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# *Obstacles and opportunities for solar district heating*

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# Obstacles in Austria

- Professional operation management needed
- Barrier on historical buildings
- (Industrial) CHP and waste heat
- Too low subsidies
- High return temperature

# Obstacles in Czech Republic

- Surplus heat from CHP in summer
- No support in biomass district heating areas (30% support possible in other areas)
- Customers disconnect from district heating and connect to gas
- Not possible to find large areas in fields
- High return temperature

# Obstacles for Germany

- CHP-heat and waste heat covers much of the market (surplus heat in Summer)
- High capital costs means high producion costs/kWh
- Lack of actor capacity
- Local conditions have to be accepted when placing solar collectors and integrating in district heating
- High return temperature

# Obstacles in Italy

- District heating incentives are for geotermal and biomass
- Heat from CHP and waste
- Large capital costs
- Lack of actor capacity
- High return temperature

# Summary of obstacles

All countries have at least one of the following obstacles

- Heat from CHP and waste covers the base load
- Lack of area
- Too high costs
- Stakeholders lack of information and capacity

# Heat from CHP and waste covers the base load

- Find plants without CHP and waste
- Extend th district heating coverage.
- Introduce a storage in the system
- CHP using natural gas as fuel will be too expensive in periods with low consumption and high production from other sources (wind, photovoltaic)
- Biomass CHP is limited because biomass is a limited ressource

# Lack of area

- Grow solar on your farmland. Near to villages with small plants. Longer distance to cities with large plants
- Grow solar in connection with transmission lines between cities
- Place large plants as feed in plants in the city (the small ones are too expensive and the small areas are better for photovoltaic)
- Integrate solar in the cities

# Too high costs

## Keep it large and simple.

Example with 10.000 $m^2$ collectors in Tørring

| | |
|---|---|
| Cost of land (30.000 $m^2$) | 80.000€ |
| Collectors (10.000 $m^2$), pipes, pumps, antifreeze and heat exchangers | 2.000.000€ |
| Fence, ground shaping etc. | 80.000€ |
| Transmission pipe (1.000 m) | 300.000€ |
| Control system | 80.000€ |
| Consultancy | 40.000€ |
| Total | 2.580.000€ |

Calculated production 4.500 MWh/year

Yearly capital costs:

| | |
|---|---|
| 2.580.000 € x 6,7%/year = | 173.000 €/year |
| Maintenance 1 €/MWh | 4.500 €/year |
| Total production costs: 177.500 €/year / 4.500 MWh/year = | ~ 40 € /MWh |

