

# *Global Benefits from Local Decisions*

*Policy tools to promote district heating and  
combat climate change*

*Hugh Ho*

International Energy Agency (IEA)

*District Heating Futures Seminar/Workshop*

*31 August 2009*

# Overview

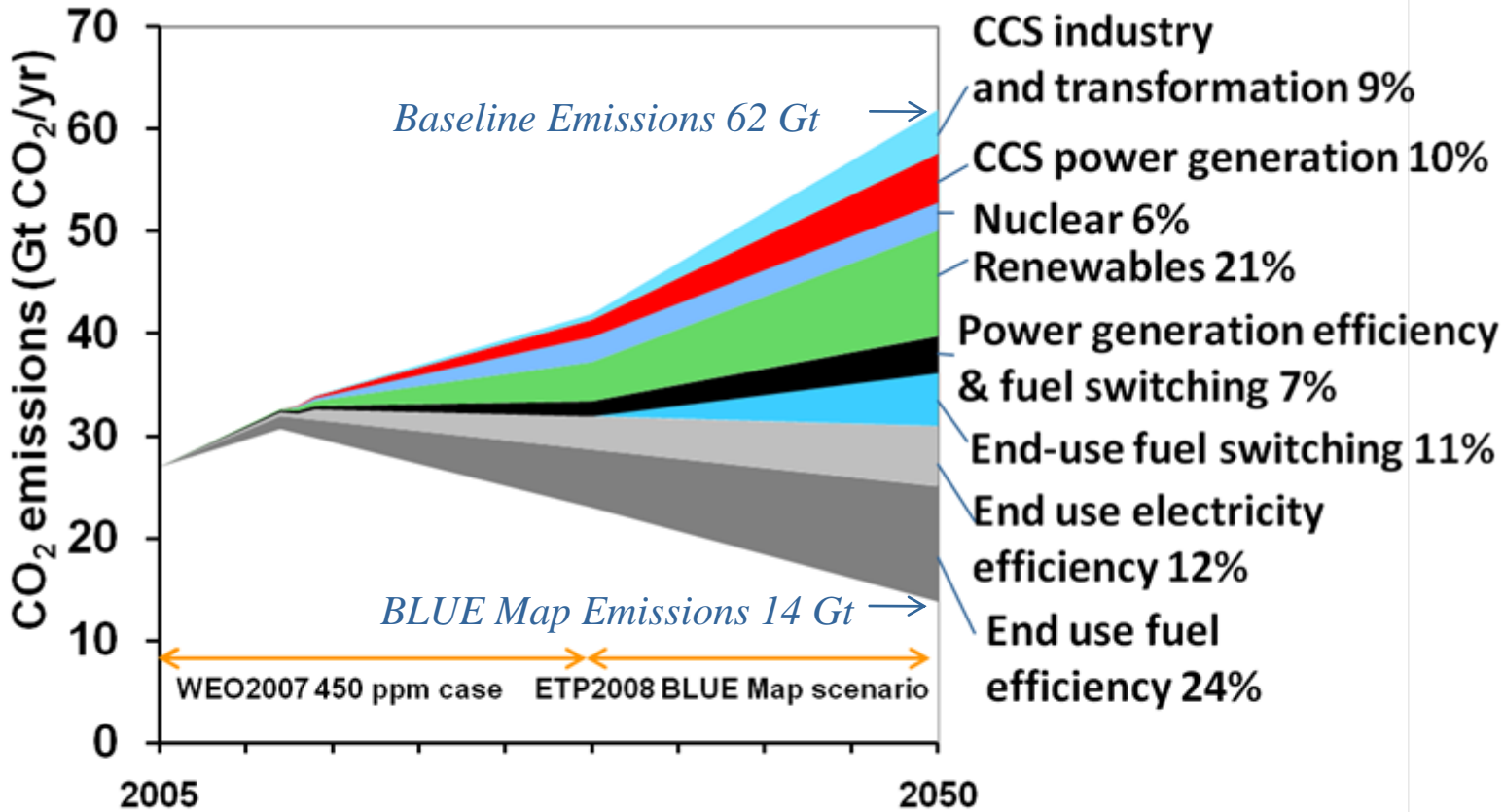
- Today's Energy Challenges
- The Role of DHC and CHP
- Lessons Learned
- Policy Toolset
- Next Steps to Success

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and  
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# An Energy Revolution Is Needed

