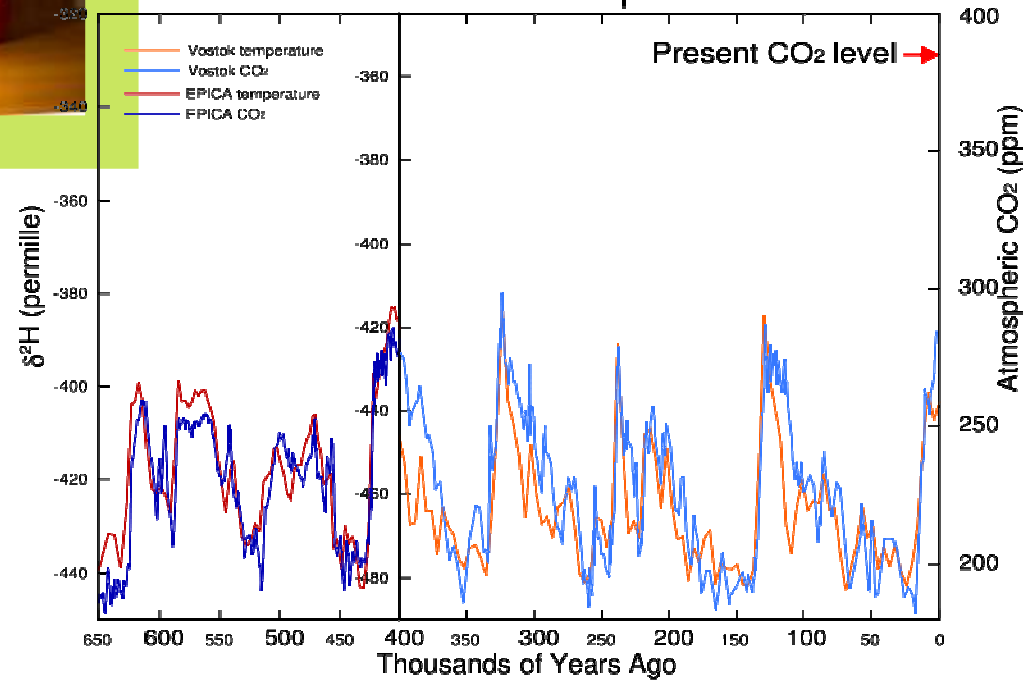


# Meeting The Energy Challenge

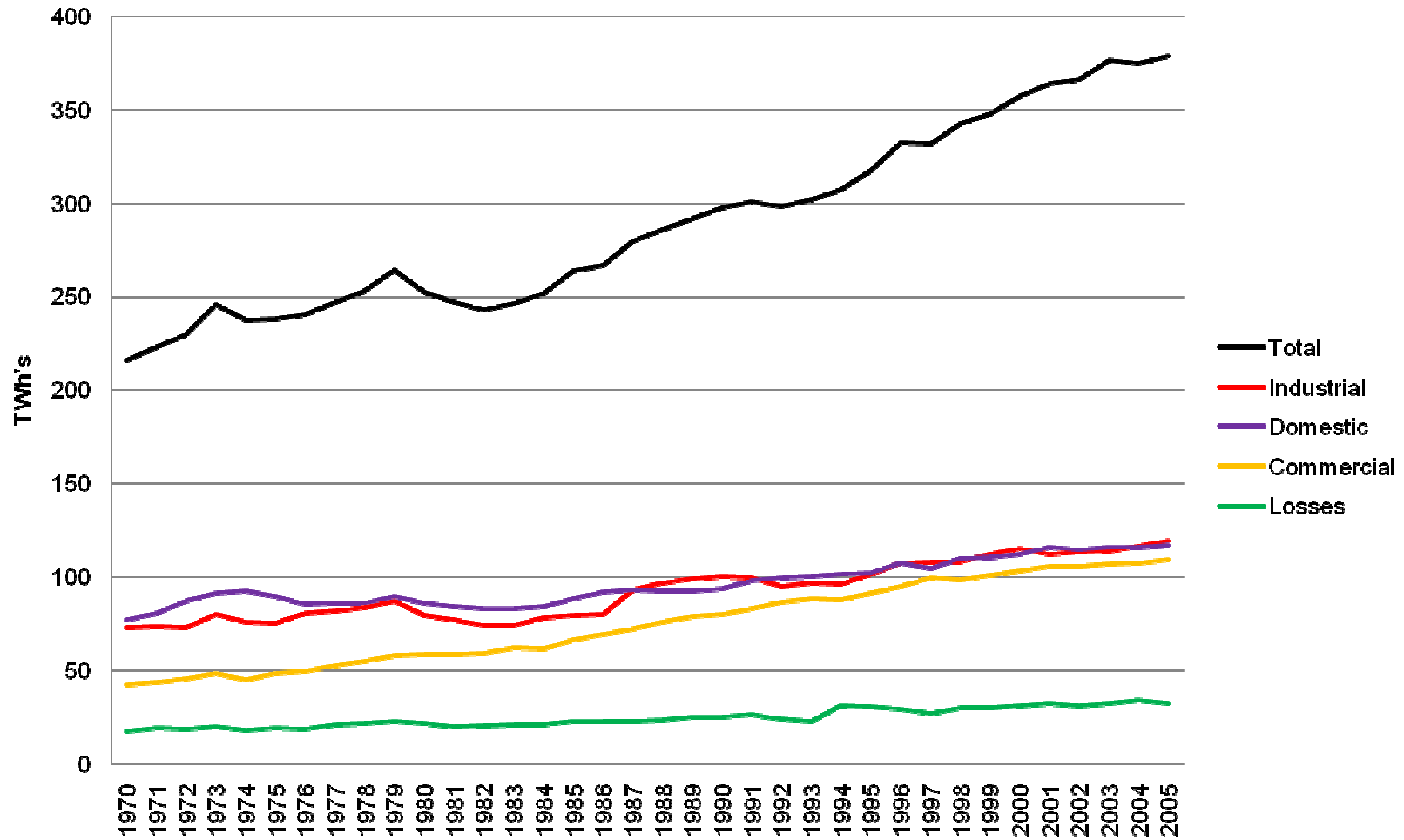


