



Finnish Energy Club 2017

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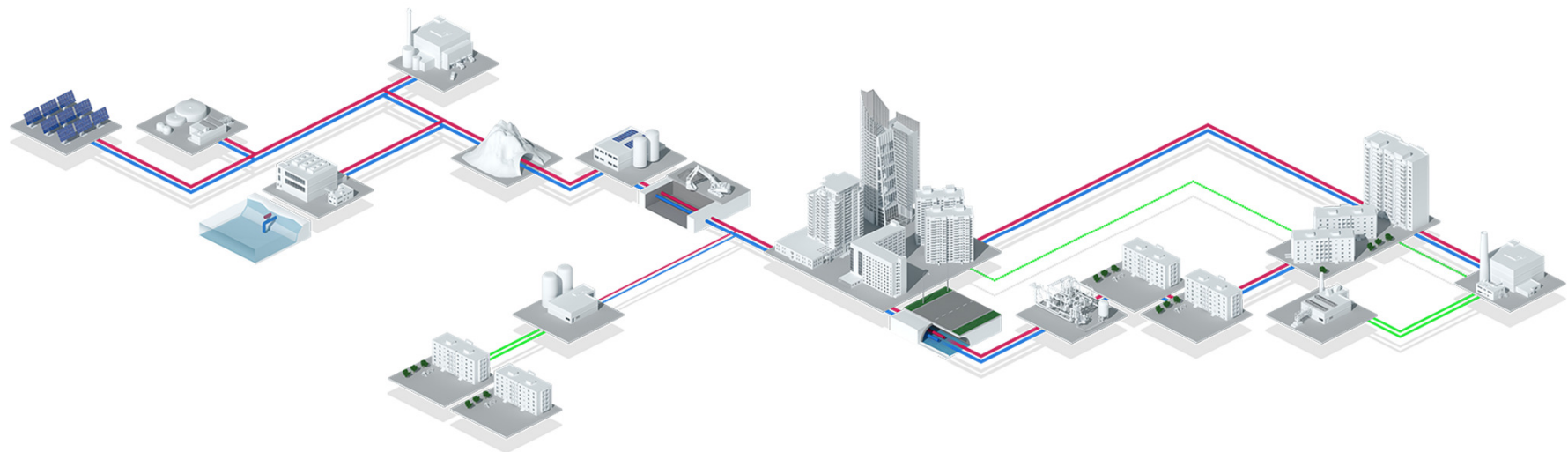
Finnish Energy Model by Helen

Beijing 15- 24.5.2107

What is the Finnish Energy Club

- **Introduction of the Club**
 - Was established in 2010
 - Club members are energy sector companies and different organisations
 - Club wants to increase cooperation between countries and companies
 - Share experiences between companies and countries
 - Promote utilisation of best practises in the energy sector
 - Promote sales of member companies

