

District heating perspective toward smart energy system

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Aalborg Forsyning

About us - Aalborg Forsyning, Energi

- Aalborg Varme A/S – district heating company with about 39.000 meters, 90.000 homes connected with 12.750.000 m² heated area. Supplies district heating to 98,8% of the potential costumors in our supply area distributing 6.683 TJ of heating energy
- Aalborg Bygas A/S – town gas and natural gas sale and distribution company
- Aalborg Fjernkøl A/S – district cooling company starting i 2020 to deliver cooling for the first costumor
- Nordjyllandsværket A/S – power plant, that produces electricity and district heating from coal and wood pellets. The plant has an electrical power output of 383 MW and a maximal heating output of 420 MJ/s
- Aalborg Energicenter A/S – consulting company which core area is to produce energy savings – the yealy demand of energy savings of 65.500 MWh

District heating... it's SMART

Nursery in Vestbjerg

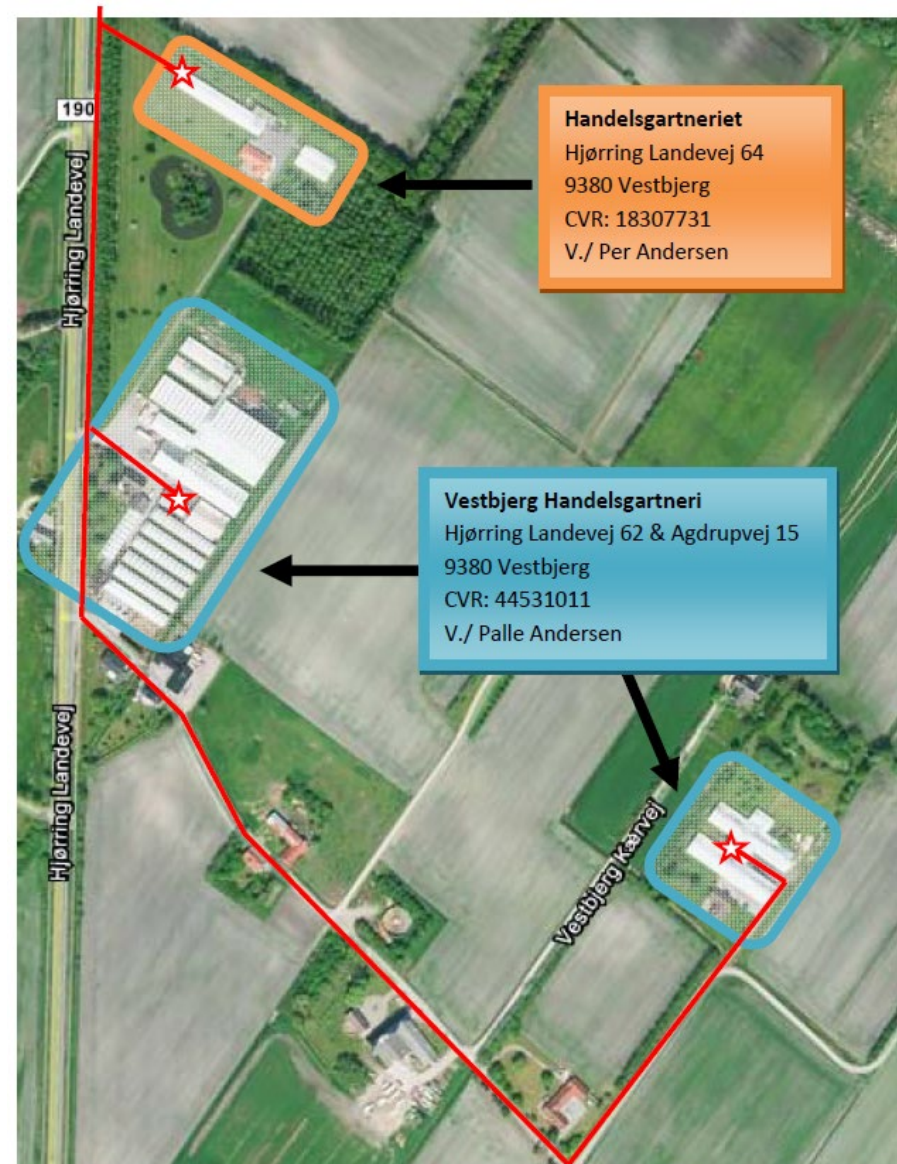
Converts from coal to district heating

11.000 m² greenhouses

Price to modify 350.000 €

