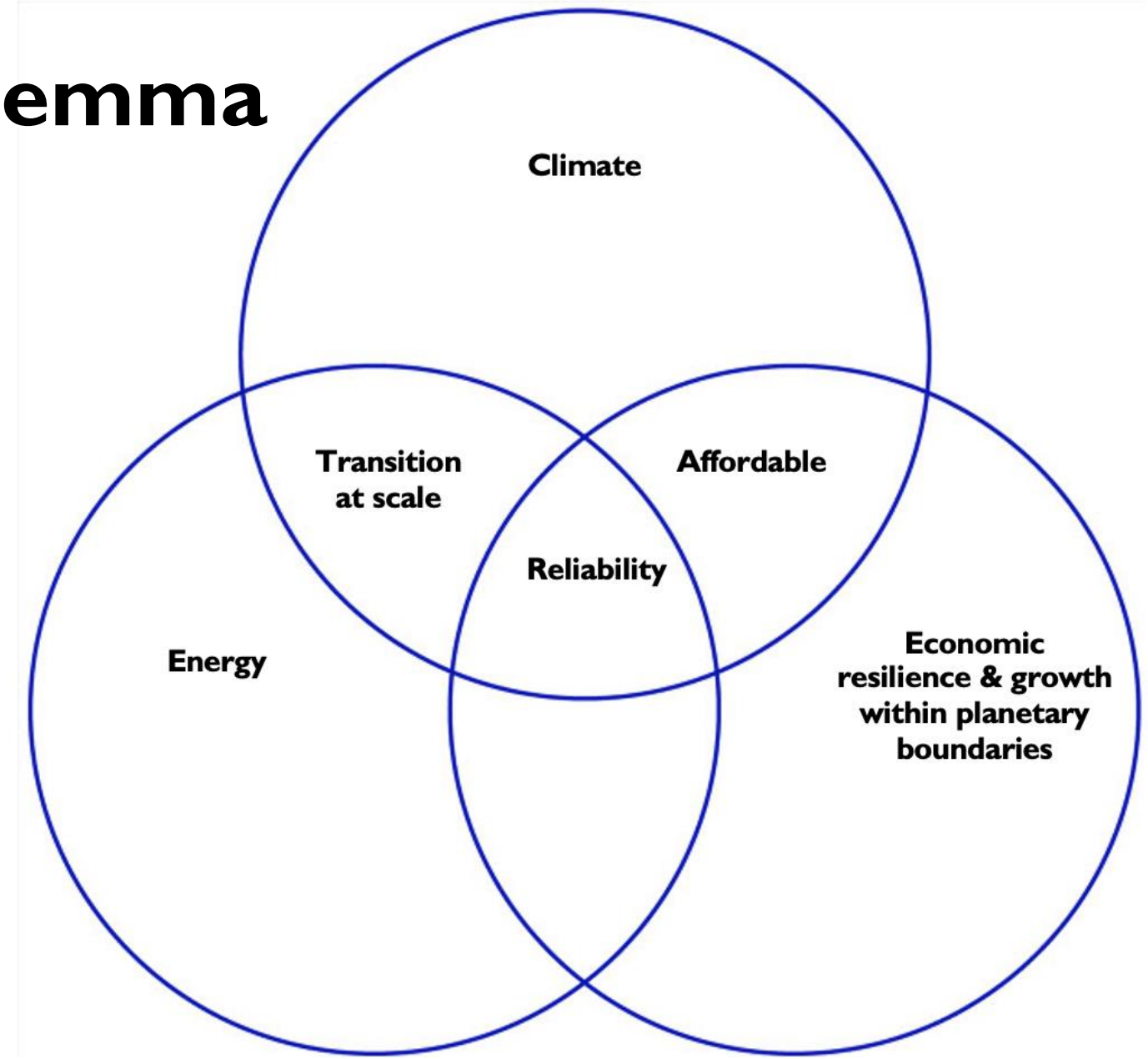
Unlocking the geothermal decade: The vital role of cities