Companies providing services in China together with the Finnish Energy Club

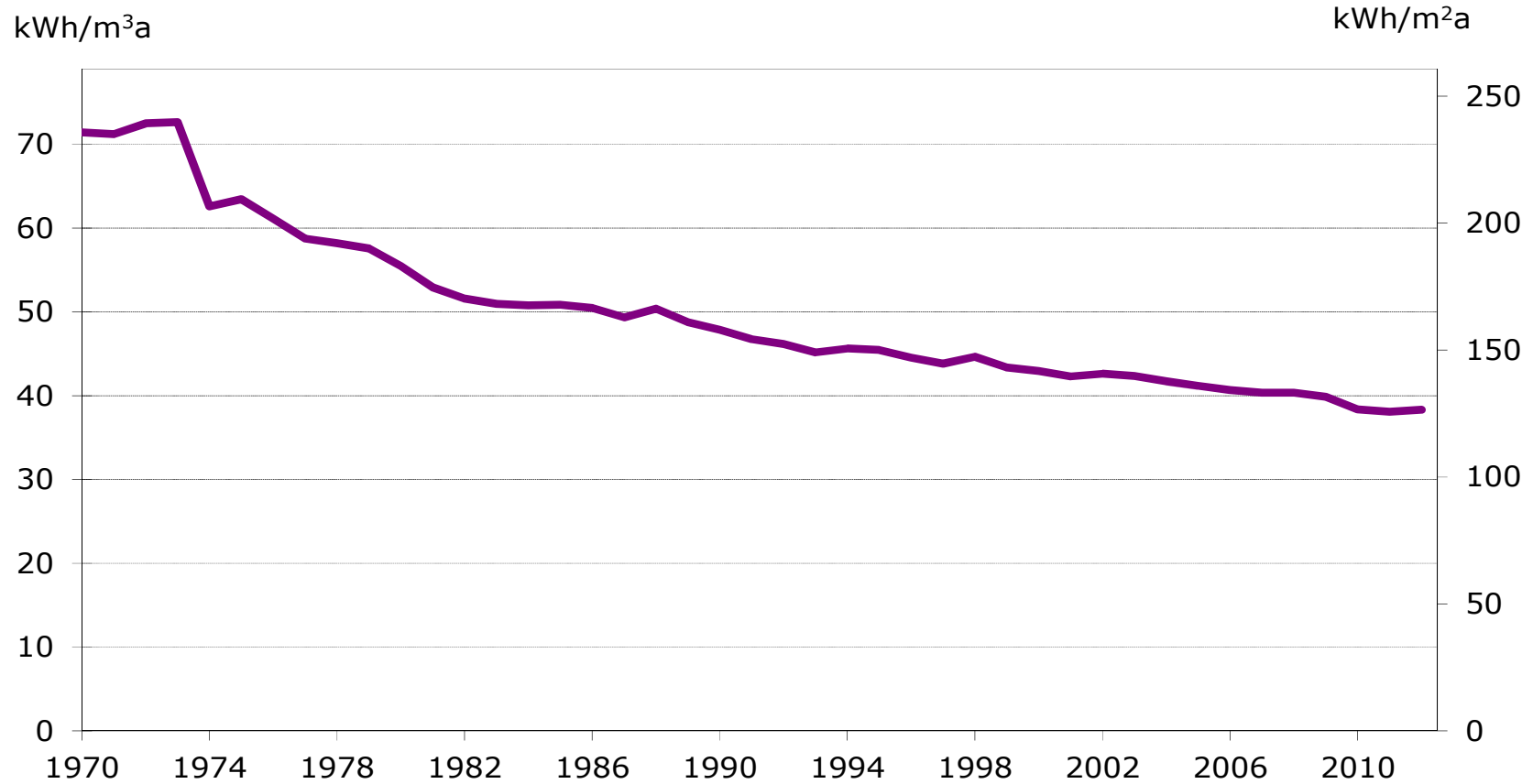


Key Performance Indicators in the district heating system in Finland



Key Performance Indicators	Finland (200 companies on average)
Network heat losses of production	6-9%
Make-up water replenishment need per year	1
Reliability	99,98%
CHP share of DH production	76%
DH generation efficiency	93%
RES share of DH production	38%
Staff productivity (GWh / employee)	20
Profitability % of turnover	10-20%

Specific heat consumption in district heated buildings incl. energy for heating and hot tap water



