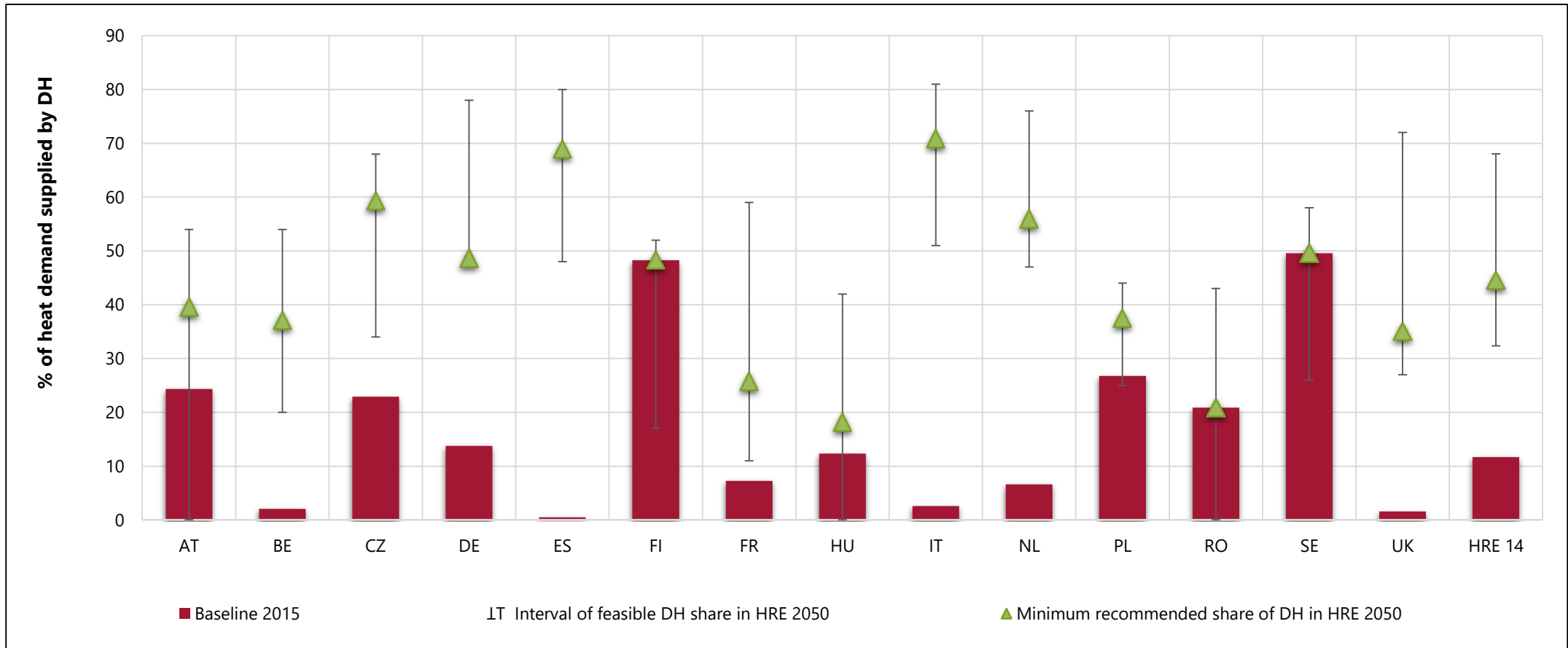
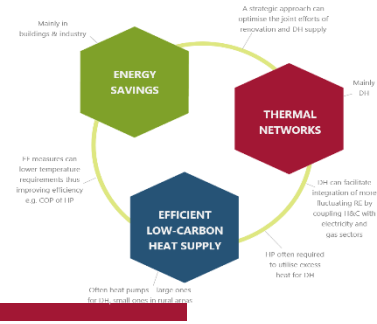
- Industry and service sector are highly feasible
- For space heating; there is typically a tipping

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



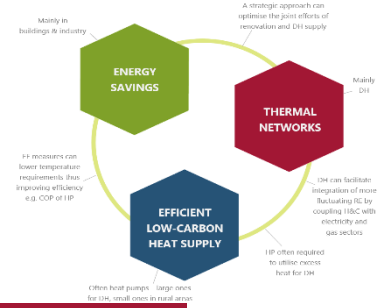
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# Total heat supply

