energikontor sydost

VI STÖDJER FÖRETAG & OFFENTLIGA AKTÖRER I ENERGI- & KLIMATARBETET

Small Scale CHP from biomass
– a demonstration project in Southeast Sweden

Karoline Alvånger, Energy Agency for Southeast Sweden

Program 9th International Seminar on Gasification

Partly financed by EU programme Life+ and Swedish Energy Agency

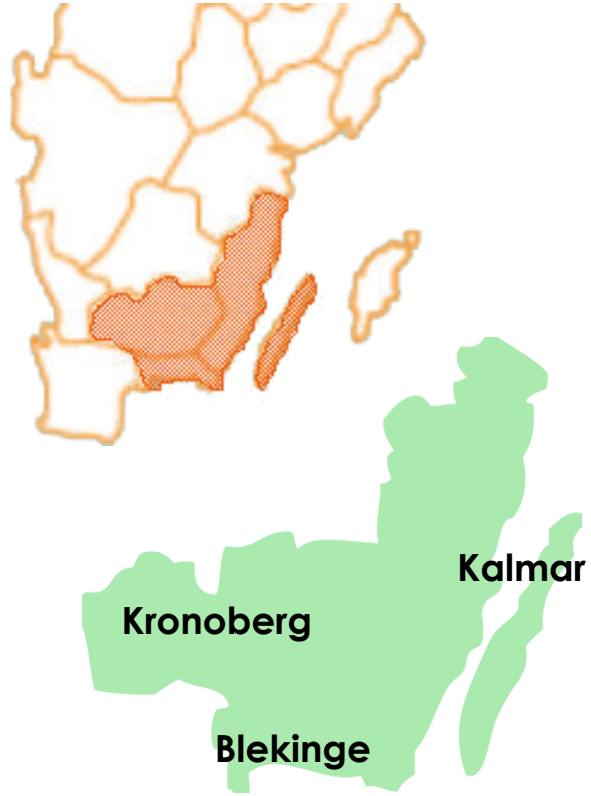
Agenda

- ESS (Energy Agency for Southeast Sweden)
- Small scale CHP – potential, reasons and opportunities
- Demonstration project Small Scale CHP from bioenergy
- The first micro-gasifier in Sweden
  - The dairy
  - Reasons for investing
  - Technology
  - Status and lessons learned
  - Upcoming actions

Part financed by EU programme Life+ and Swedish Energy Agency

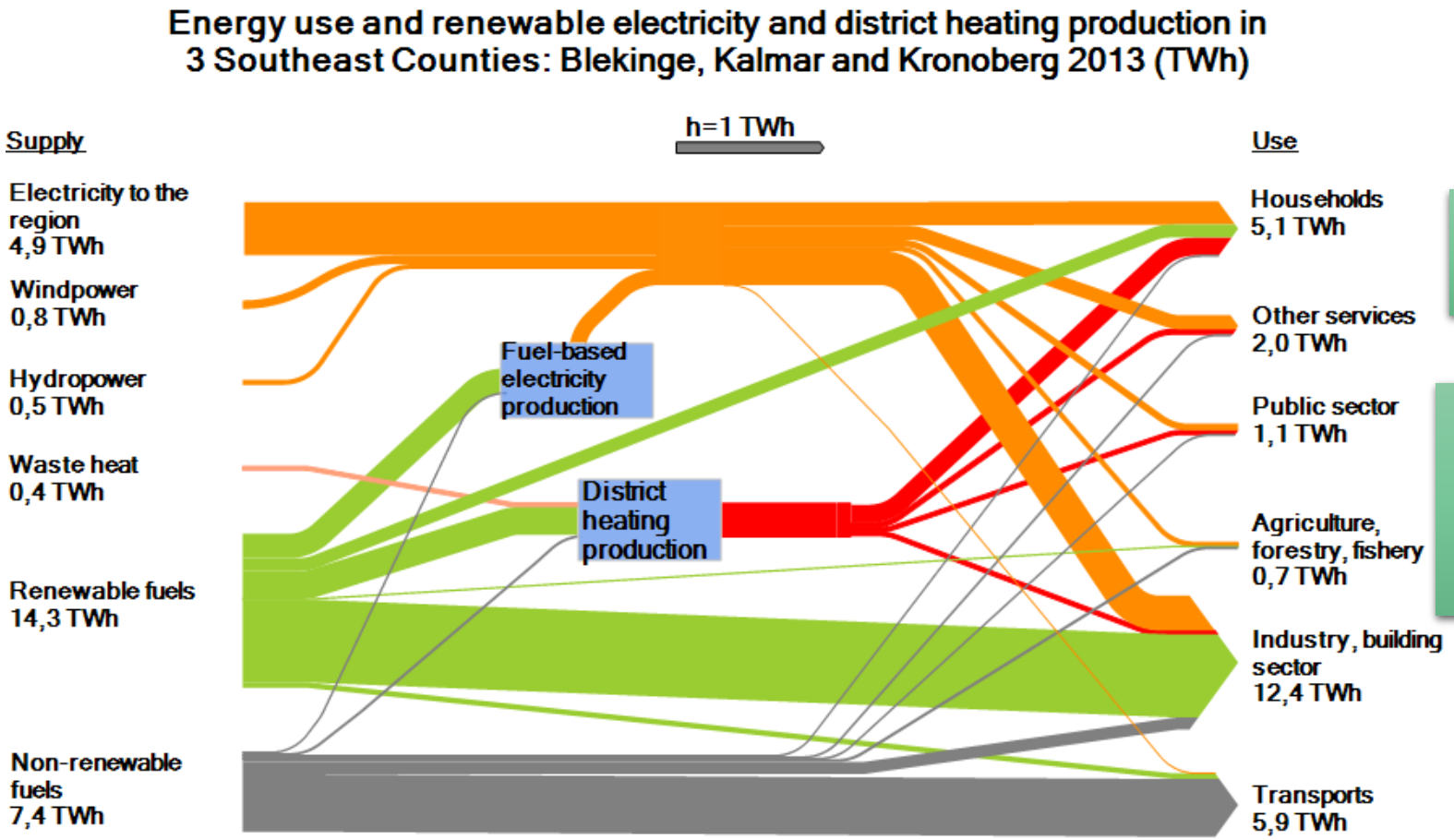
The Energy Agency for Southeast Sweden (ESS)

