



Changing Energy Landscape - Implications for Metso

Metso Capital Markets Day
March 21, 2007

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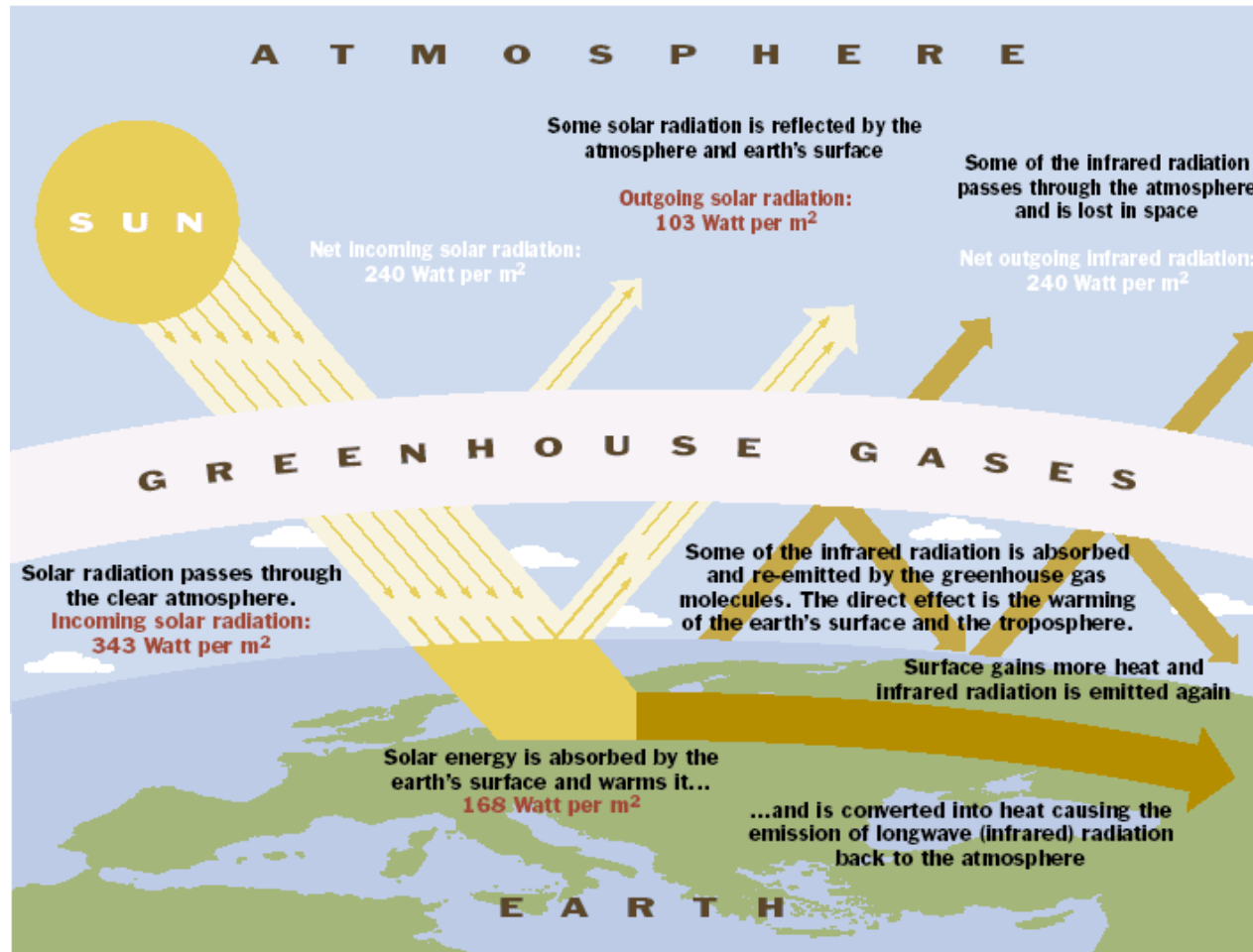
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The BIG Global Energy Topics

- **Two themes** control the global energy discourse overwhelmingly:
 - **Climate change** and the need to reduce greenhouse gas emissions
 - **Security of supply** in energy procurement

