

# Heat: a major component of our energy system

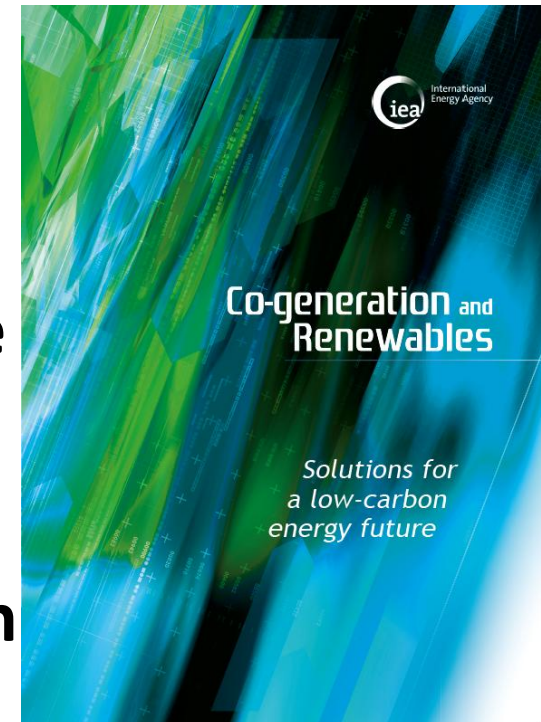
Jayen P. Veerapen, IEA

# Overview

- Genesis of focus on heat
- Plans for Energy Technology Perspectives (ETP) 2012
- Break-out session

# Co-generation (Combined Heat and Power-CHP) / district heating (DH) report

- 2011 report “Co-generation and Renewables – Solutions for a low-carbon energy future”
- Renewables: garnering more and more attention and support, and rightly so
- Proven low-carbon solutions like co-generation/DH should not be forgotten
- Analyzed cases where co-generation and renewables are complementary and share common goals

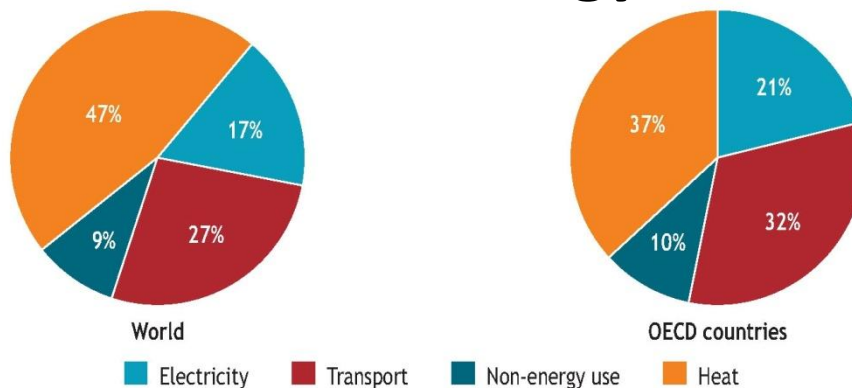


## Report - *contd.*

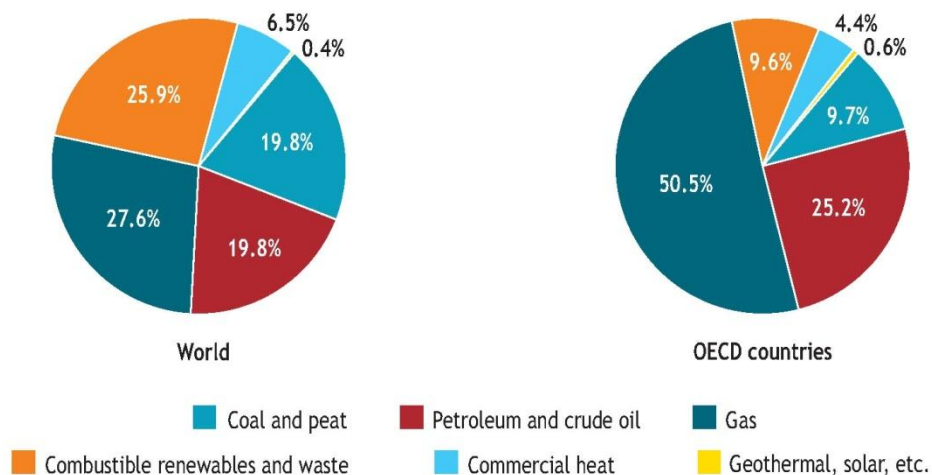
- **Attempt to quantify the importance of heat in the energy supply**
  - Both co-generation/DH and renewables are relevant to heat
- **Identify and document examples of “renewable” technologies with potential for operation in co-generation mode**
  - Biomass
  - Geothermal
  - Concentrating solar power (CSP)
- **Analyze how greater variable renewable electricity could lead to increased emissions due to back-up and how co-generation could help to reduce the carbon footprint**
  - Combination of co-generation plant and thermal stores within a district heating network

# Report—spotlight on heat

## ■ Heat dominates all other energy uses



## ■ Heat production is dominated by fossil fuels



# 2009 and 2011 District Energy Awards

- Joint initiative of Euroheat and Power, International District Energy Association, Danish Board of District Heating and IEA
- Inaugural awards 2009: 27 applications
- 2<sup>nd</sup> District Energy Awards 2011: 37 applications
  - Only 3 applications from outside Europe
  - 4 categories: expansion of an existing scheme, modernization of an existing scheme, new scheme, district cooling
  - 5 winners in all



[www.districtenergyaward.org](http://www.districtenergyaward.org)

## Call for applications



# The International District Energy Climate Awards

<http://www.districtenergyaward.org>

Awarding those who lead the way in providing clean, sustainable, district energy solutions.

For more information  
[www.districtenergyaward.org](http://www.districtenergyaward.org)

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### 4. Written description (max. 10 pages) covering

- 4.1. System history, configuration of production units, distribution network, number or square footage of buildings/customer facilities served, average age of production and distribution system facilities.
- 4.2. Data supporting the systems overall energy efficiency in terms of useful energy delivered to end use customers divided by fossil primary energy input to production/distribution process, specification of fuel/energy input mix.
- 4.3. How has the programme reduced greenhouse gas emissions and/or other emissions in your community? Environmental benefits which the system provides over other available energy options (trends in CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, particle emissions). Please describe fuel and water conservation achieved.
- 4.4. What makes your programme outstanding and innovative?
- 4.5. How has the programme improved the quality of life of your community?
- 4.6. What are the challenges you face and how were they overcome?
- 4.7. How was the programme financed?

### 5. Attachments:

- 5.1. Max. 10 photos, graphs or similar
- 5.2. Letter of support from the community served (optional)

By submitting the application, candidate authorizes the organizing team to copy, publish, post, publicise, promote and use all the information and materials provided without restriction and with full copyright.

Submissions, strictly in PDF format, should be sent to the following address :

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France  
[jayen.veerapen@iea.org](mailto:jayen.veerapen@iea.org)

No later than Friday April 1st, 2011.

Proud organisers:



# Genesis of focus on heat

- Report/Award
- Feedback received from member countries and other stakeholders
- Our realisation of the need for a more holistic approach to the energy system including various forms of energy



# Plans for ETP 2012

- The current status of heat
- Projections on the provision of heat in the future
- Thematic spotlights
  - Renewable heat
  - Cooling
  - Electrification of heat
  - Smart energy systems incl. heat storage

# Break-out session - Heat

- Informative session
- Input on each of the topics that will make up the heat section of ETP 2012
- Input on the interdependencies that exist between the three components of the energy system: heat, transport and electricity
- Logistics: Room 250 – Button “2” for elevator

# Conclusions

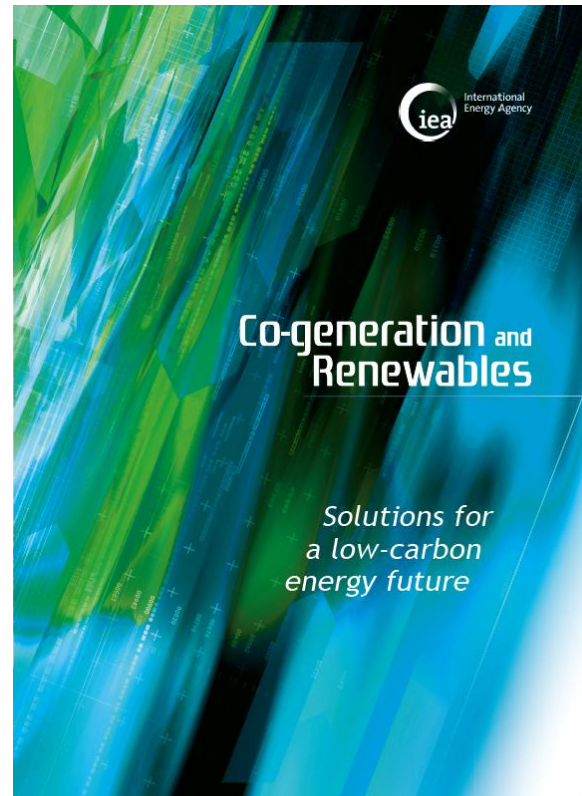
- Starting to pay more attention to heat
- ETP 2012: a good step forward
- Will lead to future work
- Your input is valuable.



International  
Energy Agency

- Energy security
- Environmental protection
- Economic growth
- Engagement worldwide

# Thank you



[http://www.iea.org/index\\_info.asp?id=1941](http://www.iea.org/index_info.asp?id=1941)



International  
Energy Agency

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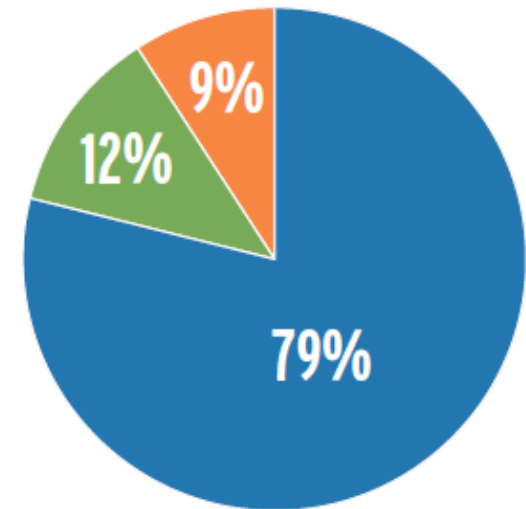


# 2011 District Energy Awards: Gothenburg, Sweden – $\approx$ 500,000 inh.

- District heating: since 1953; cooling: mid-1990s
- Incorporates highly-efficient CHP plant: 30% and 35% of city's electricity and DH needs respectively
- 1000 km of pipe network -  $\approx$  64% of residents with DH
- An innovative system:
  - Despite differences in altitude across the city, few portions of network are separated by heat exchangers
  - Testing how laundry machines, dryers and dishwashers can make use of DH

# Gothenburg, Sweden – key feature

- Nearly 80% of the heat in the DH system is recovered (waste) heat that would otherwise be lost
  - ‘Waste’ heat from power plants (CHP)
  - ‘Waste’ heat from two large oil refineries
  - ‘Waste’ heat from waste incineration and wastewater



- **Waste heat 79%**  
(Waste heat includes heat from:  
Refuse incineration 26%  
Refineries and other industry: 24%  
Electricity production: 26%  
Wastewater: 3%)
- **Renewable resources 12%**  
(Biomass and renewable electricity)
- **Fossil resources 9%**  
(Oil, fossil electricity and natural gas)

# 2011 District Energy Awards: Zeewolde (Polderwijk), Netherlands – $\approx$ 1,000 houses

- New DH grid (2007), new residential area (2005), new municipality (1984)
- 80% renewable: Heat and electricity demand met by biogas from farm
- 5km pipe carries biogas from farm to CHP plant

# Zeewolde (Polderwijk), Netherlands – key feature

- The farmer is not only producing biogas but is also owner and operator of the CHP unit.
- He sells the heat to Essent - a major energy company - at a price related to the price of natural gas.
- Essent owns the DH grid.



# CHP/DE work: 2009 report

- 2009 report “Co-generation and District Energy – Sustainable energy technologies for today ...and tomorrow”
- Identified a consistent set of “world-class” policies to address barriers faced by CHP and DE



# CHP/DE work: 2009 report – *contd.*

- **Financial and fiscal support**
  - Capacity grants-NY state, Feed-in tariff-Germany
- **Utility supply obligations**
  - Green certificate scheme-Belgium
- **Local infrastructure and heat planning**
  - Buildings regulations-United Kingdom
- **Climate change mitigation (emissions trading)**
  - EU emissions trading scheme
- **Interconnection measures**
  - Interconnection standard - United States
- **Capacity building and outreach**
  - Fuel cell CHP R&D programme - Japan