



CLEAN ENERGY
M I N I S T E R I A L

Accelerating the Transition to Clean Energy Technologies

CLEAN ENERGY MINISTERIAL CHP/DHC WORKING GROUP WORK PROGRAMME

**IEA CHP/DHC Collaborative & CEM CHP/DHC WG
Joint Workshop, Paris, 12-13th February, 2013
Satu Helynen
VTT, Finland**

WHAT CEM PROVIDES AND HOW ?

- A high-level forum hosted by different nations to promote policies and programs that **advance clean energy technology** based on common interests of participating governments and other stakeholders. The meetings are an opportunity to assess progress and to communicate this progress globally.
- **Annual ministerial meetings**
 - Reports and Announcements on the progress of initiatives
 - Status report of clean energy deployments by IEA
 - Public-Private Roundtable Discussions and receptions with ministers
 - Side events, meetings and site visits arranged mainly by initiatives and host countries
- **Initiatives and their working groups**
- Clean Energy Solutions Center and CEM Secretarial Services

INITIATIVES OF CEM

Initiatives

Ministerials

Public-Private Engagement

Energy Efficiency



Appliances



Buildings and Industry



Electric Vehicles



Clean Energy Supply



Bioenergy



Carbon Capture



Hydropower



Solar and Wind

Crosscutting



21st Century Power



Clean Energy Policy



Energy Access



Smart Grid



Sustainable Cities



Women in Clean Energy

- [Energy Management Working Group](#)
- [Power Working Group](#)
- [Steel Working Group](#)
- [Cement Working Group](#)
- [Cool Roofs and Pavements Working Group](#)
- [CHP/DHC Working Group](#)
Established after CEM1 in Washington DC in July 2010, led by Finland

THE MISSION OF CHP/DHC WG

ACCORDING TO WORKSHOP HELD IN WASHINGTON, SEPTEMBER 12-13, 2011, WITH PARTICIPANTS FROM USA, JAPAN, RUSSIA, SWEDEN, MEXICO, IDEA, EUROHEAT AND POWER, US CLEAN ENERGY ASSOCIATION, FORTUM

CHP/DHC WG will increase awareness about the vast potential of CHP and Efficient DHC to:

- Reduce fuel consumption
- Reduce emissions of greenhouse gases
- Reduce emission of other air pollutants harmful to the environment and human health e.g. black-carbon
- Increase the use of renewable resources for heat and power production
- Reduce dependence on energy imported from other regions or countries
- Increase economic competitiveness and generate employment.

IMPORTANCE OF CHP/DHC IS GROWING

New legislation to improve efficiency and decrease emissions,
such as EU Energy Efficiency Directive 2012/27/EU

Energy security

Integration of intermittent renewable energy production to energy systems: challenge, but also an opportunity

More available heat loads for CHP

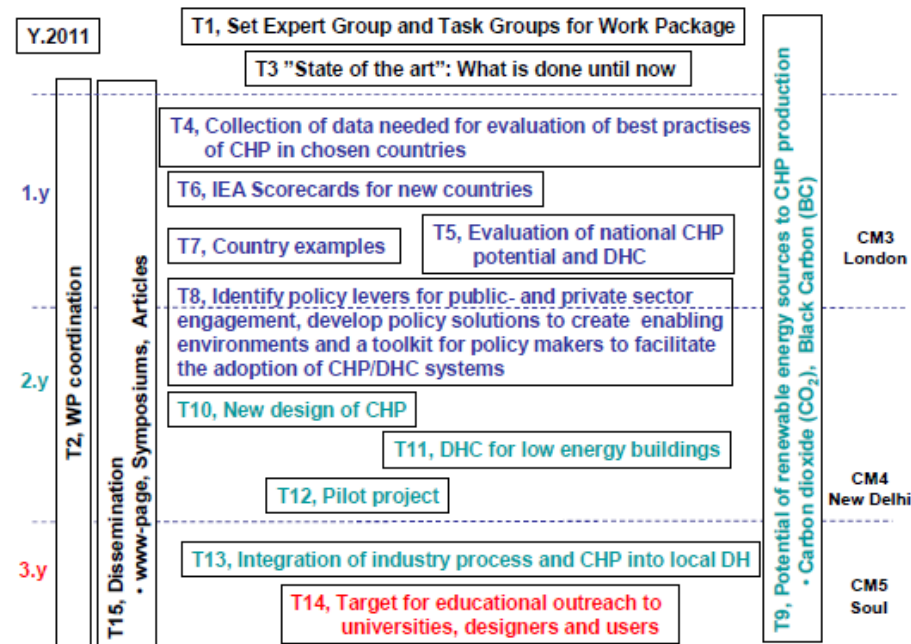
- cooling, desalination
- production of pellets, torrefied biomass, SNG (synthetic natural gas), biofuels, bio-oils and other biomass-based products with sustainability criteria