The Greenhouse Effect and Climate Change

The **Greenhouse Effect**



Source: the Pew Center on Global Climate Change

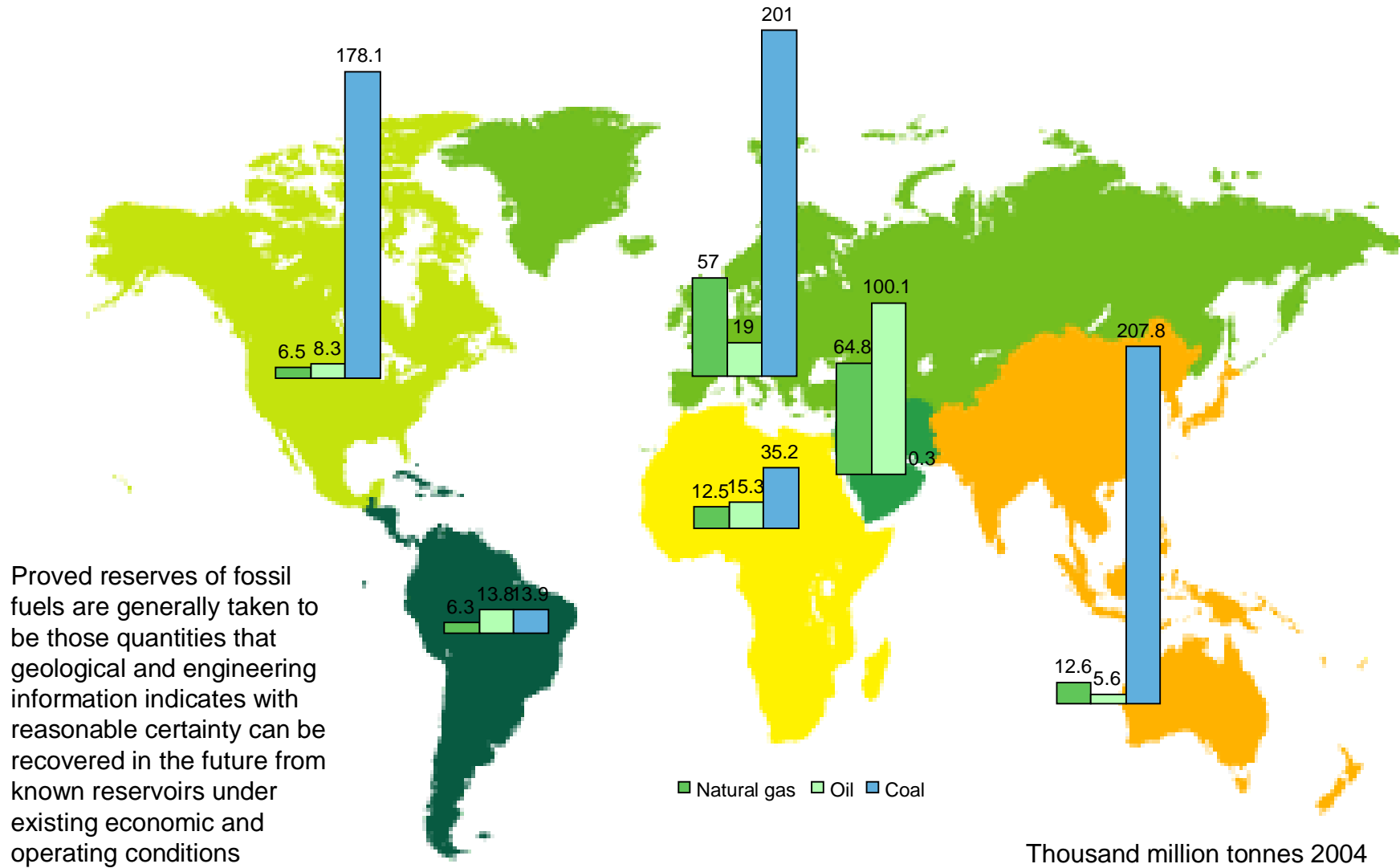
Security of Supply

In the oil industry, the best and largest assets are not in the hands of the most efficient and best-capitalised western majors, but of national oil companies. In the table, top 20 Oil Companies (by Reserves) in 2003 are being presented

