

Confederation of Indian Industry

Energy Efficiency Technology Workshop

Delhi 14th November 2011

Energy efficient thermal utilities

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DEE ASSOCIATES

History – main events

1930s – National Grid

1950s – Birth of nuclear power

1960s – Legacy of old coal plant

1970s – CEGB vision – coal

1980s – Privatisation, mine closures, acid rain

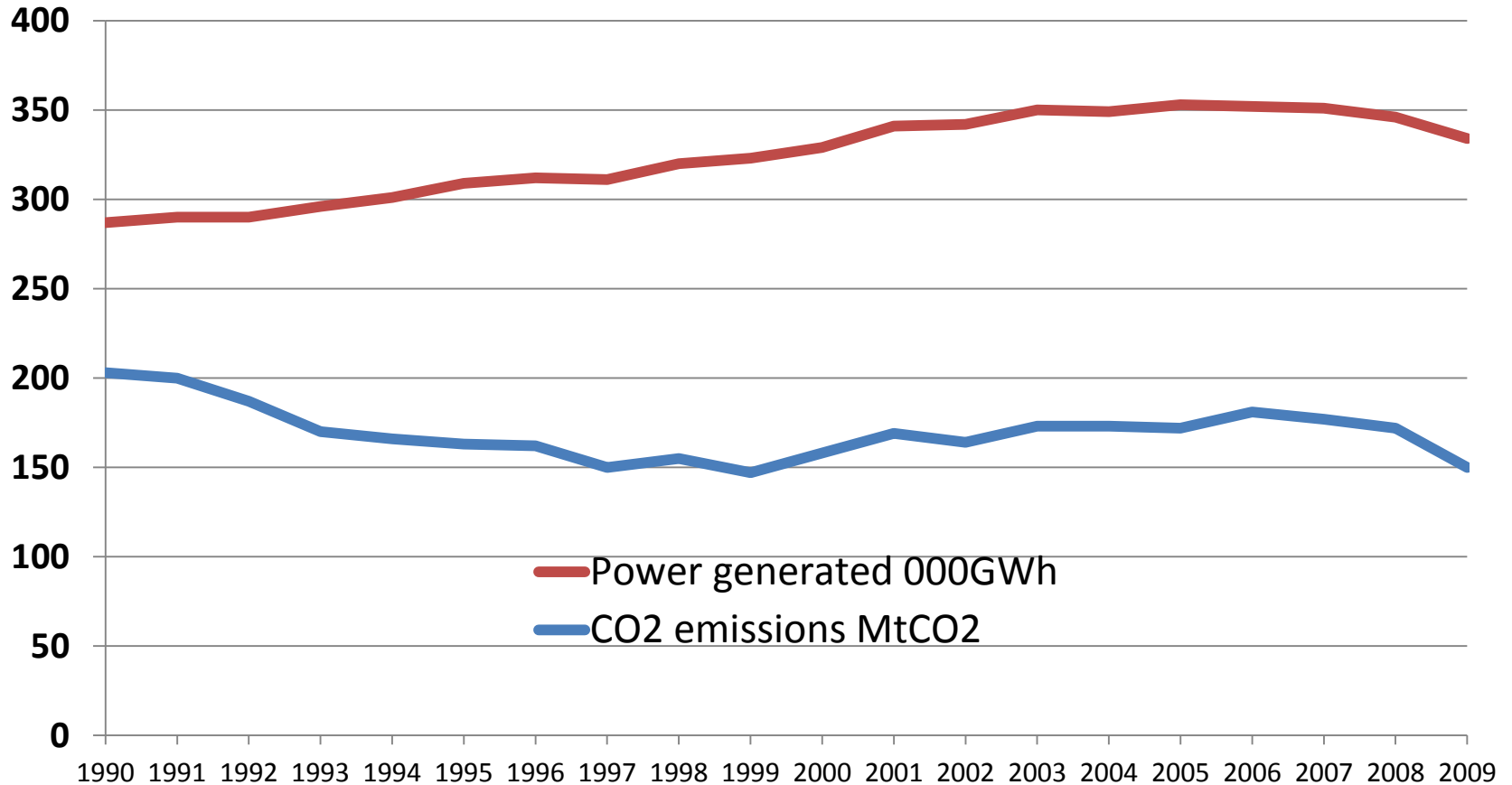
1990s – Dash for gas, coal imports

2000s – Nuclear retirement

2010s – NOx legislation, coal retirement, bio, wind

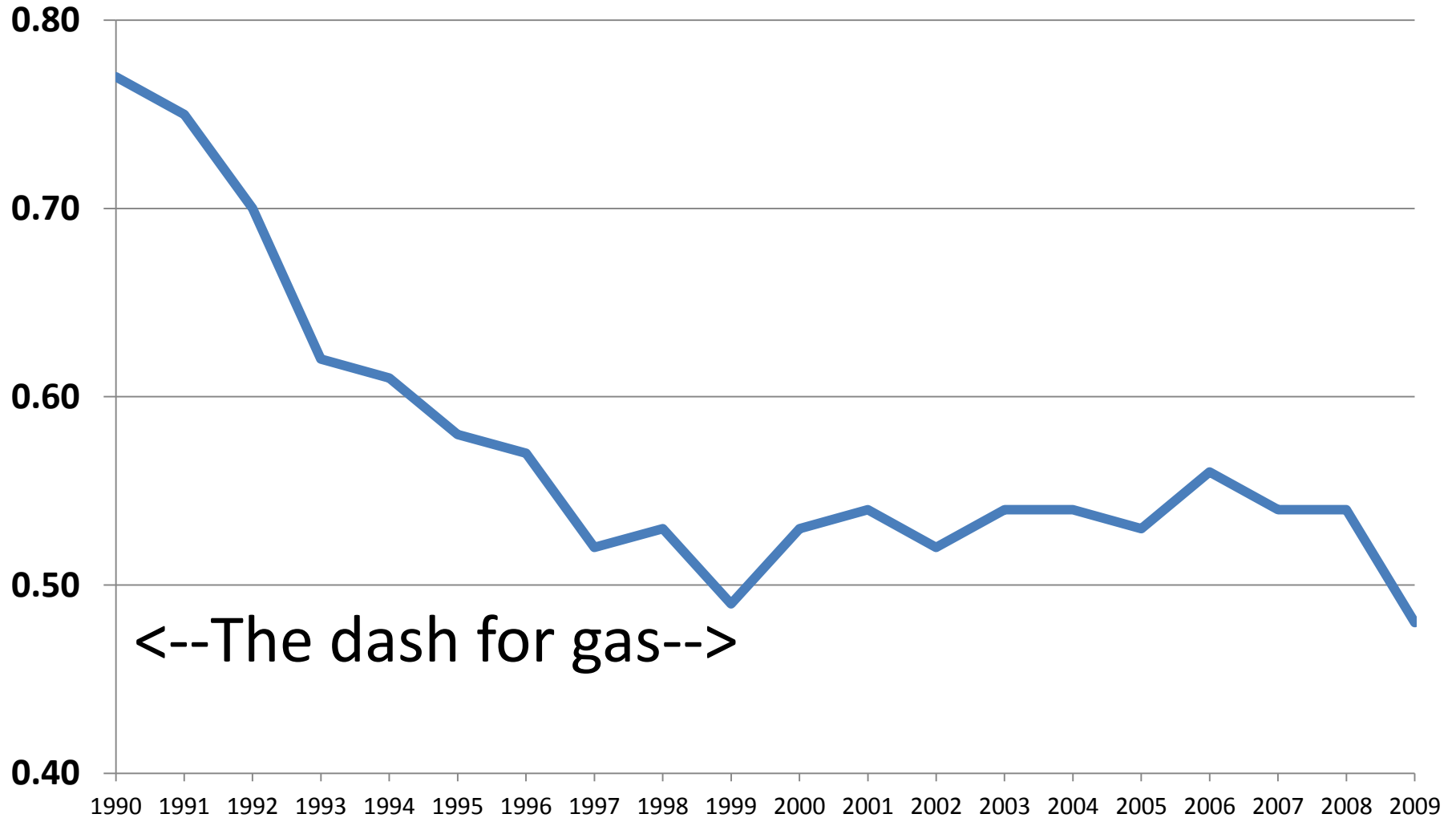
Growth of demand

Source: <http://www.decc.gov.uk/en/content/cms/statistics/publications/dukes/dukes.aspx>