- Started 1999
- Owned by municipalities, regional councils and county councils in Blekinge, Kalmar & Kronoberg
- 20 employees, head office in Växjö, regional offices in Kalmar, Karlskrona & Oskarshamn
- Experienced project partner
- Sustainable energy region:
  - Energy efficiency
  - Renewable energy
  - Mobility
  - Energy in society



Part financed by EU programme Life+ and Swedish Energy Agency

Background - Energy use southeast Sweden



Small Scale CHP from biomass is one part of the solution

- 80 potential plants for small scale CHP

- 40-50 plants with a possible average electricity production of 3 GWh/year

Part financed by EU programme Life+ and Swedish Energy Agency

Reasons and opportunities for investing in small scale CHP based on biomass

- Lower costs for bought electricity
- Unburden the power grid
- Environmental profile to the company – green electricity and heat
- Local fuel
- Decreased tax relief for oil use in Swedish industry
- Promote employment in rural areas
- Increase locally produced renewable electric power

Photo: Bo Dahlin, Svenska kraftnät

Photo: Ronneby Miljö och Teknik AB

Part financed by EU programme Life+ and Swedish Energy Agency

Small scale CHP
– a demonstration project in Southeast Sweden

- A project within the EU programme Life+
  - Energy Agency for southeast Sweden (*project manager*)
  - The Emå-dairy
  - Ronneby district heating

Objective:

- Demonstrate different technologies for small scale CHP
  - Gasification to power
  - Wet steam turbine
  - Organic Rankine cycle
- Increase the use of small scale CHP
- Establish a platform for small-scale CHP showcases
  - Study visits at the plants
- Decrease emissions of CO_2
- Increase renewable electricity production

Photo: Bo Dahlin, Svenska kraftnät

energikontor sydost

Energimyndigheten

Life

Target groups for micro gasification CHP

- Small industries with heating systems based on oil or in need for reinvestments
- Farmers
- Greenhouses
- Department stores
- Hotels/block of flats

In south east Sweden still appr. 170 companies use oil, 40 of them same size or larger than the dairy.

energikontor sydost

EMÅMEJERIET

Life

Energimyndigheten

Emå dairy

- Local dairy, in Hultsfred
- Focus on traceability
- Produce appr. 13 million kilo dairy products/year
- Milk from local farms
- Aim at minimum possible climatic impact:
  - Own electricity production
  - Short transportation
  - Paper packings
  - Decay products go back to the suppliers (farms) for biogas production