## Cutting Energy-Related CO<sub>2</sub> Emissions

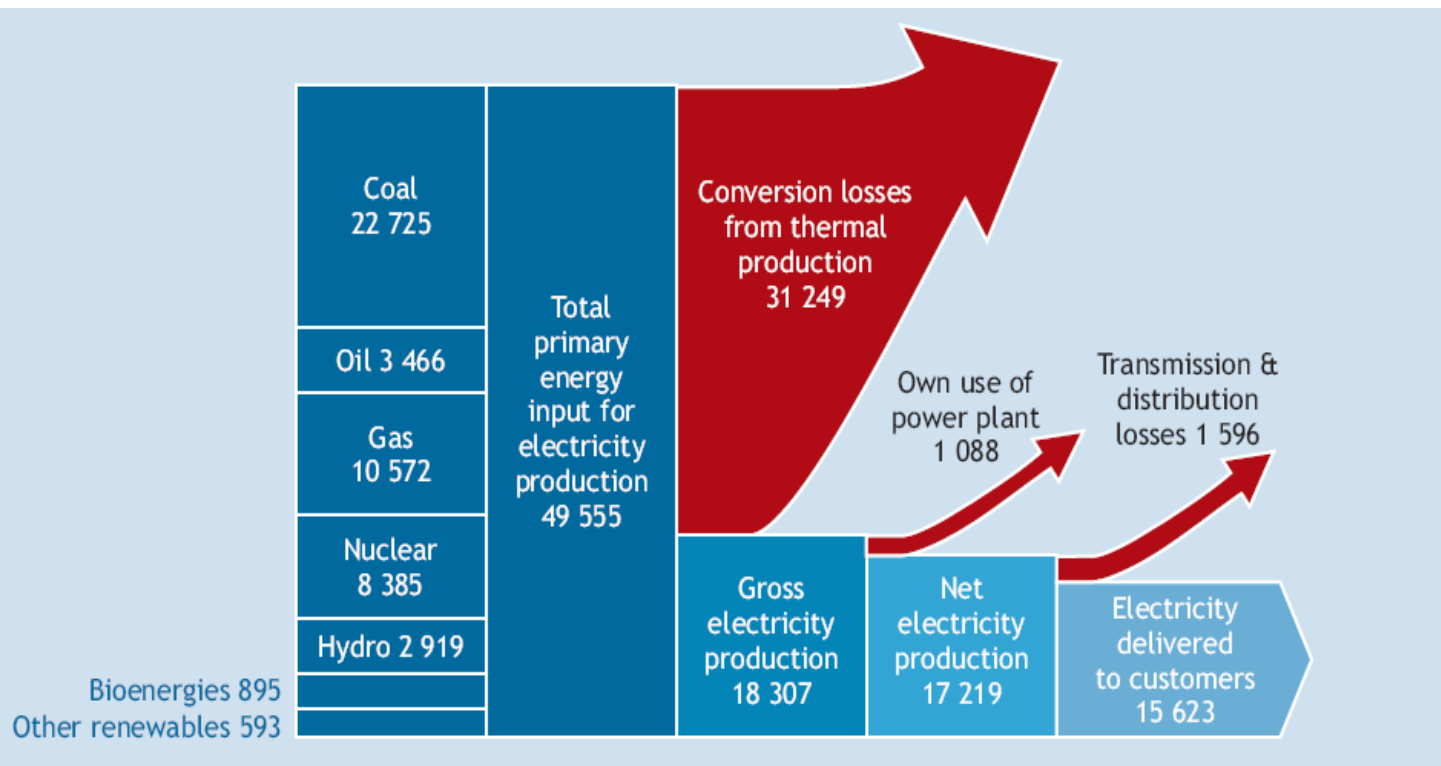


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Source: IEA, *Energy Technology Perspectives* (2008)

# Energy Supply Inefficiency Is a Huge Opportunity

## Energy Flows in the Global Electricity System



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Source: IEA, *CHP: Evaluating the Benefits of Greater Global Investment* (2008).

