

# Energy Solutions and Applications from Converting Waste-to-Energy

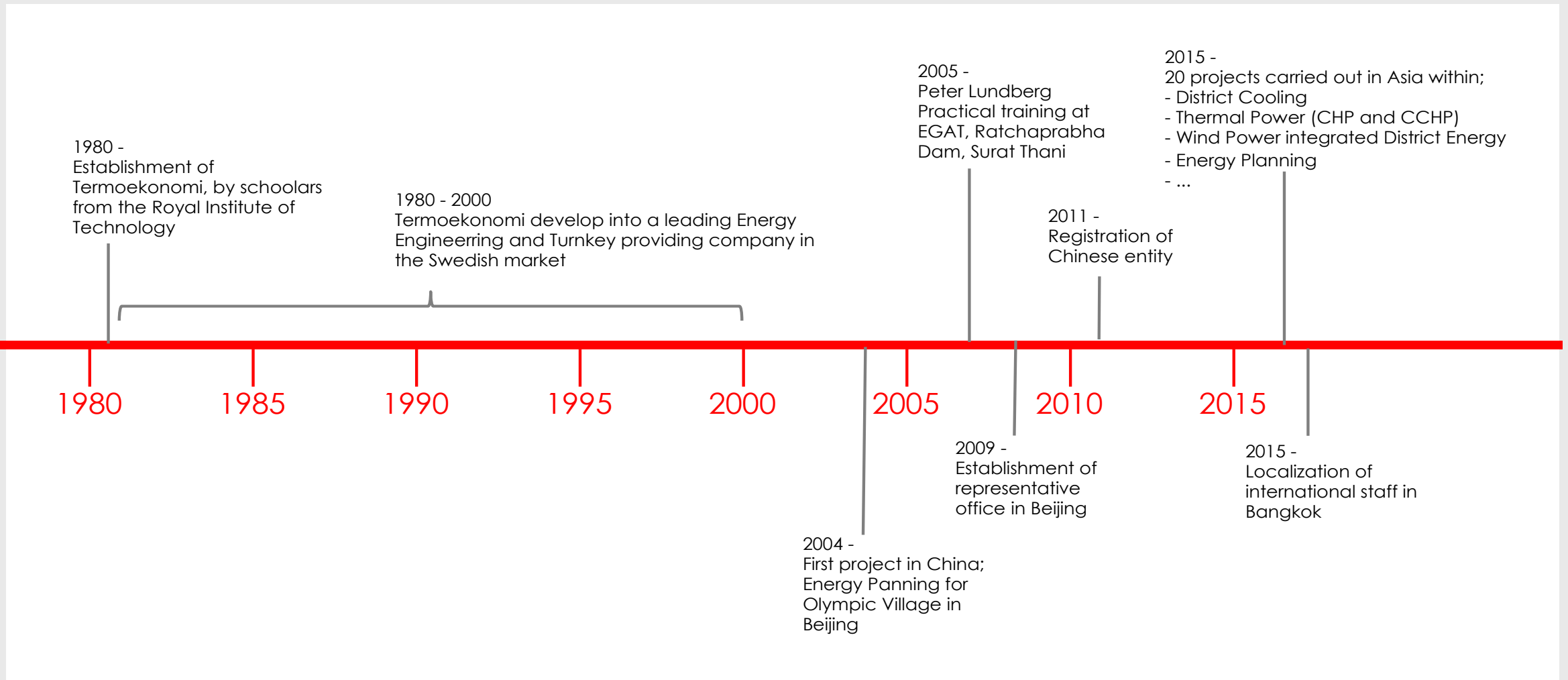
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# Agenda

- Thermoekonomi
- Integrated energy systems
- Swedish examples
- Energy solutions and applications