Heat losses/year in DH system in Finland



Energy needed by Customers/year

38
kWh/m³

Fuel needed in boiler plants

45,5
kWh/m³

Losses in heating network 8 %

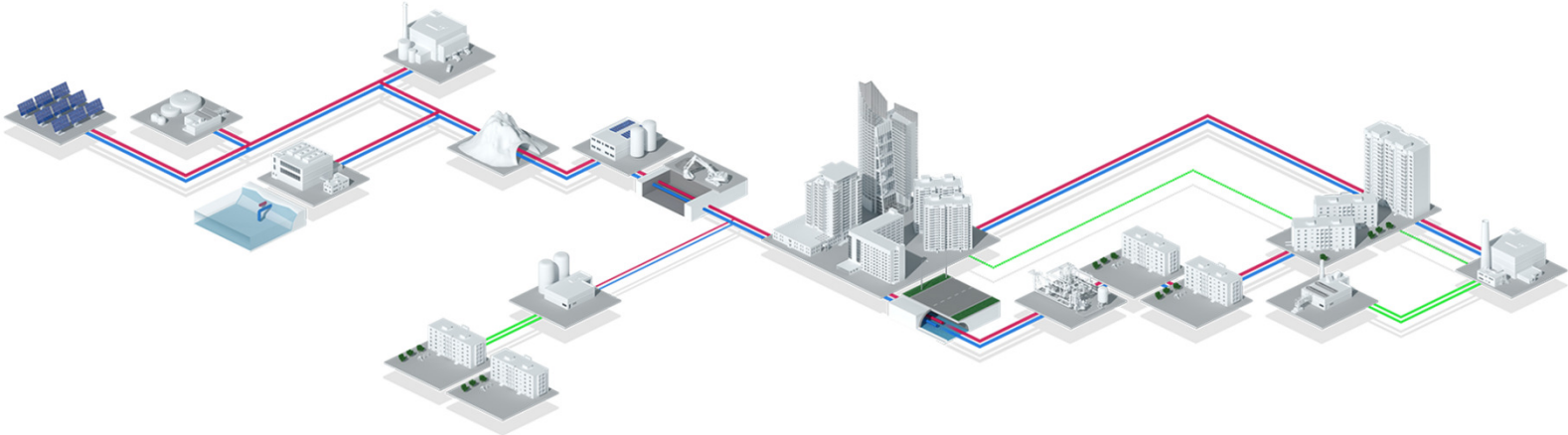
+3,5
kWh/m³

Losses in production 9 %

+4.0
kWh/m³

Total Losses 16 %

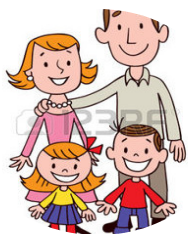
7.5
kWh/m³



Finnish Energy Story and Finnish Energy Model (FEM) by Helen



It is the Story and Model of Winners, which are



Consumers



Energy companies



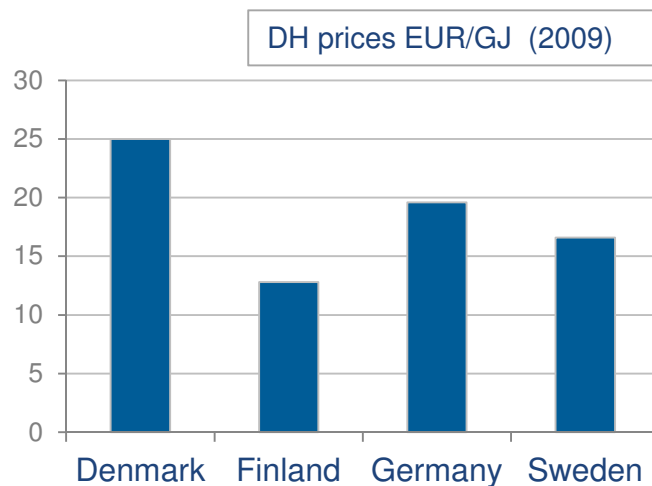
State



Environment

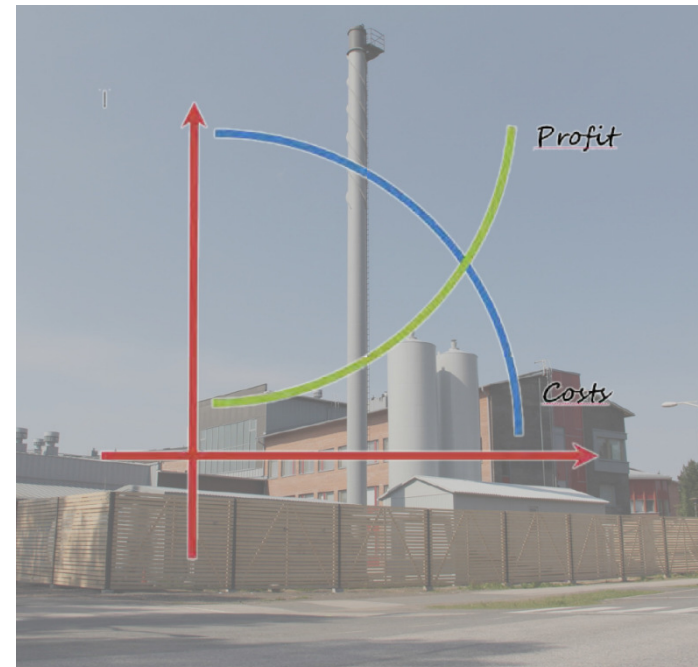
Why to utilize Finnish Energy Model? Because

- ✓ Finnish consumers pay the lowest energy price in Western Europe. And compared to the purchasing power, the lowest in the whole world.