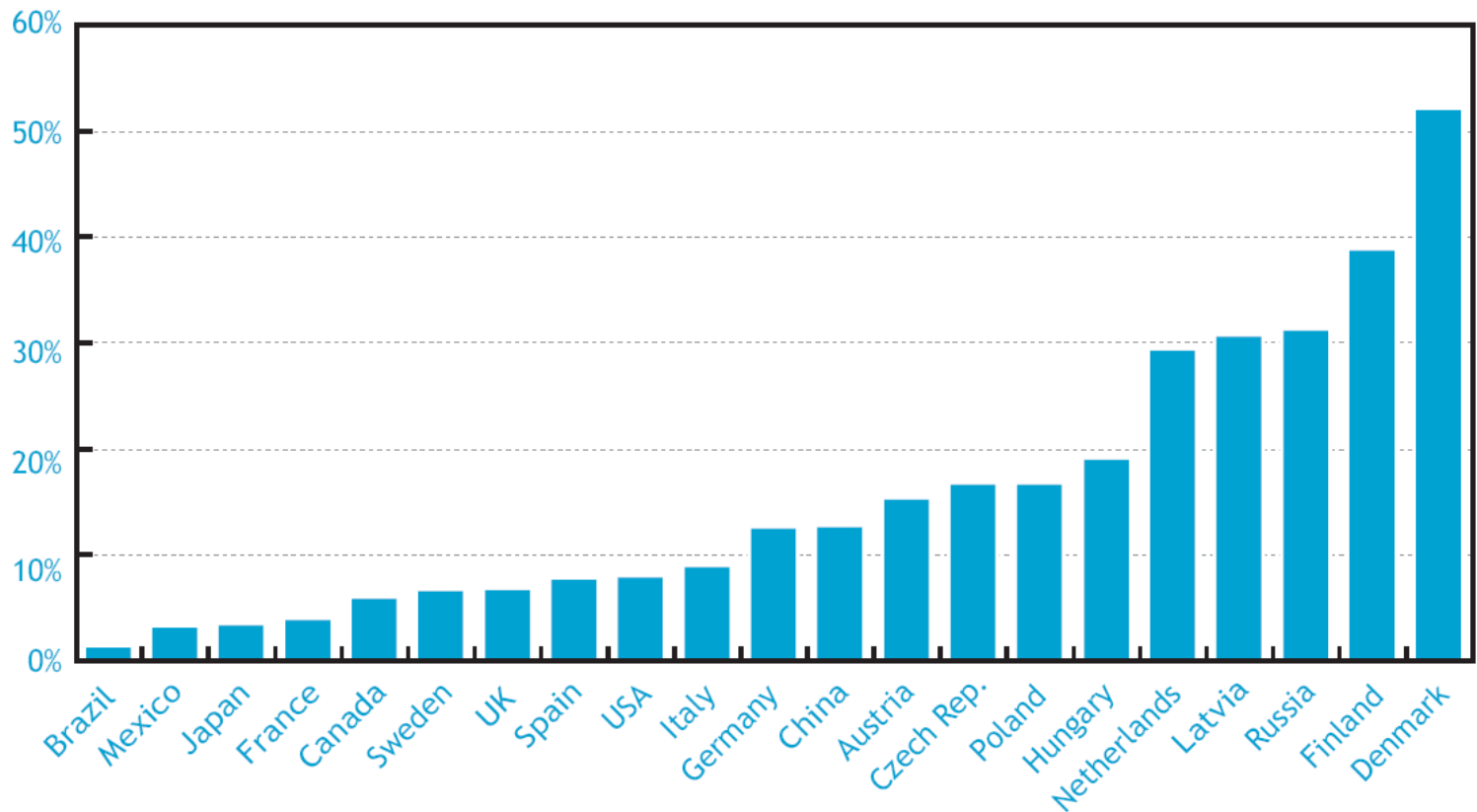
*2/3 of the fuel we use to produce power is wasted --  
CHP and DHC can more than double this efficiency*

# CHP Generates just 9% of Global Electricity

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## CHP Share of National Power Production



