



Lessons from the Gas Crisis

What Price Energy Security?

ceda

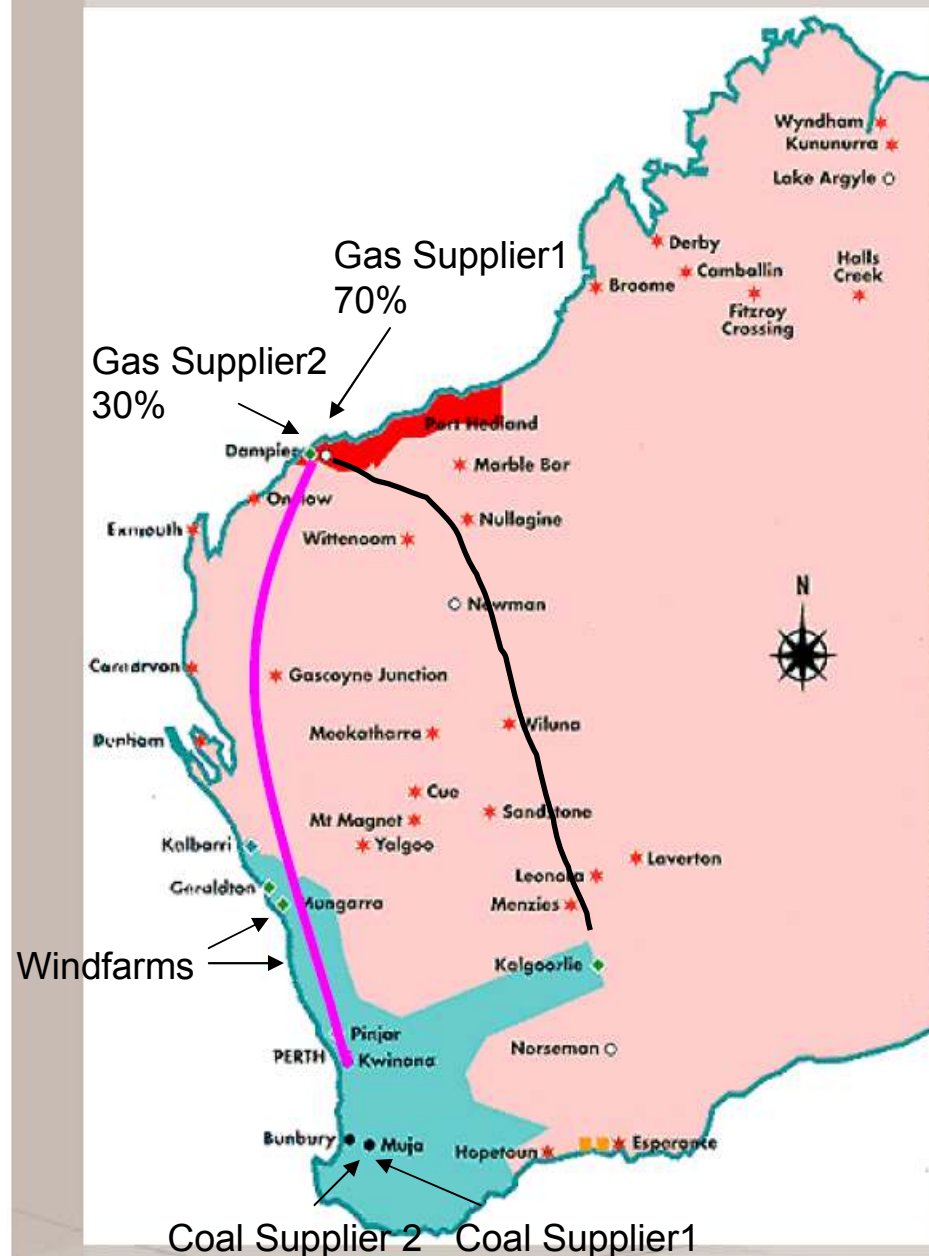
12 November 2008

Ken Brown
GM System Management
Western Power



Impact: A series of blasts at Varanus Island has left energy supplies in turmoil.

Western Australia's Energy System

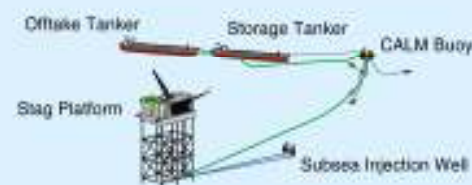
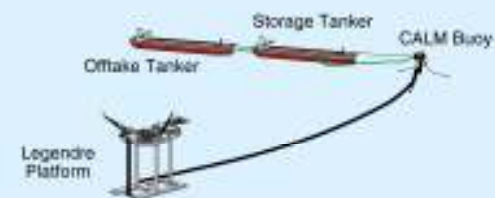


- South West Interconnected System
- Pilbara Interconnected System
- Wind farms
- Regional power systems (WP owned)
- ◆ Gas turbine generating stations
- ◆ Solar (photovoltaic generating stations)
- ◆ Thermal generating stations (WP owned)
- ◆ Non-Western Power owned generating stations



APACHE FACILITIES DIAGRAM

Indian Ocean



Not to Scale

May 2008 FS0000

2008 Varanus Incident

- Occurred on the 3rd June 2008
- Loss of about 350TJ (30%) gas
 - Some went south
 - Some went north and east
- Loss of fuel to a number of generators
 - Verve, Alinta, EG Gas Turbines and Non SWIS generators

Impacts

- A number of gas customers curtailed
- Some electricity customers curtailed or told reduce their load to minimum
- Generation

