



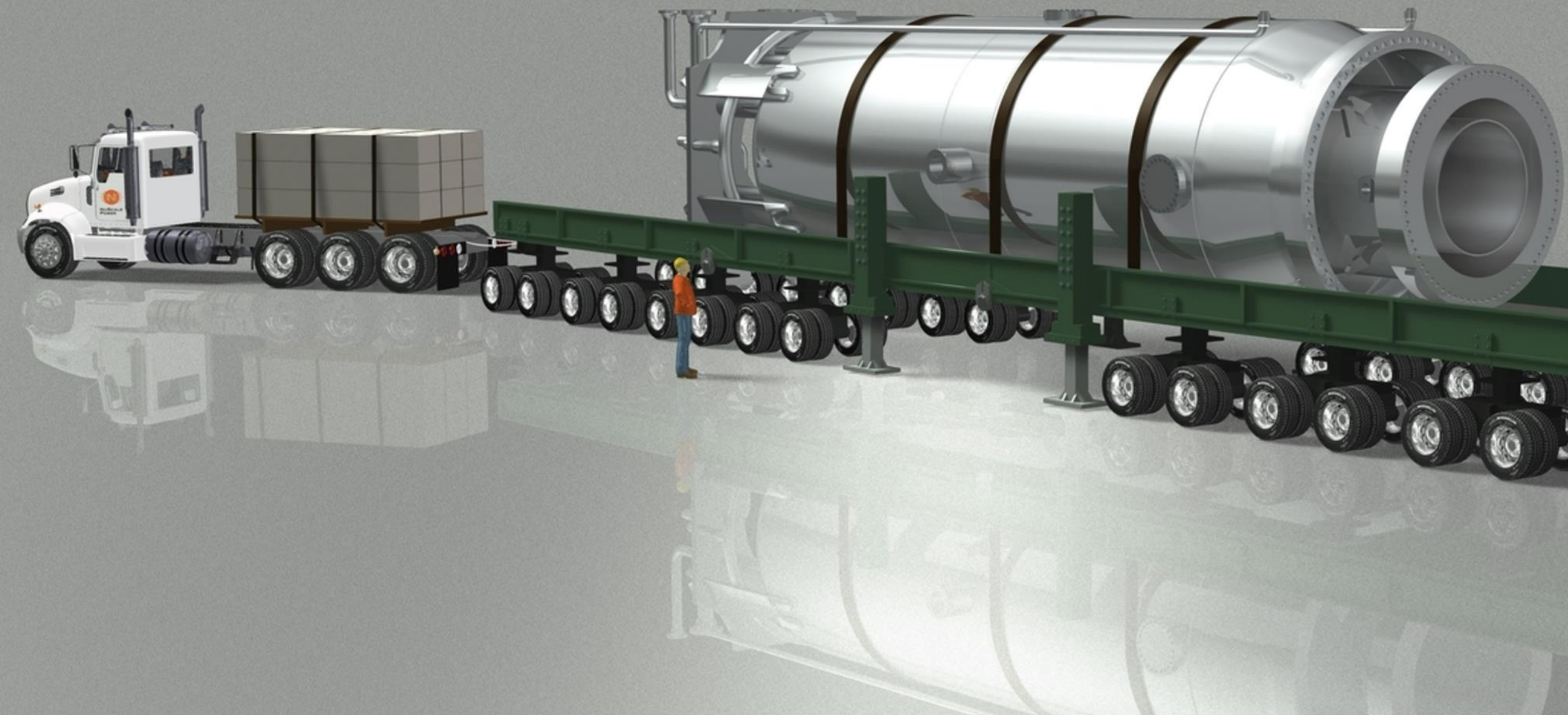
System Requirements for Alternative Nuclear Technologies

Sam Friggens
Mott MacDonald

The role and requirements of Small Modular Reactors

Sam Friggens, Senior Consultant (Energy Strategy & Innovation)