Comparison of energy prices in Northern Europe

- ✓ Finnish energy companies make good profit



Why to utilize Finnish Energy Model? Because



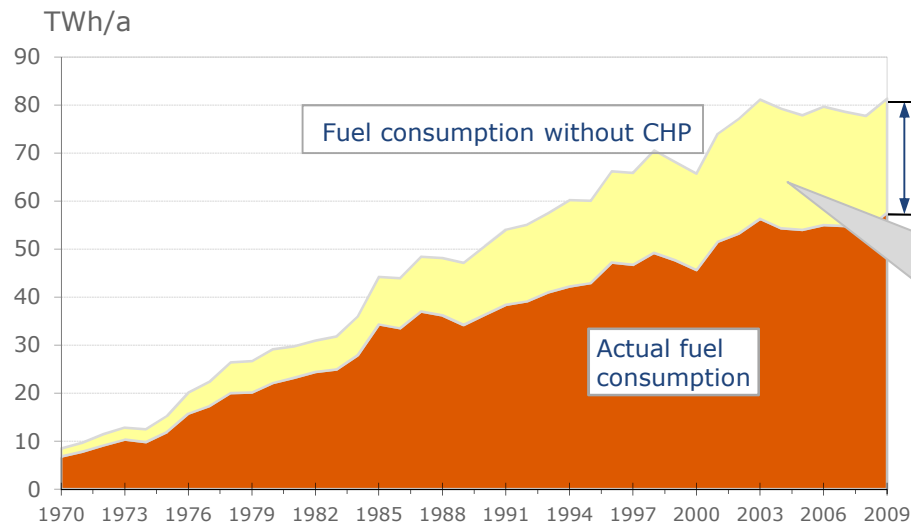
✓ State

State gets good tax revenue from the energy sector

✓ Environment

Losses in energy production and networks are the lowest in the world

Due to CHP-solutions savings in fuel are huge and CO₂-emissions are low.



“The fuel savings of about 22 TWh are equal to 3 million metric tonnes of hard coal. Such savings resulted in 600 kg of coal and 1400 kg of CO₂ equivalent saved per inhabitant in 2009.”

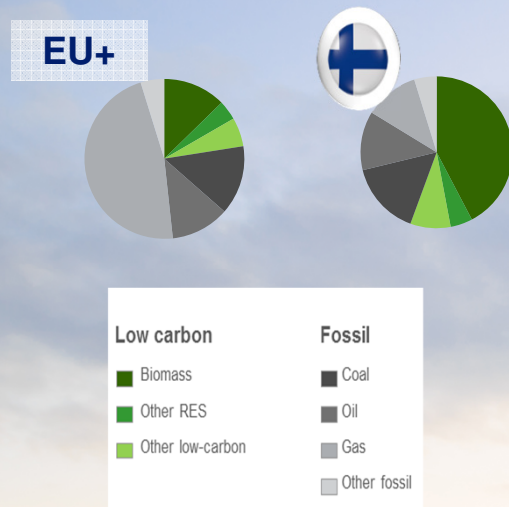
The Finnish Energy Model provides

- **A very effective energy system**
- **Tax revenues for State and Areas**
- **Profitable Operation for Energy Utilities**
- **Savings in State and Areas budgets**
- **Savings in Investments**
- **Savings in Operation**
- **Foundation for Smart Energy Utilities and Cities**
- **Effective Training program**
- **Positive environmental impacts**