Planned Outages

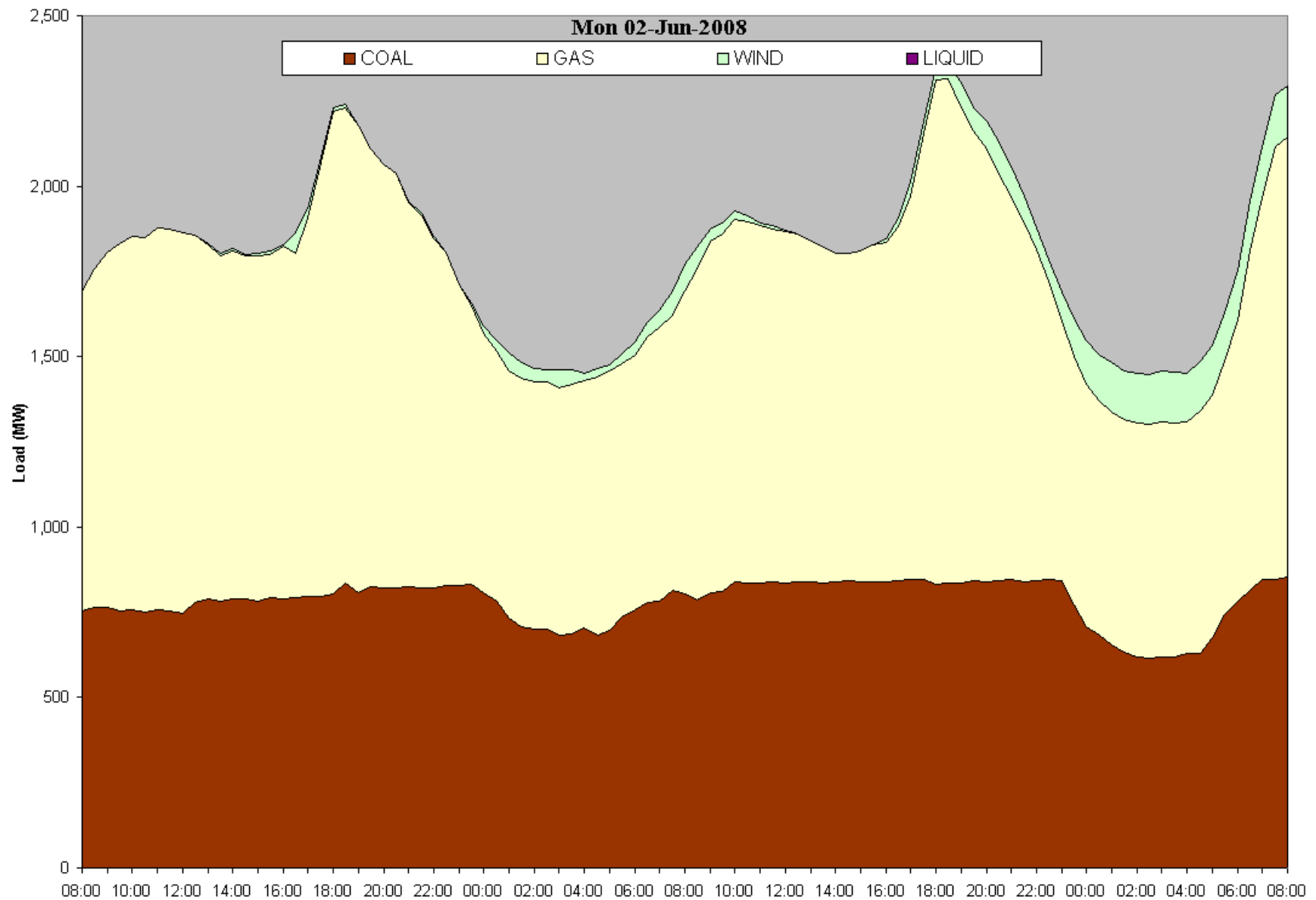
- | | |
|-------------|---------|
| • Muja 7 | 225 MWs |
| • Kwinana 1 | 120 MWs |

Unplanned Outages

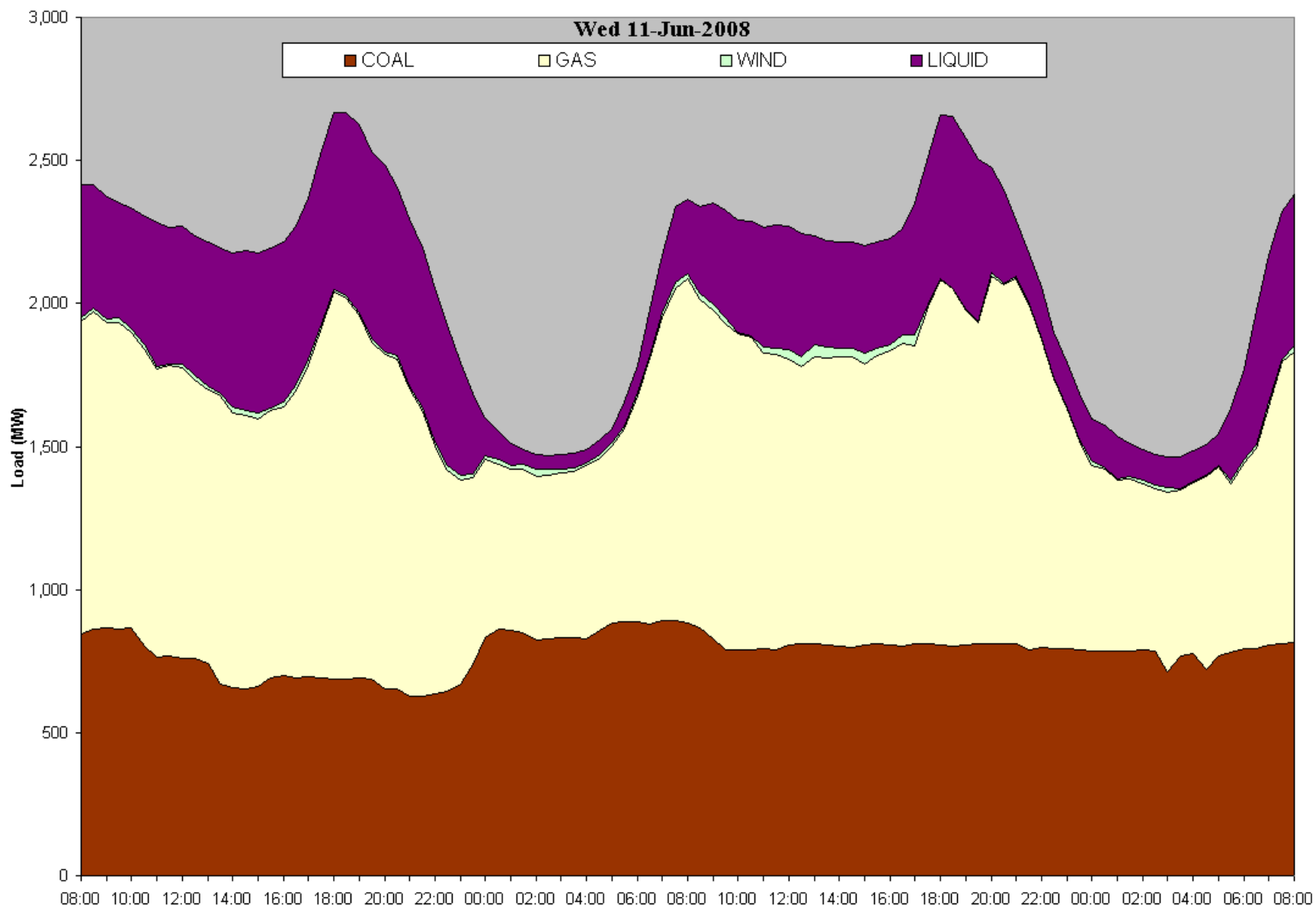
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| • Collie PS | 340 MWs |
|-------------|---------|