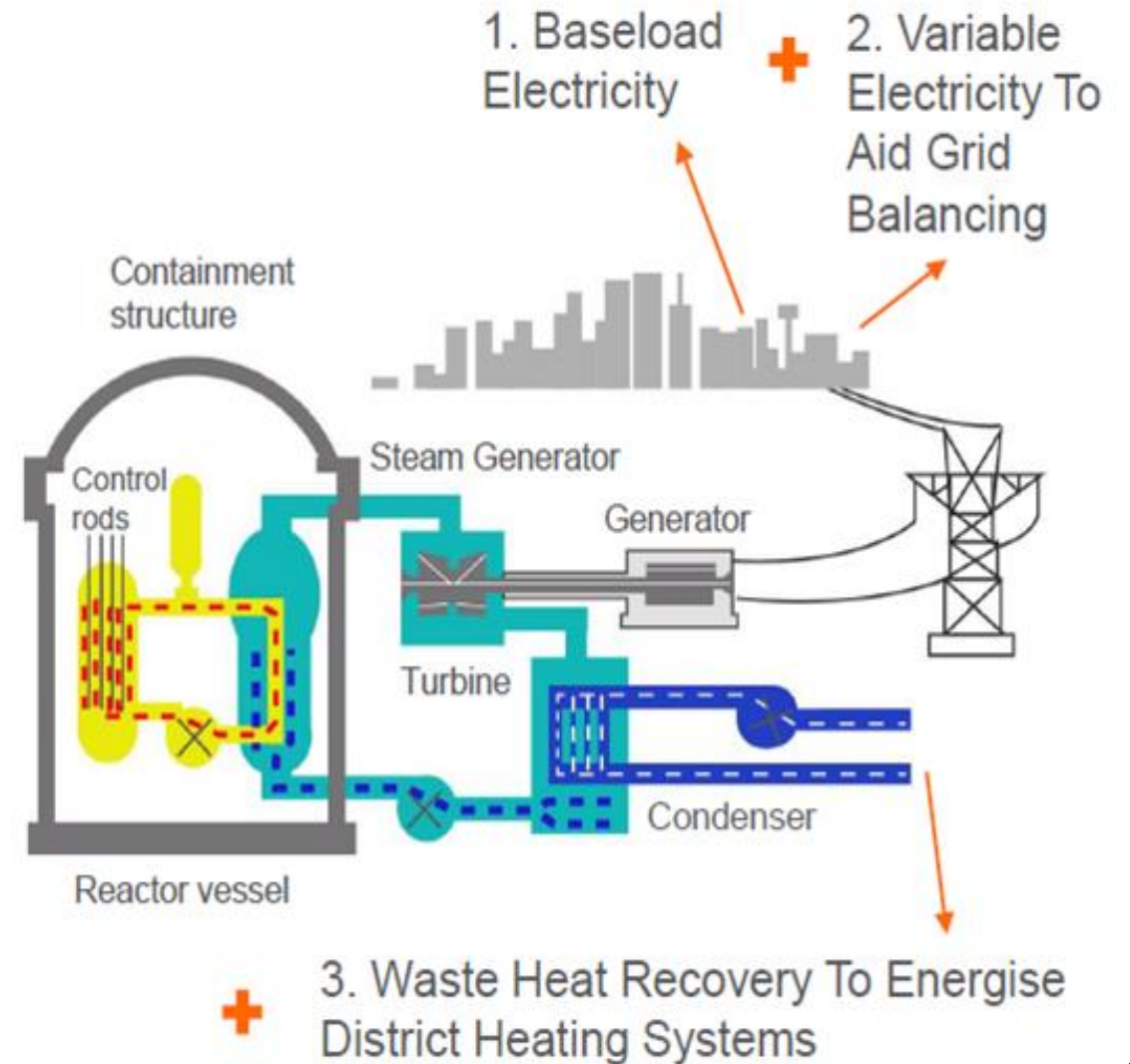
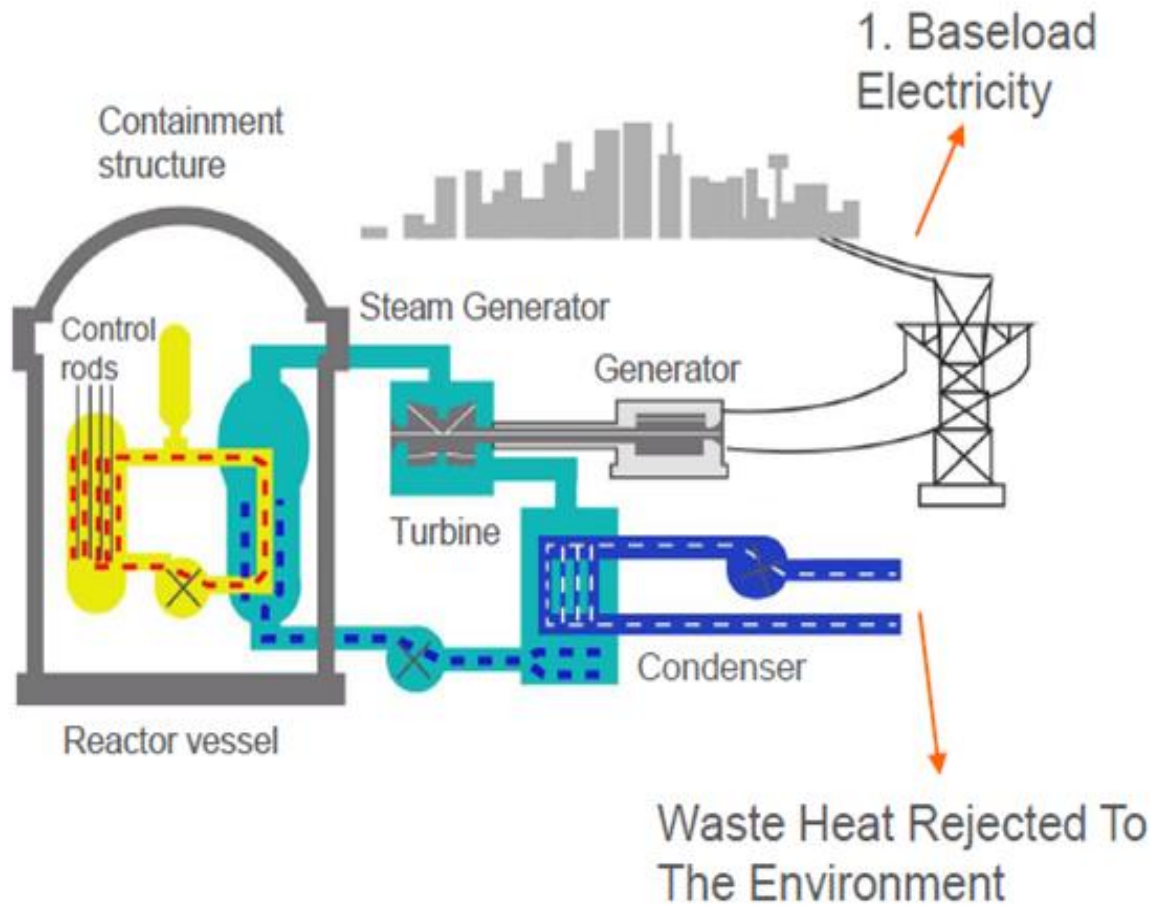