# Termoekonomi



# Termoekonomi

**Business scope:** “From idea to commercial operation”

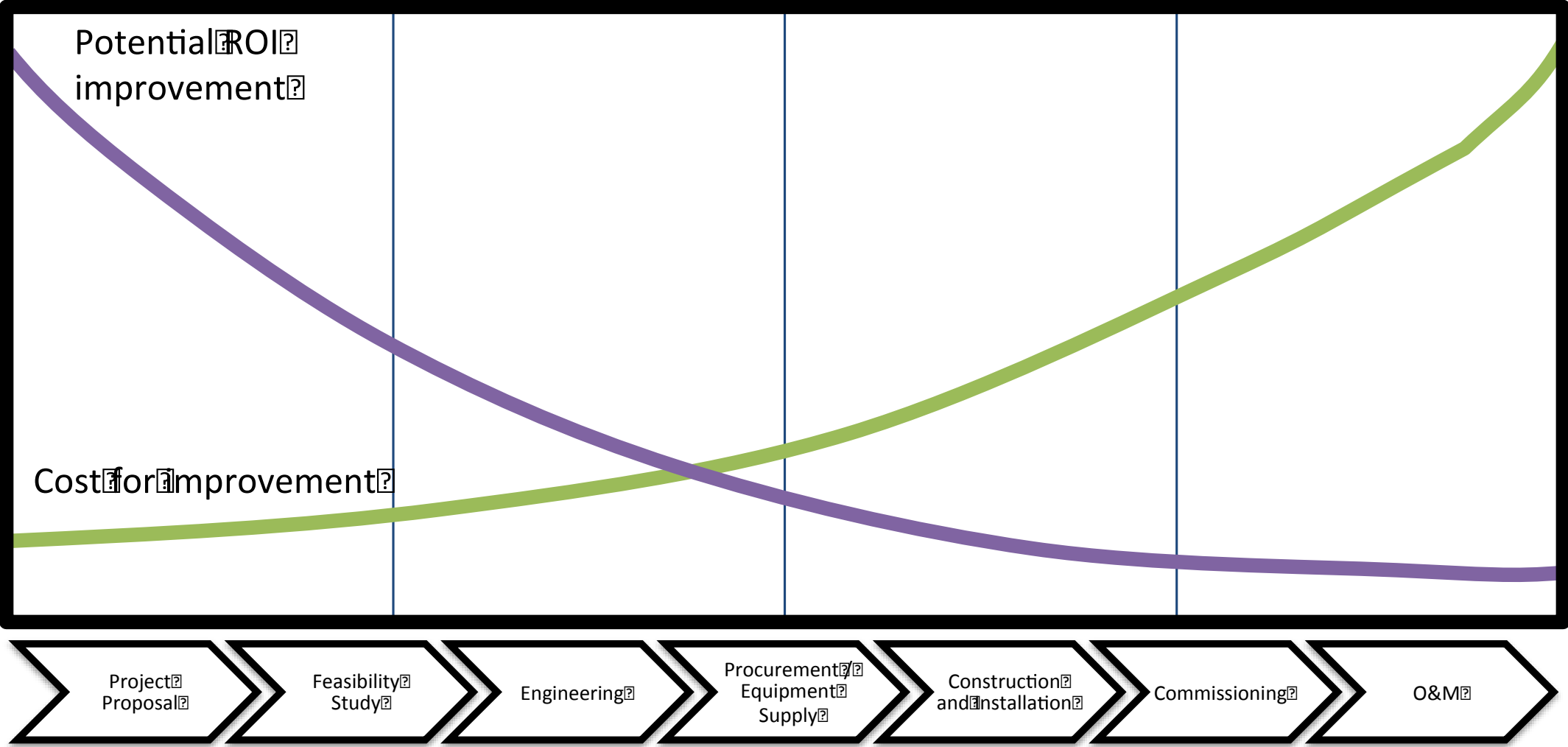
**Provide services in:**

- Planning
- Management
- Engineering Procurement Commissioning Management (EPCM)
- Operation & Maintenance (O&M)

**Business area:**

- District Energy
- Thermal Power/Distributed Energy
- Large scale Heat Pump/Chiller facilities

