

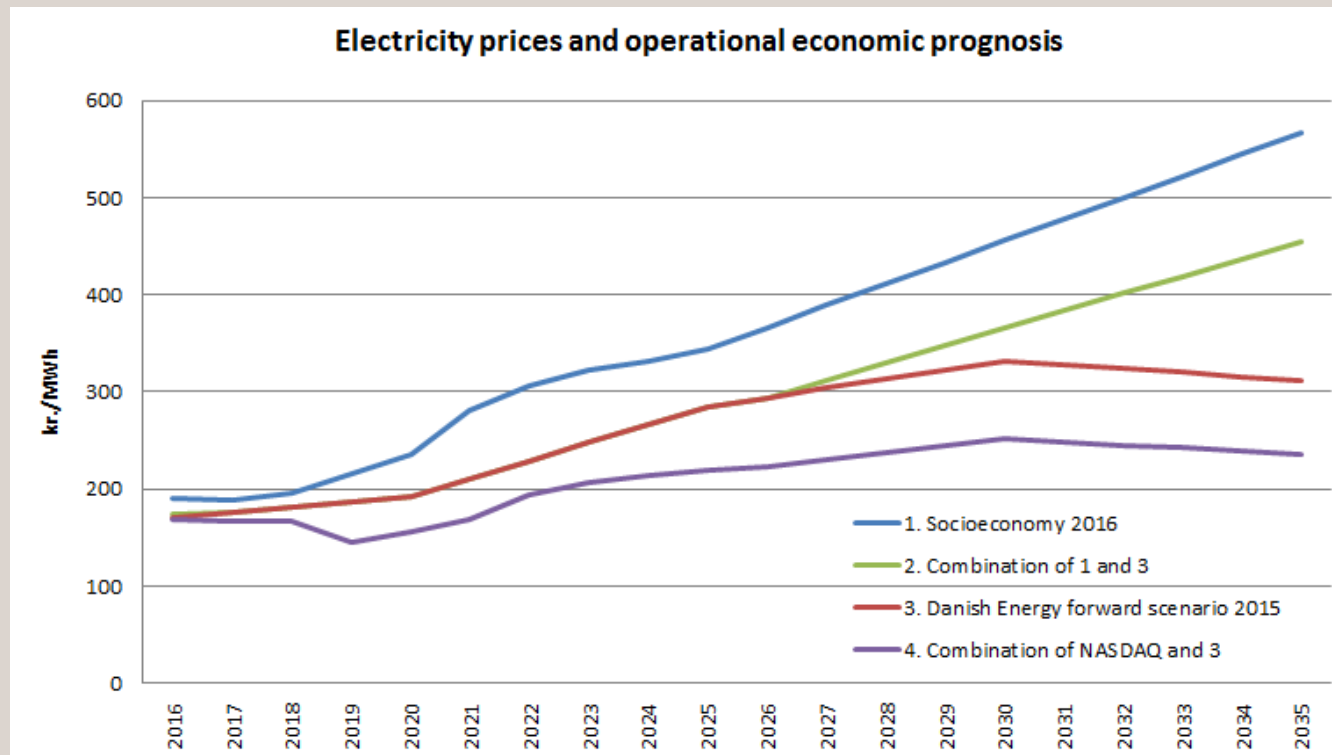
Session 1: Smart Energy Systems

Balancing District Heating to
increase uptake of low
temperature surplus heat
sources