Single Revenue Stream



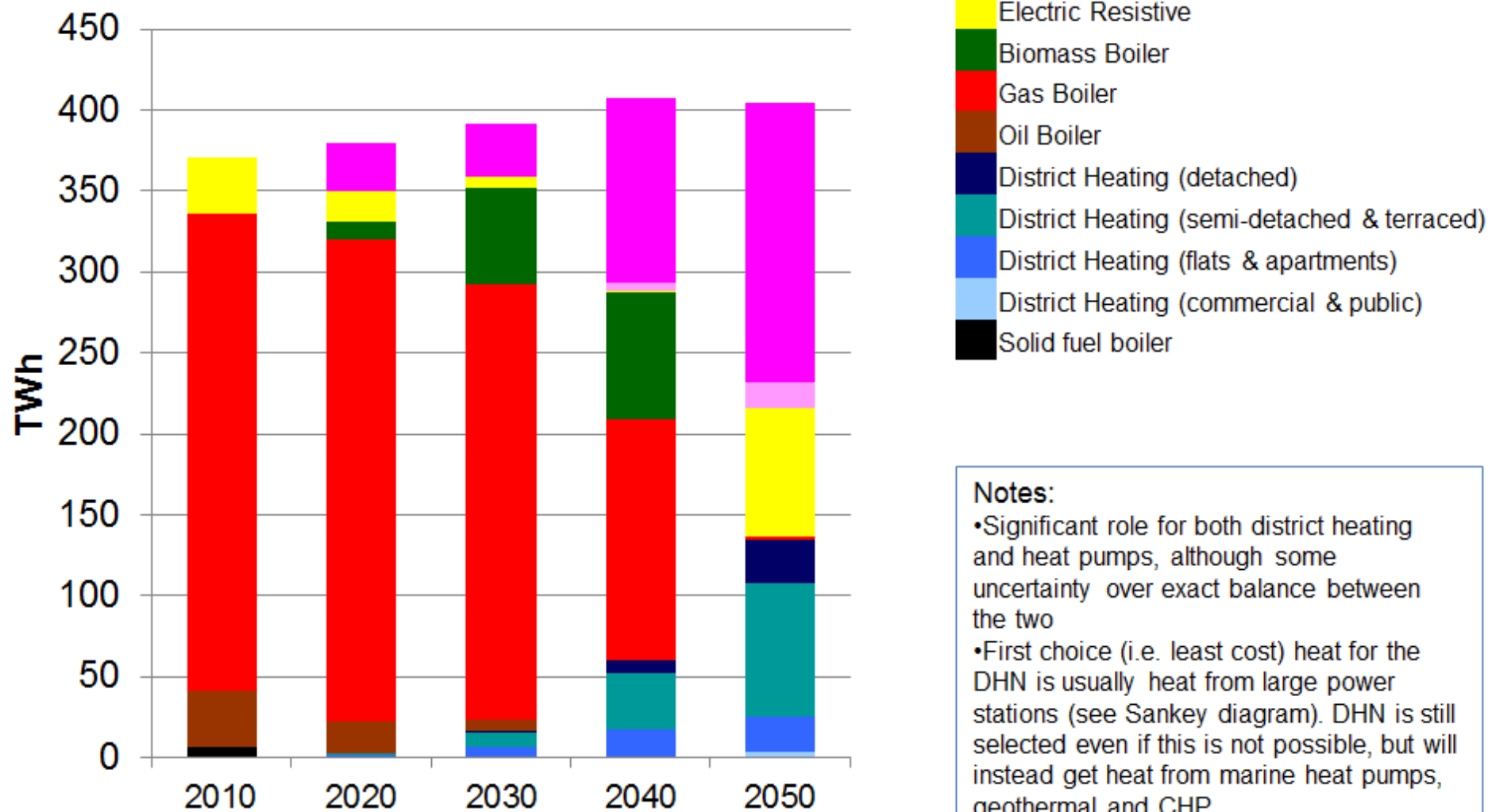
Multiple Revenue Streams



There is a potentially significant future market for low-carbon heat from SMRs

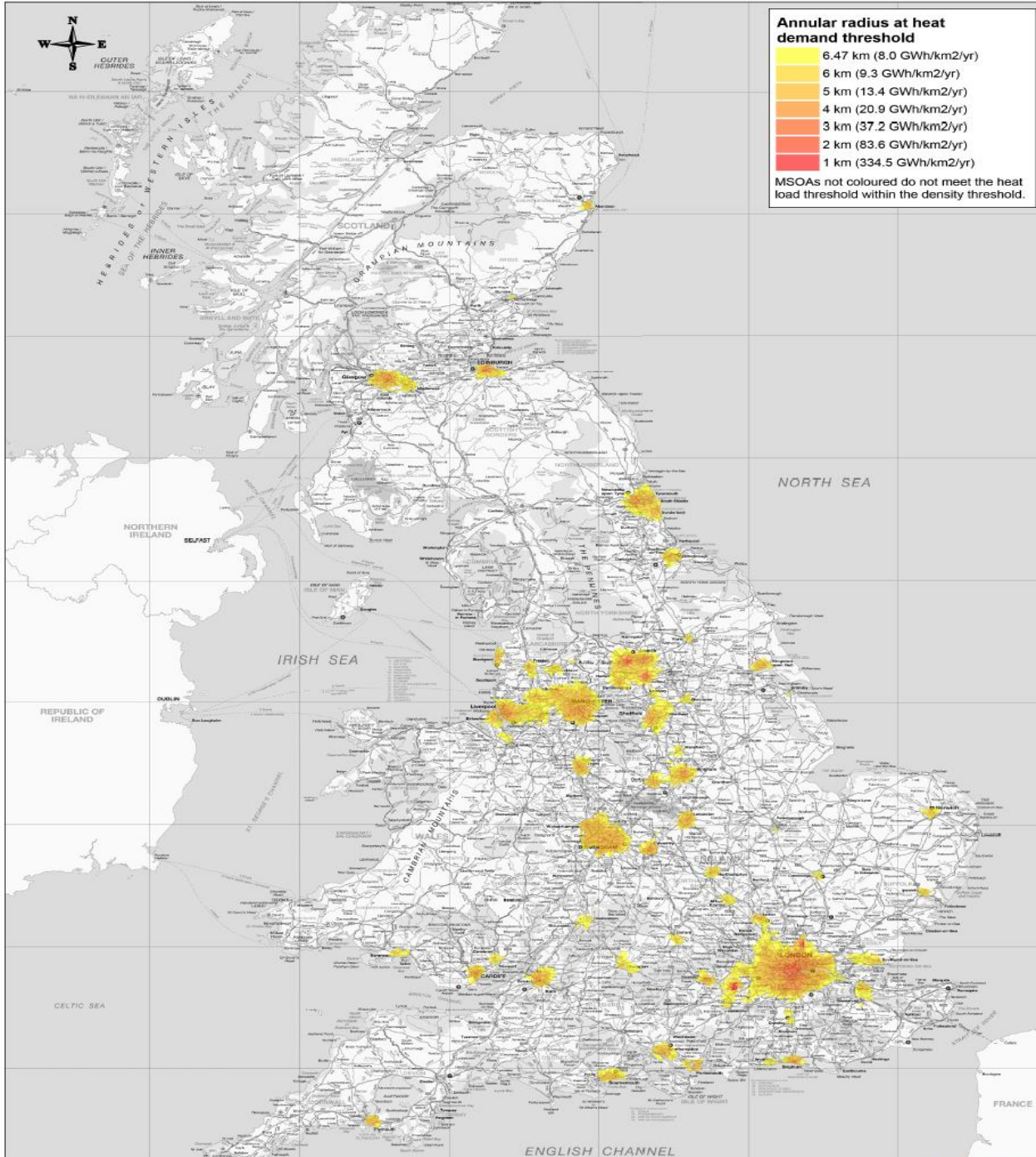


Space Heat Production



Notes:

- Significant role for both district heating and heat pumps, although some uncertainty over exact balance between the two
- First choice (i.e. least cost) heat for the DHN is usually heat from large power stations (see Sankey diagram). DHN is still selected even if this is not possible, but will instead get heat from marine heat pumps, geothermal and CHP.

