

# hive



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# The TEAM



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SAVOSOLAR 

newHeat



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CRIGEN



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PlanEnergi

TRACTEBEL

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hive



- Close to HYVÄ
- Short
- **Helsinki Innovative & Versatile Energies**
- A good picture for our team
- A good picture for the solution: an assembly of modest production tools contributing and helping each other satisfying the City's heat demand



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# Our solution for Helsinki

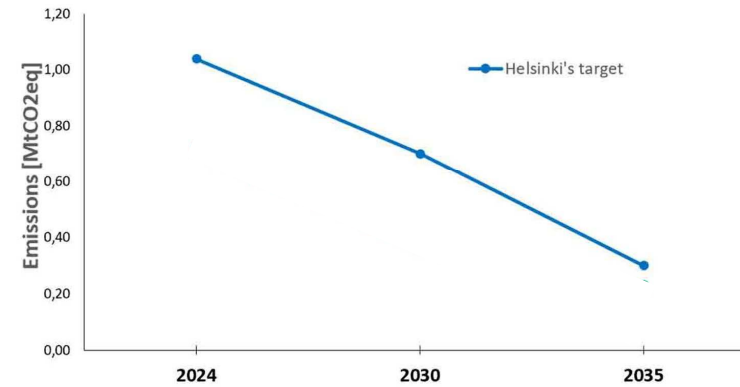


## Key specifications

Yearly heat supplies 2024-35:

Year	Total heat supply GWh
2024	6060
2030	5650
2035	5450

GHG emissions for DH heat production:



National ban on coal firing: 1 May 2029  
City's target: 0 fossil fuel burning by 2035  
Minimize use of biomass



## Hive 'baseline scenario' solution: key features

- **Gradually increase renewable production assets:**
  - sea water heat pumps: carbon free sea water heat + low carbon power (Finnish power mix)
  - solar thermal: 0 carbon heat
- **Additional storage:**
  - PTES: fast response, seasonal storage
  - BTES: large energy buffer, peak & back-up supply
- **Lower DH operating temperatures:**
  - minimize/eliminate need for high temp production assets (biomass, electrical boilers, etc.)
- **Support demand side management**