12TH SEPTEMBER 2017

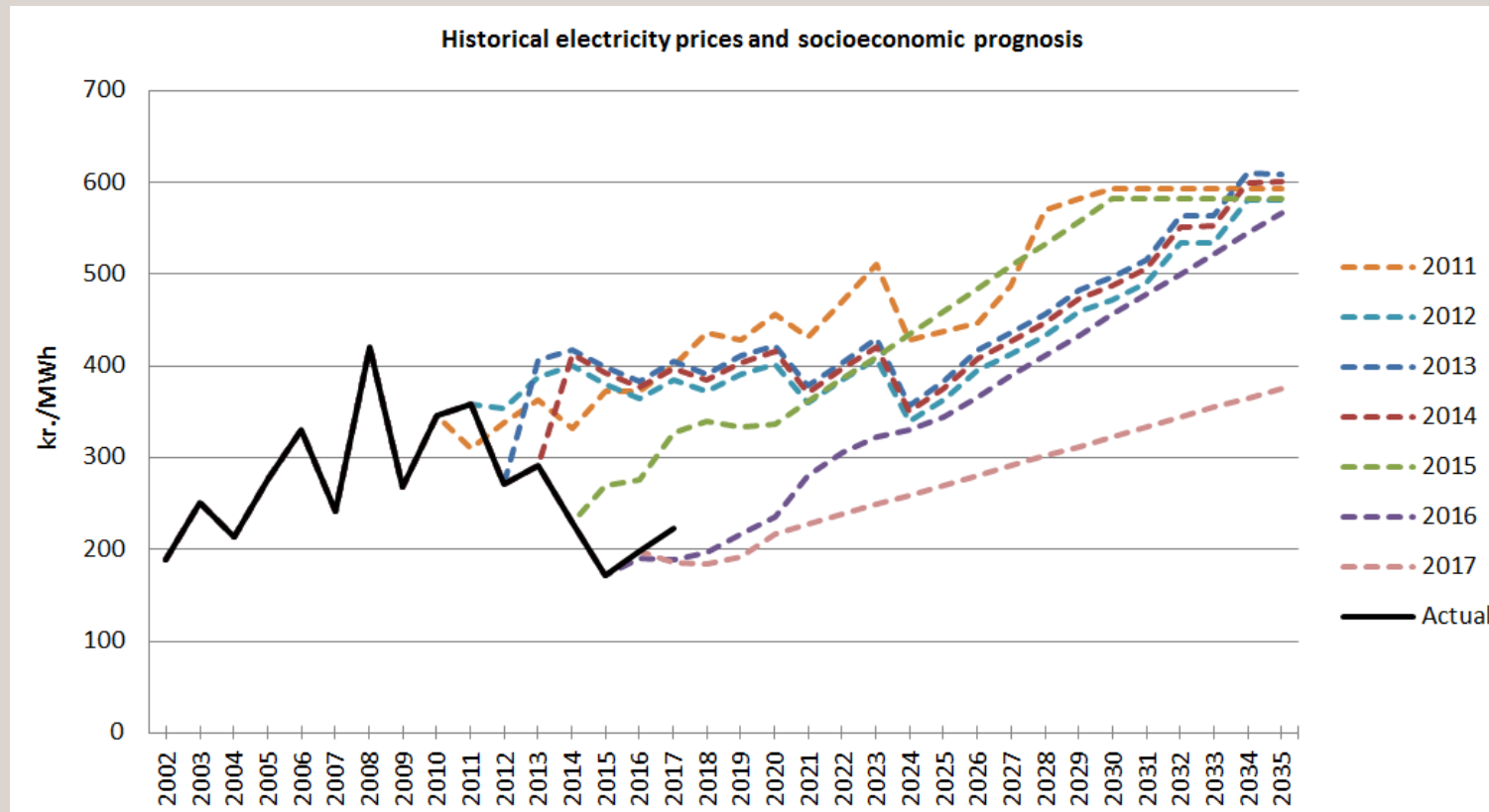
Planning, Practical and Economic challenges

Preconditions and assumptions - Electricity prices operational economic



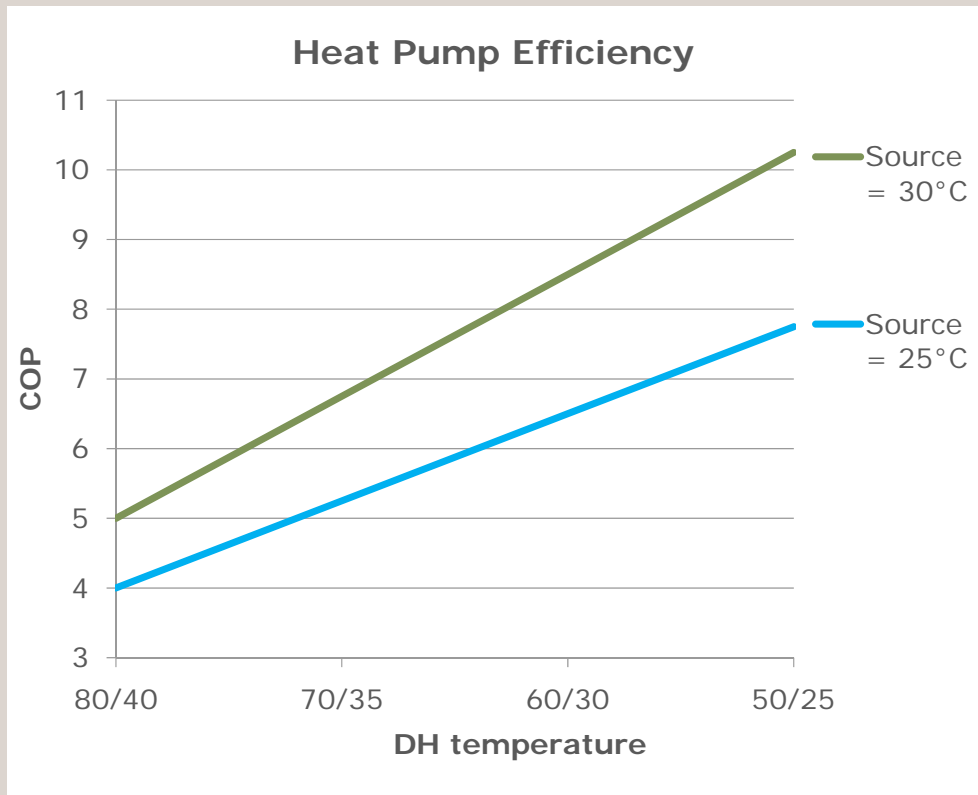
Planning, Practical and Economic challenges

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Planning, Practical and Economic challenges

Preconditions and assumptions - COP

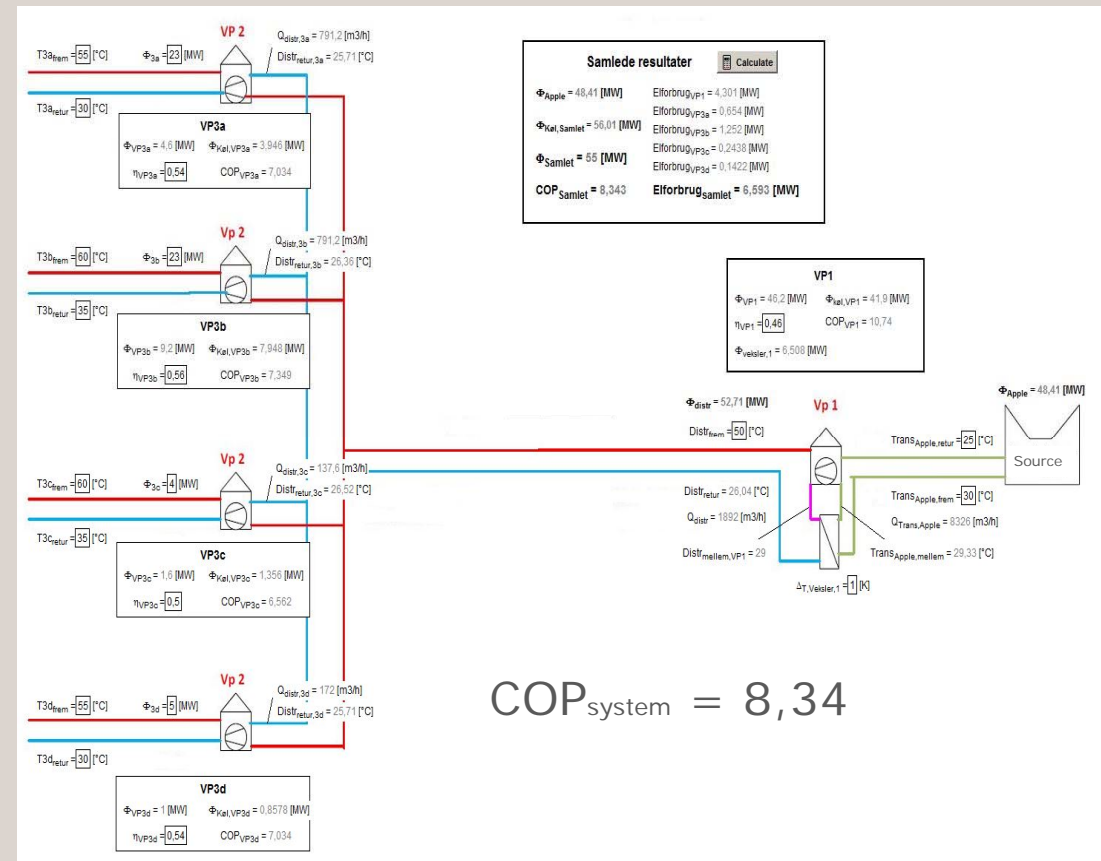


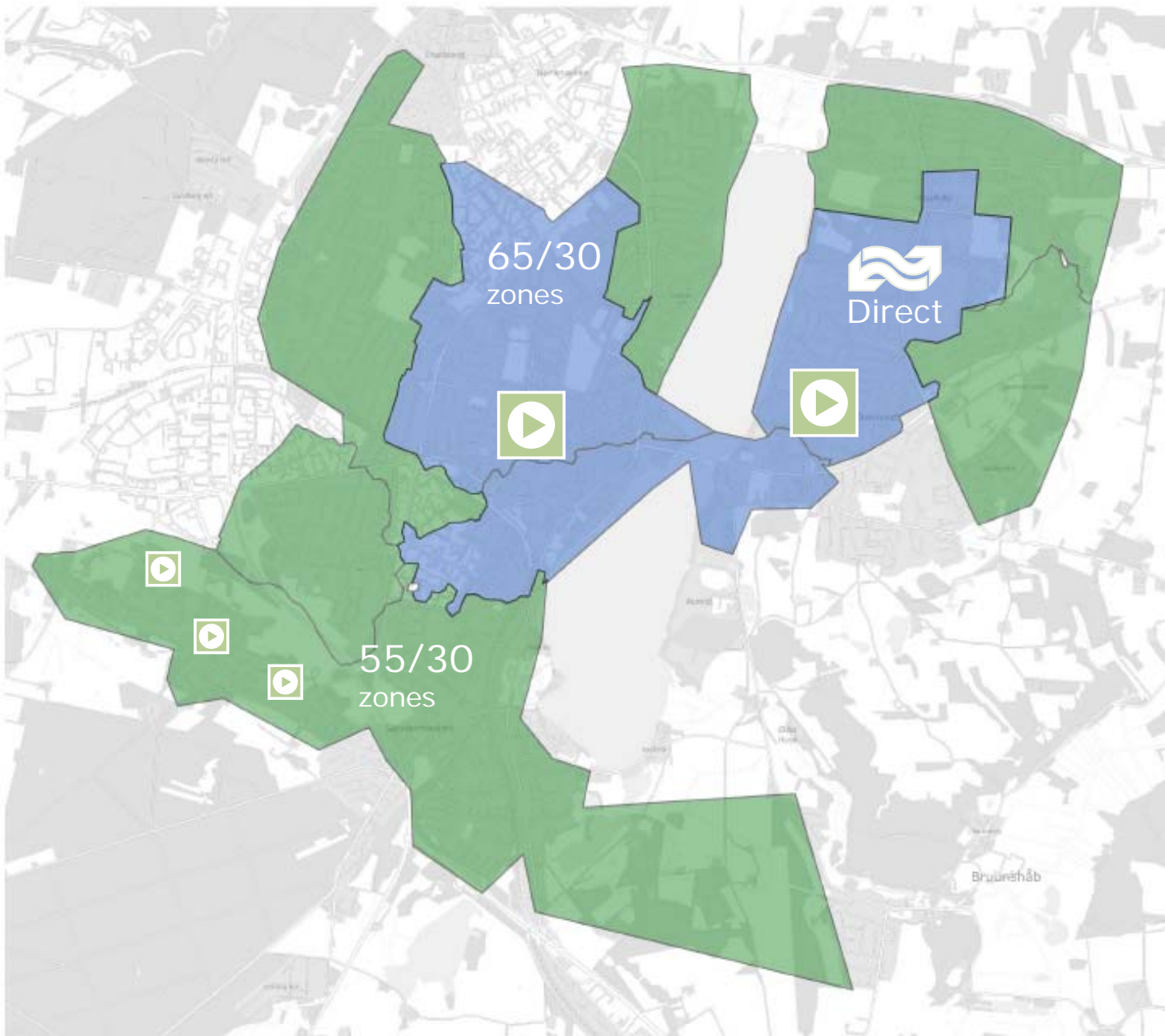
+
Type, Location and
size of
Heat Pumps ?

Planning, Practical and Economic challenges

Scenarios

Scenarios	Ref.	0	1	2	3
Natural Gas CHP	X	X			
Natural Gas DH	X	X	X	X	X
Heat pump at source		X	X	X	
Heat pump's in City				X	X
Temperature 80/40	X	X			
Temperature 60/30			X		
Temperature 55/30				X	X



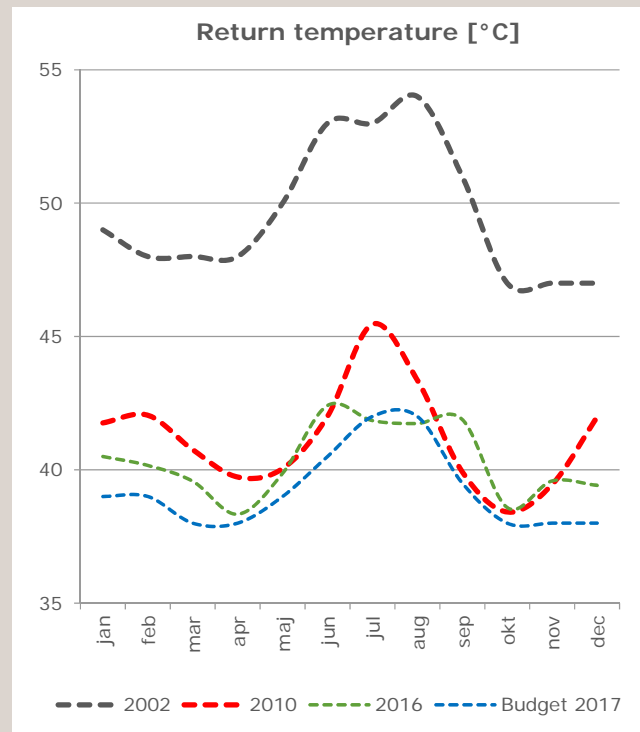
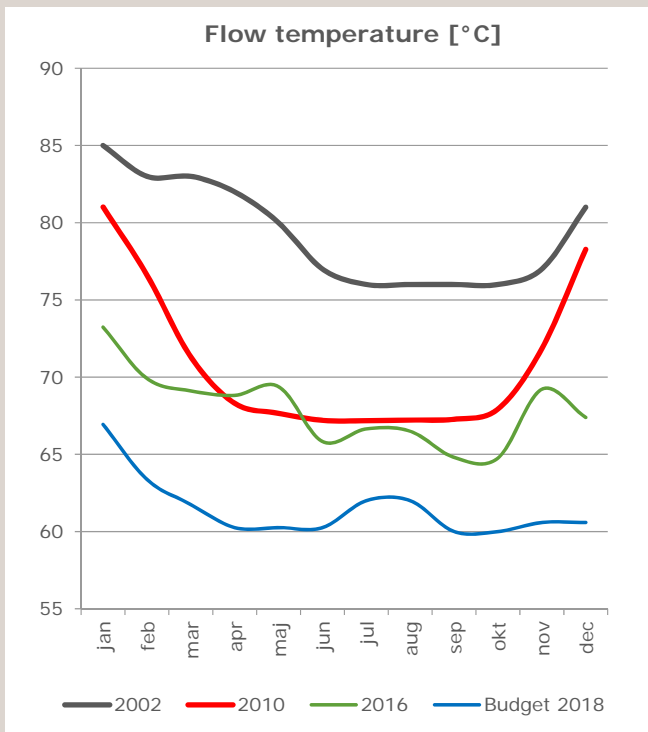


Change / Development

1. Two zones (65/30 and 55/30)
2. Local Heat Pump boost inner city
3. Local Mini Heat Pump boost larger consumers
4. Change from indirect to direct connections of building blocks
5. Limited changes to City transmission net
6. Limited changes to supply pipes, pumps and flow measuring for one sub-zone
7. Rental model for consumer installations now including low temperature unit

Planning, Practical and Economic challenges

Conclusion / next steps



1. Optimize net and user installations for lower temperatures
2. Prioritize renovation and investments
3. Further discussions on preconditions and assumptions
4. Ownership, operation and maintenance agreements
5. Optimize transmission lines, pump stations, heat pumps and local zones
6. Negotiations for supply of surplus heat from industries and companies in the city

NIRAS as leading expert in exploiting **surplus heat**

NIRAS as leading expert in planning, design and implementing **low temperature district heating**

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