# Influence of project optimization made along the project value chain



# Integrated Energy Solutions and Multi-Energy Systems

## Energy systems

- Power grid
- District cooling
- District heating and industrial steam system
- Municipal utility systems

## Energy sources

- Renewables: biofuels, hydro, solar, wind
- Fossil fuels: coal, gas, oil
- Municipal (and industrial) solid waste
- Industrial waste energy

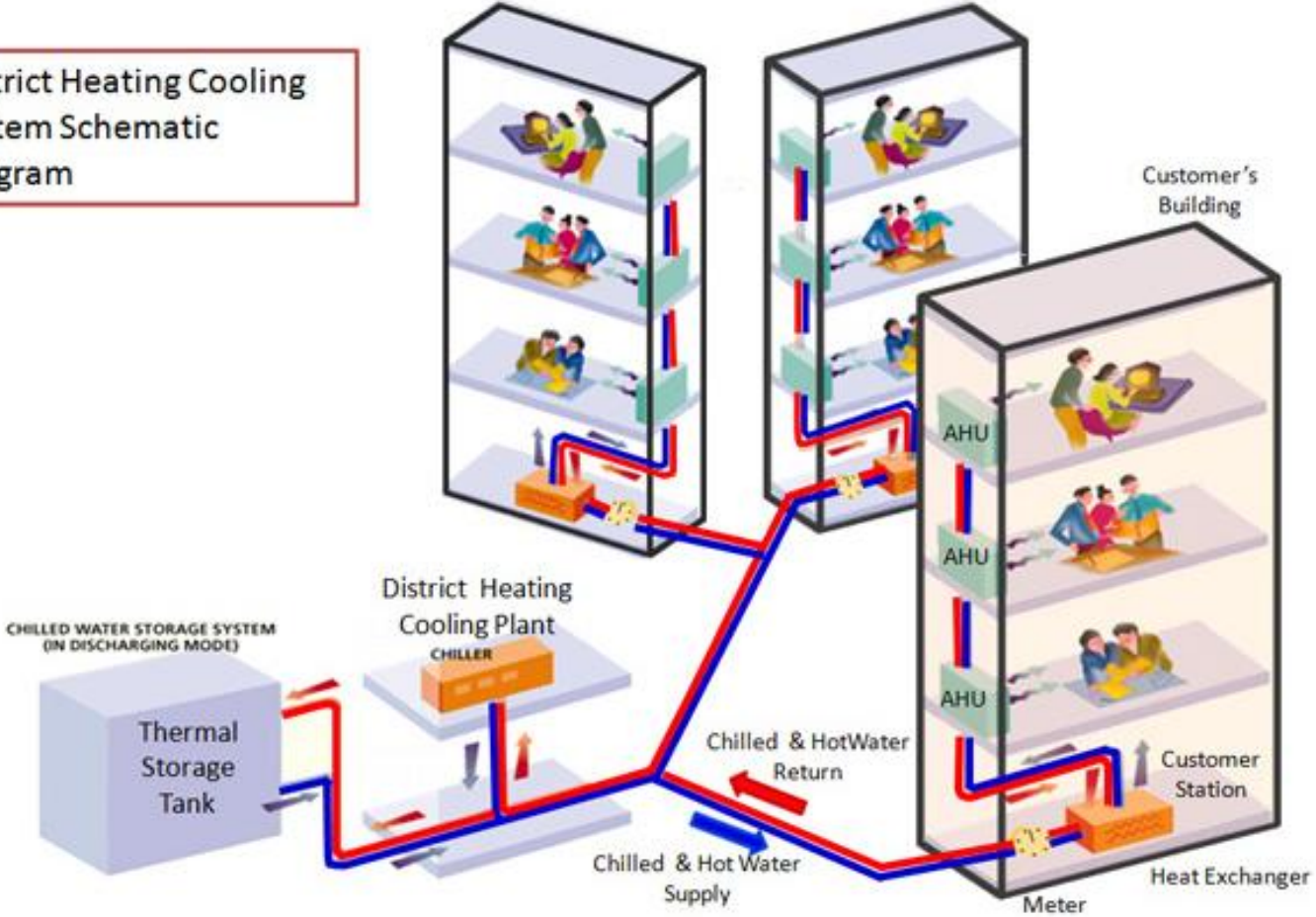
## Energy generation

- Co- and tri-generation
- Heat-pump/Chillers
- Etc.