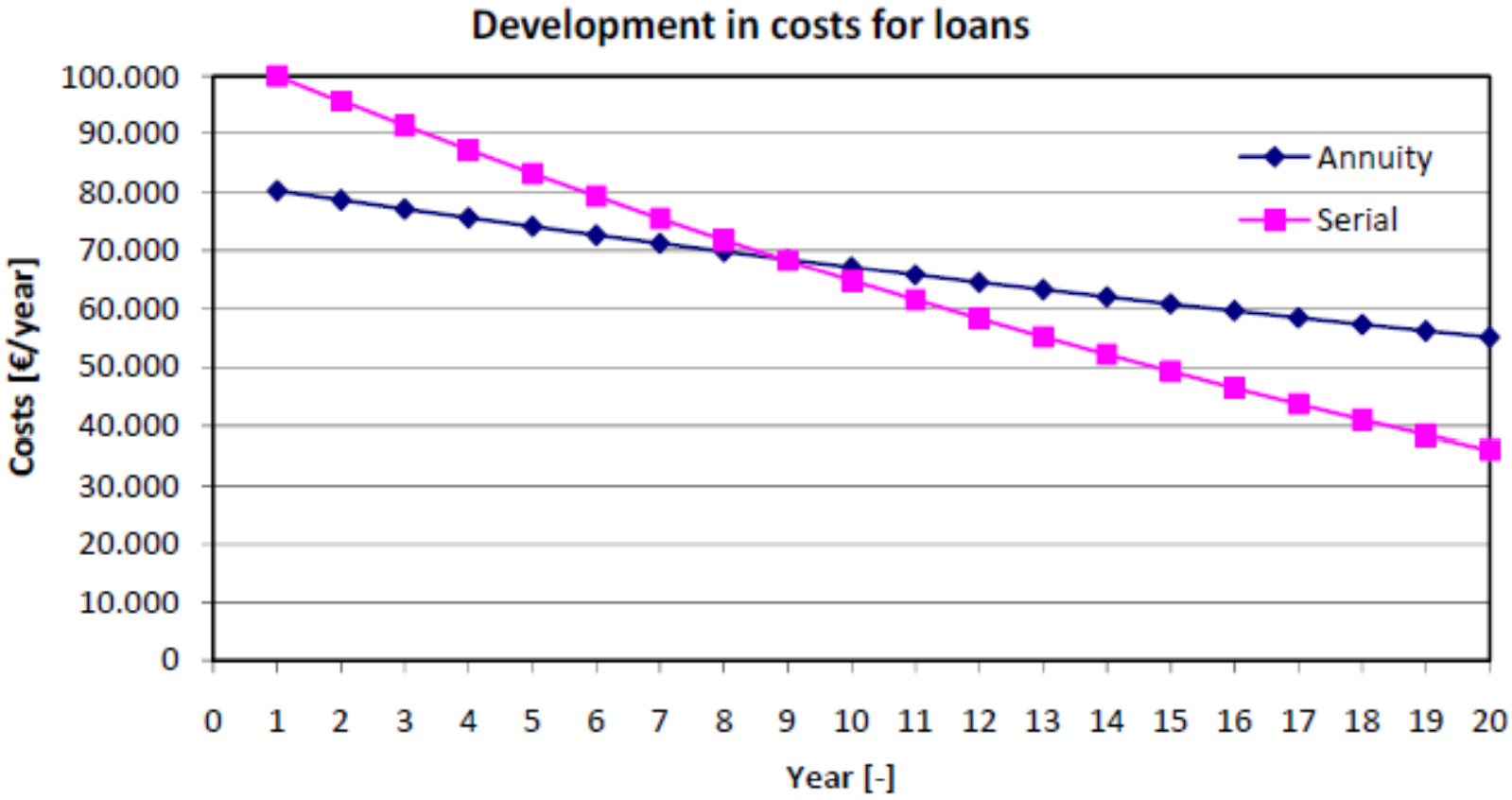
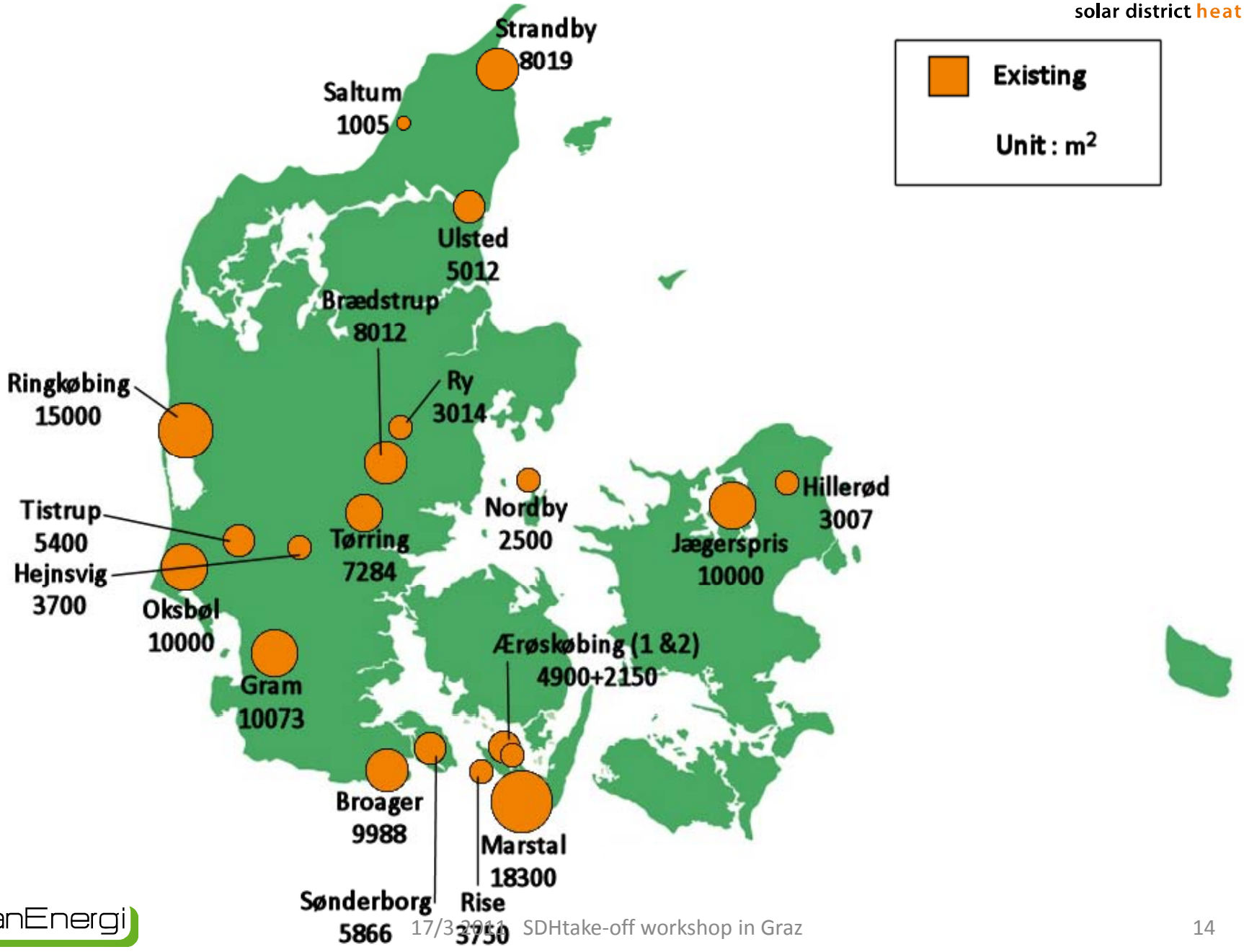