Sanjeev Kumar
Head of Policy, EGEC
s.kumar@egec.org | +32 499 539731

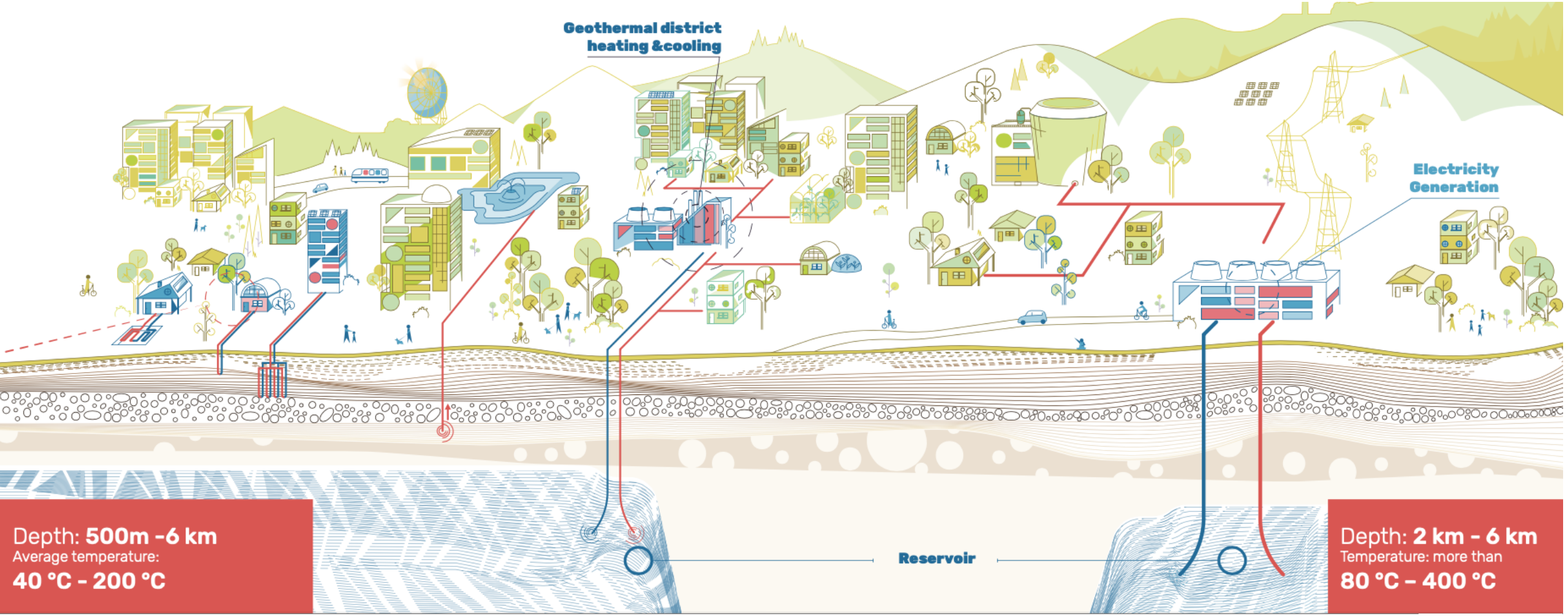
EGEC GEOTHERMAL

The importance of geothermal

Our trilemma

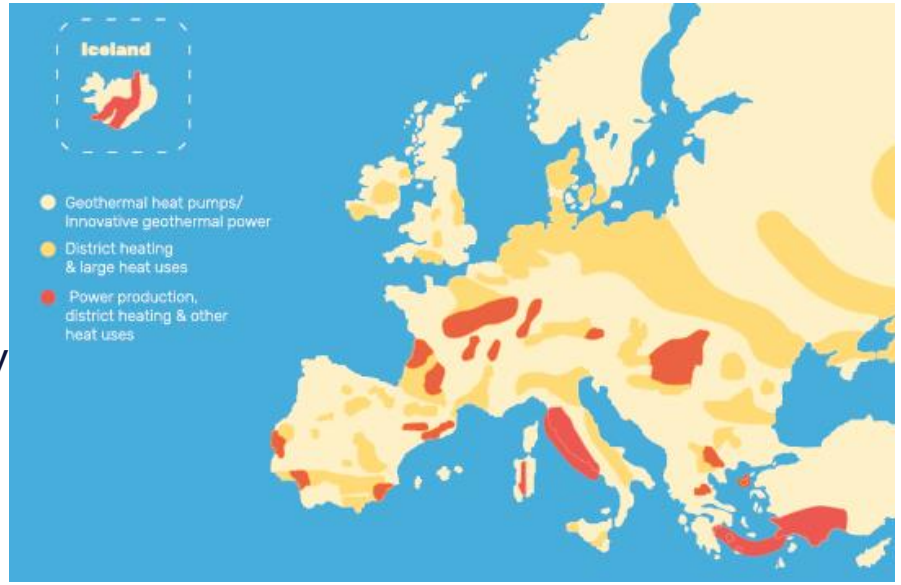


Geothermal is the multi-solution provider



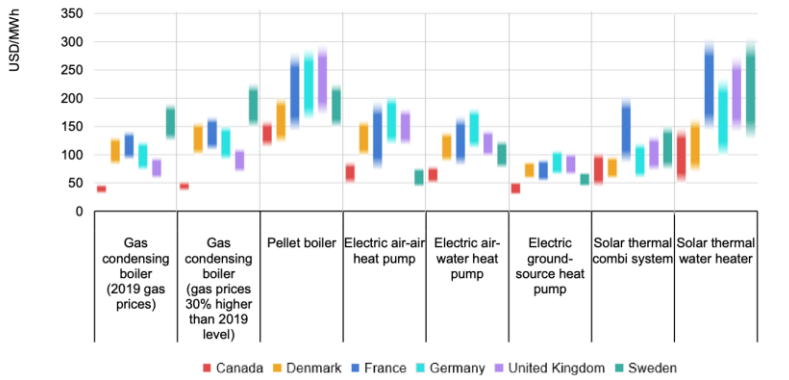
Geothermal is...

- **Cheaper than fossil and other renewable heat sources** in many Member States according to the International Energy Agency (see Figure 1). ADEME, the French environment agency, found that the levelised cost of geothermal district heating was €15 MWh compared to €51 MWh from fossil sources in 2019.
- **Good for property values:** In Sweden, household retail agencies found houses with Geothermal Heat Pumps increased property prices by about €10-12,000.
- **The *'go to'* solution for urban and rural cities:** Cities all over Europe are opting for large-scale geothermal district heating systems.



Overall cost-competitiveness of heating technologies

Figure 4.25 Levelised cost of heating for consumers, for selected space and water heating technologies and countries