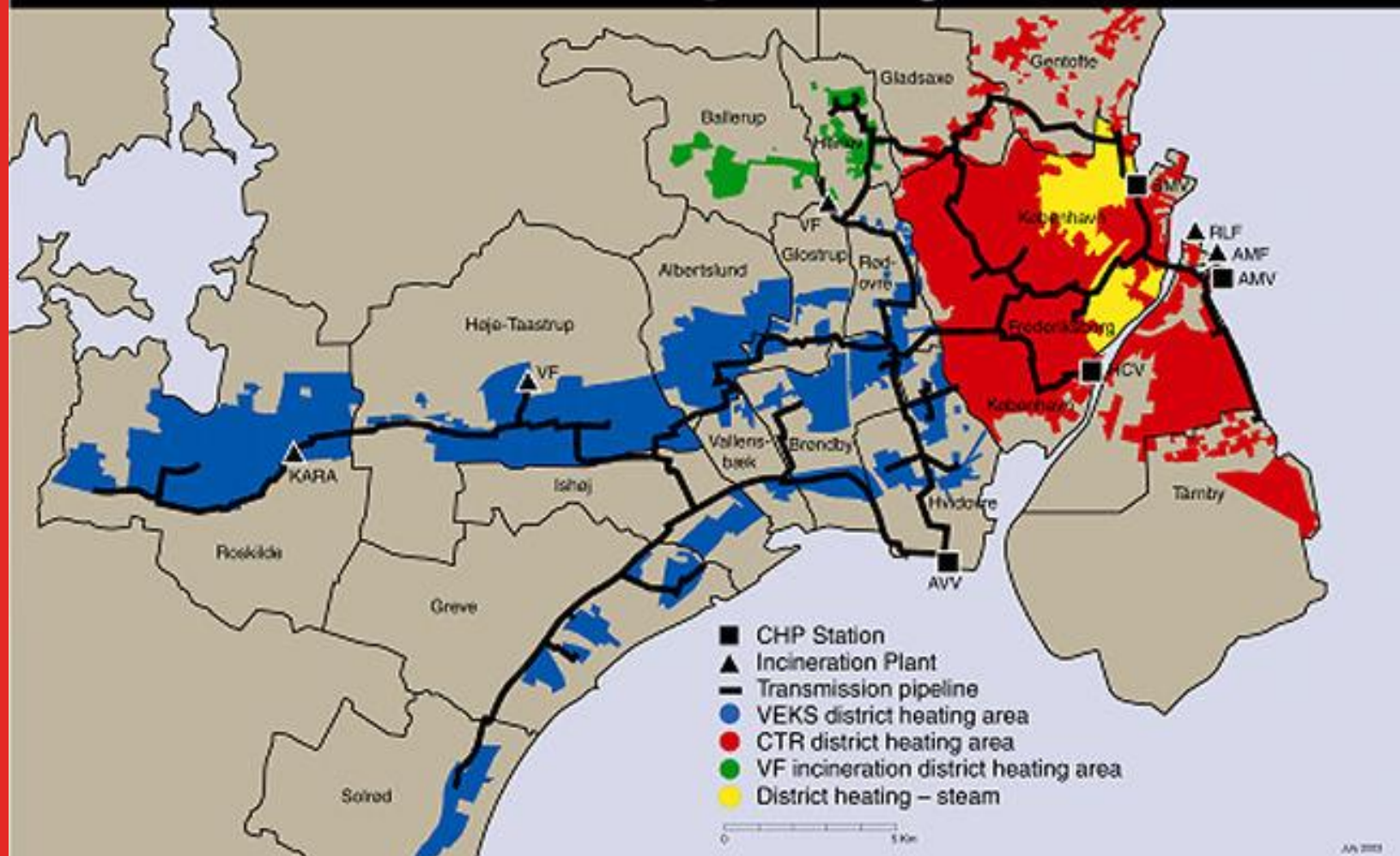


50 cities could host District Heat networks of sufficient size & density

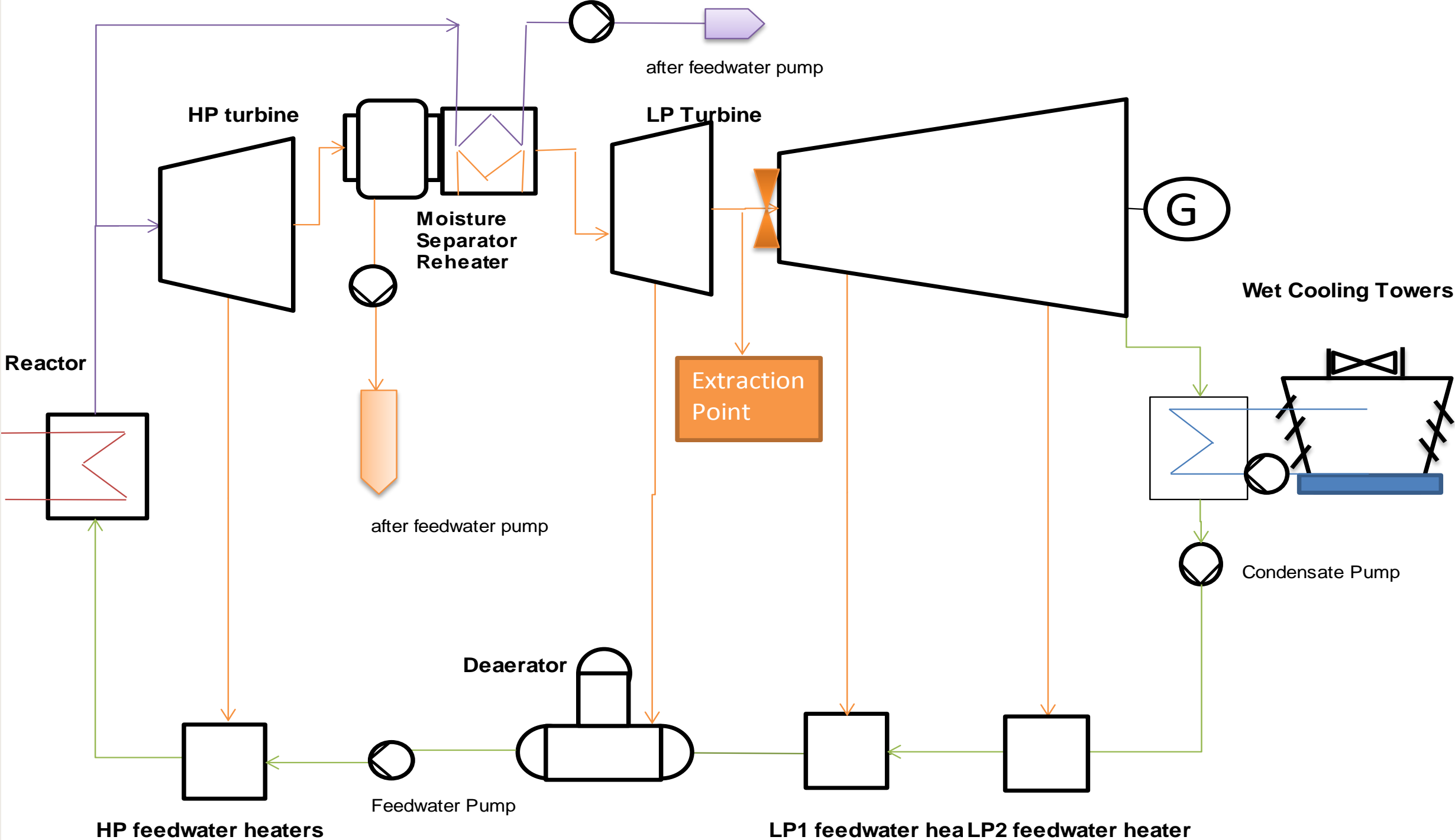
This would require around 22GWe / 40GWth SMRs