Company	Country	State ownership, %	million barrels
Saudi Aramco	Saudi Arabia	100	259 400
NIOC	Iran	100	125 800
INOC	Iraq	100	115 000
KPC	Kuwait	100	99 000
PDV	Venezuela	100	77 800
Adnoc	UAE	100	55 200
Libya NOC	Libya	100	22 700
NNPC	Nigeria	100	21 200
Pemex	Mexico	100	16 000
Lukoil	Russia	8	16 000
Gazprom	Russia	73	13 600
Exxon Mobil	US	-	12 900
Yukos (controlled by the government)	Russia	-	11 800
PetroChina	China	90	11 000
Qatar Petroleum	Qatar	100	11 000
Sonatrach	Algeria	100	10 500
BP	Britain	-	10 100
Petrobras	Brazil	32	9 800
Chevron Texaco	US	-	8 600
Total	France	-	7 300

Security of Supply

Oil is expected to last for 40, natural gas for 70 and coal for 160 years



What Are the Implications of These Two Issues to Metso?

- **Climate change and the need to reduce greenhouse gas emissions:**
 - Metso, through the acquisition of Aker Kvaerner Power, is one of the few companies globally offering a top-of-the-line fluidised bed boiler technology to efficiently combust a wide variety of biofuels and other solid fuels including difficult low-quality fuels
 - Impetus to replace part of fossil fuels (coal, oil, natural gas) with renewable fuels is now greater than ever before. This is mostly due to perceived serious threat from climate change

What Are the Implications of These Two Issues to Metso?

- **Security of supply:**
 - The political decision makers both in Europe, USA and also in China have realised how dependent they are on imported fossil fuels. This has created a new thinking where domestic energy sources are being developed much more actively in order to improve the security of supply in energy management
 - In most cases this means increased utilisation of biomass and waste derived fuels as well as increasing use of coal

From Easy to Difficult Fuels

- Easy fuels
 - Global energy production infrastructure has been built based on abundant supply of fossil fuels, which all are “easy fuels” in a sense that their combustion presents no great technical challenges. Hydrocarbons are natural fuels
 - However, non-renewable fuels are by nature non-renewable. Eventually this leads to a situation where other sources of energy have to be looked for and currently the eye is on biomass and waste derived fuels

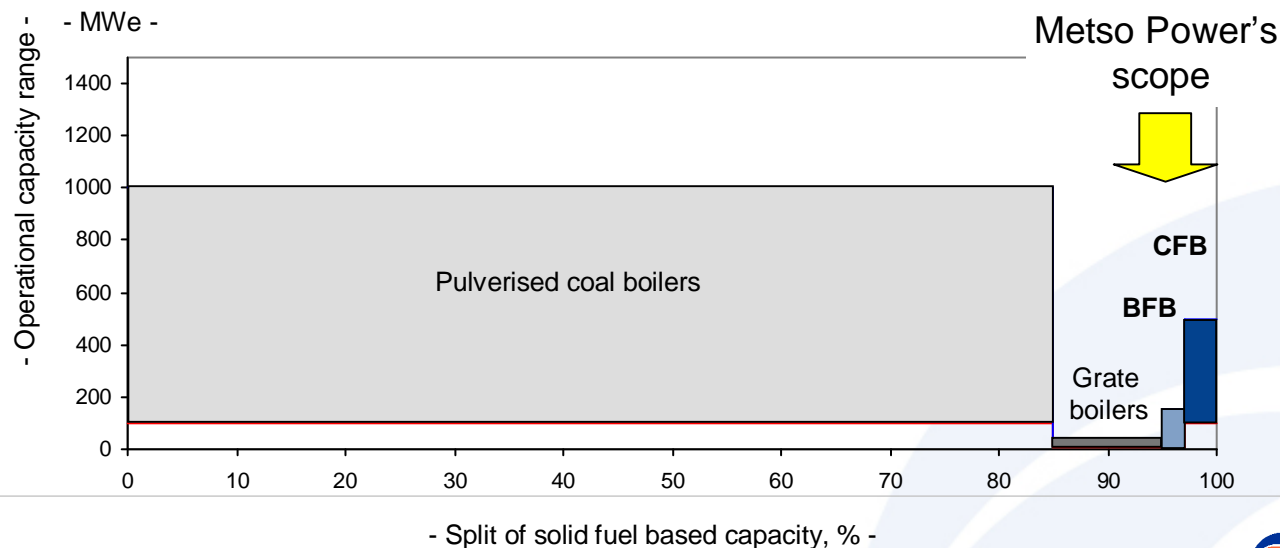
From Easy to Difficult Fuels

- Difficult fuels
 - Combustion of these non-traditional fuels is technically demanding and fluidised bed technology that can use multiple and difficult fuels (e.g. high moisture content fuels) has a bright future
 - Technical capability to combust non-traditional fuels is not alone enough. In addition the energy production must reach high fuel efficiency and low emission levels. Also these criteria can be met with fluidised bed technology