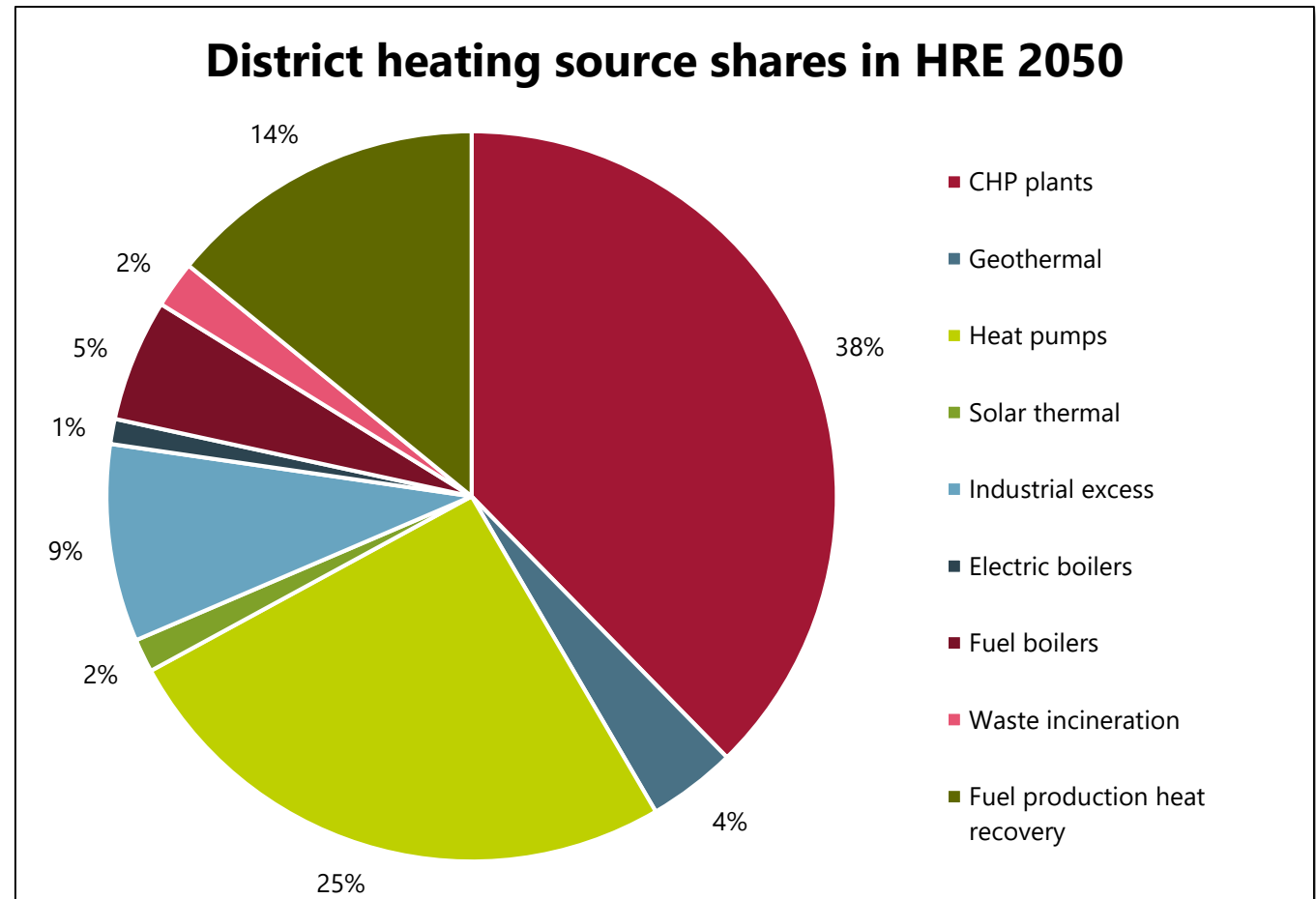


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# District heat supply



- 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

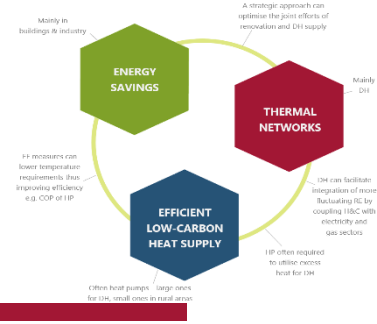