*Fig. 2.4.1. Development in costs for annuity loans and serial loans, interest rate 5%, inflation 2%.*

# Solar district heating in Denmark



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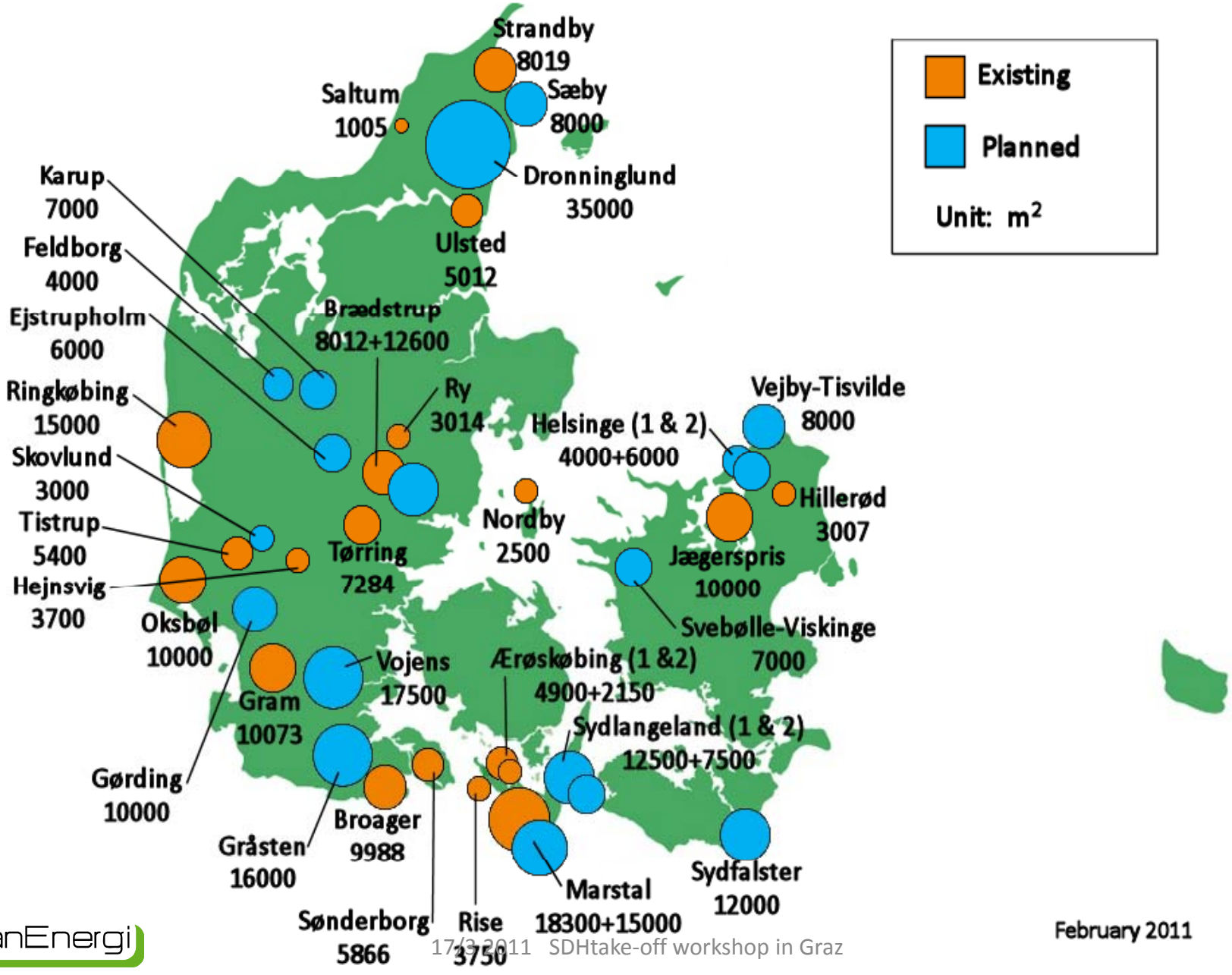

# It can also be done in your country!