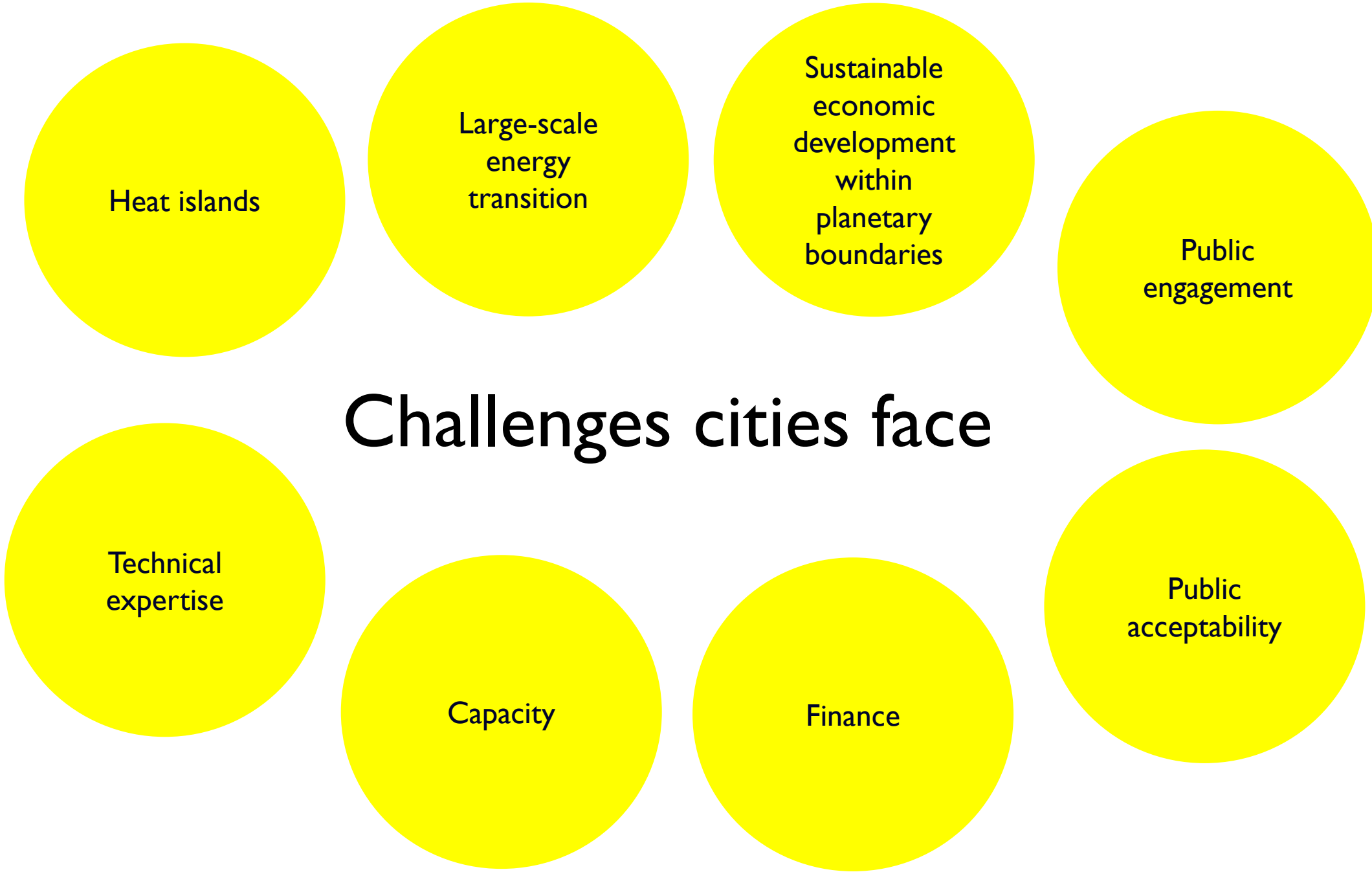


Source: IEA

- **Grid balancing:** Geothermal electricity provides baseload solves **security of supply threats** by removing dependence on the import of fossil fuels from third countries.
- **Available everywhere:** Heat reservoirs and basins have only been mapped in some regions and in some countries. Over 25% of the EU's population can be supplied by geothermal district heating by using resources mapped in 2013. Combined with geothermal heat pumps (GHPs), nearly half of the EU's heat demand can be met by 2030.
- **Sustainable lithium:** Geothermal operations in Germany, France, UK, Kenya, New Zealand, Canada & the US are investing in geothermal lithium hydroxide and other related lithium chemicals from existing and new geothermal capacity. This zero-emission extraction is the foundation for the global lithium battery value-chain.

Unlocking the geothermal decade across Europe

Challenges cities face



Geothermal in coal regions

- Heerelen in Limbourg, the Netherlands, reflooded an abandoned coal-mine and used this for a 4th generation geothermal district heating and cooling system for the local community.
- The scheme is called Mijnwater
- Last coalmine closed in 1974. 2003 exploratory drilling. 2005 geothermal drilling and 8 km piping system installed. 2008 geothermal plant fully operational supplying nearby offices. Extended to residential houses and other offices.

- The **Asturias region**, in north west Spain was the centre of the country's coal mining.
- Phase 1 started in 2006 to supply Vital Álvarez Hospital (7 million kWh per year) and the University of Oviedo campus (208,000 kWh per year).
- Phase 2 added 2 MW more in 2020 including another university campus and 248 residential buildings.
- European Regional Development Fund grant of €500,000 leveraged 1.4 million private finance.

Geothermal District Heating & Cooling

- Over 250 geothermal district heating & cooling systems in operation across Europe.
- About 300 geothermal district heating and cooling projects at various stages of development.
- City of Epsoo, Finland, has the largest district cooling system globally. Fortum expects 95% of the city's buildings to receive geothermal heat from its DHC system by 2029.