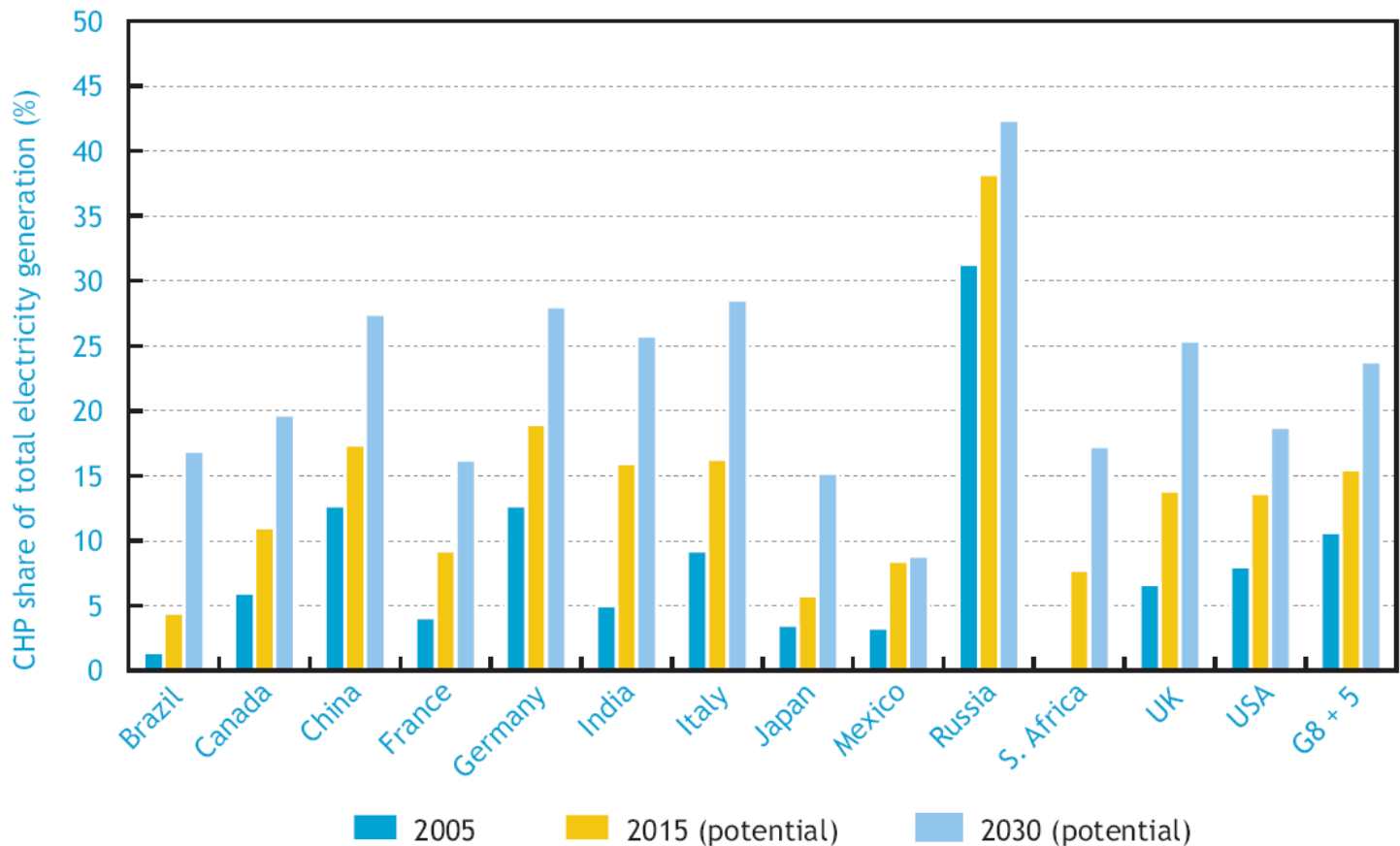
Source: IEA, *CHP: Evaluating the Benefits of Greater Global Investment* (2008)

# There Is Significant Additional Potential

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## CHP Potentials -- Accelerated CHP Scenario



Source: IEA, *CHP: Evaluating the Benefits of Greater Global Investment* (2008)

# DH Provides Global Benefits

- District heating systems deliver ~5% of global final energy demand
  - 2% in OECD countries
  - 7% in non-OECD countries
  
- 700-900 MtCO<sub>2</sub>/yr avoided due to use of CHP/DH
  - Reduces existing CO<sub>2</sub> from fuel combustion by 3-4%

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# CHP/DHC is Recognized at a High Level

## ■ 2007 G8 Summit, Heiligendamm

“instruments and measures will be adopted to significantly increase the share of **combined heat and power (CHP)** in the generation of electricity”

set up a network to “develop practical instruments for assessing and advising on the implementation of energy efficiency in buildings and the use of renewable energies, especially for **cooling and heating**”

## ■ 2009 G8 Summit, L'Aquila

“We especially encourage more rapid application of the many cost-effective technologies already available to improve the energy efficiency of **power generation facilities, buildings ...**”

Accelerated investment in low-carbon technologies is needed to minimize the existing and potential carbon lock-in represented by capital stock in buildings, factories ...”

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## ...So Why Are We at 9%?