Subsidy from the government
230.000 €

Early savings for the gardener (the
company) 40.000 €





510 ton coal + 7.000 liters of oil

Unstabil, expensive and dirty/pollutive



2.200.000 kWh district heating
Safe, reliable, sustainable and cheap



The yearly CO₂-saving of 1.250 ton put in perspective

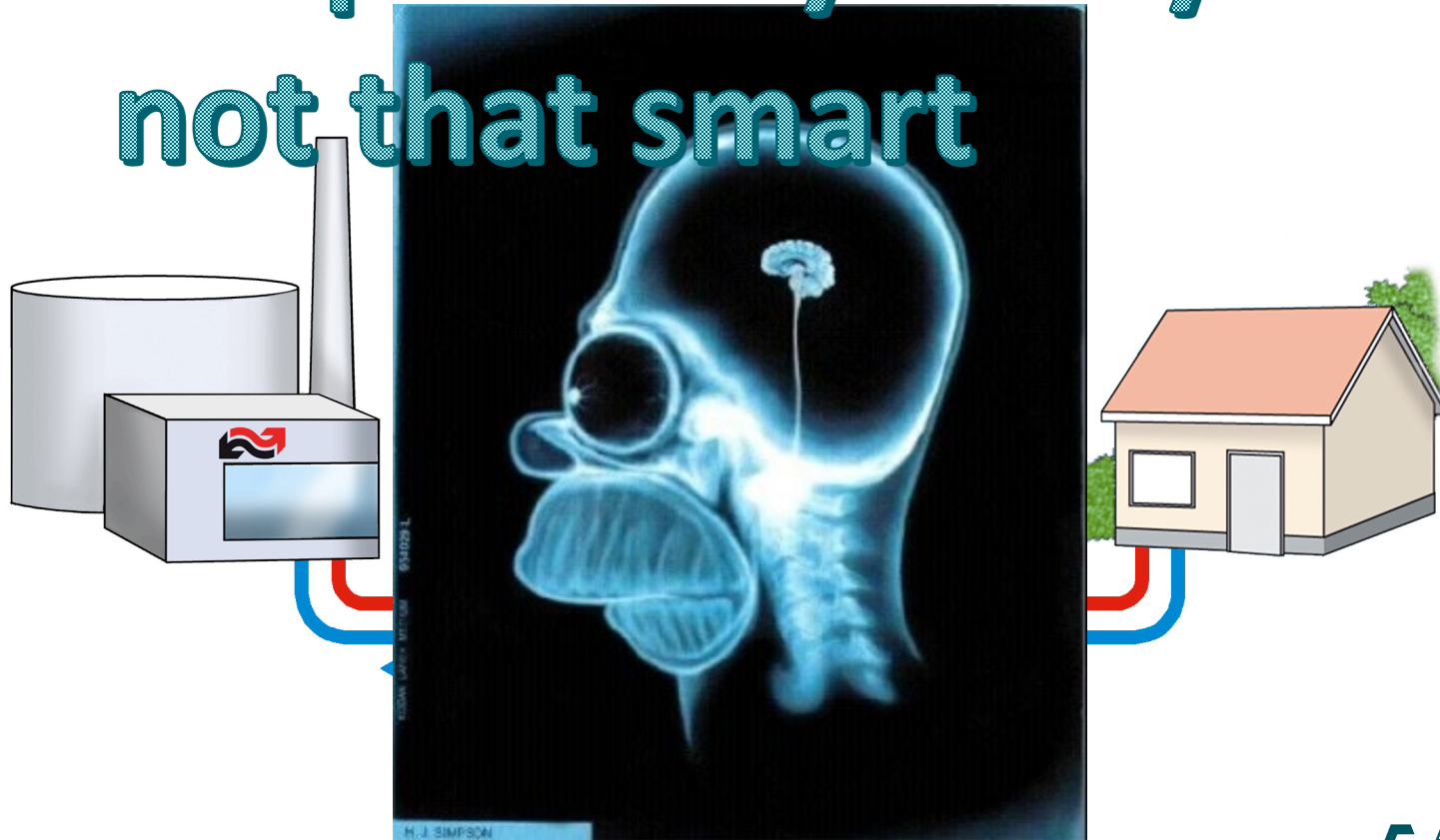
One gardener = 1.200 Tesla'er

So until you can buy a Tesla for less than 292 € - it's more profitable to invest in our energy systems

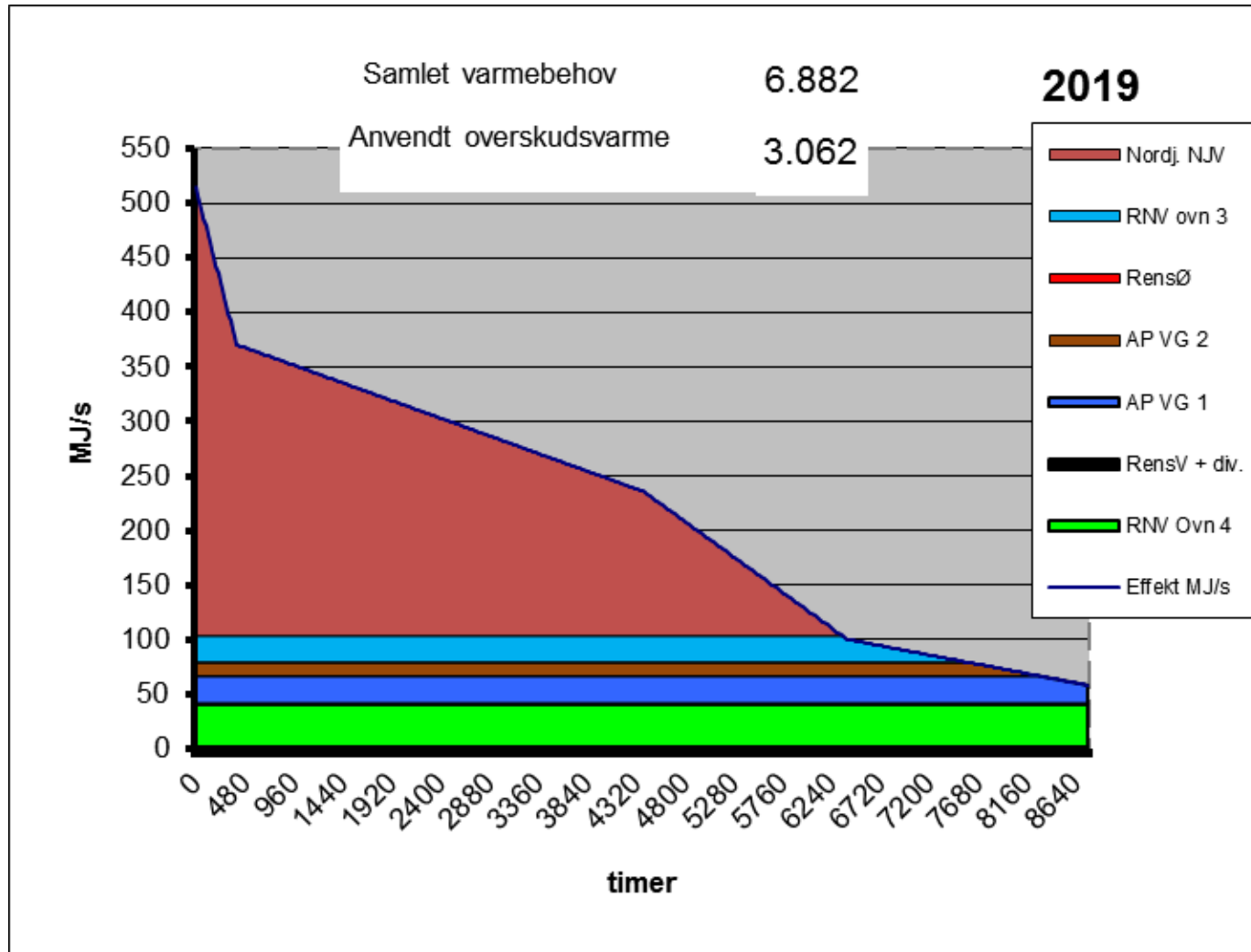
Traditional utility/consumor relationship