Newly commercialised CHP technologies for small and micro scale

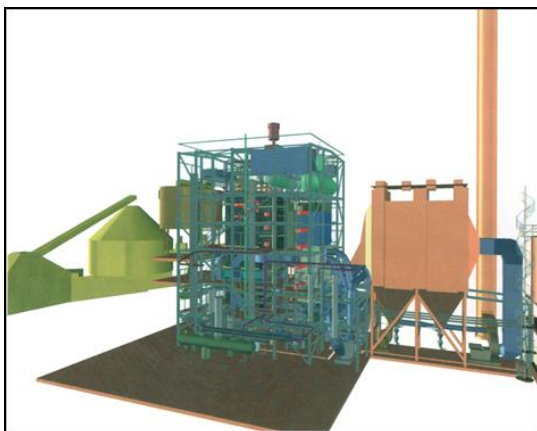
- gasifiers integrated engines, fuel cells, Stirling, ORC

INITIAL WORK PROGRAMME AND WHAT IS DONE

- Opportunities and barriers for CHP and DHC in countries in the following categories
 - New development
 - Expansion
 - Refurbishment
 - Consolidation
- Updated information of best practices, case studies, country potential estimates for CHP
- Launch of SharePoint site to share information
<http://gseppartnership.energetics.com/chp/>
- Reports on progress and announcements for CEM meetings



ONE-PAGE REPORT AND REPORT OF FOUR COUNTRY GROUPS FOR CEM3 IN LONDON, 2012



Refurbishment countries

Description

District heat has high market shares (10-50%), but the systems need major refurbishment in order to increase customer confidence, energy efficiency, and profitability. The common denominator for the DHC systems is often that they were introduced and developed within planned economies.

Examples of countries in this category
Russia, several central and eastern European countries

Main areas of CHP/DHC potential

Efficiency of DHC could be improved: refurbishment of heat production and delivery systems, new type of tariffs, introduction of renewable energy sources, such as municipal waste

Barriers

Lack of required capital investments because of low profitability

Russia

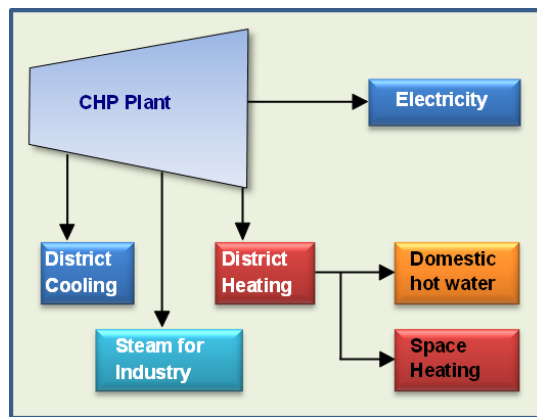


Chelyabinsk – is the city in South-Urals region with a population more than 1.2 million. In the region the ambient temperature may drop as low as to -45°C. OAO Fortum and Chelyabinsk Region Authorities have agreed on extensive cooperation in the area of energy efficiency. The largest operation in the programme is the automation and upgrade of the Chelyabinsk DHS, which will reduce energy losses in the area by over 30% as well as significantly decrease fuel consumption and emissions. The main idea of the project is to interconnect the three heat sources including one heat only boiler (HOB) into one integrated scheme that will allow to produce heat in the most cost-optimal way (CHP) and deliver the heat to customer at any place of the city. New heat substations are to be installed as well. The project this size is unique in Russia and will be partly funded by rising heat tariffs. Once completed, consumers will be provided with uninterrupted and more affordable supply of district heat. Fortum plans to have all customers with heat metering by year 2013.