Power Plant Siting Study suggests site availability

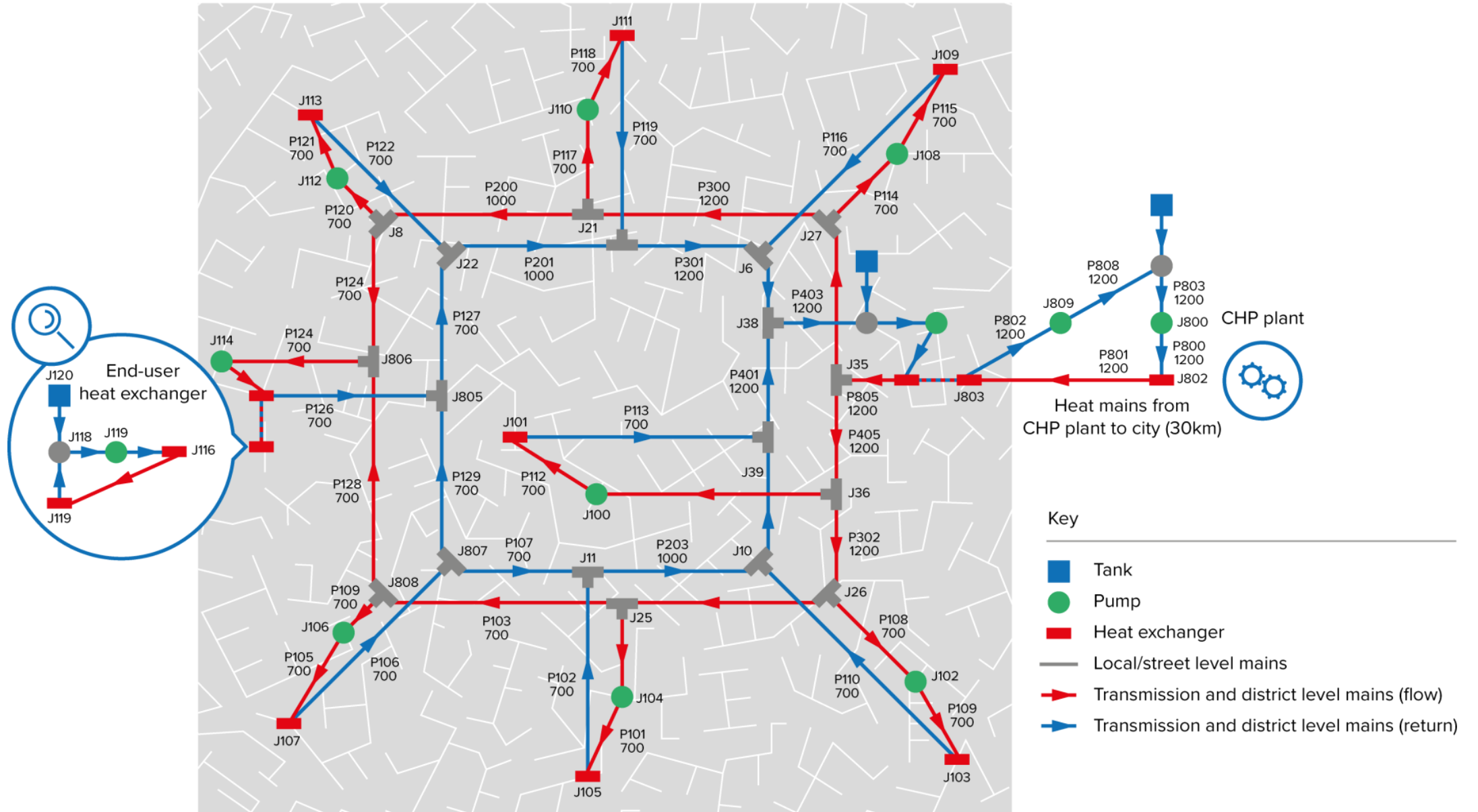
CHP in the Copenhagen area

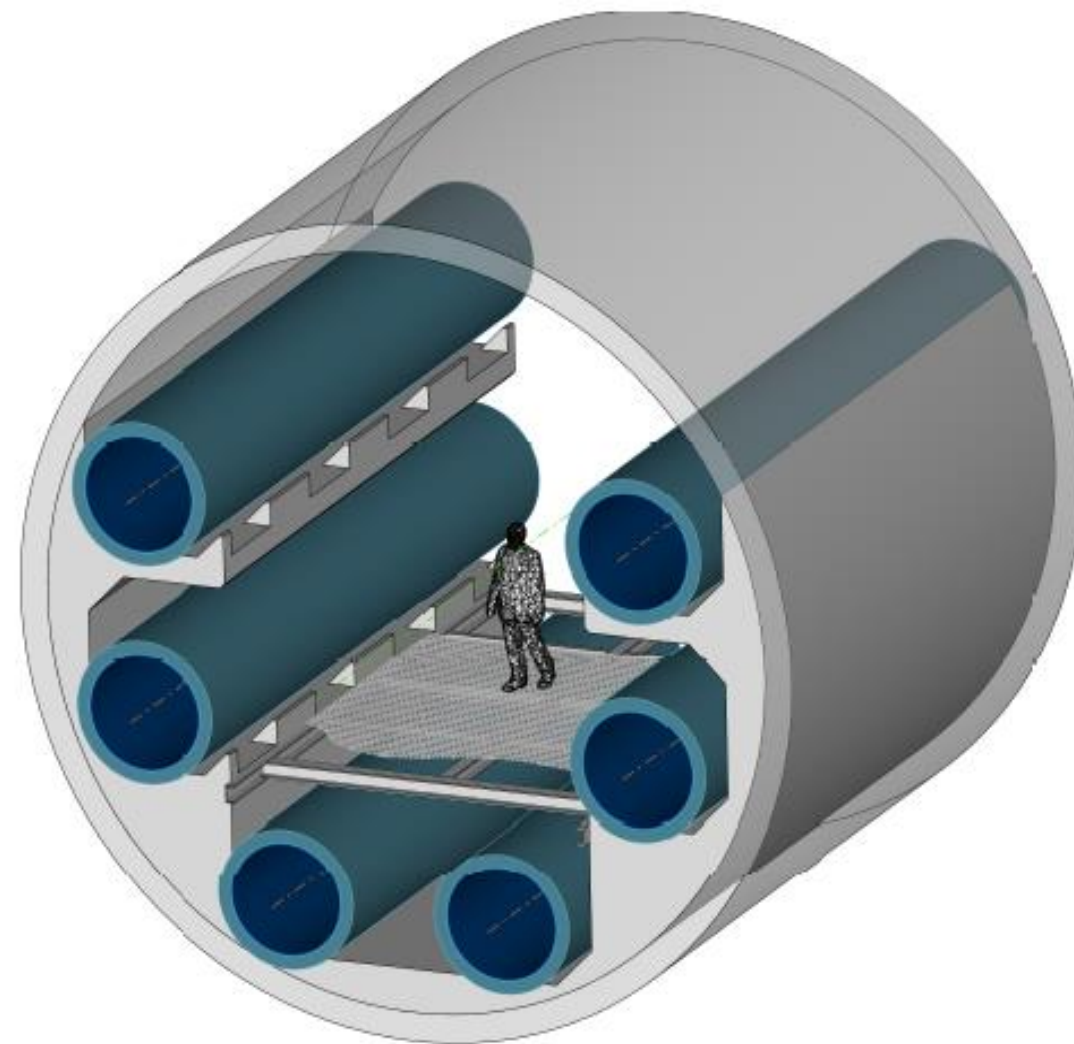
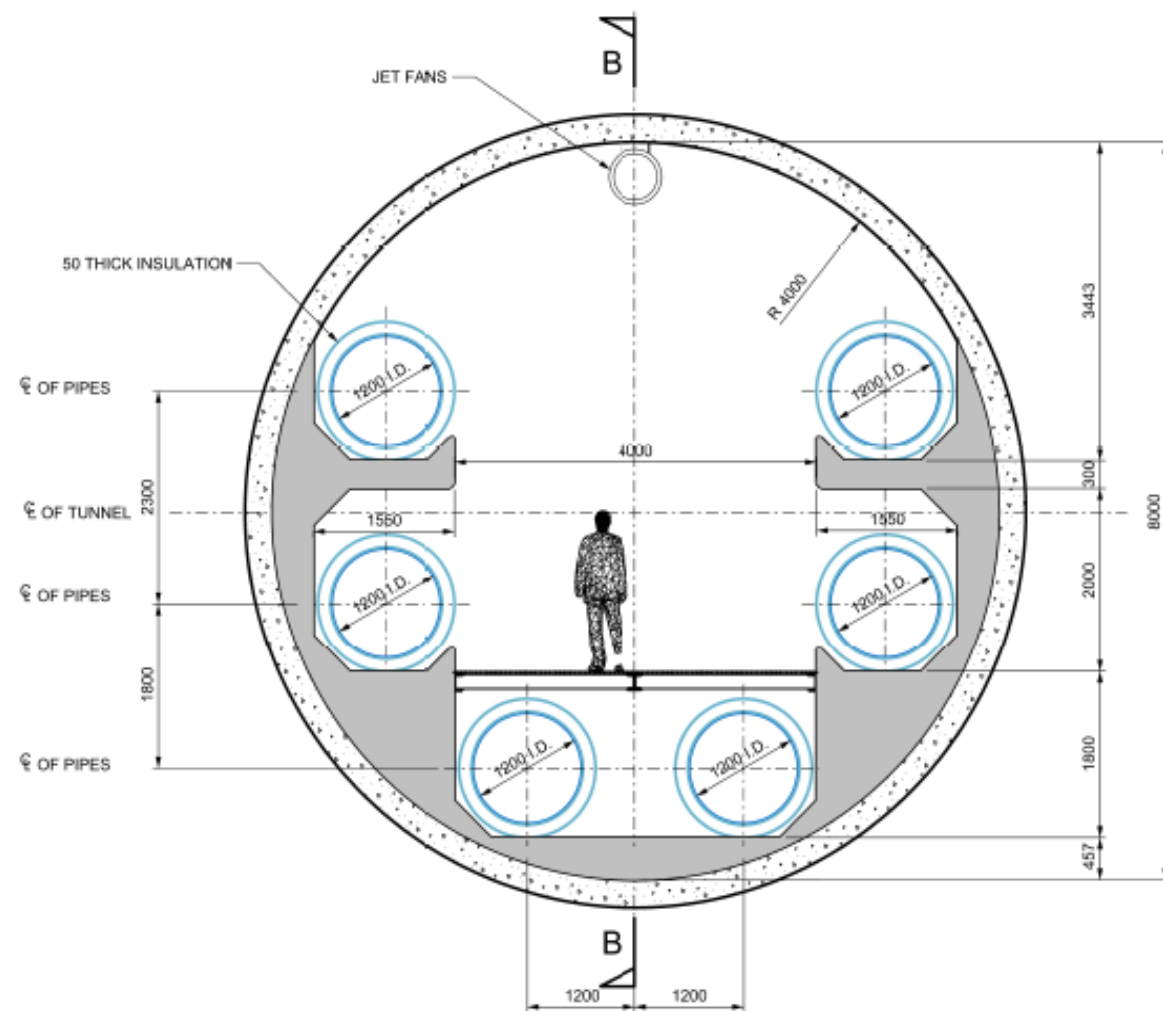