- Lack of information about cost savings, environmental benefits
- Difficulties connecting to the electricity grid
- CHP/DHC benefits difficult to recognize in GHG regulation
- Lack of strategic heat resource planning

*Government champions needed*

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# Best Practice Policies

## ○ Policy case studies

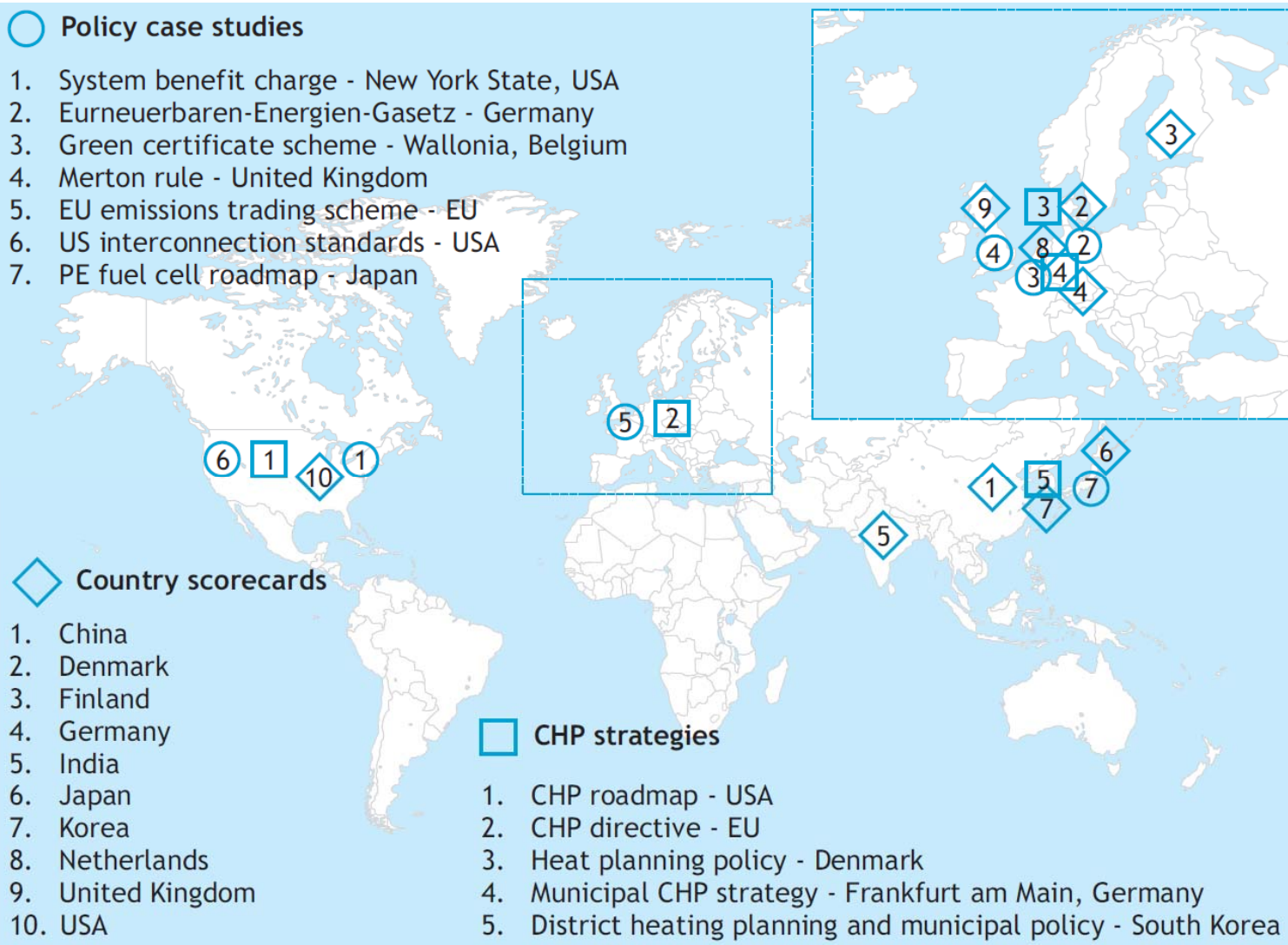
1. System benefit charge - New York State, USA
2. Erneuerbaren-Energien-Gasetz - Germany
3. Green certificate scheme - Wallonia, Belgium
4. Merton rule - United Kingdom
5. EU emissions trading scheme - EU
6. US interconnection standards - USA
7. PE fuel cell roadmap - Japan