Poland and Estonia



Poland and Estonia were the forerunners of district heating rehabilitation after the Soviet Union collapsed. In both countries the DH systems were in very bad conditions for some 20 years ago. Through a systematic rehabilitation the DH industry has become modern, competitive and preferred by the customers while the costs of DH in real terms could be cut by 50% (The World Bank 2001 and 2003). Thereafter, such rehabilitation has expanded to many other countries in the region.



Consolidation countries

Description

DHC systems have reached a very mature, almost saturated market share of 50-60%.

Examples of countries in this category
Denmark, Finland, Sweden, Austria

Main areas of CHP/DHC potential

Increase of CHP to utilise smaller heat loads with new technology
Increase of cooling networks
Increase the share of renewable energy sources

Barriers

Reduction of heat demand in low-energy houses pressure on DH to reduce temperature level and enlarge ΔT .

Good examples and best practices

Sweden: increase of renewable energy sources
Finland: increase of CHP with high efficiency for biomass
Denmark: solar integration in small DH systems
high efficiency cooling systems

Sweden



Sweden has actively increased share of bio-fuel in CHP production.

Finland



Energy solution in Helsinki combines CHP, district heating (DH) and district cooling (DC) in the most energy-efficient way in the world. DH is produced concurrently with electric energy with an annual efficiency rate of more than 90% in CHP. Fuel is turned into energy in the most possible extensive way. DH covers over 90% of heating need in Helsinki. CHP accounts for over 90% of town's DH production. Produced in the same processes with DH, DC is the most energy-efficient form of cooling properties by far. In Helsinki, the heat gathered from properties with rapidly expanding DC is used fully in DH. One part of the DH and DC are produced from the waste heat of purified sewage water and from sea water in the heating and cooling plant under the Katri Välia Paik. The data centre concept consists of heat produced by computers cooled with DC and is conducted to the DH network to provide heat to buildings. Light district heat is a heating solution for low-energy houses built in the extremities of the DH network. The building automation of these houses supports the concept of lower temperature of the circulating water in the smart DH system.

Helsingin Energia's development programme will be directed towards a carbon-neutral future 2050 increasing use of bio-renewable energy.

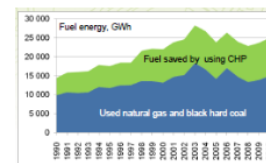
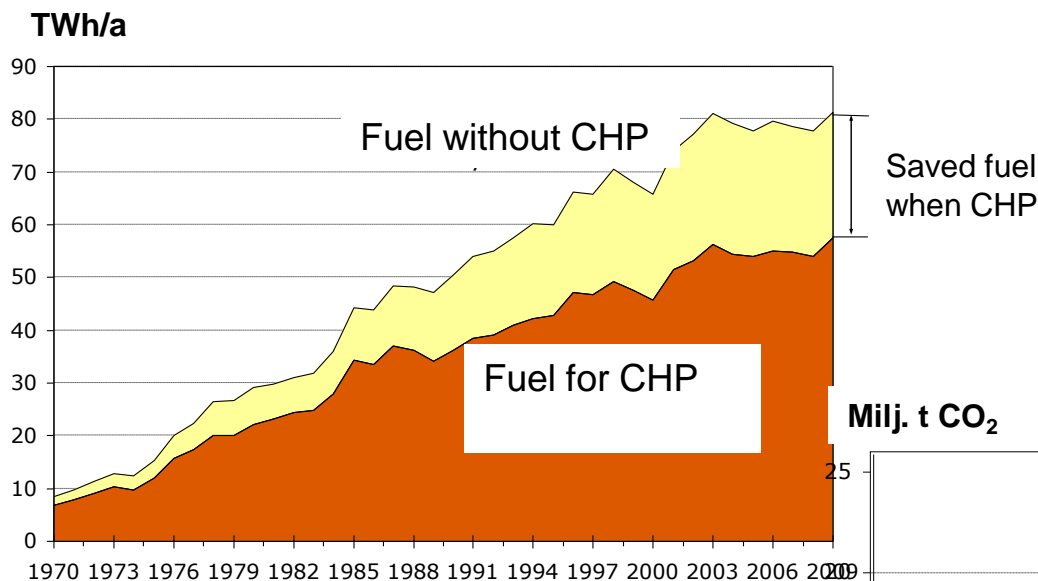


Figure 2. The amount of fuel saved by using CHP in Helsinki.