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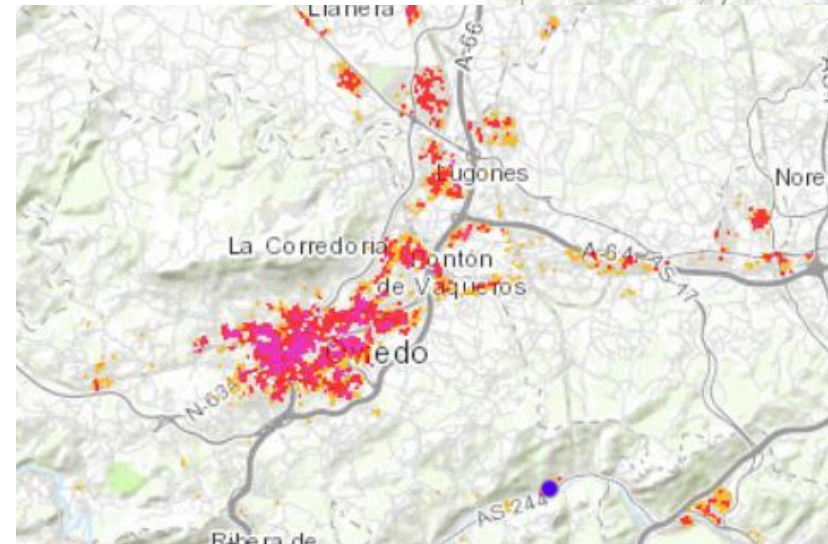
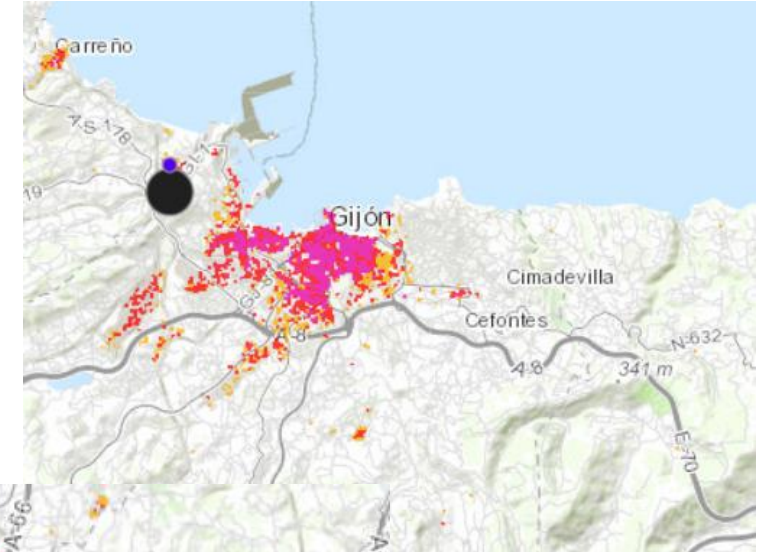
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# Role of local resources