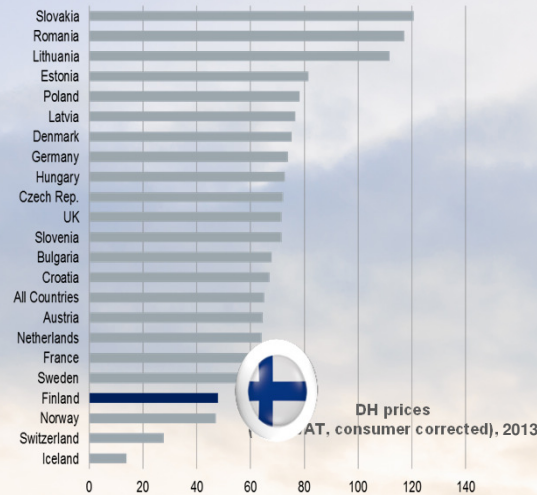
Cold, remote and small population - Finnish Energy Story is a success Story in the most difficult conditions



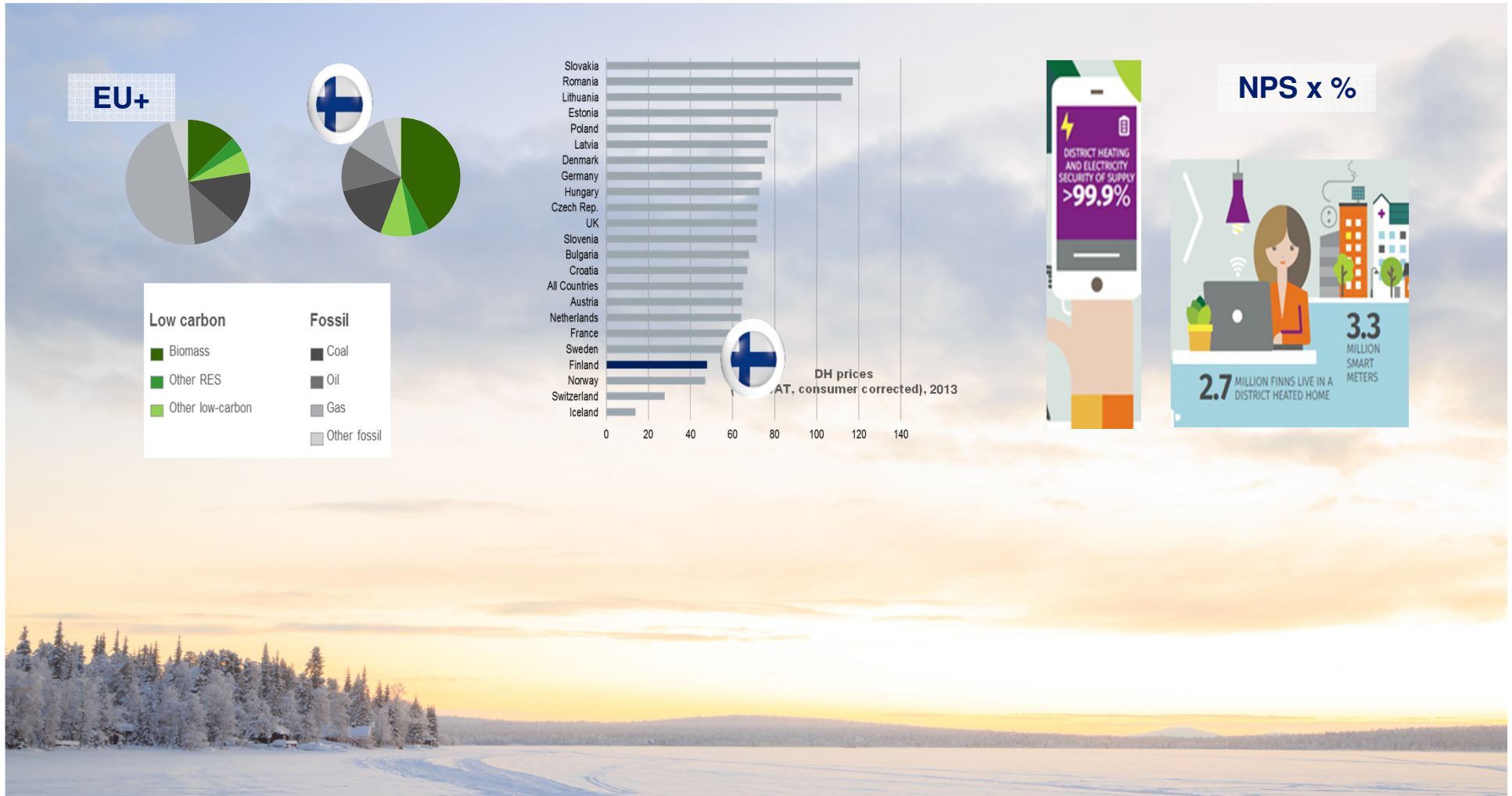
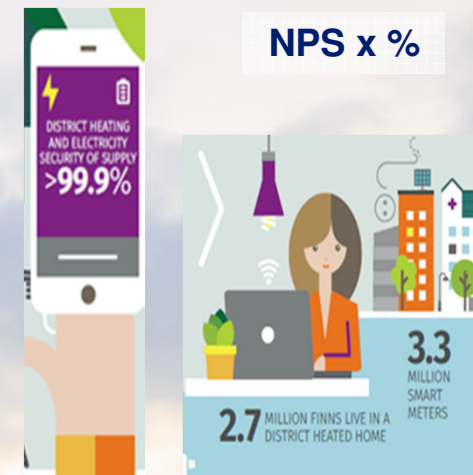
Sustainable