The Big Boiler Picture

Fluidised bed boilers (FB) are a competitive boiler type for power plants with a production capacity of 5 – 300 MWe

- Pulverised coal boilers are very large, from 100 to 1000 MWe. Close to 90% of the world's solid fuel based power production is based on this boiler type.
- Bubbling fluidised bed boilers (BFB) are typical in the size range of 5 – 100 MWe, while the capacity of circulating fluidised bed boilers (CFB) ranges from 50 to 500 MWe. In solid fuel based power plants, the fluidised bed boilers are a competitive boiler type within the scale of 5 – 300 MWe.
- The proportion of FB boilers is currently about 3% of the total solid fuel burning capacity, **but it is continuously increasing**



Markets for Fluidised Bed Boilers

Market potential of BFB and CFB boilers

- The Pöyry estimate of the total value of the global fluidised bed boiler market was EUR 3.7 billion in 2005
- The average price of a medium-size BFB boiler of 25MWe is approximately 11 MEUR and that of a CFB boiler of 130 MWe approximately 65 MEUR
- Most boiler manufacturers, have limited potential to compete in the Chinese and Indian markets. However, it should be noted that more attention is being put to environmental protection and efficiency of energy generation also in these countries – this improves market perspectives of those boiler manufacturers whose products can meet new requirements

Markets for Fluidised Bed Boilers

Market potential of BFB and CFB boilers

- Million EUR -	Total market value / (%)	Total market value excl. China and India
New BFB boilers	1 140 (31%)	600
New CFB boilers	1 950 (52%)	1 200
Conversions	200 (5%)	150
Maintenance services *)	440 (12%)	400
Total	3 730 (100%)	2 350

- Markets will become increasingly global because the need to replace fossil fuels with biomass and waste fuels is common to all. For Europe the need is the most urgent currently but the US, China and other major market areas are developing too
- Pulp and paper industry is in need of modern energy production technology in the future as well. The market outside pulp and paper industry in waste to energy and local biomass holds great potential

Fluidised Bed Boiler Market Segments

In terms of customer groups, the most potential market segment for fluidized bed boilers are independent power producers, process industry and municipalities

Potential customers for Fluidised Bed Boilers are:

- i. Independent power producers (IPP)
 - IPP's can be interested in any type of power production regarding plant size, fuels to be used and plant type (CHP vs. condensing) thus offering good potential for CFB and BFB boilers.

- ii. Process industry
 - Process industry is interested to take care of its own energy needs and if possible utilizing process wastes / fuels available from own sources.
 - Obvious plant type selection is a CHP and plant capacities are typically within 10 – 250 MWe. This means that CFB and BFB boilers are first choice for industrial customers.

- iii. Municipalities
 - Municipalities can invest to CHP production typically in countries with demand for district heating. First choice for municipalities is to purchase FB boilers.