## Carbon Dioxide and Temperature Records

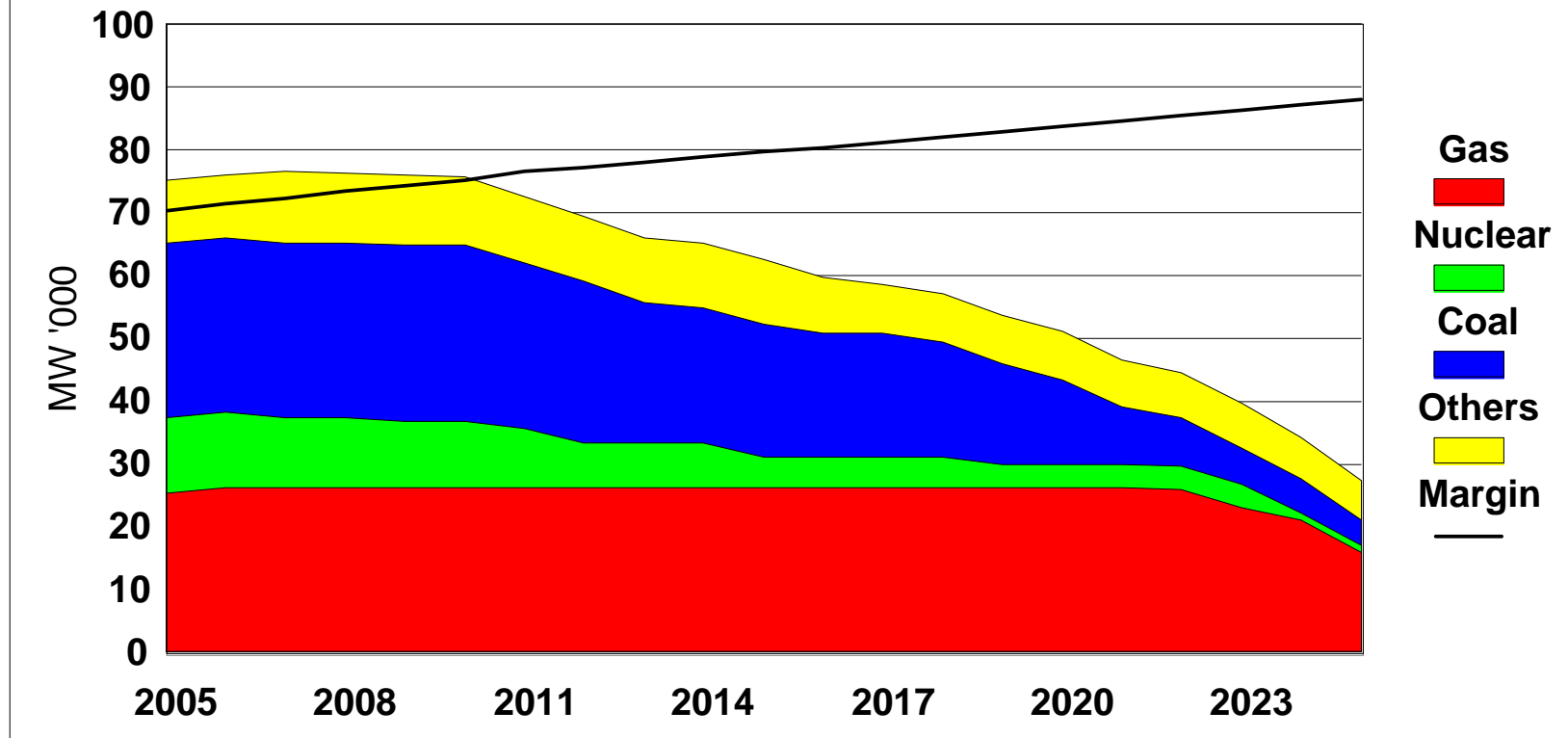


Past or Future?