- 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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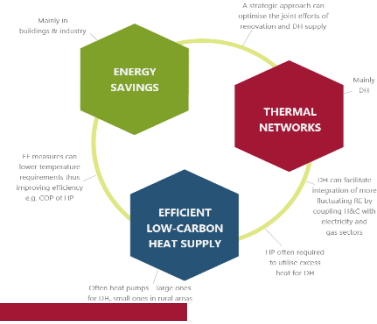
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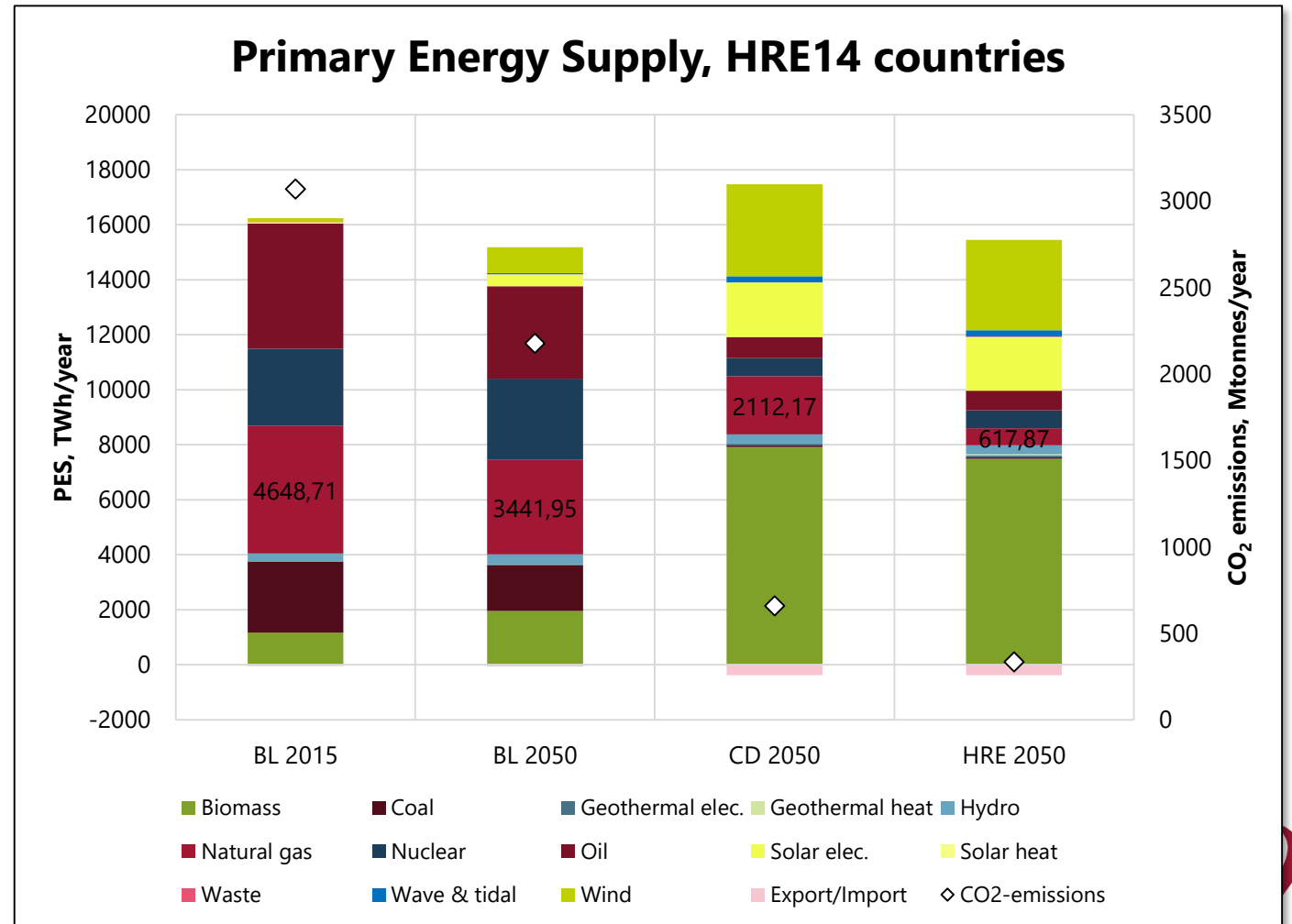




# Energy system coherency

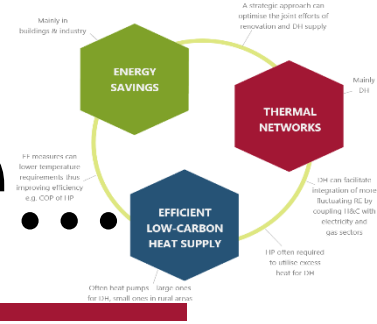


- Use electrification of key sectors
  - Heat pumps and chillers are key!
- Use flexibility and synergies to enable further decarbonisation
  - Better use of variable RES
  - Better use of grid capacity
  - Avoid peak capacity