OK – its probably really

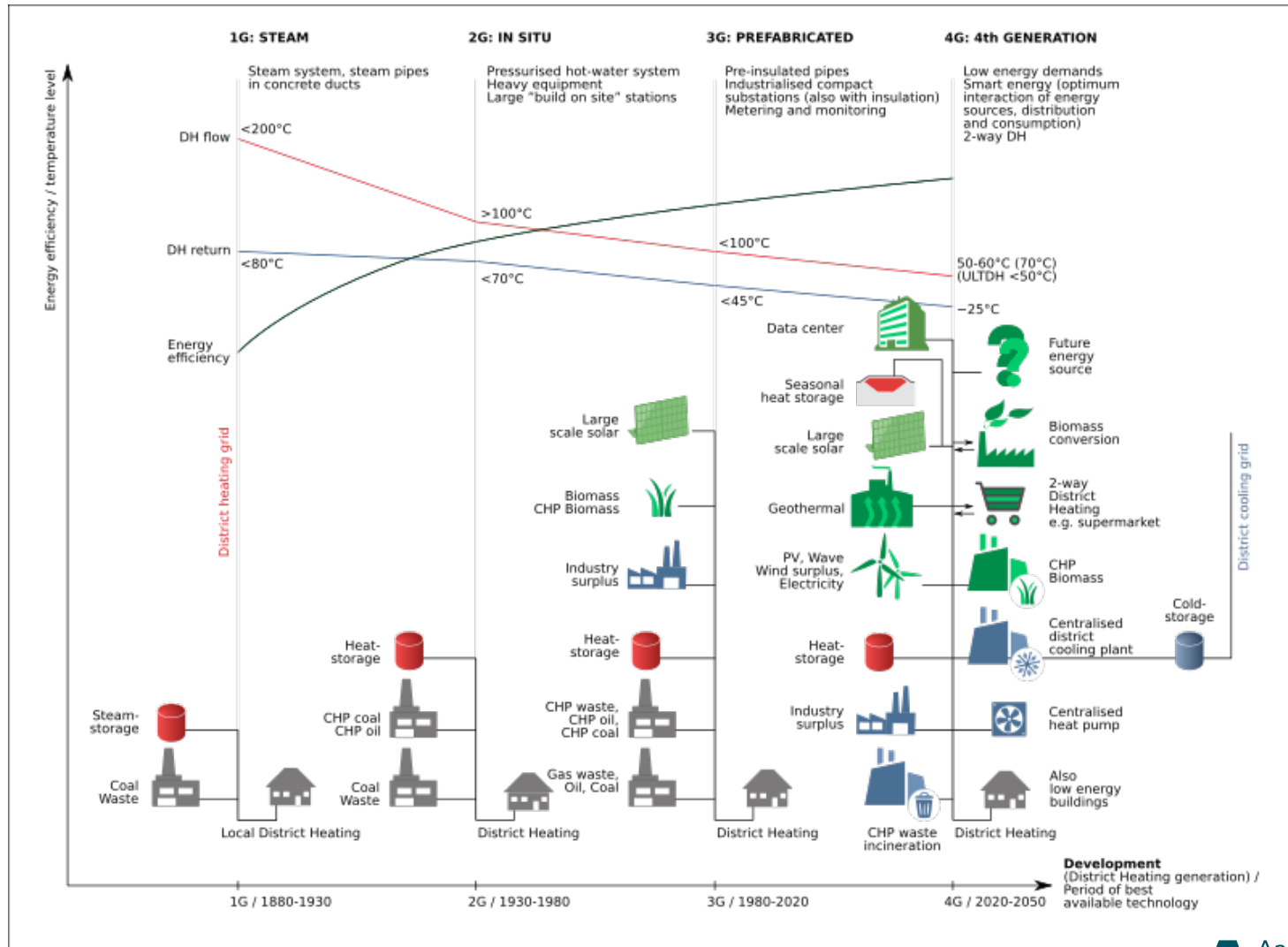
not that smart



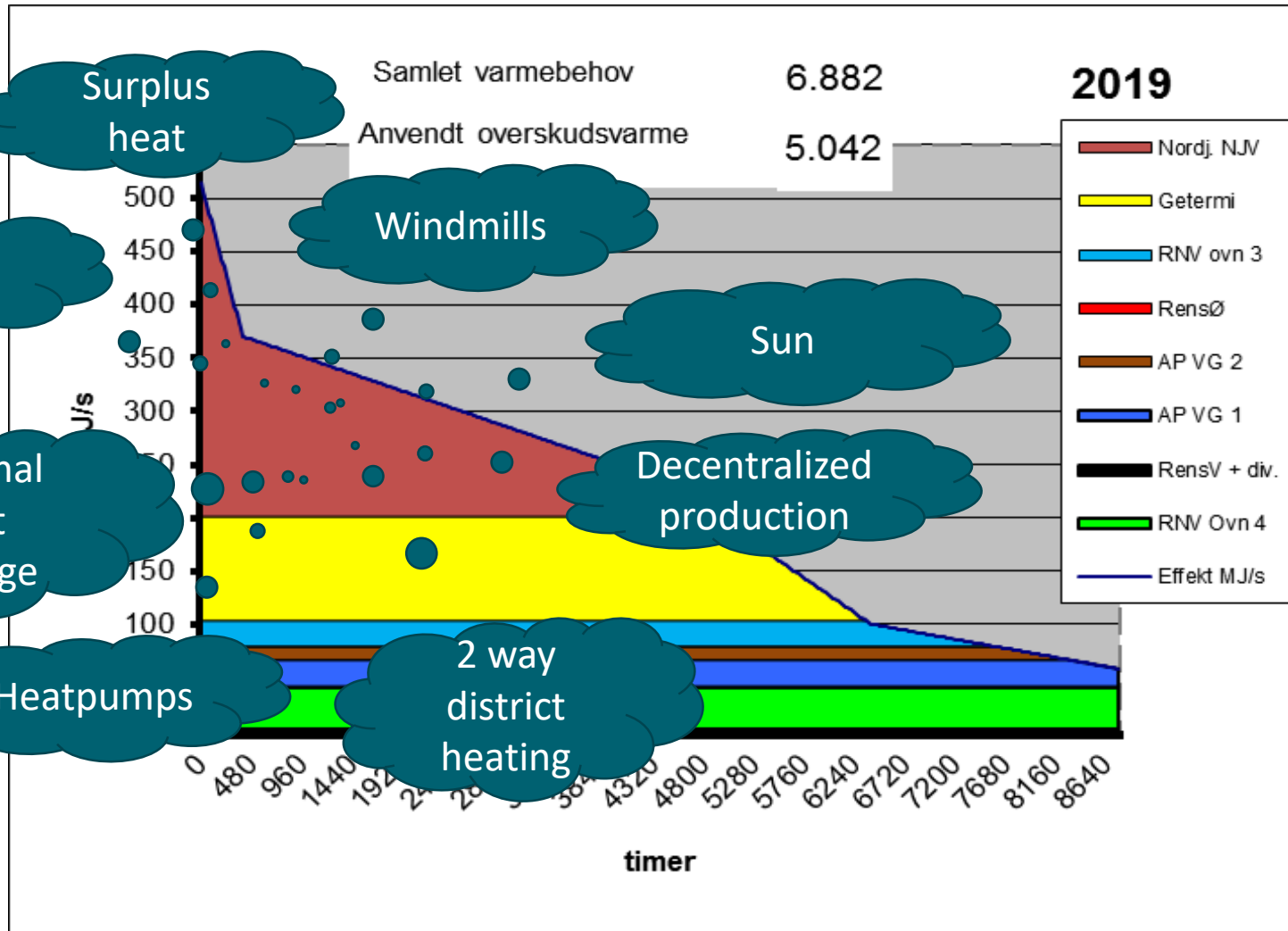
Mix of district heating in Aalborg today



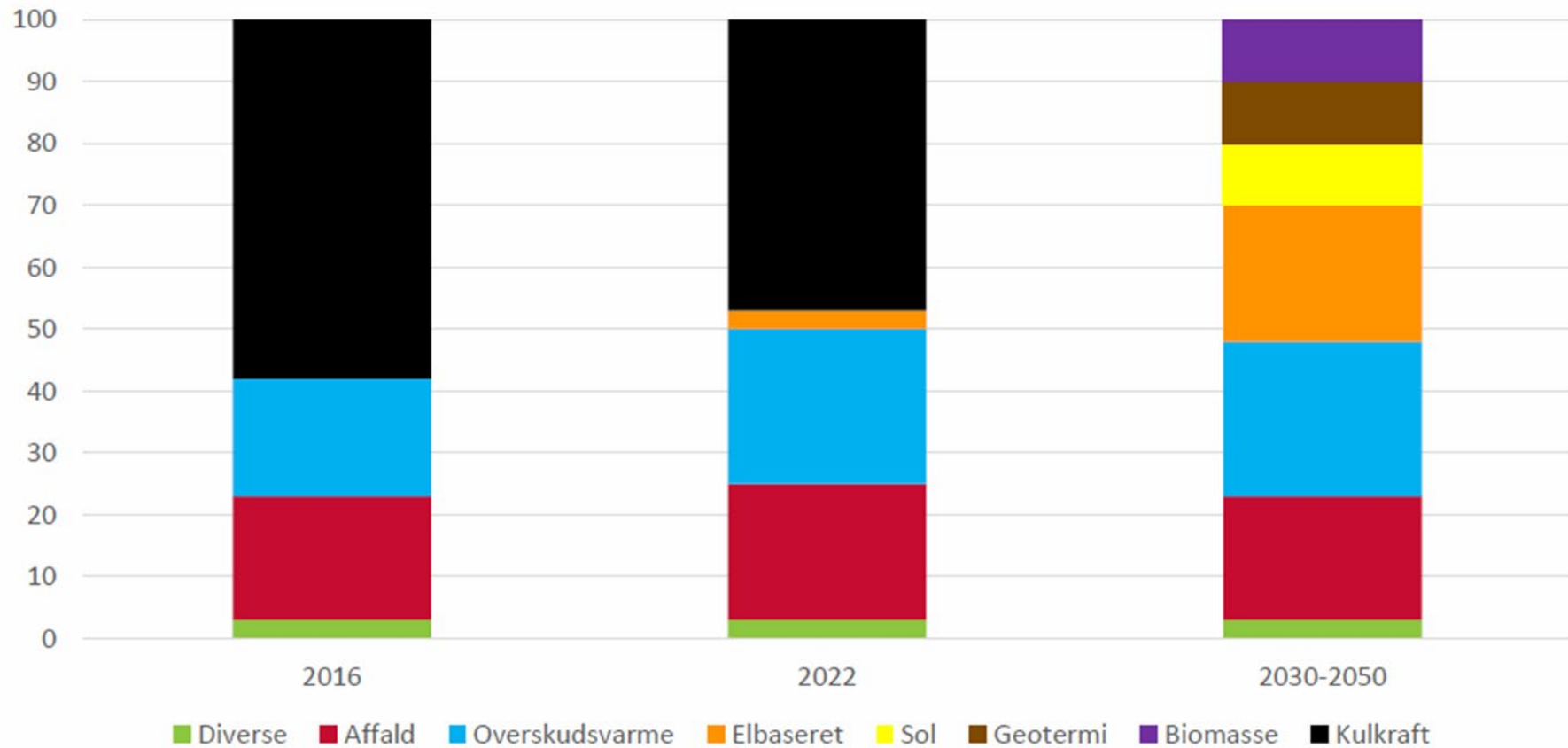
Generations of District Heating



Mix of district heating in Aalborg tomorrow



A cost efficient & diversified conversion to 100% RE



Perspective towards smart energy

Now

- Energy savings – reducing the consumption with 40 % might be profitable
- Remote metering
- Establishing prosumers
- Heat+

In 5+ years

- Remote controlling units
- Big data analysis
- Transform the consumer to be an integrated part of the distribution system
- Deliver comfort for the consumer – instead of just "hot water"

In 10+ years

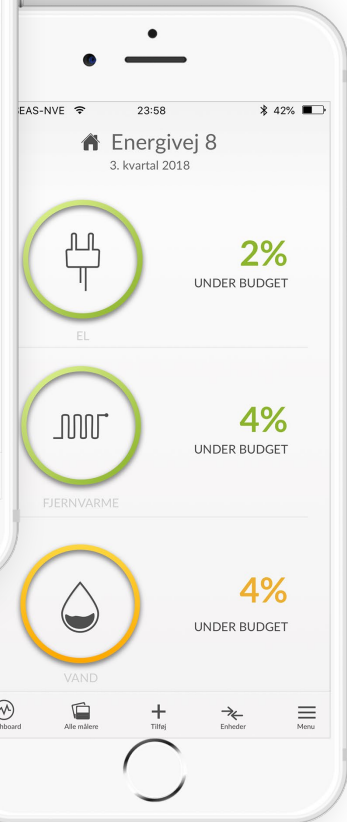