# District Heating/Cooling

District Heating Cooling System Schematic Diagram





# Stockholm – The Capital of District Energy



## District heating

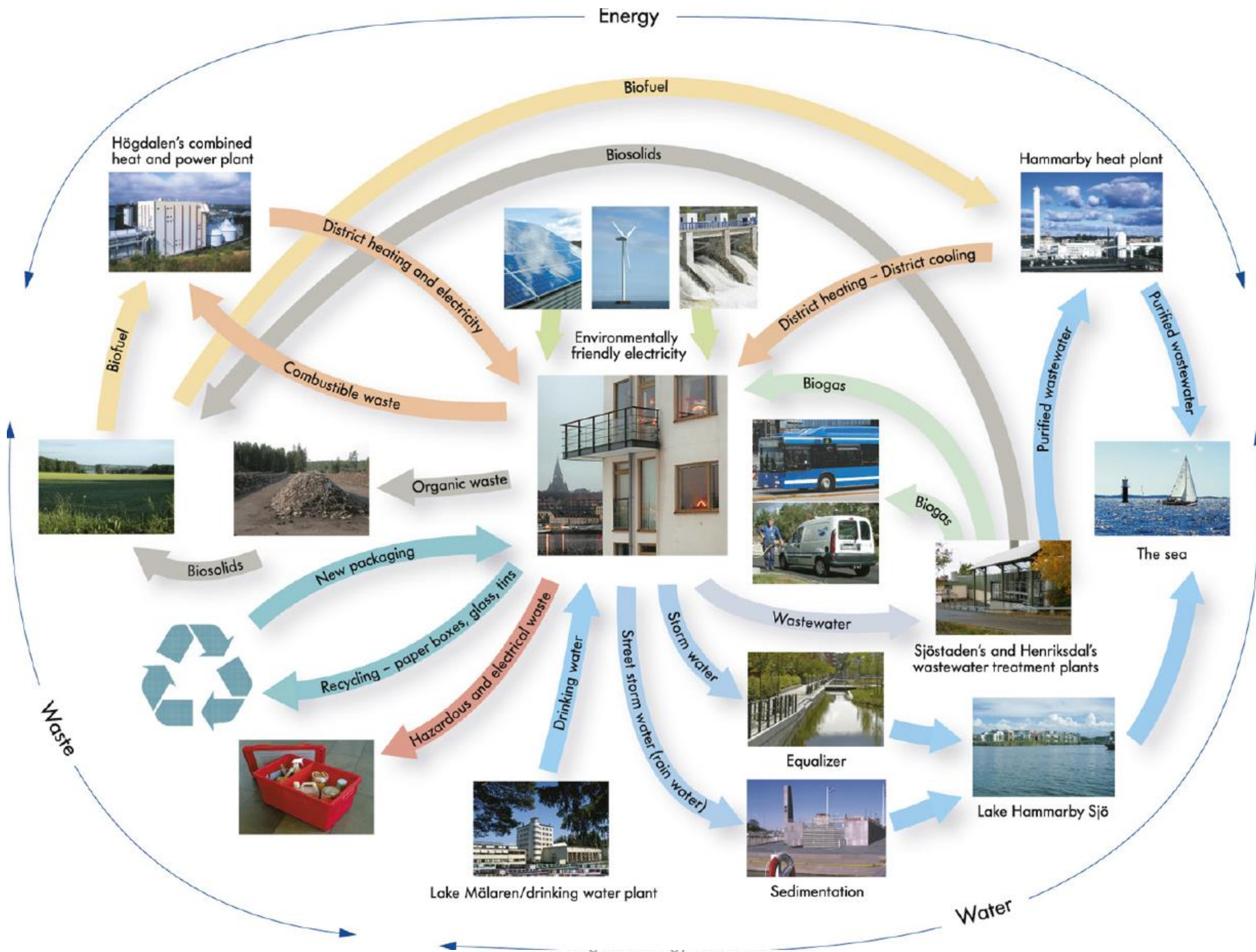
Peak Load: 3500 MW  
Annual Supply: 11.7 TWh

