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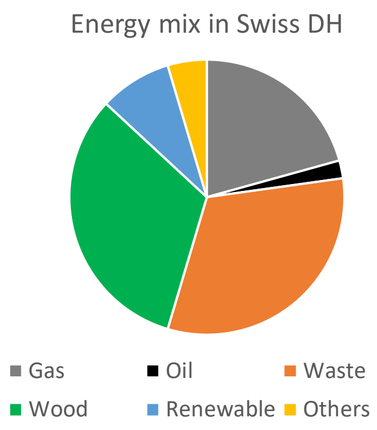
TES to reduce fossile peaks in DH networks

OST, Florian Ruesch, SPF Institute for Solar Technology, florian.ruesch@ost.ch

Goals

1. To which extend can Thermal energy storage (TES) be used to substitute or minimize fossil peak coverage in Swiss DH networks?
2. How does the need of TES differ between warm and cold winters?
3. Under which circumstances are TES solutions economically interesting?

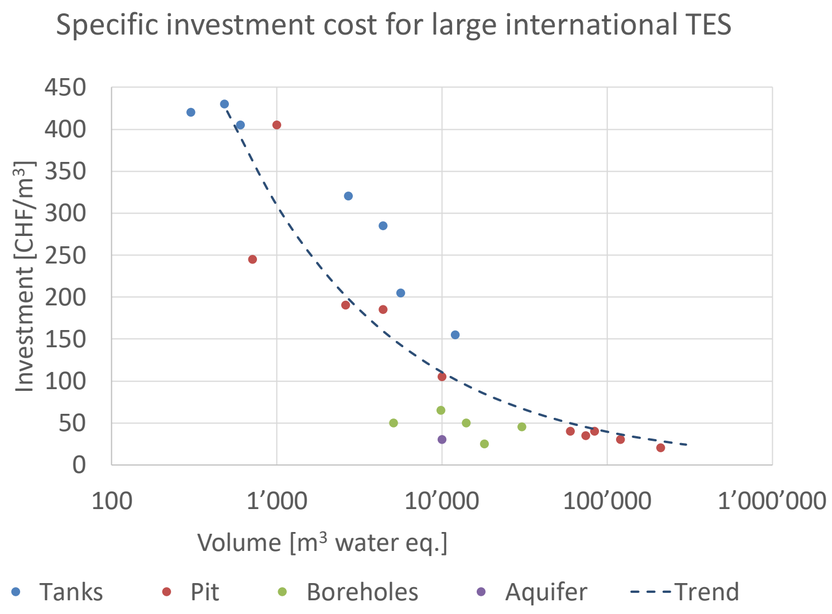
Problem



- Nearly ¼ of Swiss DH energy is fossil (mainly peaks)
- A full decarbonization is aimed for
- Renewable sources are capital intensive and therefore expensive when only operated during short peaks

Introduction

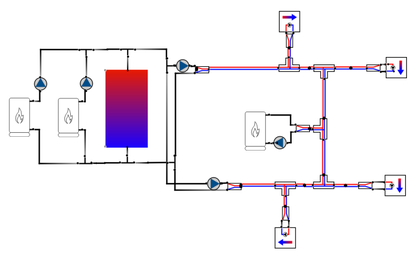
- Different TES technologies available
- Strong decrease of relative cost in international examples

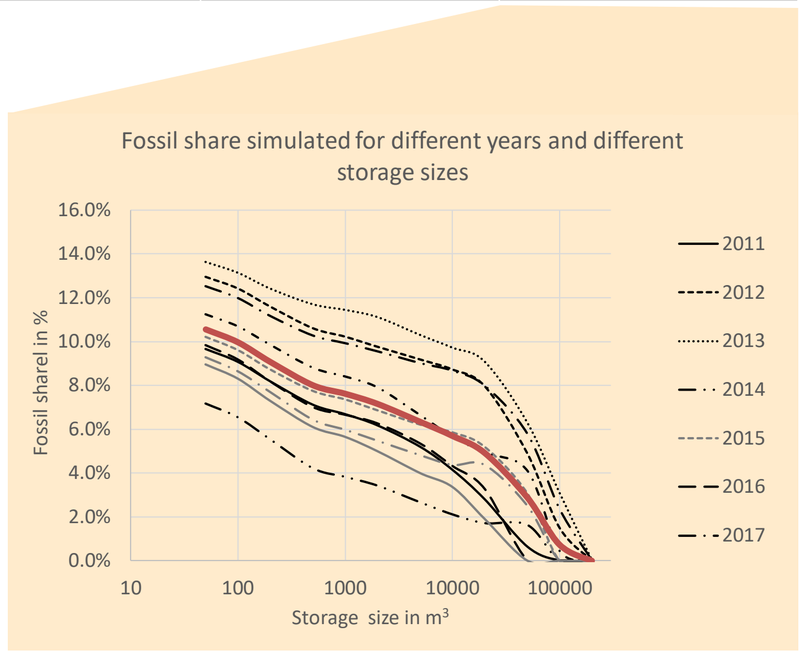


Method

Typical grids:	Wood	Lake water HP	Waste incineration
Power [MW]	0.9	3.7	23.3
Demand [GWh]	1.5	7.2	47.6
Grid length [km]	1.3	2.6	19.8

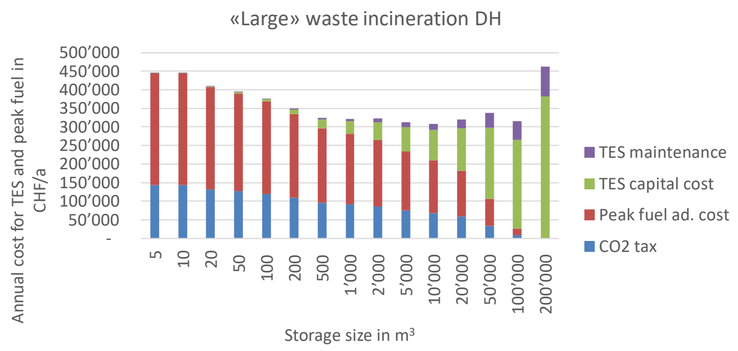
Simulation and parameter variation with simplified setup in TRNSYS:





Results

Minimization of TES volume and fuel cost for different
- typical networks
- economic parameters
- additional cost of peak fuel



Conclusions

- The difference in storage need between warm and cold winters are pronounced
- In small wood based networks, hourly TES are economically interesting
- In large waste incineration grids, seasonal TES are economically interesting

Core partners

Associate partners

Cooperative partners: