IEA-SHC Task 53 meeting
Madrid, 12th April 2016

Högskolan Dalarna Task 53 related activities

Chris Bales

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Contents

- ClimateWell (Corey)
- PhD SolGriHP
- iNSPiRe
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- IEA participation?
- Activities at KTH (Stockholm)

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SolGriHP PhD project

- Emmanouil Psimopoulos
  - Part time lab engineer and PhD student
  - Started late 2015 (studying courses)
  - Master in solar energy engineering (Högskolan Dalarna)
  - Previously designer and installer of PV systems in Greece
- Collaboration with Uppsala Univ.
  - Rasmus Luthander (PhD student)
  - Joakim Widén (supervisor)
  - We work on system and building, they work on local grid analysis (several buildings and PV systems and the interaction with one another)

Luthander, R., J. Widén, D. Nilsson and J. Palm (2015). "Photovoltaic self-consumption in buildings: A review." Applied Energy **142: 80-94.**
Widén, J. and E. Wäckelgård (2010). "A high-resolution stochastic model of domestic activity patterns and electricity demand." Applied Energy **87(6): 1880-1892.**
Sandels, C., D. Brodén, J. Widén, L. Nordström and E. Andersson (2016). "Modeling office building consumer load with a combined physical and behavioral approach: Simulation and validation." Applied Energy **162: 472-485.**

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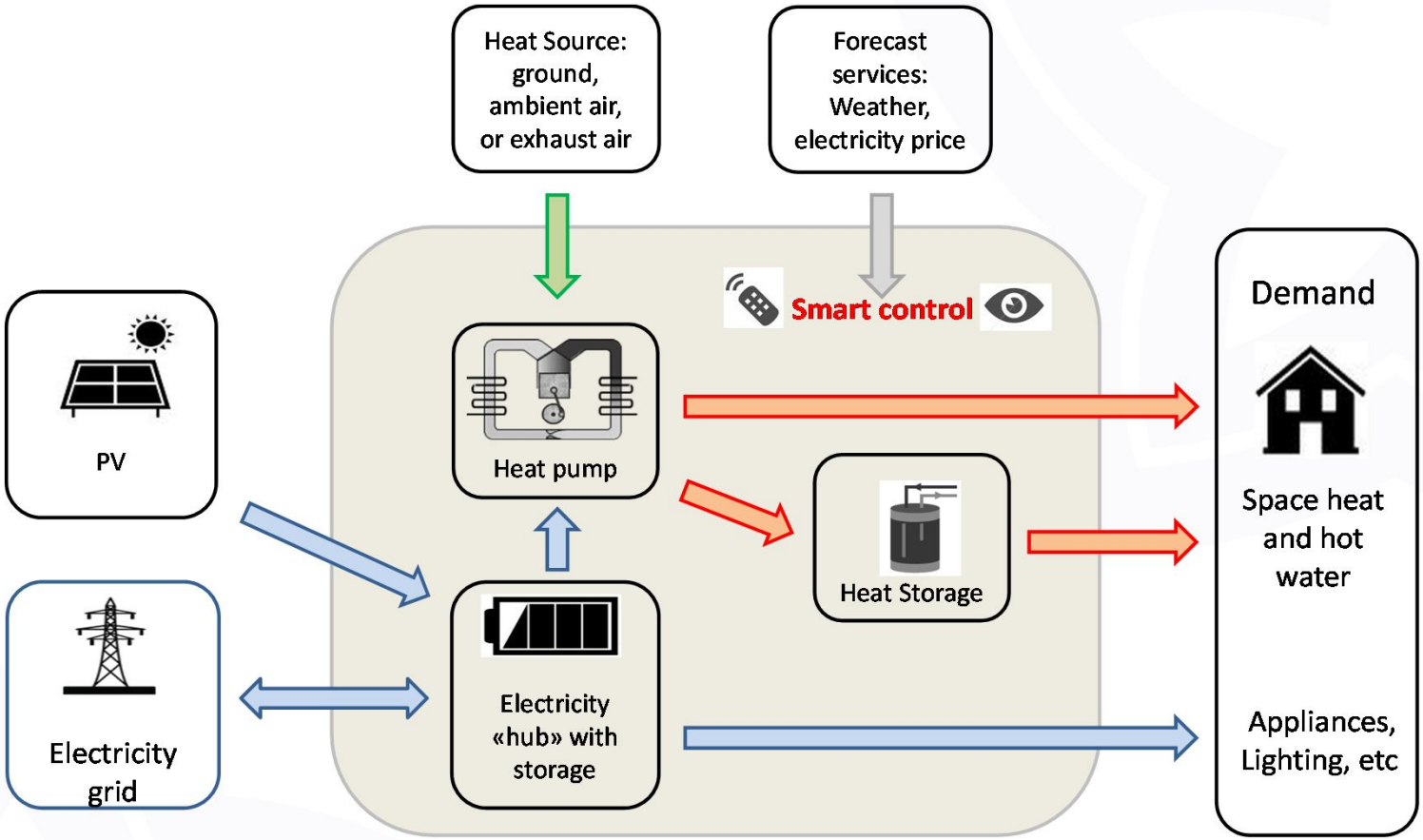
System concept



Collaboration with Swedish industry (Nibe and Ferroamp)

We do simulations of system and loads

Design control algorithms together

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Companies

- Nibe
  - One of largest heat pump manufacturers in Europé
- Ferroamp
  - Start-up company
  - 3-phase levelling
  - DC internal ”grid” for PV/battery/grid power exchange

Wyrsch, N., Y. Riesen and C. Balif (2013). Effect of the fluctuations of PV production and electricity demand on the PV electricity self-consumption. 28th EU PVSEC, Paris, France.