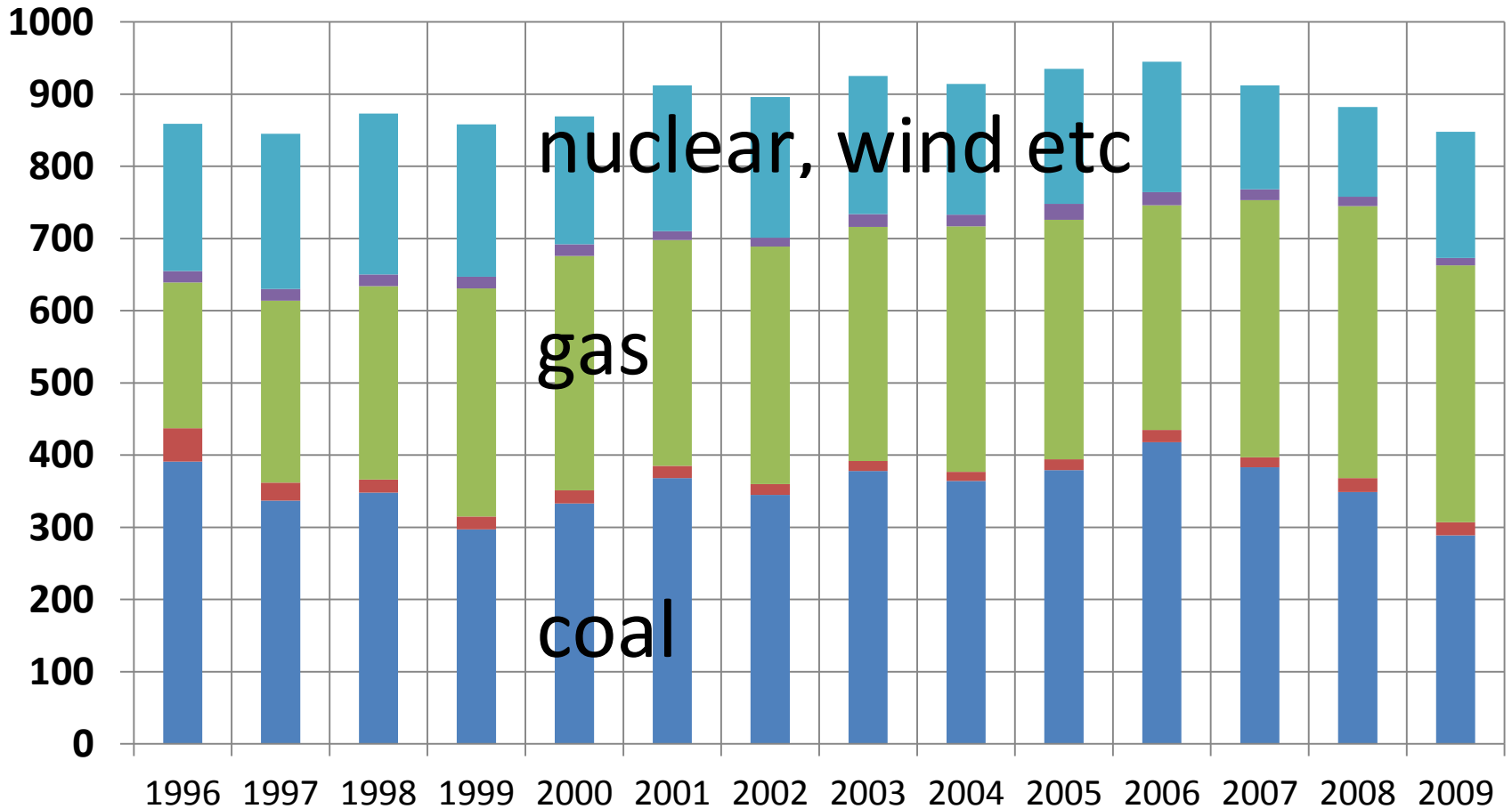
Carbon dioxide emissions – kg/kWh

Source: <http://www.decc.gov.uk/en/content/cms/statistics/publications/dukes/dukes.aspx>



Fuel consumed 000GWh

Source: <http://www.decc.gov.uk/en/content/cms/statistics/publications/dukes/dukes.aspx>



