

# Energy from biomass and bio-wastes

Khartoum landfill: 2 million tonnes, increasing by 1000 t/day from 4 million people



Helping cities worldwide move to 100% RE



# ‘Informal’ removal of recyclables





# Getting it out through the media





...that 'waste is energy'





# Bio-waste is a significant source of energy now

**In the future,  
there will be no difference  
between waste and energy.**

**将来，  
废物和能源，  
再无分别。**

[www.hsbc.com.hk](http://www.hsbc.com.hk)



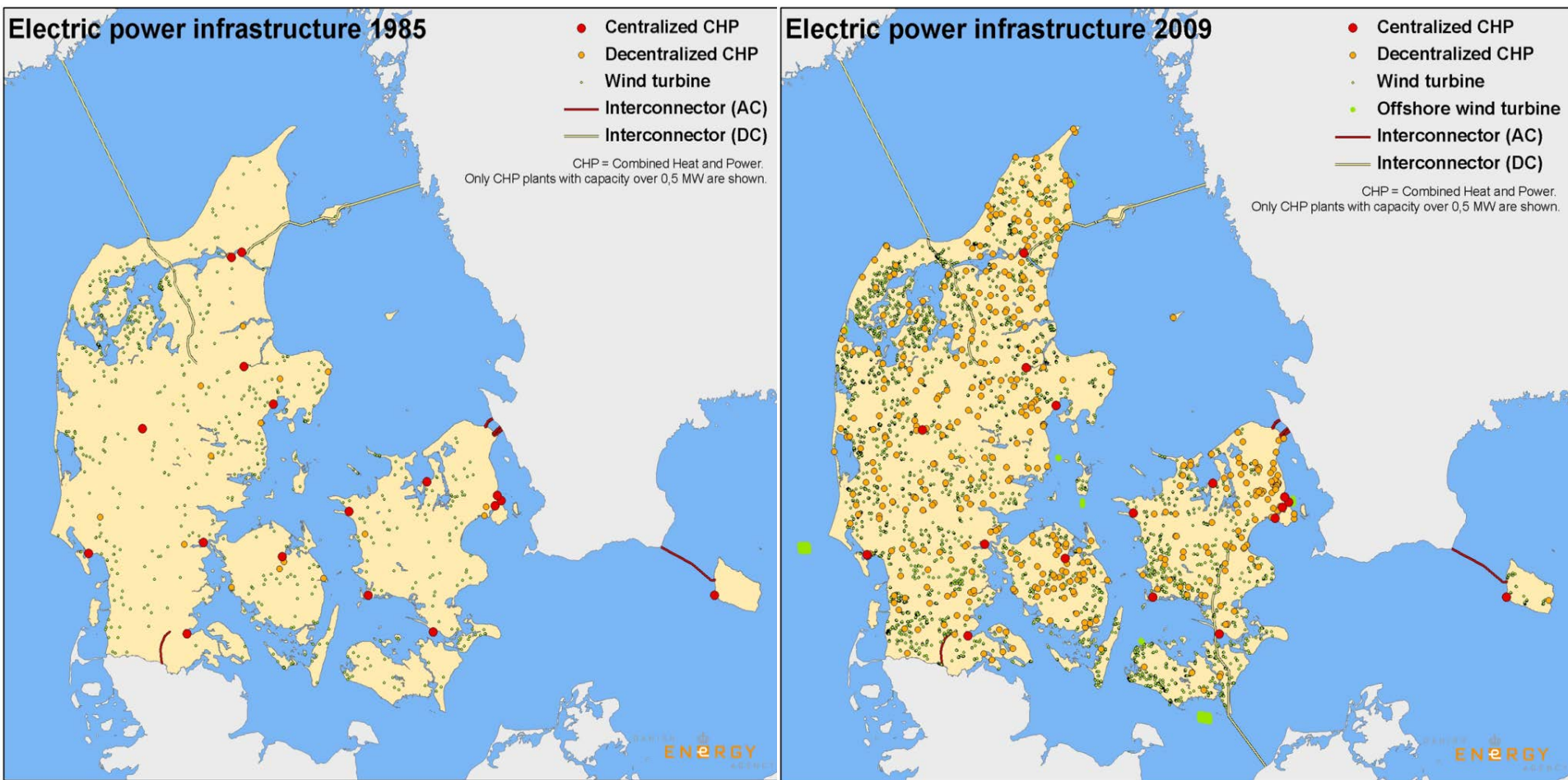
Issued by The Hongkong and Shanghai Banking Corporation Limited 由香港上海匯豐銀行有限公司刊發

But, as usual, it needs educated policy makers and good policy



# From Centralized to Decentralized CHP

Changes in Denmark's generation layout during the last 25 years



*Source: Danish Energy Agency*

Acknowledgement to Ministry of Foreign Affairs of Denmark



# WTE in Finland: Vantaa - 350 kt/yr





1000 t/day from 1.5 million people, producing 68 MW-e (600 GWh) of baseload power



and 920 GWh of utilised heat energy  
(and reducing waste to landfill to 2%)



Waste constantly mixed by  
8 m<sup>3</sup> grabs in  
automated program and  
aim to burn within 3-4 days.



Coarse waste grinding operator





The Vantaa plant replaces a gas-fired CHP plant.  
95% of fuel energy is utilised (energy content of  
over 10 MJ/kg). Emissions are equivalent to those  
from a natural gas-fired plant.  
Cost: 320 million Euros (\$5.3 M/MW-e)



Photo Vantaan Energia



A large pile of food waste and packaging, including vegetables, fruits, and plastic containers, illustrating food waste. The waste is piled high, showing a variety of items such as green cucumbers, yellow bananas, red bell peppers, and various plastic bags and containers. Some items are still in their original packaging, while others are loose. The background is a dark, textured surface, possibly a ground or a large container.



# Separation of non-degradeable packaging





A rotten apple last month, clean fuel today





# City energy from agri-biomass





China: 25 MW-e straw fired  
power plant, one of about 40  
each using 250,000 t straw/yr

Cost \$3.5 M/MW-e





# China: 100 WTE plants, 400 in planning

Investment ~CNY 100 Bn  
on WTE by 2015

Nanshan WTE plant,  
Shenzen



Baoan WTE plant  
in Shenzhen. Now receiving  
up to 4200 t/day

Photos from *Waste  
Management World*





# Biogas from wet wastes at all scales







For cooking,  
electricity...





and compressed for light transport







and to substitute  
for wood and  
charcoal for  
cooking in cities,  
and so reduce  
deforestation



# WBA: How do we work?

**Office** in Stockholm, Sweden

**Our board:** 22 members from 5 continents (Africa 4, Americas 6 , Asia 6, Australia 1, Europe 5)

**Our members:** companies, associations, individuals from all over the world

**Main issues:** biomass potential, sustainability of biomass, small scale heat with biomass, combined heat and power, future of biofuels, carbon neutrality of biomass, bioenergy statistics

**Main activities:** fact sheets, projects, position papers, presentations in conferences and workshops, supporting biomass trade with the platform: bioenergy connect (BC)





Thanks for your Attention!

World Bioenergy Association

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

[andrewlang001@bigpond.com](mailto:andrewlang001@bigpond.com)