## District cooling

Peak Load: 350 MW  
Annual Supply: 450 GWh

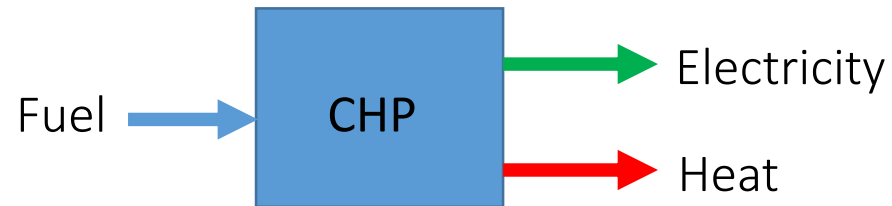




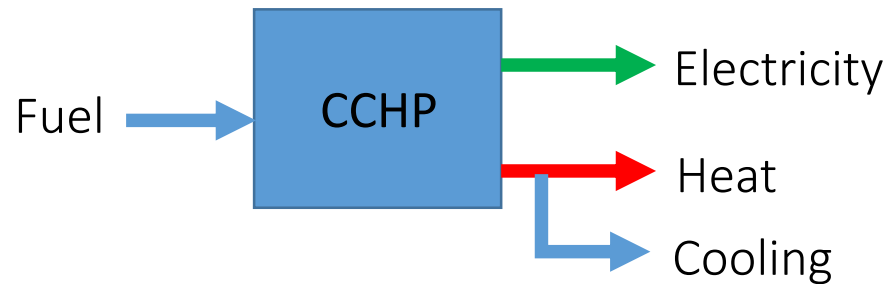


# Co-generation & Tri-generation

- Co-generation or Combined Heat & Power (CHP)