- Moving into winter
 - higher use of gas and electricity
- Distillate issues

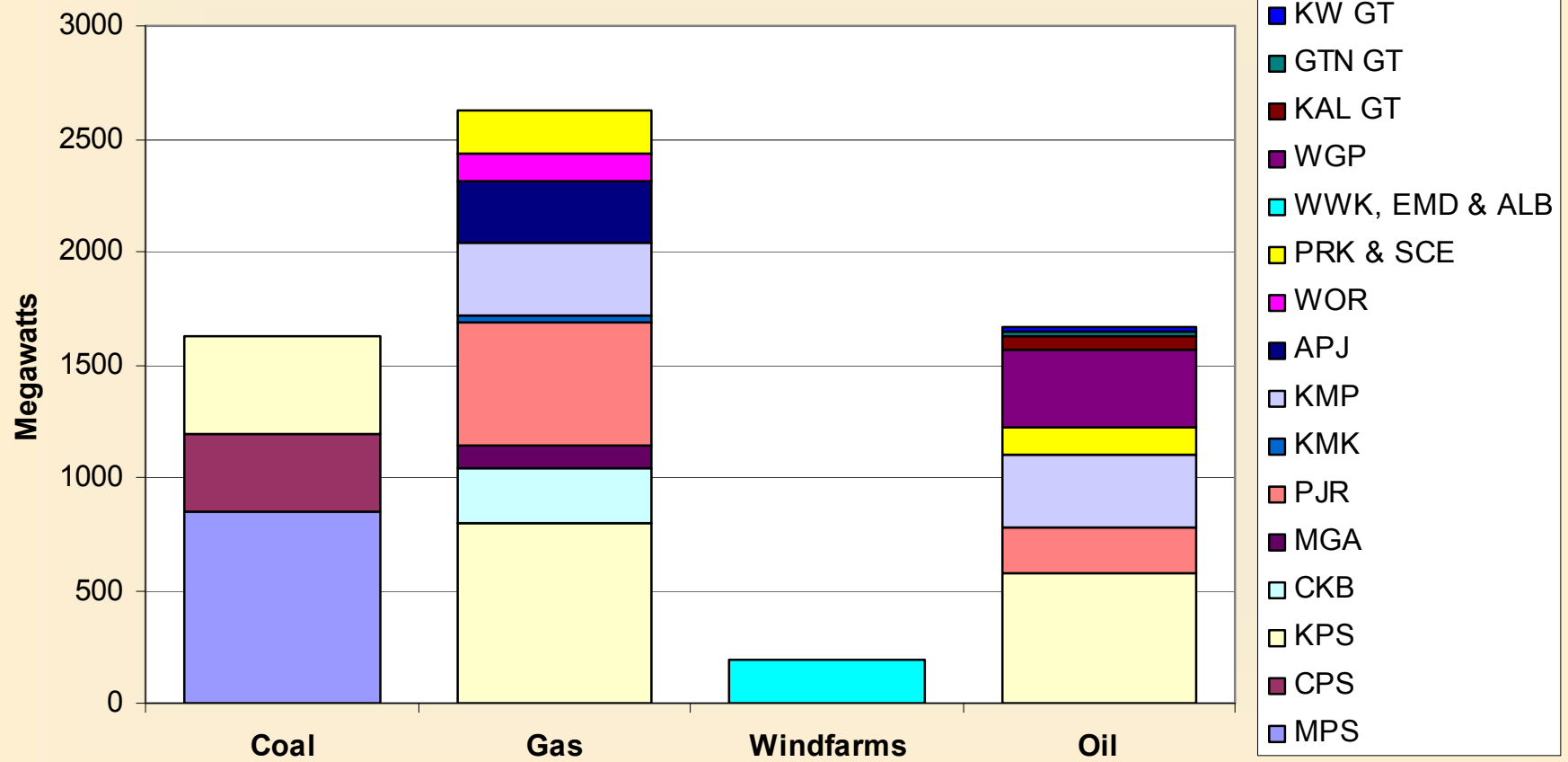
Just Before Gas Crisis



Gas Crisis



Capacities By Fuel Types



Short Term Actions Impacting Electricity System

- Maximise coal plant
- Stabilise gas use
 - Co-operation with Pipeline Operator
- Monitor distillate use
- Collie back ASAP

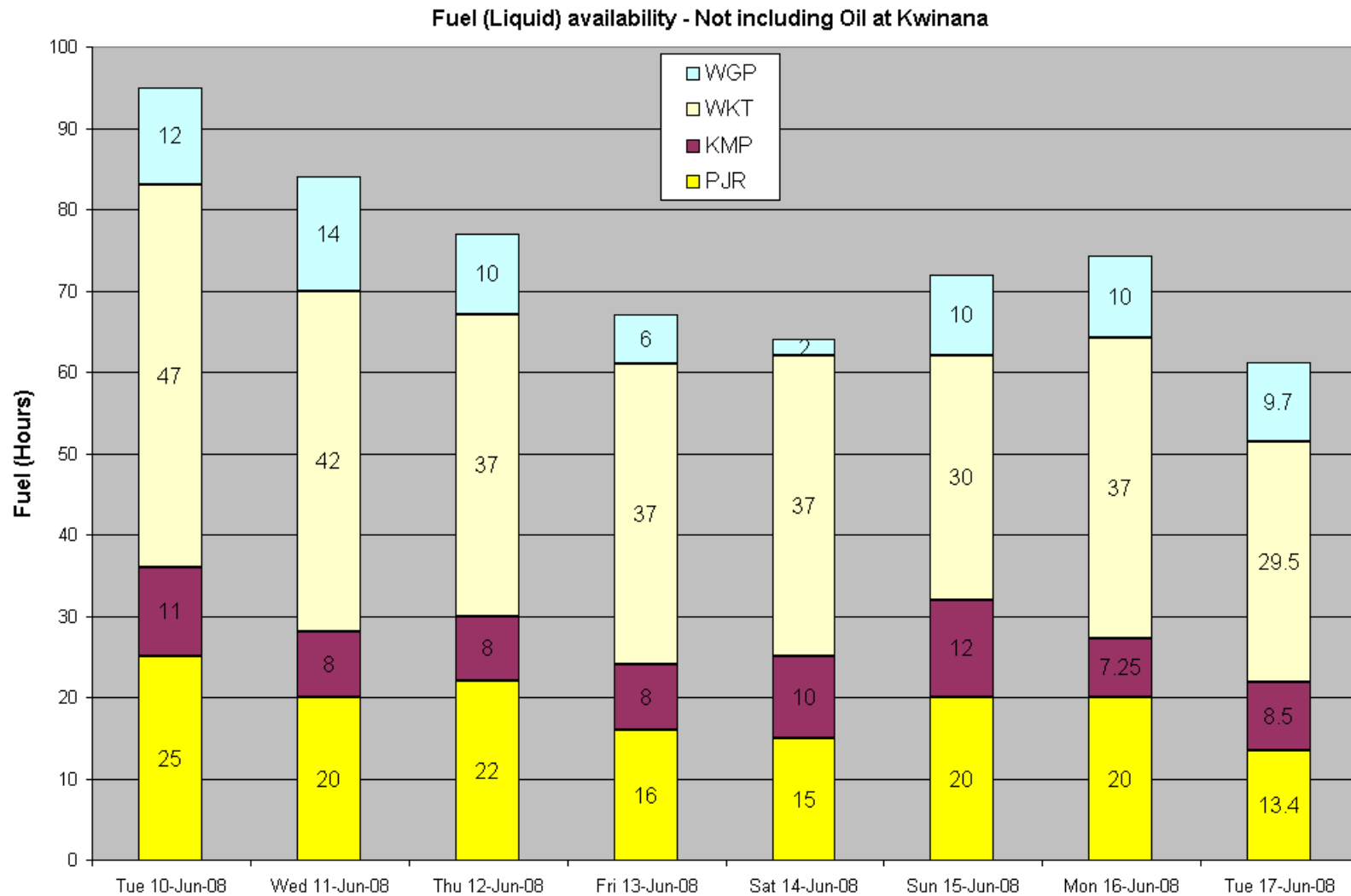
Long Term Decisions Impacting Electricity System

- Determine how long the power system can operate in this mode
- Called Emergency Operating state in WEM
 - Dispatch for Security reasons
- Gas Crisis Coordination formed
 - Gas Allocation Guidelines
 - 'Voluntary' Energy reductions?
- Additional Coal Plant
 - Resurrect Muja AB?