## ◇ Country scorecards

1. China
2. Denmark
3. Finland
4. Germany
5. India
6. Japan
7. Korea
8. Netherlands
9. United Kingdom
10. USA

## □ CHP strategies

1. CHP roadmap - USA
2. CHP directive - EU
3. Heat planning policy - Denmark
4. Municipal CHP strategy - Frankfurt am Main, Germany
5. District heating planning and municipal policy - South Korea



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# Lessons Learned

- Need to better explain how CHP/DHC are transitional technologies to a clean energy/low-carbon future
  - Industrial parks with CHP, CCS
  - The transition to renewable fuels
  - Smaller-scale applications
- Local government leadership on DHC is high; could be even more of a focus
- Heat/infrastructure planning is critical
- Governments need to lead

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# DHC/CHP Policy Toolset

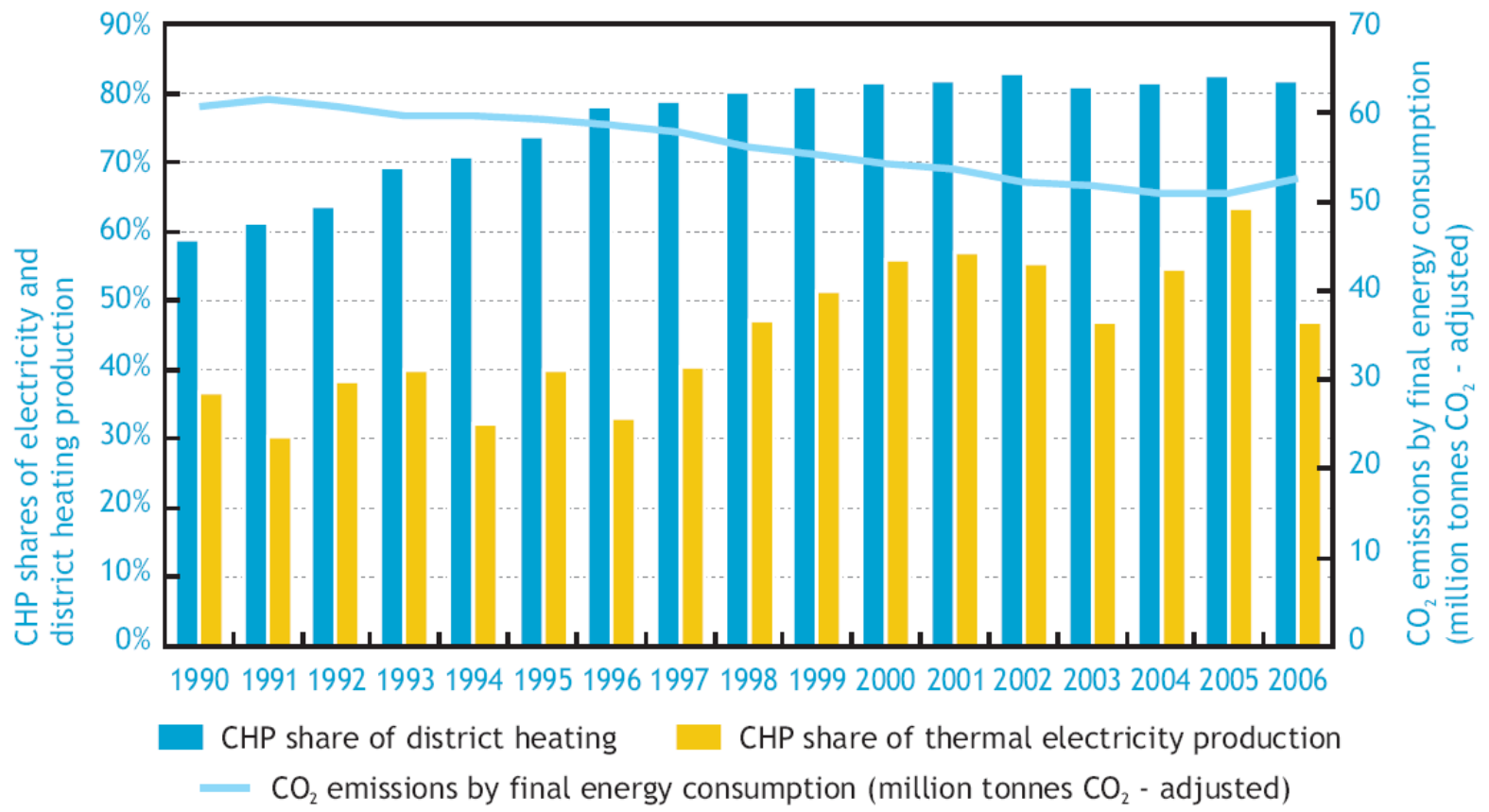
Policy Type	Policy Makers				
	Energy	Environment	Financial	Local authorities	Network planners
<i>Financial and Fiscal Support</i>	X	X	X	X	
<i>Local Infrastructure and Heat Planning</i>	X		X	X	
<i>Capacity Building/Education</i>	X	X	X	X	
<i>Utility Supply Obligations</i>	X		X		X
<i>Emissions trading</i>	X	X	X	X	
<i>Interconnection Measures</i>	X				X