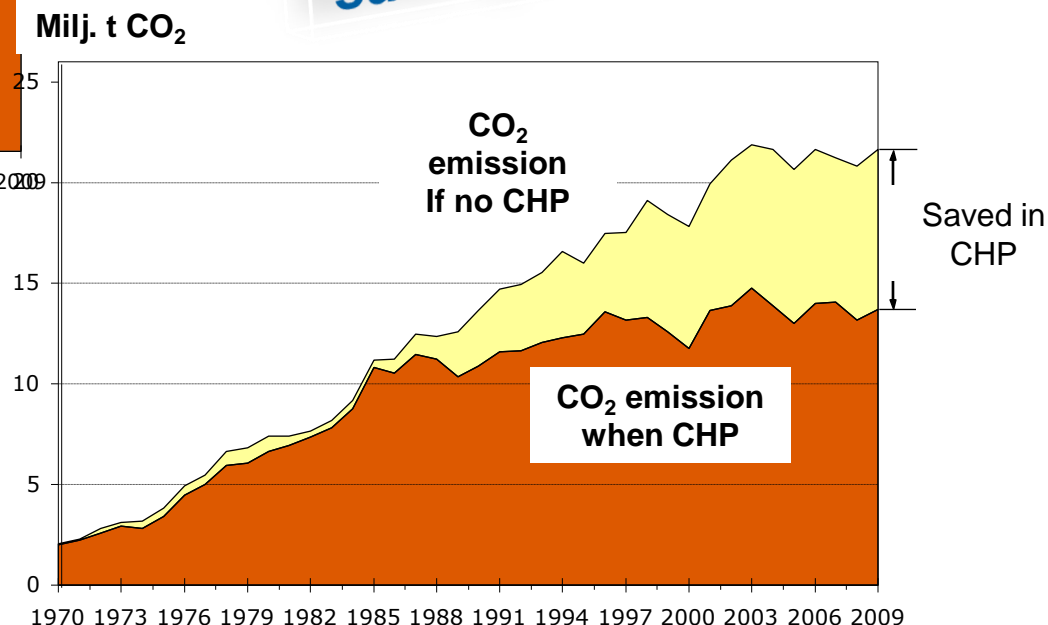
⁷ Helsingin Energia's smart CHP/DH system – the most energy-efficient solution for heating Finland's capital, Helsinki. *Energy*, 2011, 10p.

IMPACTS OF CHP TO FUEL AND CO₂ EMISSION IN FINLAND 2009



**30 % of fuel (22 TWh) and
33 % (7 milj. t) CO₂ was
saved by CHP in 2009**

**75 % of District heating and
20 % of electricity was
produced by CHP**



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What next ?

- Preparations are being finalised for CEM4 in New Delhi, April 2013
 - CHP and District Energy is presented in 2013 Tracking Energy Progress report by IEA
 - Progress report of WG and possible announcements
 - Public-Private Roundtable Discussions
 - Business Innovation to Reduce Soft Costs and Accelerate Deployment of Solar PV
 - Accelerating the Global Adoption of Clean Vehicles
 - **Power Market Evolution in Emerging Economies**
 - Large-Scale Adoption of Energy Management Systems
 - Intersection of Policy and Finance for Renewables
 - **Market Barriers to Mini-Grid Development**
 - Innovation Showcase Pavilion arranged by the Government of India for 40 exhibits

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What until CEM5 in Seoul, 2014 and CEM6 in Mexico, 2015

- Increased co-operation with IEA International CHP/DHC Collaborative
 - Both additional and updating existing country-specific scorecards on CHP and district heating
 - Analysis report of the role of CHP and district energy in a new energy future
- Increased co-operation with other CEM initiatives, eg. Sustainable Cities and 21st Century Power
- Discussions on possible co-operation with IEA Implementing Agreement on CHP
- Other bilateral and multilateral co-operation to enhance investments

CEM CHP-DHC WORKING GROUP

What until CEM5 in Soul,2014 and CEM6 in Mexico,2015

- Ensuring a wide outreach of produced results and preparation of progress and summary reports, especially on policy recommendations
- Preparation of announcements on flagship investments and other achievements in the field of CHP/DHC
- Meetings and workshops
 - plans for a workshop/conference in the second half of 2013 in Helsinki, Finland, for wide audience
 - side events/site visits in Soul, 2014, preparatory meeting in Mexico 2014 and in Mexico, 2015