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Eurosun paper

- Base case for Swedish house with independent PV and heat pump systems
  - New SFH with exhaust air HP
  - Detailed modelling of building
  - Short time resolution weather and loads
- Development of 3 algorithms for control using thermal and battery storage
  - Thermal only (building + DHW)
  - Electrical only
  - Thermal and electrical

Wyrsch, N., Y. Riesen and C. Balif (2013). Effect of the fluctuations of PV production and electricity demand on the PV electricity self-consumption. 28th EU PVSEC, Paris, France.

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- Draft report on office simulations completed
- 162 / 324 m^2 floor area, 3/5/7 floors
- AWHP, boiler+split unit
- Radiant ceiling, fan-coil
- Roof or facade PV (3 areas each)
- 3 different building energy levels
- 7 climates
- …lots of results (incl. economic)!

- Plan a front end tool to easier access the results (database)

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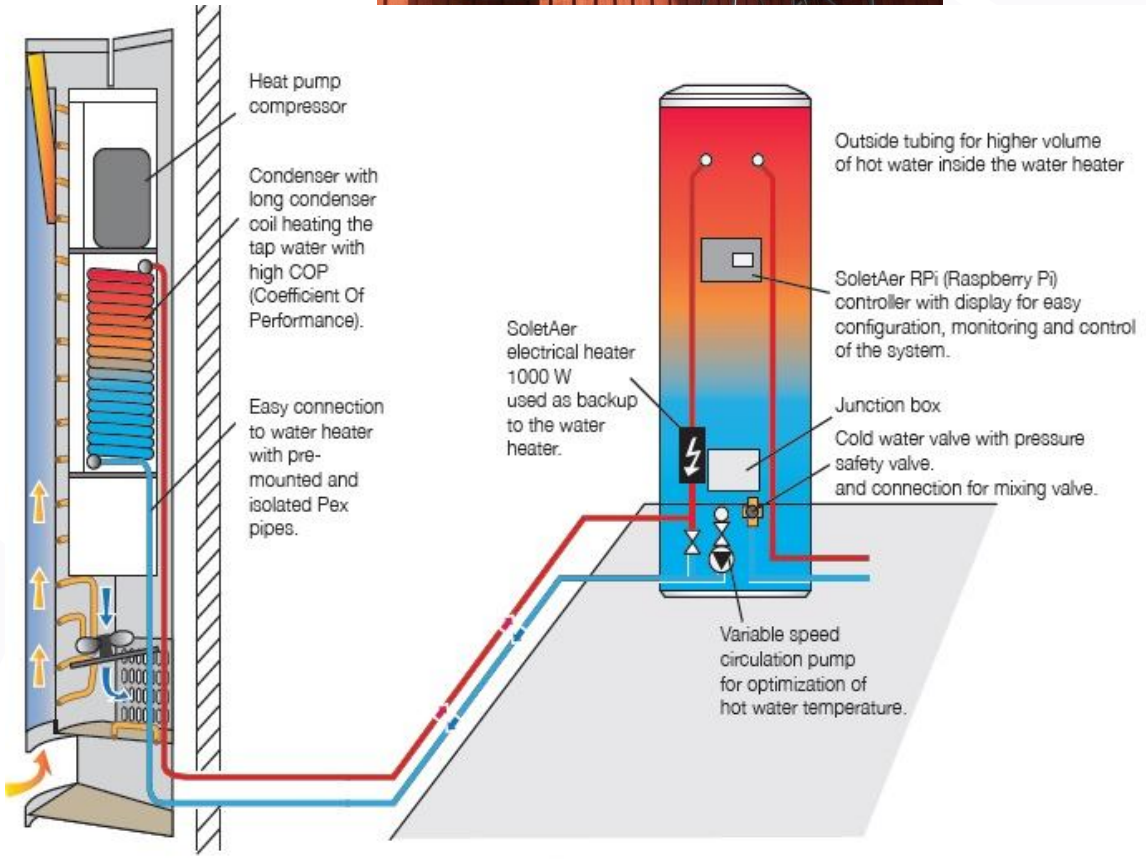
Soletaer

- Swedish start-up company
- Development engineers from Thermia
- Solar thermal + HP
- Only DHW
- Collector is also evaporator
- Natural convection refrigerant loop for solar thermal part



Soletaer

Participation in Task 53??

- No financing as yet
- Here to see what is being done and how we could contribute with the SolGriHP project
  - Corey will decide about ClimateWell
- I am personally still interested in whole system testing