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# Denmark's Win-Win-Win Approach

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Source: IEA, *CHP: Evaluating the Benefits of Greater Global Investment* (2008)

Enhanced energy security

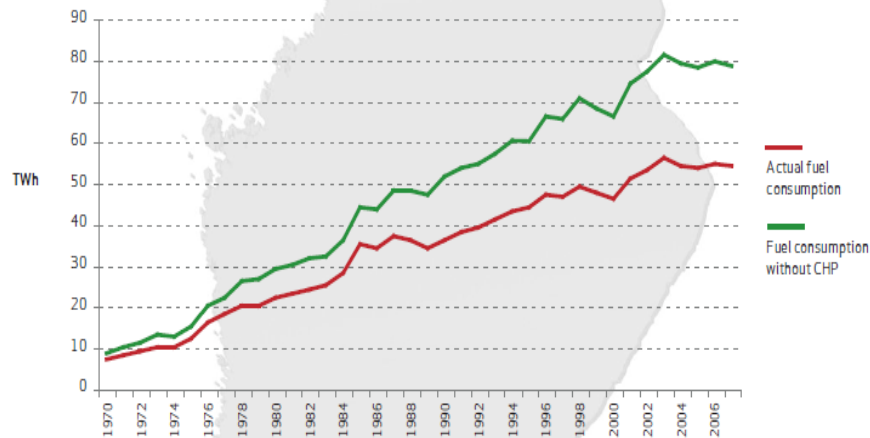
Reduced GHG emissions

Use of local resources

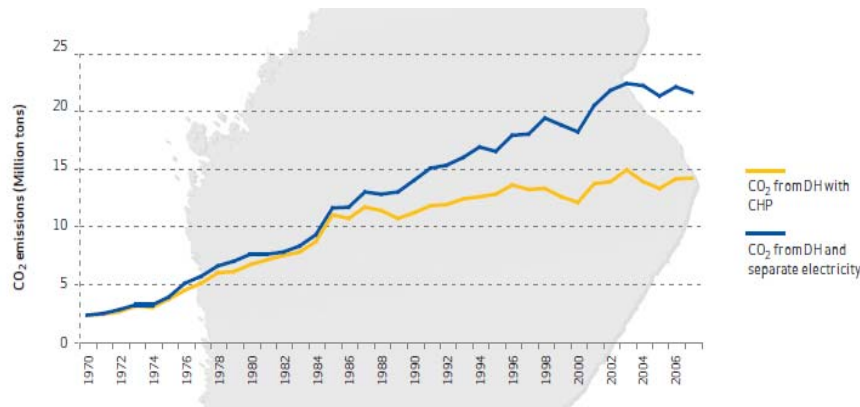
# Finland Leading in CHP/DHC

- In 2007, CHP produced 74% of heat needed for DH, and 29% of the country's electricity
- Government involvement has been limited, but strategic: guaranteed interconnection and tax support
- Large biomass CHP use
- District cooling on the rise

## Fuel Use Has Decreased



## CO<sub>2</sub> Emissions Have Decreased



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# Steps to Success

## Cogeneration and District Energy

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- Create a Champion
- Design a strategic framework
- Identify the potential
- Identify barriers to this potential
- Design and implement targeted policies