## Some HIVE production assets: sea water heat pumps

Harvesting heat along the coast  
Total capacity: approx 500 MW<sub>th</sub>





## Some Hive production assets: solar thermal

Two solar thermal fields of 25 MW each



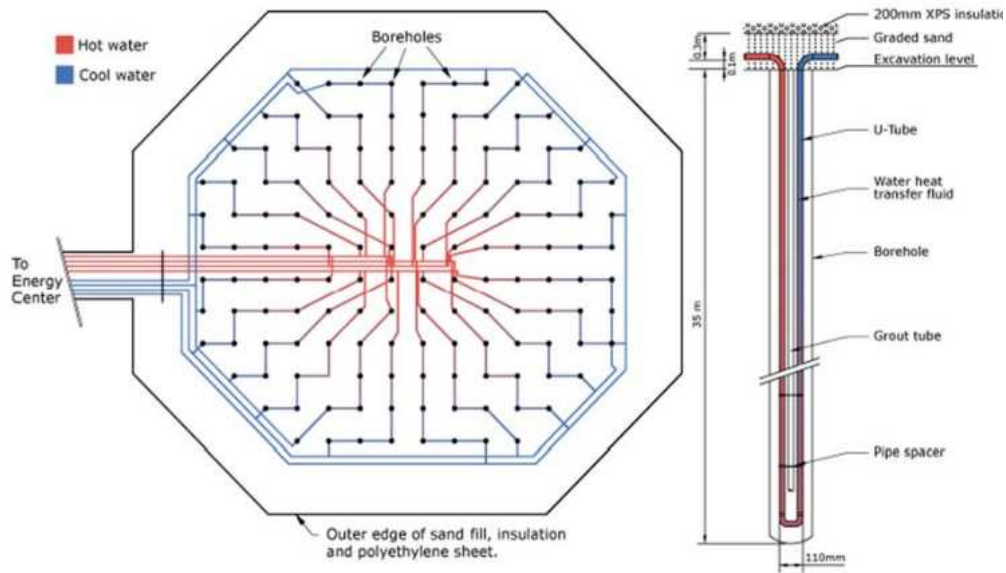
## Some Hive production assets: PTES

2 large volume units planned

275 MW/ 45 MWh



## Some Hive production assets: BTES

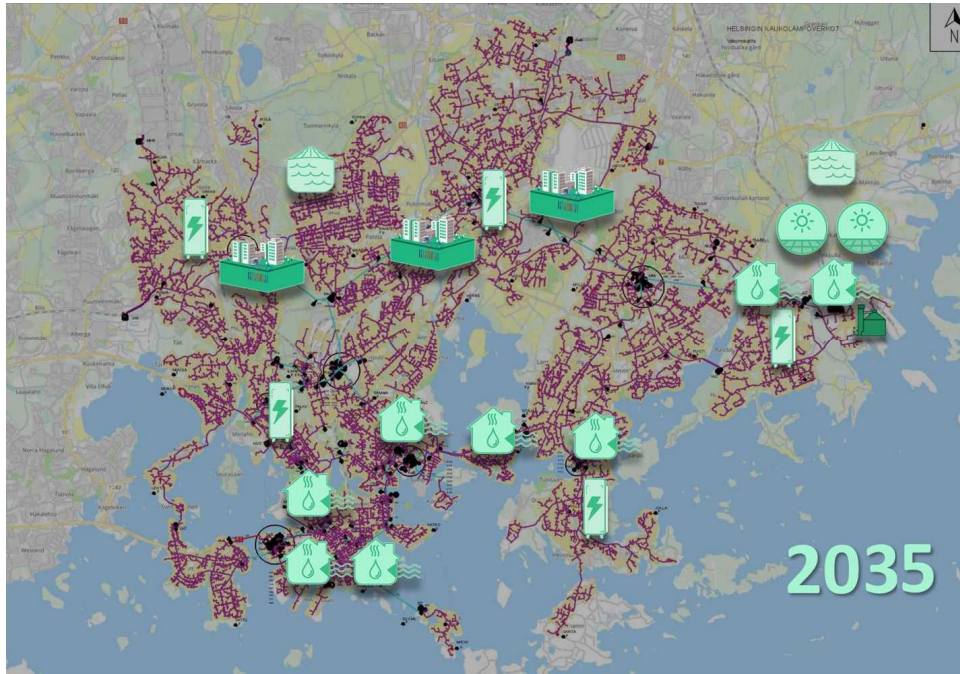


Use less valuable land

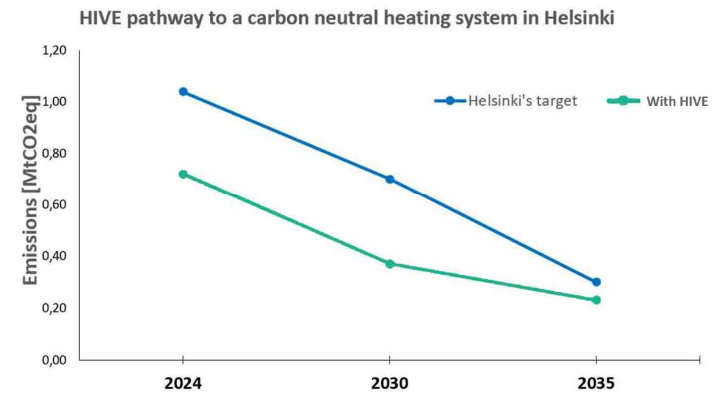
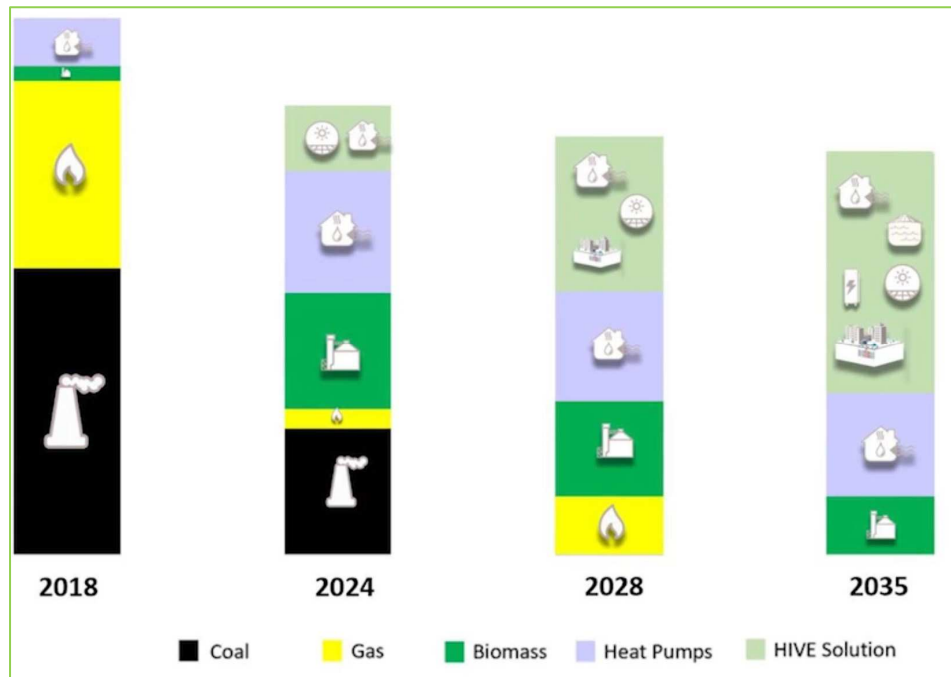
150 MW/ 300 MWh



## HIVE 2035 added assets



## Hive 'baseline scenario' asset mix



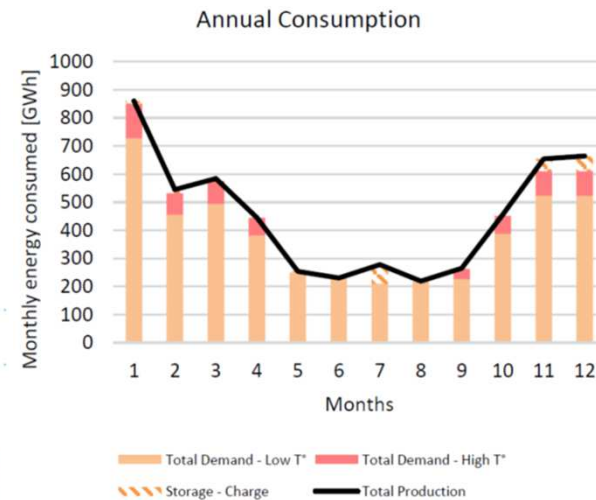
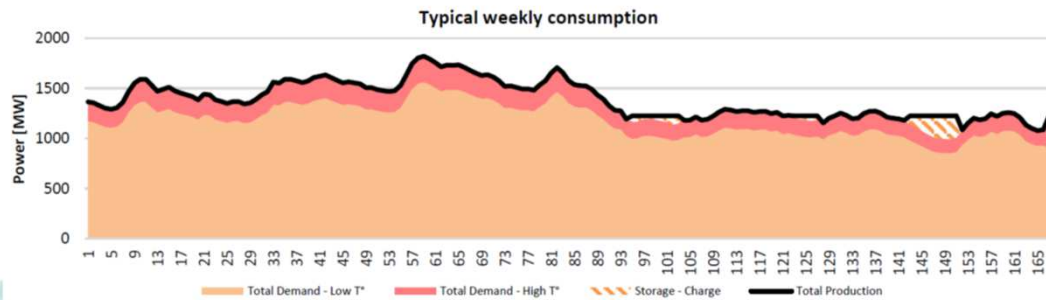
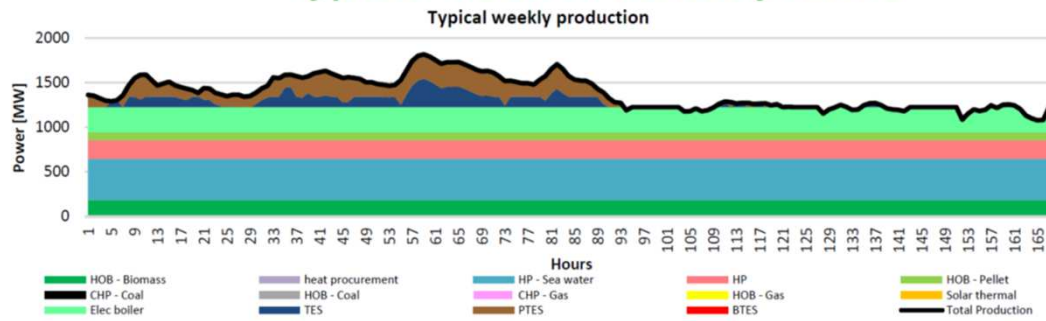
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Flexibility considerations