Part financed by EU programme Life+ and Swedish Energy Agency

Why Emå dairy invests in CHP

- Existing heating system in need of re-investment
- Lower tax-relief for oil in production industry
- Green electricity to the company
- Energy from local produced chippings
- Be part of development towards a sustainable society
- Promote rural areas
- Increased environmental/climate awareness of consumers

Part financed by EU programme Life+ and Swedish Energy Agency

The gasifier at Emå dairy

- Wood chips fuelled gasification unit
  - 40 kW electricity
  - 100 kW heat or 70 kW cooling
  - Volter OY

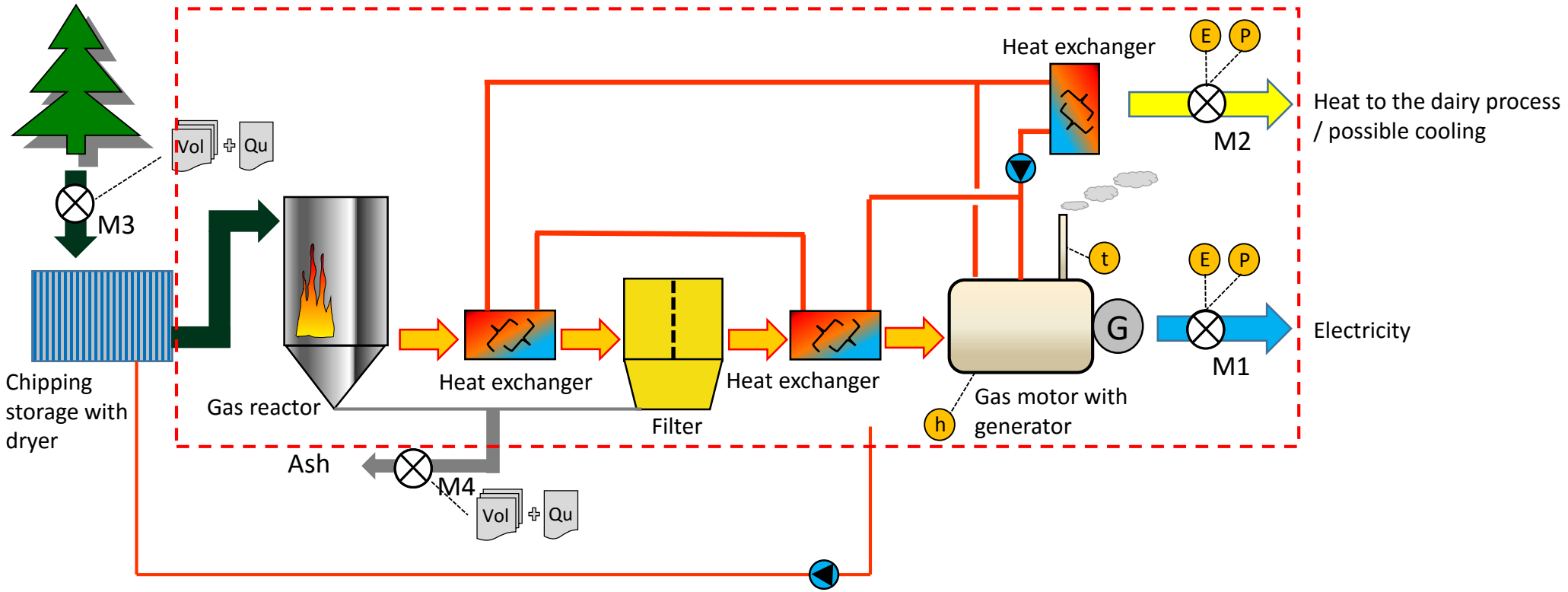
energikontor sydost

EMÅMEJERIET Etabl. 2007

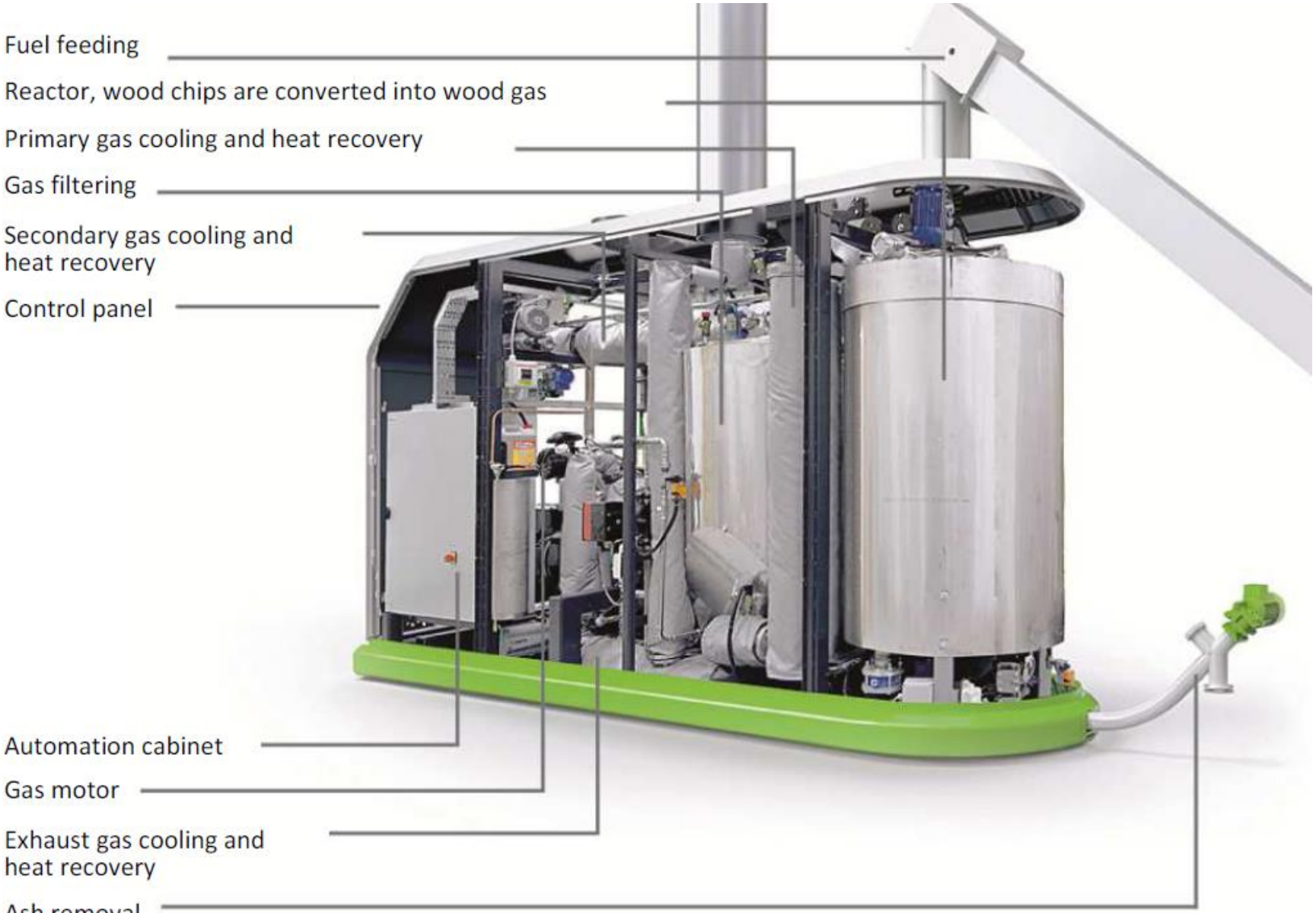
Energimyndigheten

Life

Technology – Gasifier at the dairy



Part financed by EU programme Life+ and Swedish Energy Agency