*CHP Plant:  
Arvind Textile Mill, India*

# A Range of CHP/DHC Success

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**Denmark Rating:**



**Finland's Rating:**



**Germany Rating:**



**Netherlands Rating:**



**Japan's Overall CHP Rating:**



**Republic of Korea's  
Rating:**



**UK Rating:**

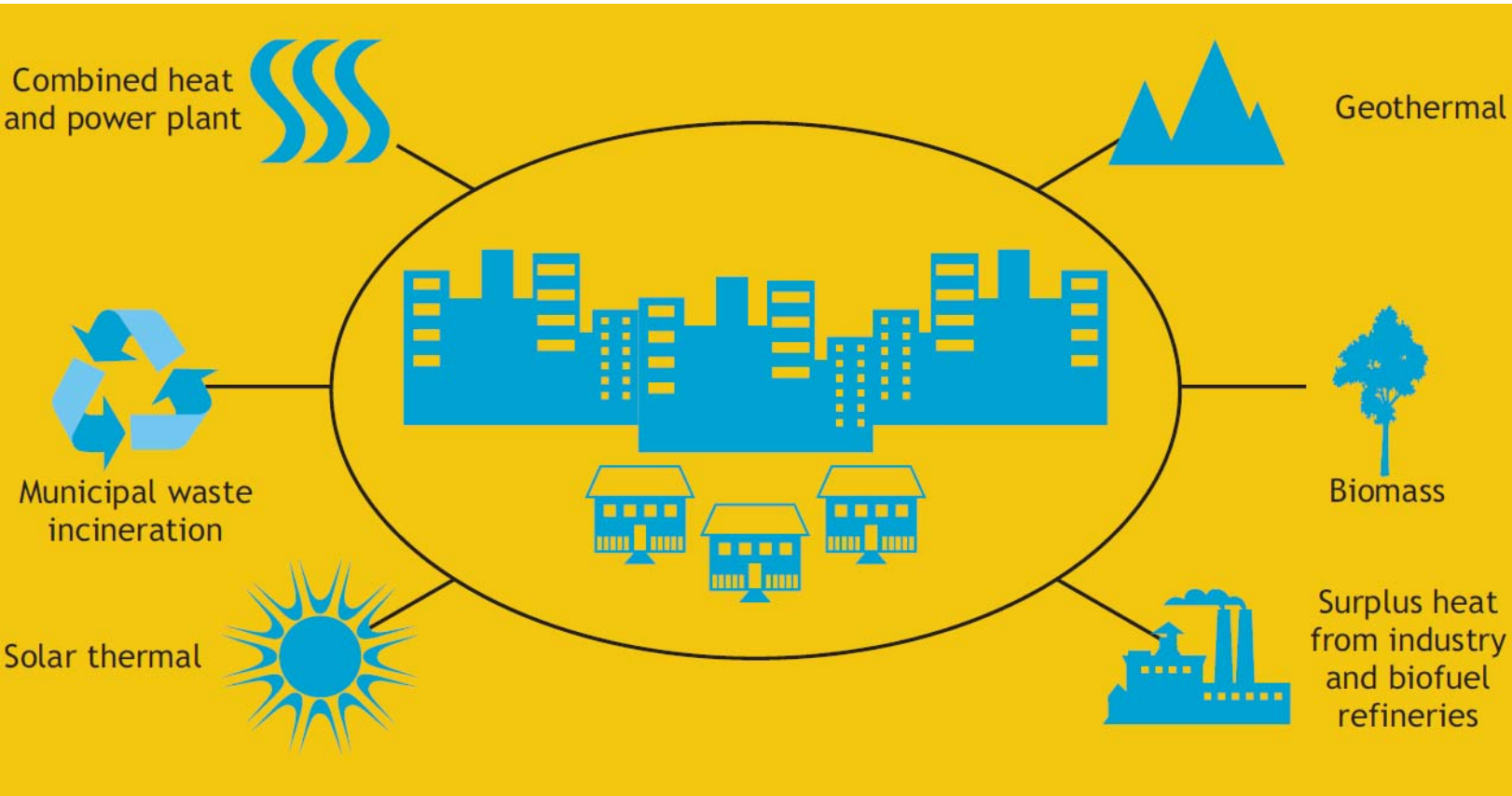


**United States Rating:**





# CHP/DHC: Technologies for Today...



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## and for a Low-Carbon Tomorrow

# Join Us at the District Energy Summit in Copenhagen



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# For More Information

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*Report available for download at*

*<http://www.iea.org/files/CHPbrochure09.pdf>*

*Visit the IEA's International CHP/DHC  
Collaborative at*

*<http://www.iea.org/G8/CHP/chp.asp>*

*Visit the IEA Implementing Agreement on  
District Heating & Cooling including the  
integration of CHP (DHC/CHP) at*

*<http://www.iea-dhc.org>*