- ADEME (French energy & environment agency) found LCE of geothermal as low as €15 MWh compared to gas at €51 MWh (see ADEME (2019) Coûts des énergies renouvelables et de récupération en France).
- Most of the Paris basin is provided by geothermal DHC systems. Installed because it was the most cost-effective and reliable solution.
- Vélizy-Villacoublay geothermal project in France, by Engie, used innovative multi-draindrilling techniques which increased the geothermal output by 30%.

Geothermal heat pumps

- Over 2 million geothermal heat pumps in operation in Europe. Sweden, Germany and France some of the largest markets.
- Poland, Spain and the Netherlands rapidly growing.
- Public and commercial buildings look to geothermal heat pumps. Bundestag Germany and Parliament of Malta use geothermal heating and cooling.
- The European Parliament in Brussels investigating geothermal cooling.

- Geothermal heat pumps also allow corporations to replace fossil use with renewables. Microsoft installed geothermal system to manage its own waste heat profile.
- IKEA committed to mass roll out of geothermal and other renewables across all their stores to meet their climate, energy and sustainable goals.

Innovative business models

- **Heat Purchase Agreements** mainly for food, beverages, local authorities.
- Based on long-term supply contracts (about 10 years or more). This is a guaranteed income to allow for geothermal development to occur eg 21 horticultural consumers signed **Letter of Intent** to purchase heat from energy company Tulip Energy (the Netherlands) in February 2022. Helps to de-risk geothermal system development.
- National, EU or local **de-risking schemes** are key to providing geological data and public/private risk coverage to increase successful project development.

- Utilities moving into the market.
- Vattenfall in Sweden offers geothermal heat pumps, district heating and air-source heat pumps to residential consumers.
- e.on building geothermal heating and cooling system to deliver Malmo City's (Sweden) 100 renewable energy commitment.
- ***'délégation de service public'*** allows private companies in France to deliver public services. Allowed Engie to build geothermal DHC system in Cachan in 2 years!

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#geothermaldecade

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