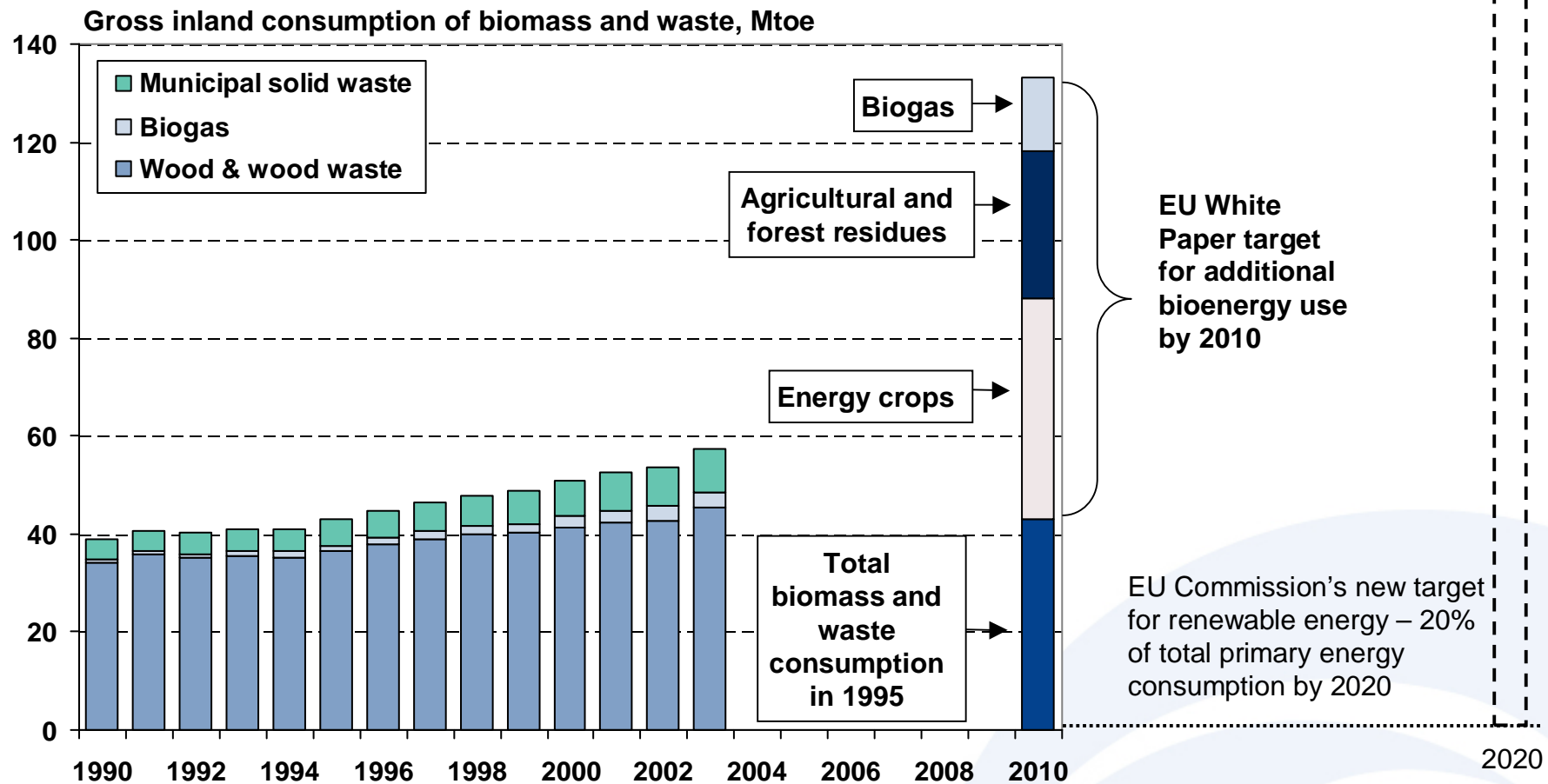
- iv. Utilities and energy companies
 - Utilities and energy companies interested in large scale production of electricity.
 - CFB combustion technology could be an obvious choice within suitable capacity (<300 MWe) and fuel range (low rank coals: lignite and subbituminous coal).



The Joker

The Joker - EU Target on Bioenergy

In 1997, the European Commission published a White Paper on renewable energy (12% of total primary energy consumption by 2010) setting the target of increasing the use of bioenergy by 90 Mtoe by 2010. A part of this is covered by wood based biomass. Recently the Commission announced a new target for renewable energy of 20% by 2020.