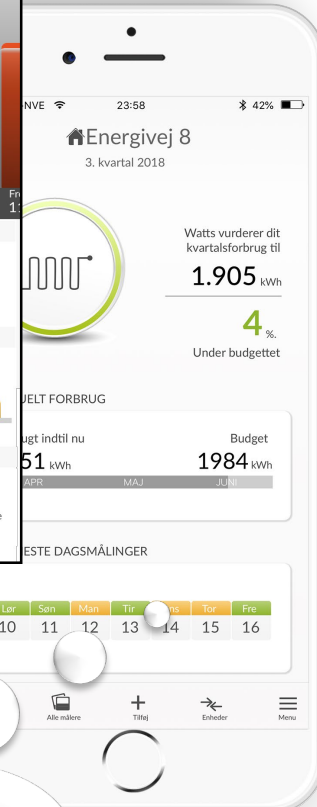
- District heating is 100 % renewable
- Established seasonal heat storage
- Ultra low temperature district heat
- Time shifted consumption



Differentiated prices

Introducing 'Watts'

Få overblik
over dit energiforbrug
med appen Watts



Notifications & alarms
Individual prices
Benchmarking

All utilities in one app

Personal energy advices
Intelligent budgets

I samarbejde med
KALUNDBORG FORSYNING
Aalborg Forsyning

Introducing Heat+ (Varme+)

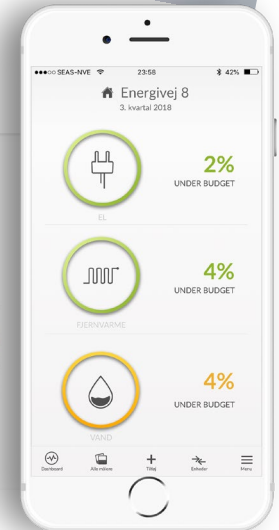
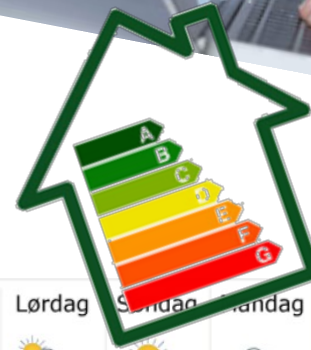