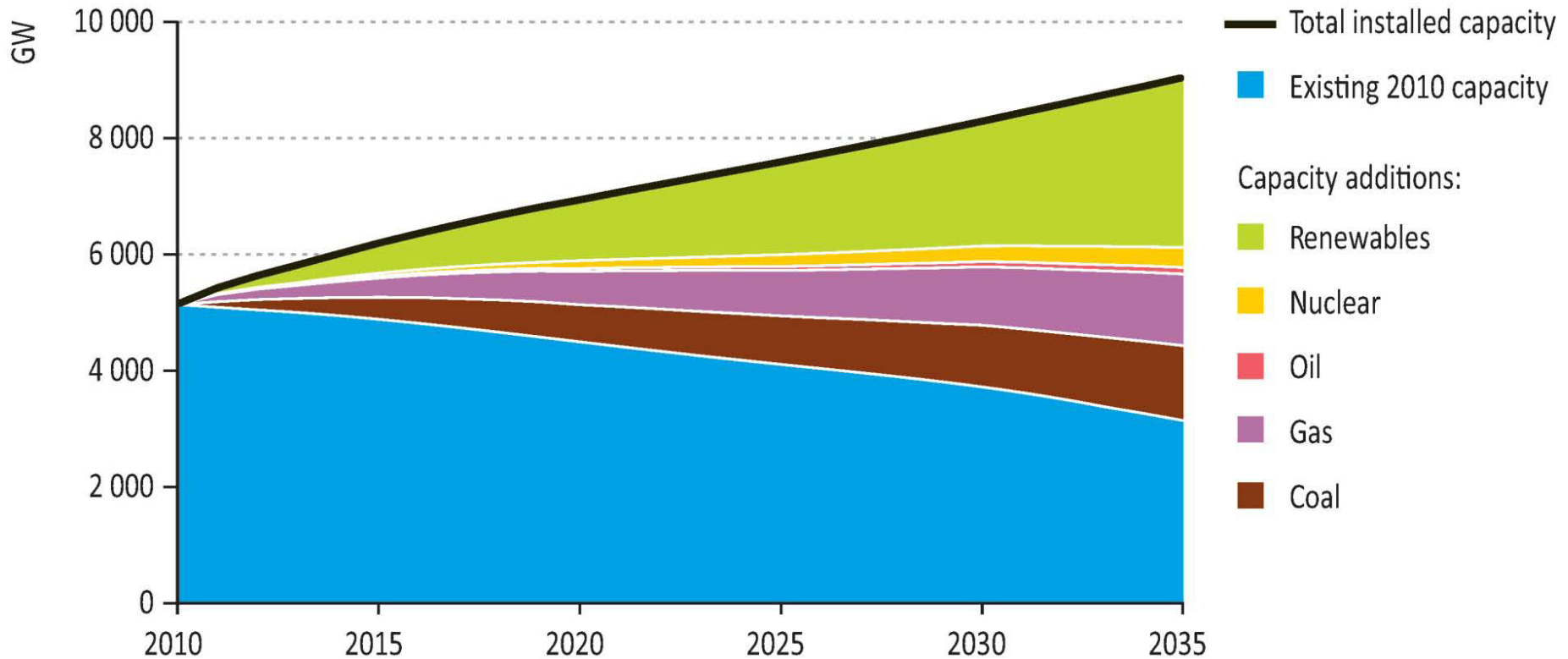
Typical 2,000MW coal station



Global context – IEA forecast

Source: http://www.iea.org/weo/docs/weo2011/key_graphs.pdf
<http://www.nationalgrid.com>