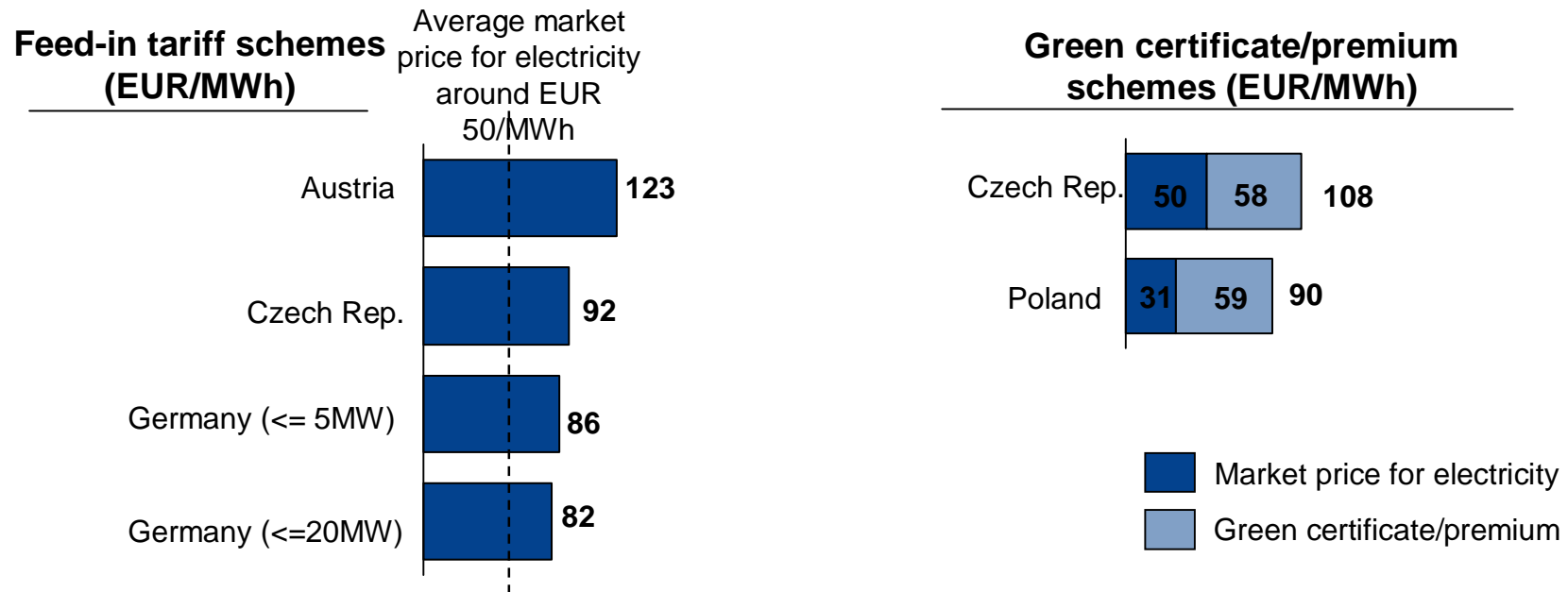


The Joker – Subsidy Schemes

- The EU's new bioenergy target together with other policy targets in various corners of the world are all creating additional demand for biomass in energy production
- In a normal market economics the cheapest fuels (traditionally fossil fuels) are being used. Renewable energy targets need support mechanisms to materialise. These support mechanisms can drastically increase the financial feasibility to produce energy from biomass – in many European countries production of green electricity for example is a great business
- This bioenergy boom and existing and new support schemes have already created and will continue to create even new market opportunities for fluidised bed boiler manufacturers

The Joker - Bioenergy Support Schemes

Examples of Current Revenues from Electricity Generated from Biomass



– Currently most of the existing subsidies are for renewable electricity production but new support mechanism are being developed also for heating & cooling as well as for green transport fuels

Source: EREF; IEA; National sources

The Joker – the United States

- The United States like Europe has recognised how dependent it is from oil and in the future also gas imports. Domestic coal reserves however are substantial and it is likely that coal will in the future have even greater role in the US energy production
- Existing coal-fired generation capacity is aging rapidly – some 70% of the capacity is over 25 years old. New, more efficient and low emission capacity is needed in the coming years. This offers opportunities also to circulating fluidised bed boiler (CFB) manufacturers that can offer their products to utilities
- The US and also Canadian pulp and paper industry has already for some time struggled with poor economic performance which is partly due to rising energy costs. One of the most interesting and available options to reduce energy costs and improve profitability is to invest in new, more efficient energy production capacity that can utilise available wood-based fuels

Conclusions



- The world's growing appetite for energy is a fact
- The hunger must in the future be increasingly satisfied with non-traditional fuels such as biomass and waste
- Energy must be produced with a wide variety and combination of fuels and with very low emissions
- Due to the abovementioned reasons, fluidised bed boilers are technically and economically very well prepared to answer these challenges



Thank You!

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