Affordable



Smart & Customer friendly



Targets of China in building more effective energy infrastructure networks

13th 5-year-plan

focus on Cleantech and sustainable technologies

- change the way, how China's economy is growing
- create better natural environment for the citizens by green and low carbon technology development
- create win-win co-operation with collaborators outside China in order to achieve better environment

Benefits to consumers

- Clean, comfortable and safe living environment
- Secured heating and cooling
- Sustainable energy infrastructure
- Increasing the consumer know-how



Together to Sustainable District Heating, Case Helen, Helsinki, Finland



In the city of Helsinki, DHC and electricity are produced in CHP processes on a large scale. The emissions have decreased and the air quality in Helsinki has improved considerably since 1990s – despite the fact that energy production has increased by more than 60%!

- **District heating** covers **93%** of the total heating energy demand in Helsinki
- **More than 90% of DH** energy is produced by **CHP**
- The energy efficiency of CHP exceeds 90%, which is one of highest in the world
- Despite of **low prices of DH**, Helsinki Energy is highly profitable.
- Helsinki is the third biggest and fastest growing district cooling operation in Europe.
- Data server centers are connected to DHC system to create world's most eco-efficient computer halls.



Awards:

- The EU has ranked DHC and CHP in Helsinki as **Best Available Technology** in 2008.
- International Energy Agency IEA has awarded Helsinki for **superior solutions for climate change mitigation** in 2009.
- Euroheat&Power and IEA has awarded Helsinki the **Best District Cooling System** in 2011.

Together to sustainable district heating 4.0



History: "Helen

Today: "Helen 2.0"

and

- **Efficient DH system**
- **CHPs based on natural gas and coal**
- **Energy efficient city planning and building standards**

- **More distributed generation: geothermal, solar**
- **More waste heat used**
- **District cooling**
- **Heat storages**
- **Voluntary demand side response**
- **Energy efficiency of the whole system**



Together to sustainable district Heating



Future: **"Haidian 2.0 + 4.0"**

- **2.0:** Ensuring world class performance of the current DH operations
- **4.0:** Utilizing globally leading practices in future development
 - Flexible, integrated and sustainable DHC system platform
 - All distributed RES and waste heat used: geothermal, solar, WtE, etc....
 - Storage and flexibility: Integration of heat and electricity
 - Optimized system with IoT, available information and automation
 - Demand side response and smart heat solutions at consumer level
 - New products to consumers



We could join forces and implement Case Helen solutions in Beijing, and in the future develop together the Model Helen to be even more effective and a leading Sustainable District Heating platform 4.0

Finnish Energy Club offers the best practices and services (FEM By Helen)



Finnish Energy Club with its members is pleased to offer:

- Establishment of Expert Data Base (EDB)
 - ✓ The foundation and prerequisite for smart cities and smart grids
- Optimization
- Design
- Deliveries:
 - ✓ Heat Substations
 - ✓ Network, accessories and devices
 - ✓ Heating, Power Plants and different accessories and devices
- Construction
- O&M (Operation&Maintenance)
- Management and business models
- Effective Training program
- Lifetime partnership

Your partners in Finland: Finnish Energy Club and



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