- UK capacity 90GW world 5,000GW – 1.8%
- UK power CO₂ emissions – 1.2%



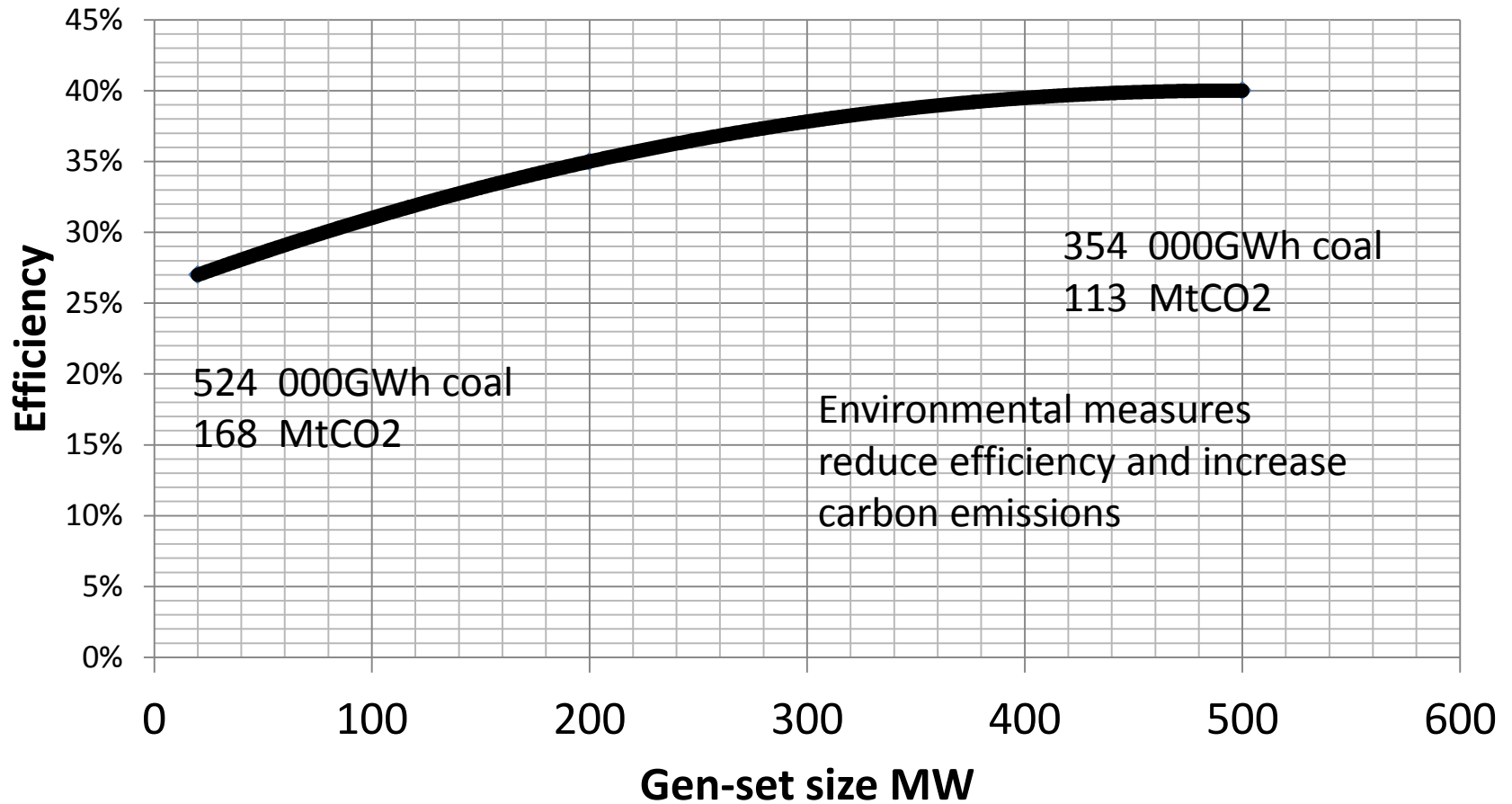
New technologies

- Wind
- Solar
- Bio mass
- Fuel cells
- Nuclear fusion
- Distributed generation and CHP
- IGCC with pre-combustion carbon capture & storage
- Post-combustion CCS
- Supercritical boilers
- Energy from waste

Optimising coal

- Steady operation
 - Supply & reclaim scheduling
 - Planned maintenance
 - Boiler tube failure
 - Operator training
- Fuel blending
 - Sulphur emission limits
 - Cost optimisation
 - Thermal value control
- Flame and burner control
 - Mill operation
 - Fans
- Condensers & cooling water
 - Fouling
 - Cooling towers

Scale effects

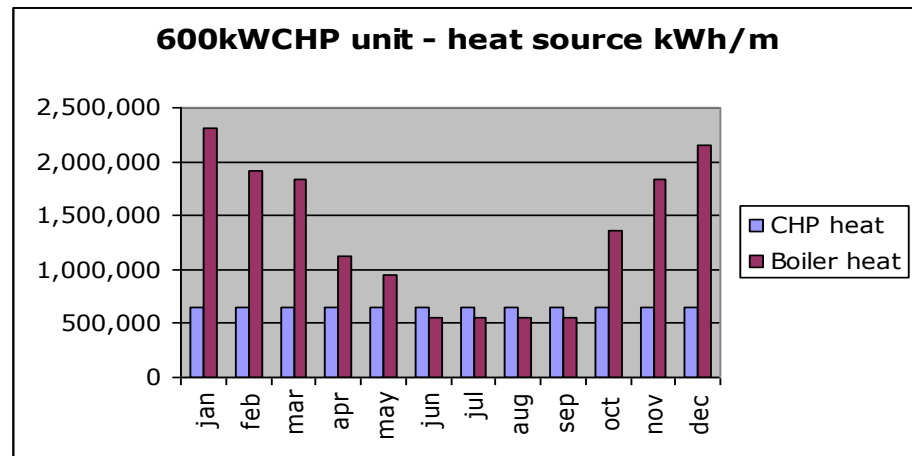


Co-firing Bio mass

- Up to 20% boiler fuelling
- Pelleted fuel from food & forestry waste
- Separate fuel storage
- Separate milling systems
- Separate burner in co-firing boiler
- Impact on flame temperature
- Motivated by subsidies.

CHP

- Justified where seasonal demand for heat is consistent with power needs:
 - Chemical plants with high steam usage
 - Paper mills
- Back-up boilers usually needed in seasonally affected sites:
 - Leisure centres
 - Residential sites



Energy management

- Policy and strategy
 - Appoint an energy champion
 - Develop and communicate a policy
 - Formulate a strategy and action plan with targets
 - Monitor progress and revise/update
- Create an awareness
 - Training staff
 - Promoting energy saving
 - Involve staff
 - Reward good ideas
- Measurement and control
 - Measure energy consumption
 - Install the best control systems
 - Train staff in their use
 - Monitor progress and report

Thank you

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