Distillate Issues

- Limited storage facilities at power station sites
- Couldn't afford to 'run out' at any power station
 - Lead to possible power rationing
- 2 Gts at KMP 320 MWs use 80,000 liters p/h
 - Each road tanker 70,000 liters
- Everyone scrambling for distillate
 - Extra 3-4 million liters per day
 - Pressure on Storage, Delivery and Refineries
 - Delivery and Product co-ordination essential

Distillate Availability at Power Station



Public Information

- Reduce gas demand
 - TV and Print media
 - Started seeing high gas prices (equivalent distillate prices)
- Reduce electricity demand
 - Don't swap from gas to electricity
 - Conserve distillate stocks
- Ready for next issue

Fragile 10 days ahead for power supplies

YASMINE PHILLIPS

Companies claim Alinta switches them on when they don't need electricity but cuts them off with a few hours notice

Industry fury at power lottery

KIM MACDONALD

Businesses are furious over the daily

but Alinta had refused its request to spread its allocation over several days so it could be guaranteed of power to

staff stand-downs.

Chamber of Commerce and Industry chief executive James Pearson

Calls grow for gas royal commission

AMANDA BANKS and ROBERT TAYLOR

lation that while the assessor did visit the island's facilities the timeline was

Government cover-up. Alan Carrington insisted yesterday

Cold offices, no tap beer, dark shops ...