- 'Varme+' is launched as a new product the 1st of October 2018
- The consumer and the utility company is integrated. Aalborg Forsyning offers to own, operate and maintain the district heating unit
- The consumer is offered a maintenance scheme for the buildings heating system (50% of the heating systems has errors today)
- The benefit for the consumer is, that the utility company takes the investment, maintenance and operation. The consumer avoids risks and trouble regarding to the unit
- The benefit for the utility company is a competitive product, benefits in including the consumers heating installation in the district heating system as well as access to energy optimizations

Use and exploit big data

Combine big data to make the data alive for the utility company and the consumer

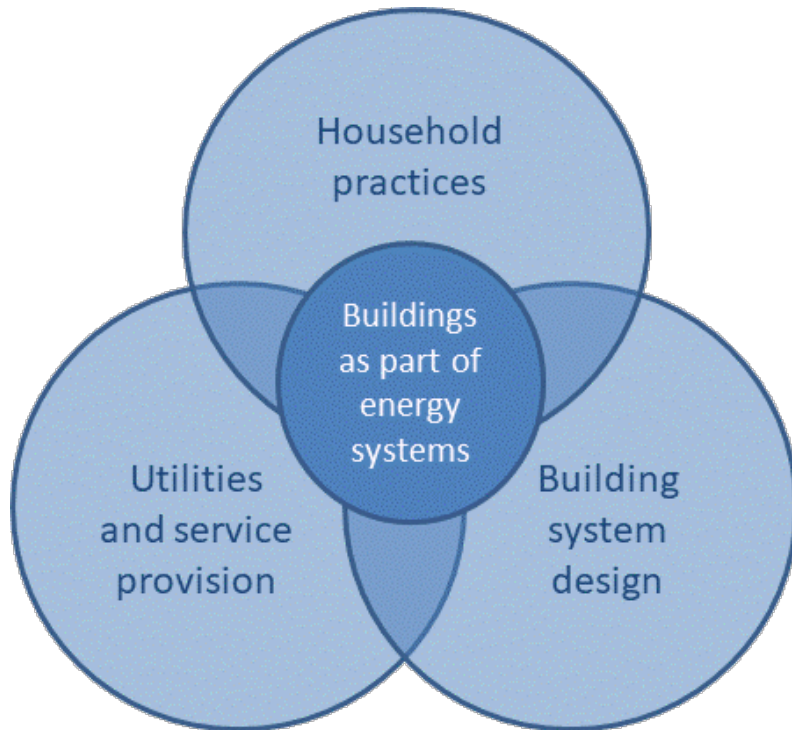
- Use data from meters
- Use weather data
- Use energy label data from the house
- Integrate sensors – and IOT
- Business case? – some say up to 70-100€ per meter in savings
- Today the biggest consumer in Aalborg is the pavement (<18% heat loss)



When we get all this in place, we...

- Monitorize the energy consumption at our consumers (Today we inform if something goes really bad)
- In time operate the consumers district heat unit (first level VIP consumer)
 - Optimize the system from weather forecast, production prices, user habits etc.
- In time operate the consumers internal heating system (second level VIP consumer)
- Integrate the consumer, the distribution/transmission system and the production
- Deliver the needed temperature – ultra low, traditional – or boosted temperature district heat

Perspective in a short summary



- Use the district heating system as a 'battery'
 - In popular - produce heat when the wind blows
- Making consumers VIP consumers
 - Integrating consumers, distribution, transmission and production
- Make it possible to displace the energy consumption
 - Use energy when prices are low – and save when prices are high
- Differentiated prices
- Make the transition from consumers to prosumers

Thank you for you attention

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