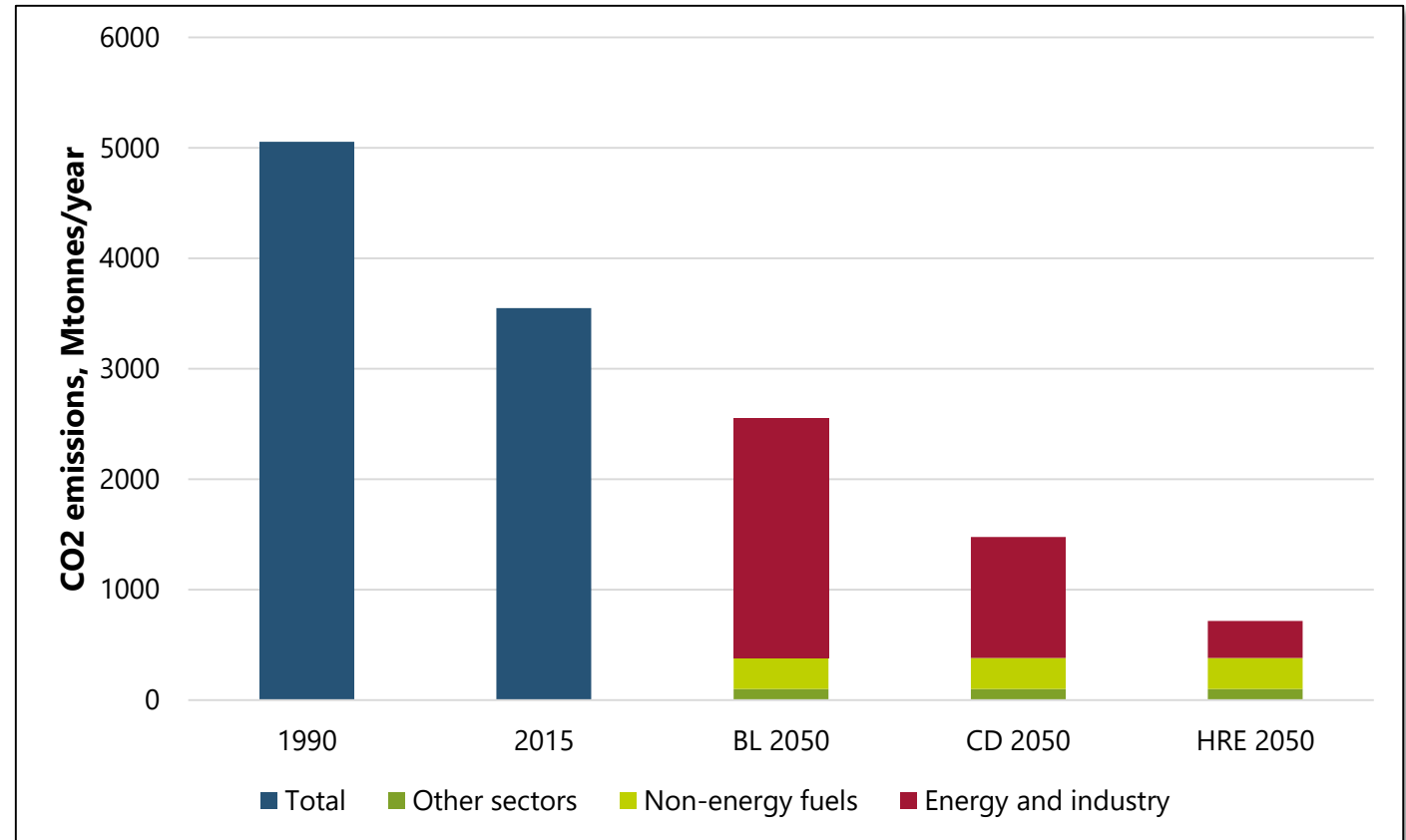


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# Decarbonisation is possible...