KIM MACDONALD and CATHY SAUNDERS

Worse to come in WA gas crisis

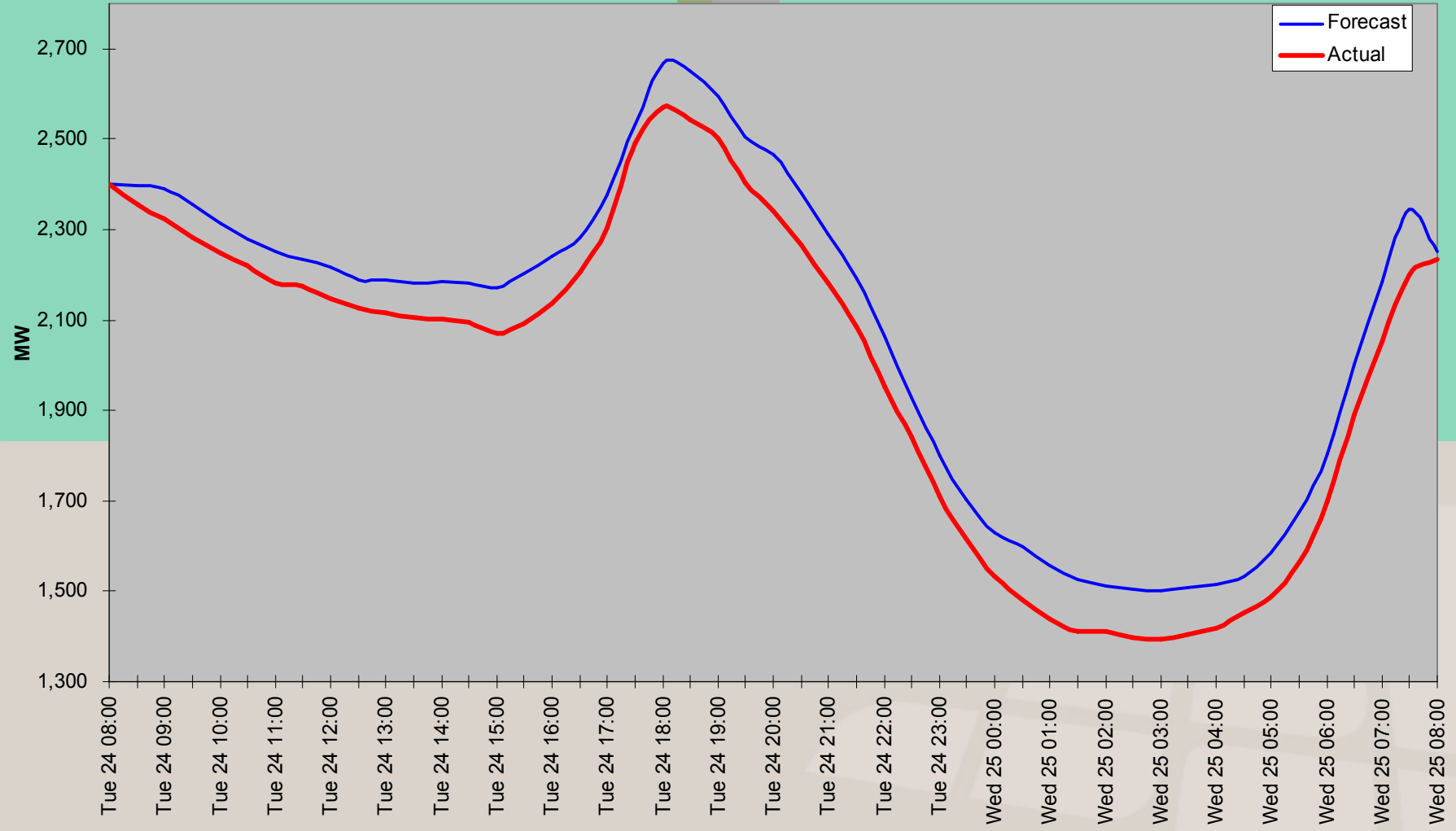
By Nicolas Perpitch

Anger as gas for business rationed to keep householders warm

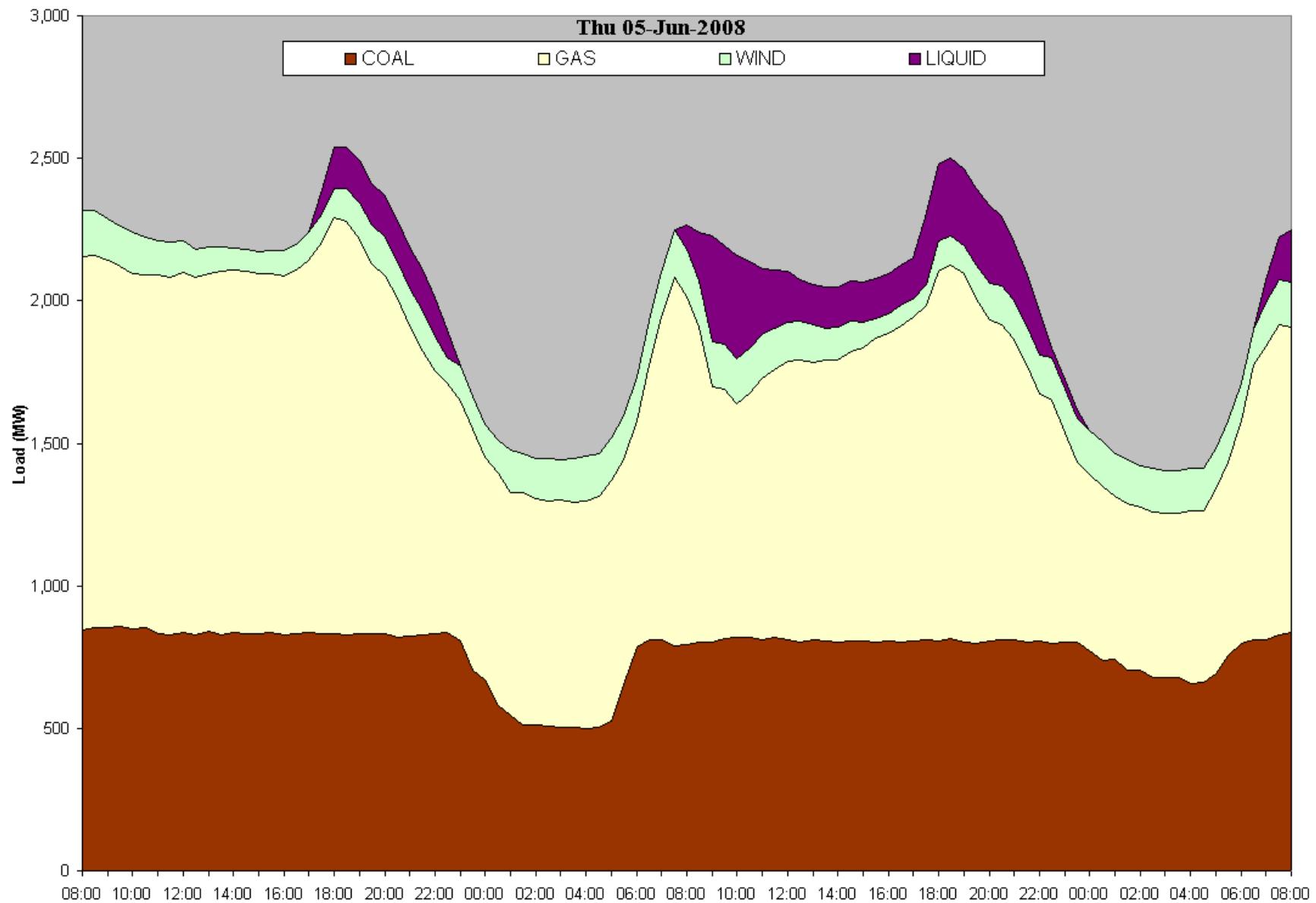