It is technically feasible to use SMRs as
Combined Heat and Power (CHP) Plants



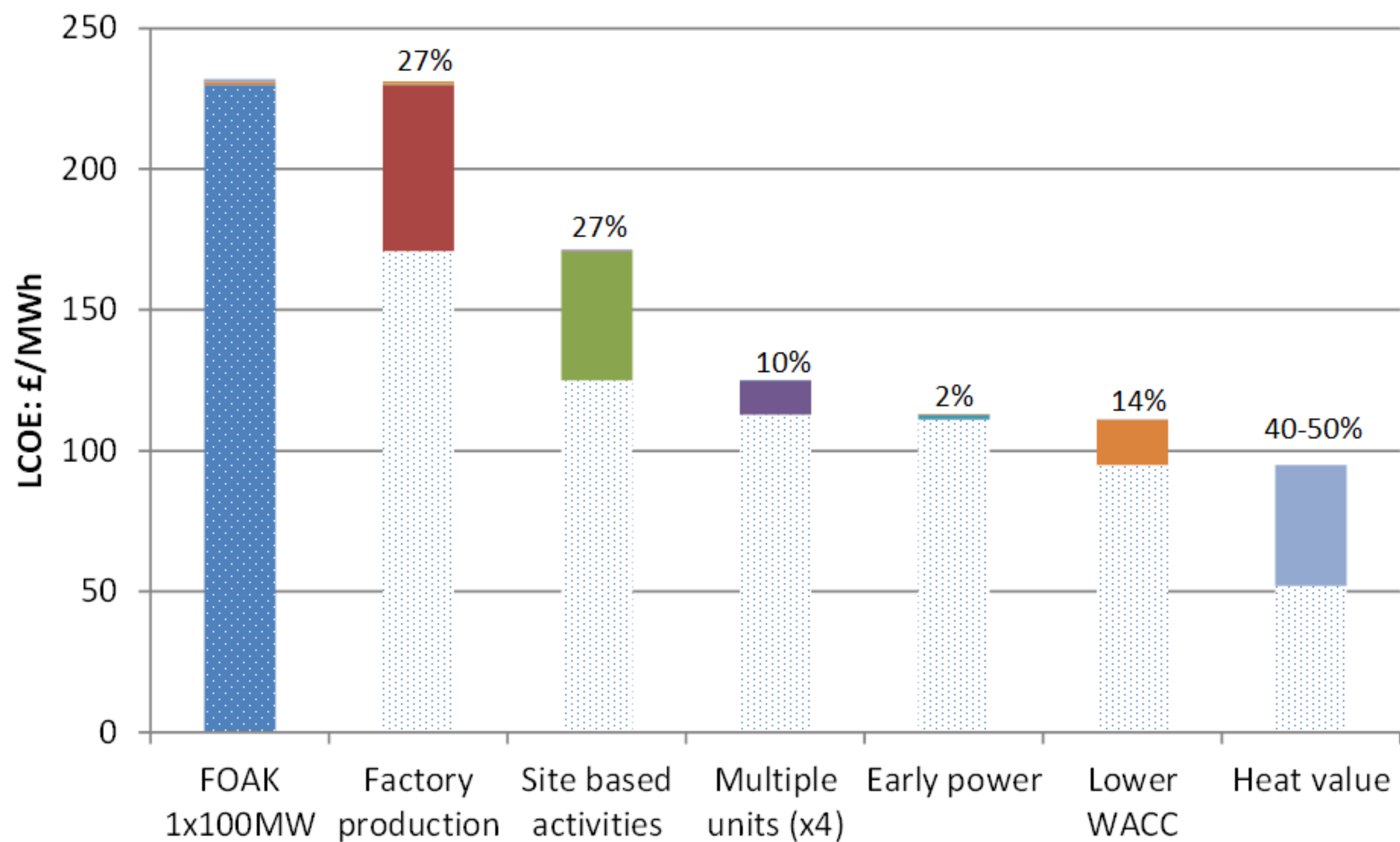
City-scale district heat network





Cross section for 8m diameter pipe carrying 6 x DN1200 DH pipes

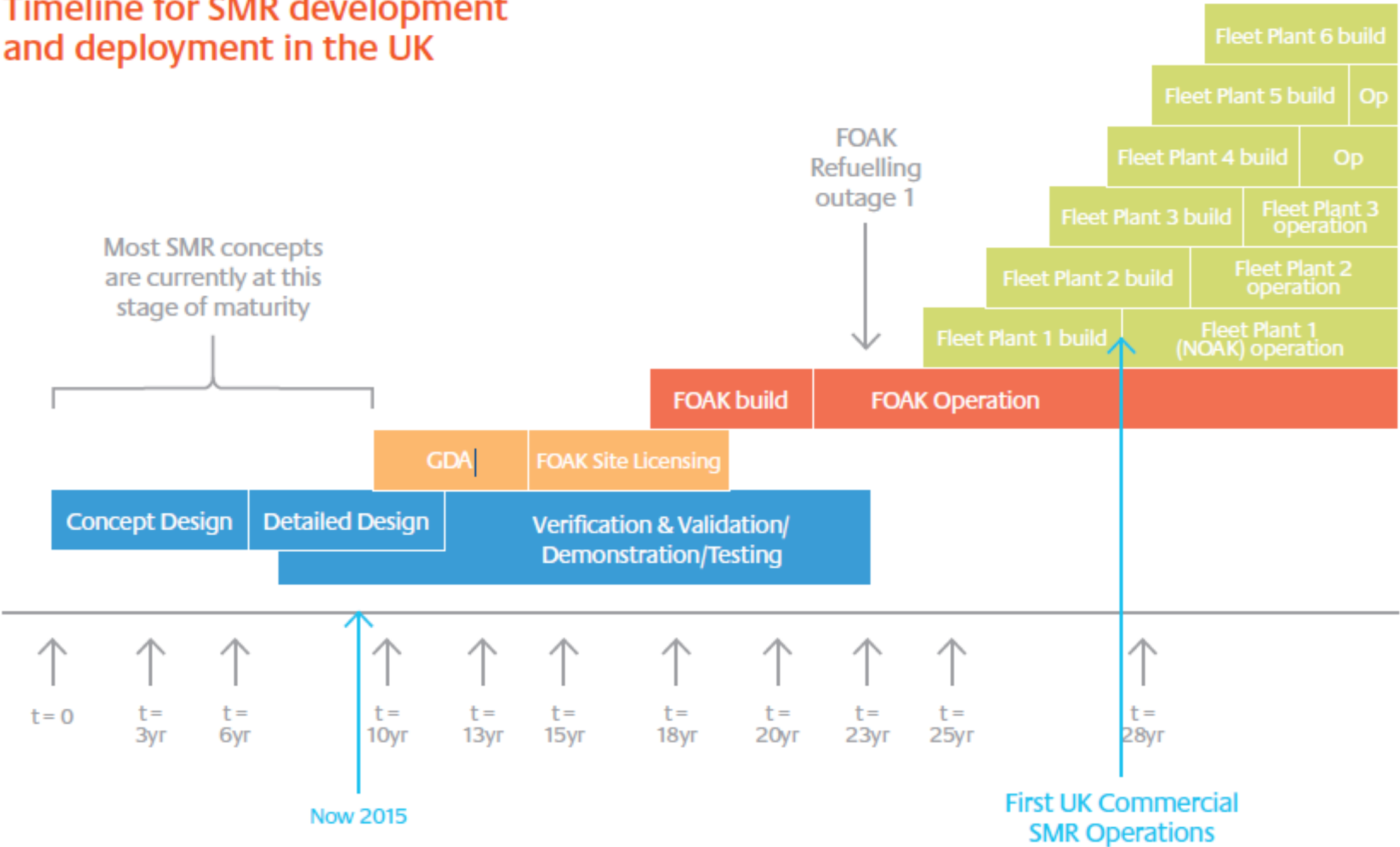
Heat supply is likely to improve SMR economics and competitiveness



Target costs

	NOAK plant (base case)	NOAK plant (sensitivity)
Electricity-only SMR (baseload)	<£3,600/kWe <£80/MWh LCOE	Increases to <£3,900/kWe with more optimistic assumptions
CHP SMR	<£6,500/kWe	Reduces to <£5,000/kWe with more pessimistic assumptions

Timeline for SMR development and deployment in the UK



Recommendation: SMR plants
should be built 'CHP ready'



Working with the ETI

- Strong relationship
- Communicating key messages
- Proscriptive approach



Thank you