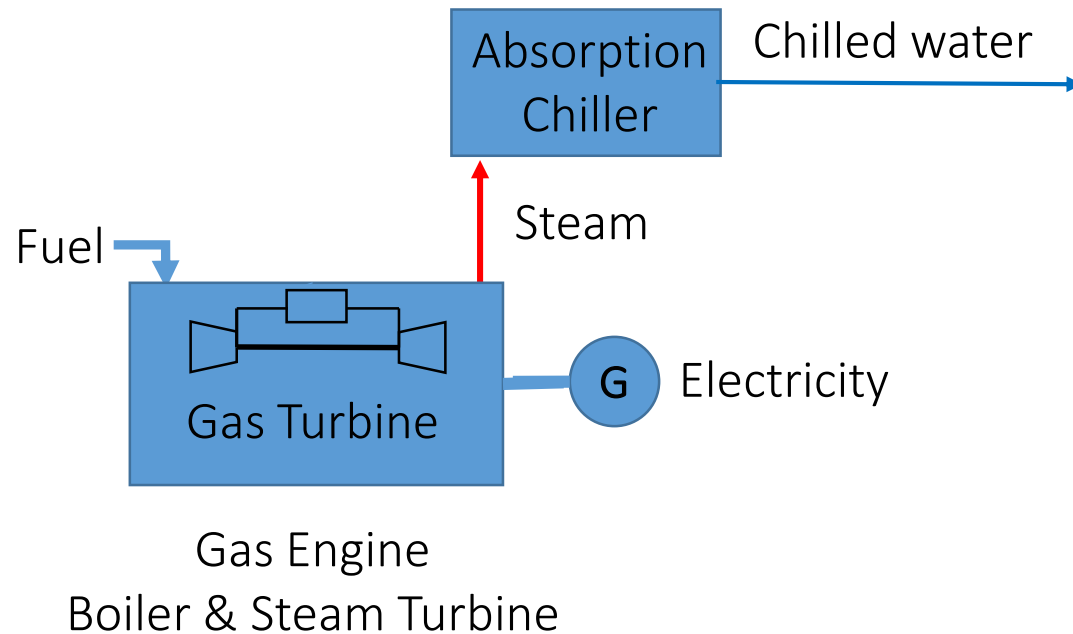


- Tri-generation or Combined Cooling, Heat & Power (CCHP)



# Example of CCHP

- Gas turbine and absorption chiller



# Key-features CHP/CCHP Plants

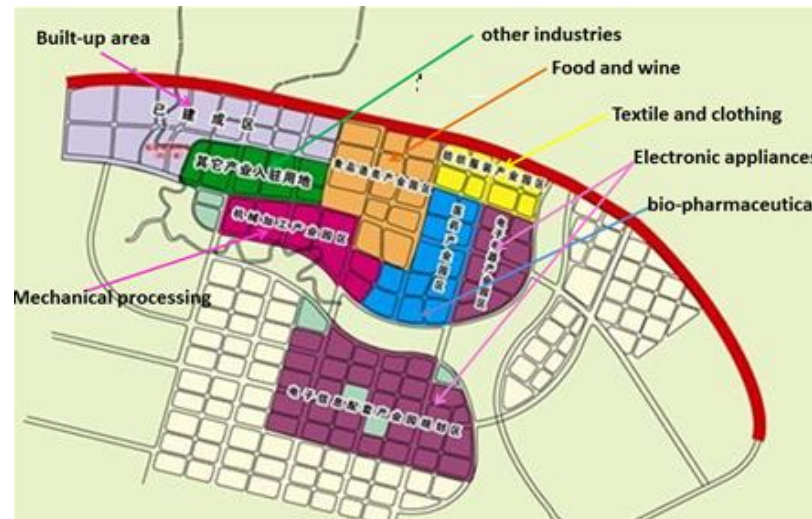
- CHP/CCHP plants has high energy utilization of fuel.
- Heat driven cooling is possible, both centralized and decentralized.
- Choice of technology / system depends on specific local conditions.
- High investment cost

# Examples

## Termoekonomi project

### *Yuechi Distributed Energy Project*

- Yuechi industrial zone
- Gas turbine CHP technology
- 2 x 13 MWeI
- 2 x 40 t/h steam



## Similar project in Thailand

### *Bangchak Utility Project*

- Bangchak refinery
- Gas turbine CHP technology
- 2 x 12 MWeI
- 2 x 48 t/h steam



# Examples

## Termoekonomi project

*Qingdao, Kaiyuan, new district development*

- Data center and industry zone
- Gas turbine CCHP technology
- 80 MW electricity
- 40 MW cooling
- 111 MW heating



## Similar project in Thailand

*Suvarnabhumi Airport*

- Airport and industry zone
- Gas turbine CCHP technology
- 56 MW electricity
- 105 MW cooling

# Examples

## Termoekonomi project

*Xinghai Bay, Dalian, new district development*

- Chiller/Heat pumps
- Sewage water as heat sink/heat source
- District cooling/District heating
- 60 MW cooling
- 50 MW heating



# Examples

## Termoekonomi project

*Olympic Village, Beijing*

- Chiller/Heat pumps
- Sewage water as heat sink/heat source
- District cooling/District heating
- 30 MW cooling
- 20 MW heating



# Selected Clients and Partners



ASIAN DEVELOPMENT BANK



四川能投分布式能源有限公司

SCEI Distributed Energy Systems CO., LTD.



AGENCE FRANÇAISE  
DE DÉVELOPPEMENT



Beijing District Heating Group



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# Thank you!

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