KIM MACDONALD and JODIE THOMSON

Premier says gas crisis to worsen

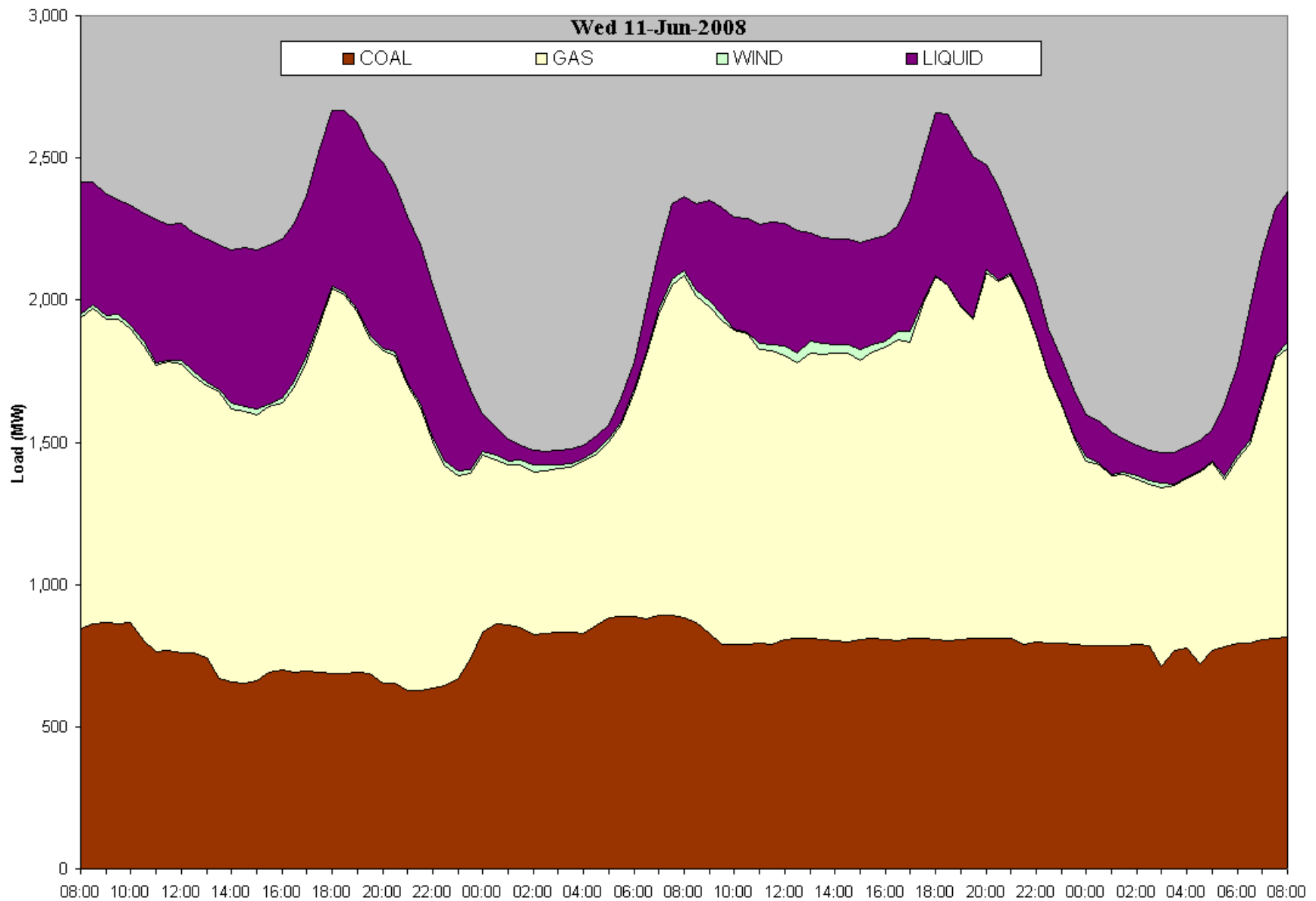
Elizabeth Gosch



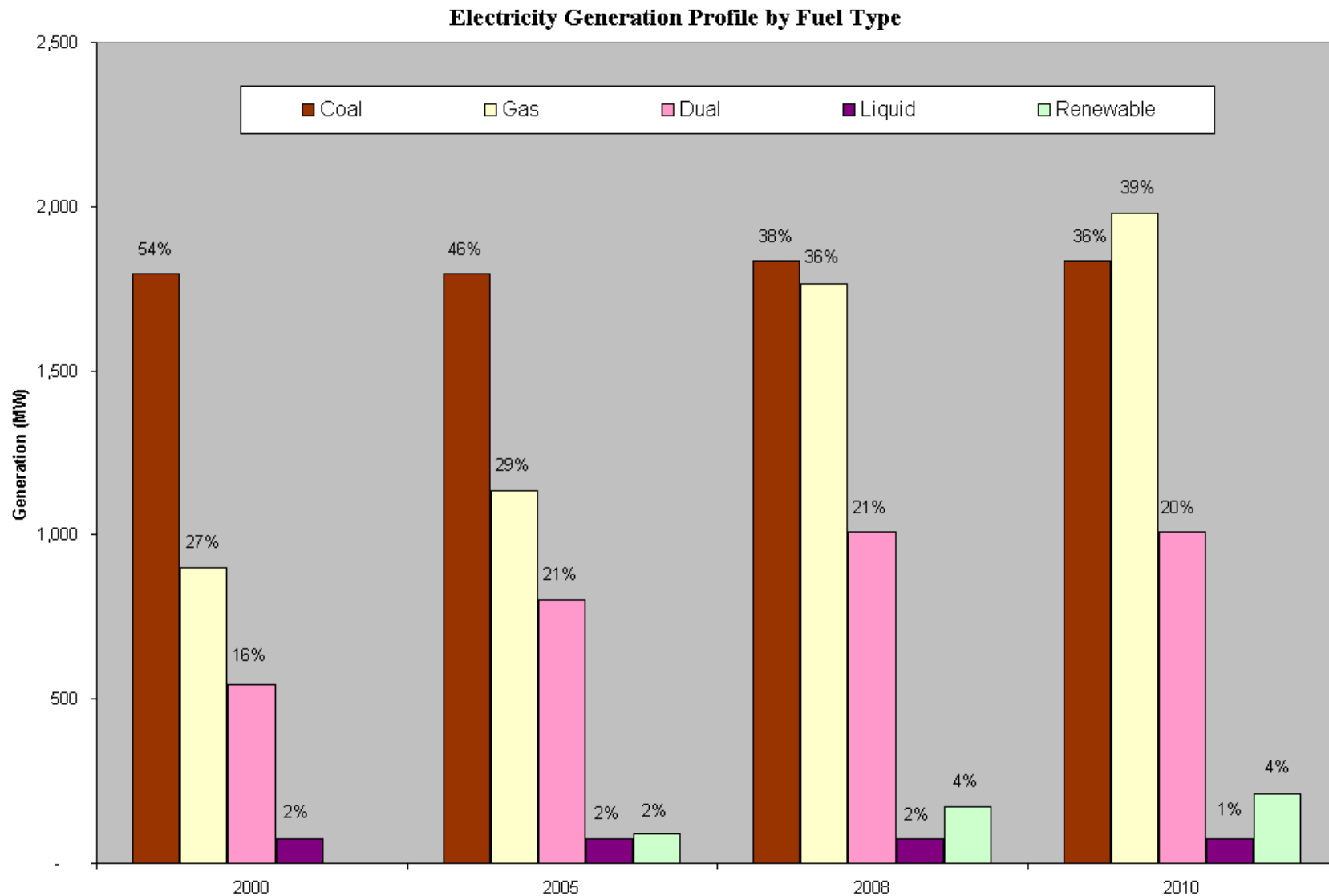
Good Wind Day Saved 10-15 TJs