Source: Volter

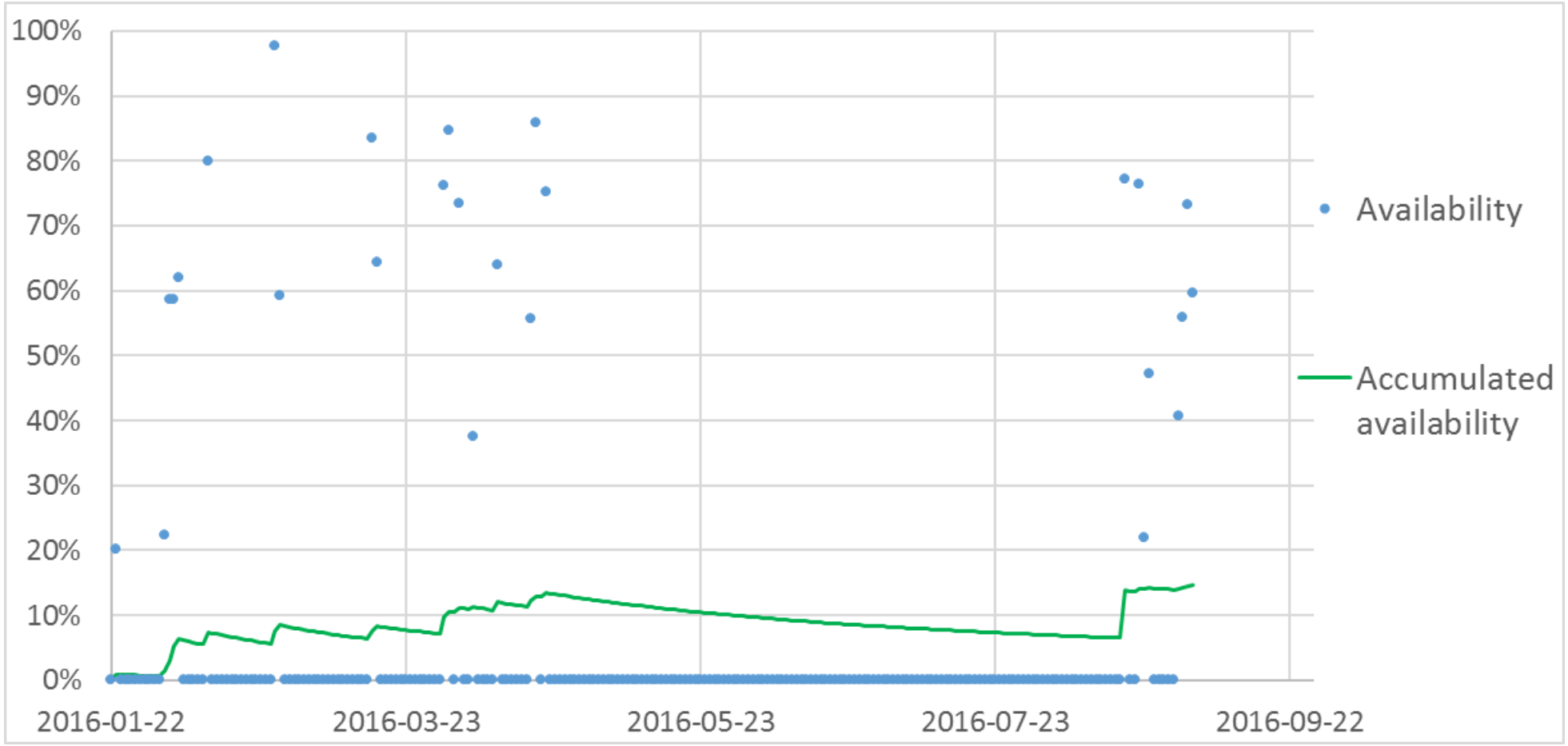
energikontor sydost

Status

- Ready
  - Gasifier up and running since October 28th 2015
  - One wood chipping dryer
  - One accumulator tank
- Remaining
  - One more accumulator tank
  - Once more wood chipping dryer

energikontor sydost

Electricity from the gasifier



energikontor sydost

Energimyndigheten

Life

Lessoned learned so far?

- Few suppliers for high flow temperatures
- No environmental permissions needed < 500 kW
- Building permits needed for storage and dryer
- Difficult to buy dried steam wood chips (transportation and price)
  -> need of a dryer
- Initial problems due to dryer – not gasifier
- More complex than expected to connect gasifier to a process with large fluctuations in heat demand
  –> need of an accumulator tank
- Recent problems with sintering

energikontor sydost

EMÅMEJERIET

Life

Energimyndigheten

Upcoming actions project

- Monitoring and evaluation of data:
  - Efficiency
  - Accessibility
  - Running costs
  - Maintenance costs
  - Problems
  - Electricity and heat production (alfa-value)
  - Fuel (wood chips) consumption

Disseminate experience from the whole process – from pre-study/procurement process to continuous operation

energikontor sydost

Energimyndigheten

Life

Great potential for the technologies! Welcome to visit the demonstrations!

Interested?

Contact me or visit our project site!
http://energikontorsydost.se/smaskaligkraftvarme

Thanks for listening!

karoline.alvanger@energikontorsydost.se

Tel. +46 709 21 60 52

energikontor sydost

Partly financed by EU programme Life+ and Swedish Energy Agency

Energimyndigheten

Life