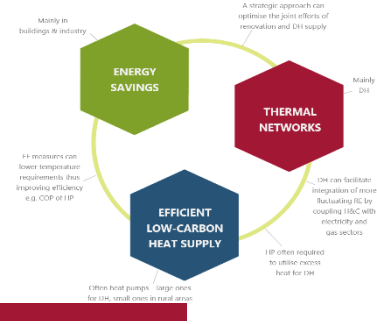


- Efficiency first
- Use renewable energy capacity better
  - Flexibility and storage
- Reducing pressure on the power sector compared to full electrification
  - Much more in peak capacity than in grid

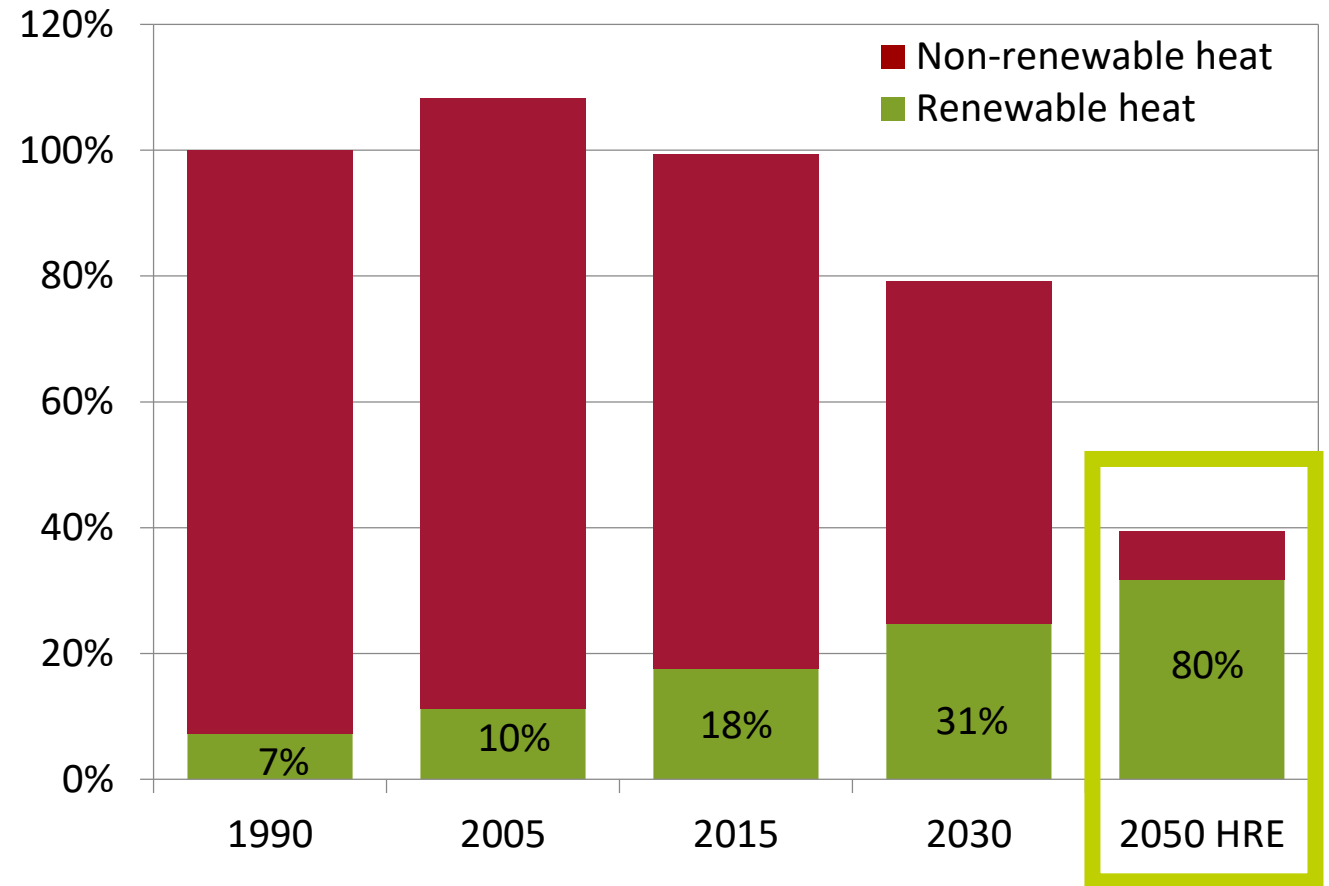


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# ...but change is required!



- 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!

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Pan-European Thermal Atlas: [www.heatroadmap.eu/maps](http://www.heatroadmap.eu/maps)



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