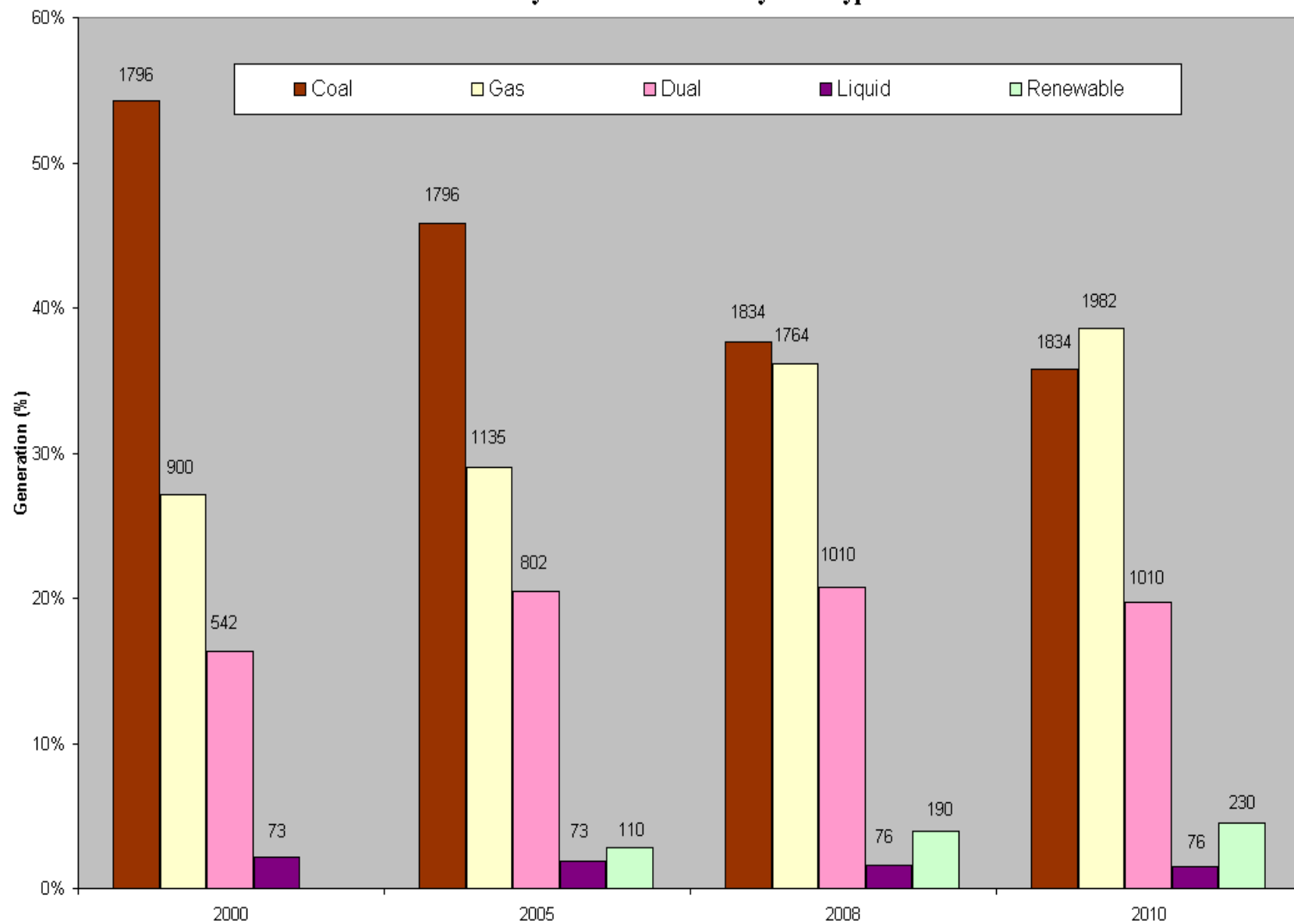
Poor Wind Day



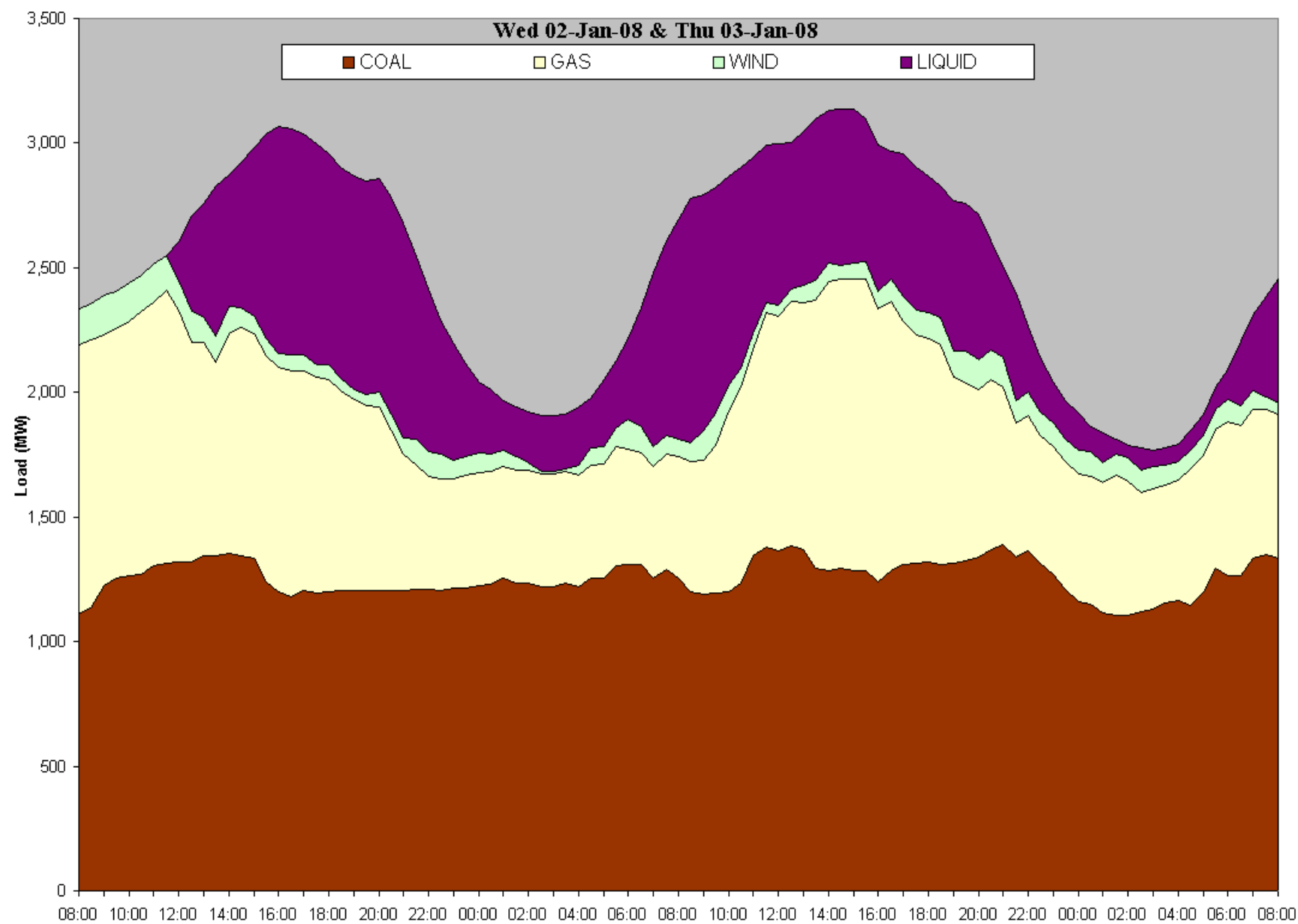
10 Year Energy Mix



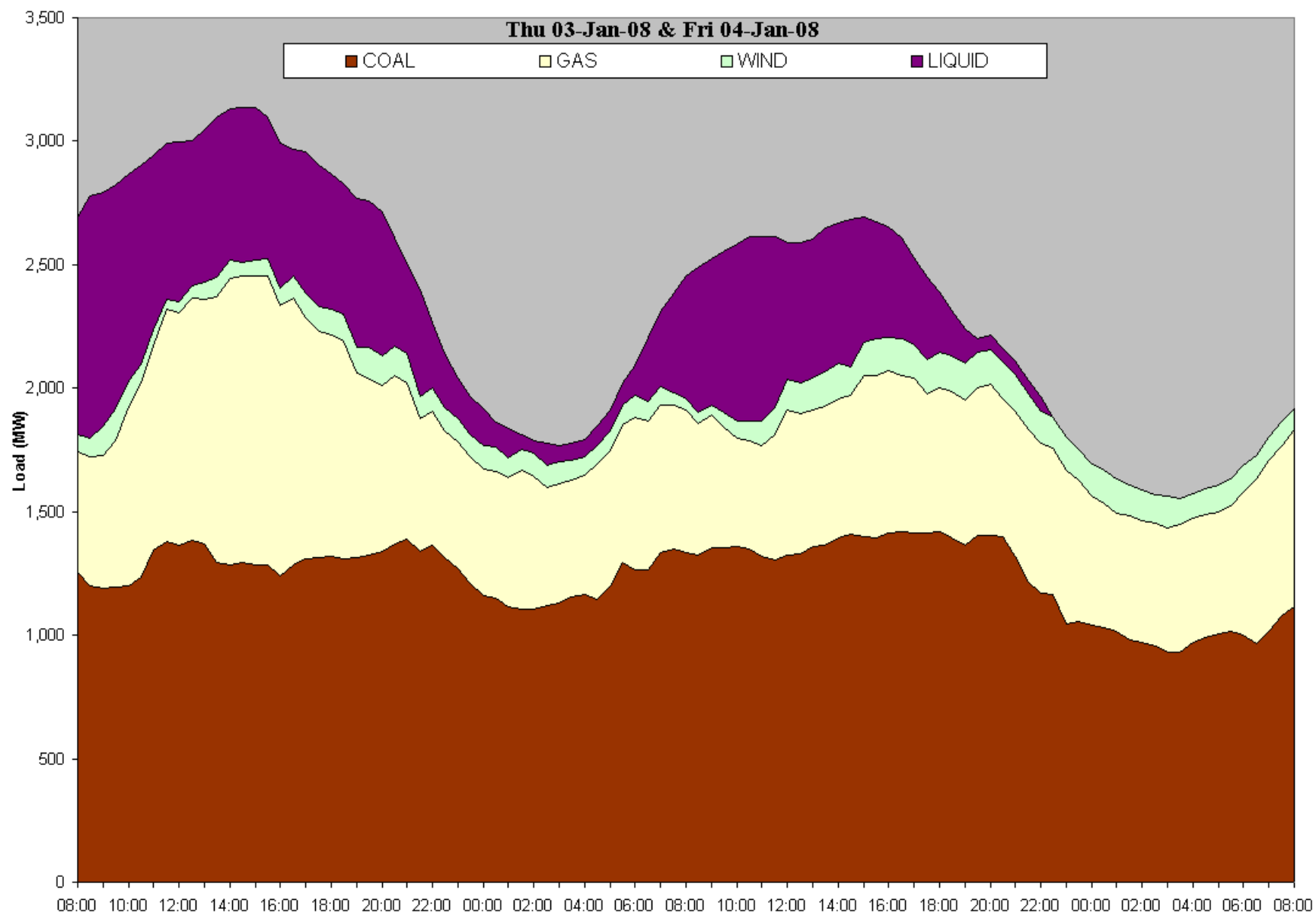
Electricity Generation Profile by Fuel Type