## Storage in the energy mix

### Typical week in January: 2035

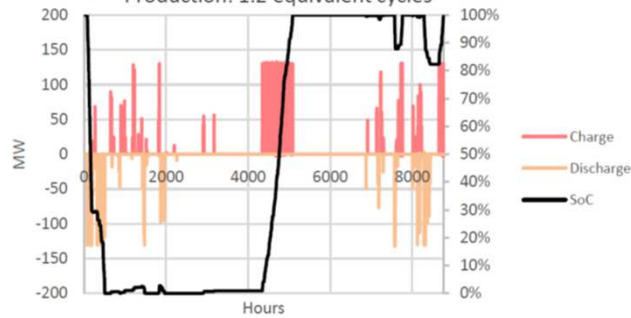


## The roles of storage

### ➤ PTES

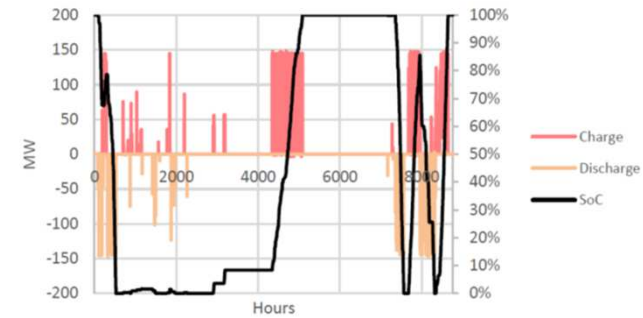
#### PTES #1

- 500 000 m<sup>3</sup>
- 130 MW
- Production: 1.2 equivalent cycles



#### PTES #2

- 500 000 m<sup>3</sup>
- 145 MW
- Production: 2.5 equivalent cycles



### ➤ BTES ensures peaking and back-up services





## Main take aways

- Hive relies on a combination of various assets: renewable heat production, large storage units, all helped by operation of the DH grid at lower temperature
- By 2035, nearly 50% of the heat demand is supplied by the sea water heat pumps
- GHG emissions will fall by approx 1 MtCO<sub>2</sub>/yr
- The heat production system will altogether use less land in the densely populated area
- Land use outside city centre will be minimal. Solar thermal allows mixed use (grazing, educational)
- The solution 'baseline scenario' is designed for stage deployment. It is flexible to new heat demand or new heat supply opportunities