Woodside Issue Jan 2008



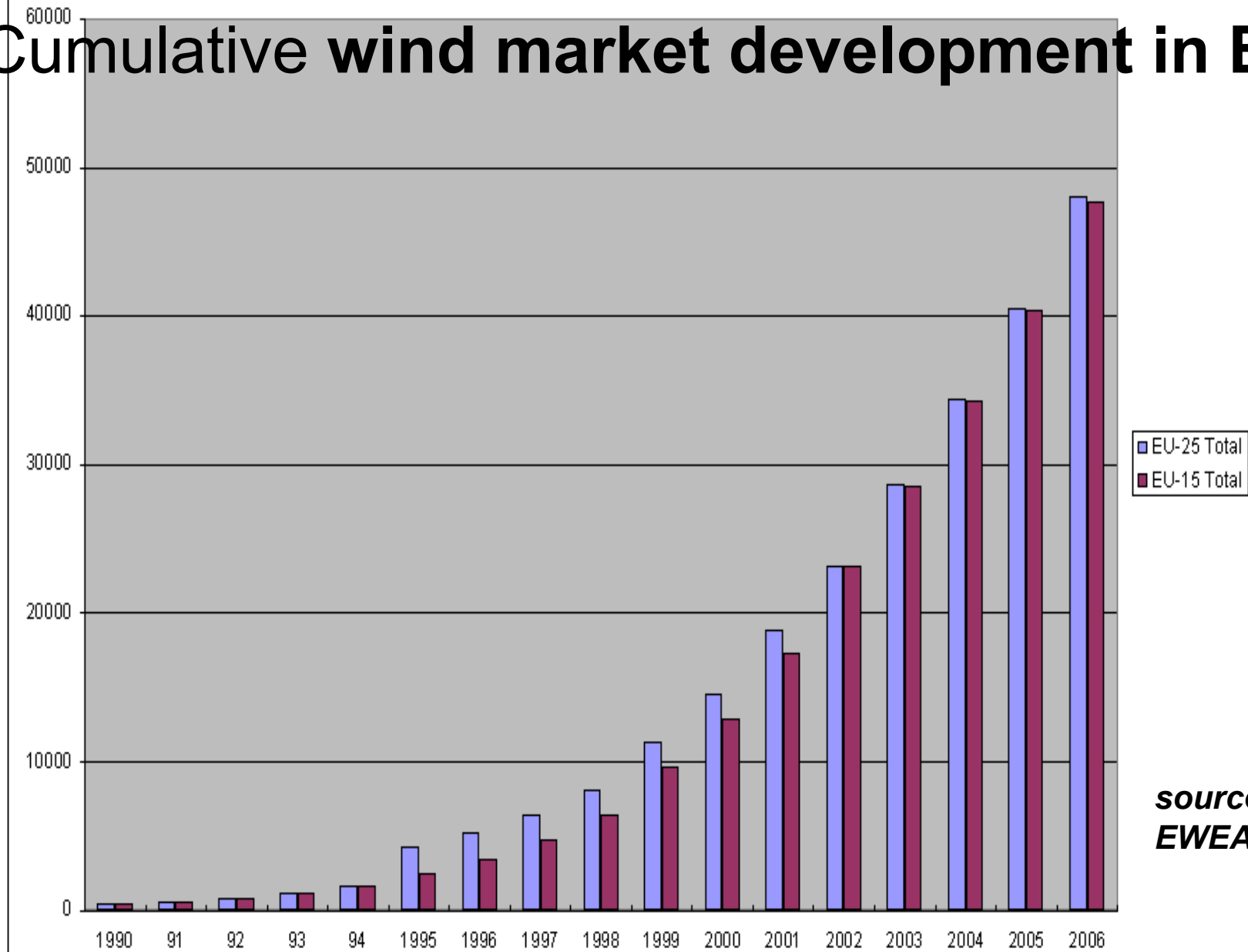
Woodside Issue Jan 2008



Power System Security

- Fuel Diversification
 - Coal, Gas, Distillate, Wind, Solar, Nuclear?
- Storage?
 - Gas, Pipelines, Distillate?
- Impact of Renewables
 - Wind, Biomass, Solar, PV Cells, Electric Cars, etc

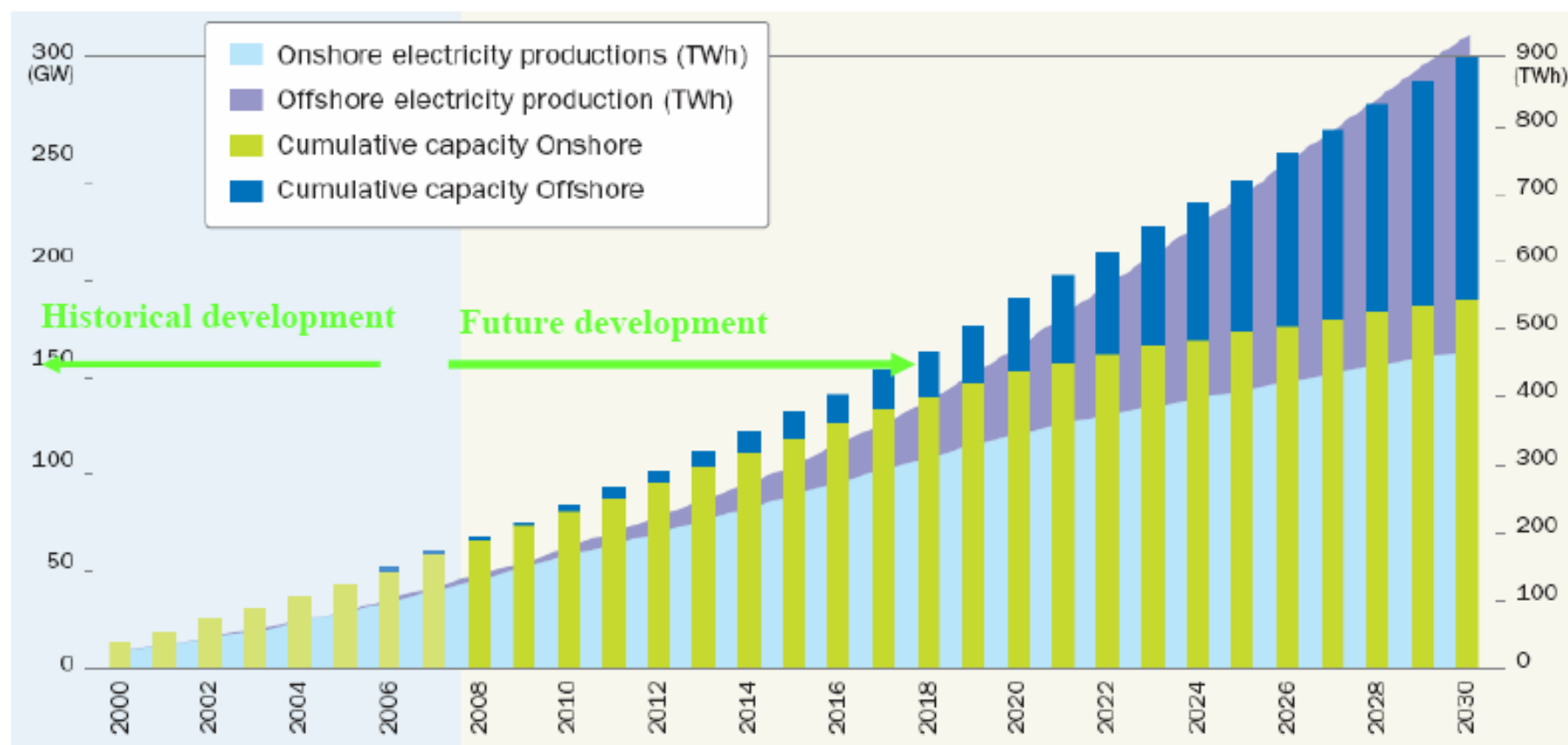
Cumulative wind market development in EU



source:
EWEA



Electricity from Wind up to 2030



Source : EWEA

CIGRE 2008 Opening Panel

Paris – August 25th, 2008