## Electricity Consumption



## Plant Mix and Capacity Requirement (2016 - 21,000MW)



# Security of Supply

- Two main challenges
  - Increasing reliance on imports
  - Require substantial investment in gas infrastructure, power stations and networks
- Many climate change measures improve SoS
  - Reduced demand
  - Renewable energy is UK sourced
  - Provides price security
  - New Planning Policy statement on Climate Change requiring planners to recognise need for renewables & low C generation

## Energy Policy Goals

- To be on a path to cutting CO<sub>2</sub> by 60% by 2050 with significant progress by 2020
- Maintain reliability of energy supplies
- Promote competitive markets in UK & abroad
- Ensure every home is adequately and affordably heated

# Meeting The Energy Challenge

- Seeking EU-ETS to be basis of global “C” trading
- Increase energy efficiency at home and business
- Encourage distributed generation
- Diverse mix of large scale energy sources providing low “C” & security of supply
- Launching competition for demonstration CCS
- Reforming planning system
- Nuclear consultation

# The Strategy

- Establish International Framework to tackle climate change
- Legally binding C targets for whole UK economy
  - Climate Change Bill – 5 yearly C budgets
- Progress fully competitive international markets
- Encourage energy efficiency via better information, incentive and regulation
- Increase support for low C technologies
- Ensure right conditions for investment

# The Way

- Saving Energy : Business
  - Currently climate change agreements, EU ETS
  - Future carbon reduction commitment  
(6000MWh -1.5 MW @50%lf)
  - Energy Performance Certificate for buildings

# The Way

- Saving Energy : Households
  - New homes zero C 2016
  - Phase out energy inefficient light bulbs 2011
  - Higher standards in consumer electronics
  - Carbon Emission Reduction Target (EEC) – suppliers to double current effort – move towards energy services vs selling units
  - Clearer information on bills, move to smart meters, between 08/10 free real time displays
  - Energy Performance Certificates

## The Way

- Saving Energy : Transport
  - Recent EU intention for mandatory car fuel efficiency
  - Seek post 2012 100gCO<sub>2</sub>/km
  - Launching Low Carbon Transport Innovation Strategy
  - EU proposed aviation included in EU ETS
  - UK pushing for surface transport to be included
  - Car tax and Vehicle Excise Duty incentives

# The Way

- Clean Energy Supplies – small scale
  - Heat from microgeneration, district heating, chp
  - Biomass strategy being published
  - Distributed electricity – more flexible licencing arrangements, clarity on terms for spill, provision of advice, incentivise DNO's to provide efficient and speedy connection

# The Way

- Clean Energy Supply – large scale
  - Investments must move mix towards low C – EU ETS crucial in this regard
  - Renewable energy – key
  - Bidding to increase and broaden deployment
  - Reduce barriers – improved PLI rules, Planning White Paper, resolve queue
  - Account for recent EU binding renewable targets
  - Nov 07 competition for demo CCS

# The Way

- Clean Energy Supply – Nuclear
  - Justified on needed for diversity
  - Expect private sector to fund, develop, build & decommission
  - Launching consultation
  - Proceeding on contingent basis with a range of facilitative actions

# The Way

- Clean Energy Supply – Transport
  - Renewable Transport Fuel Obligation to ensure % comes from renewable sources (5%)
  - Increase this when costs, standards and sustainability concerns addressed

# The Way

- Research and Development
  - Energy Technology Institute – JV public & private sector
  - £600m over 10 years for R&D into low C technology including transport
  - Environmental Transformation Fund - support demo and deployment of low C technology
  - Publishing Low Carbon Transport Innovation Strategy

## Coal Step Three

	Air Firing	Oxyfuel
Gross Plant Output	520 MWe	508 MWe
Air Separation Unit Power	-	63 MWe
CO <sub>2</sub> Compression Power	-	46 MWe
Boiler Auxiliary Power	40 MWe	36 MWe
Overall Net Plant Output	480 MWe	363 MWe
Specific CO <sub>2</sub> Emission	784 g/kWh	90 g/kWh

## Offshore Wind Economics

£1800/kW			
	<b>30%</b>	<b>35%</b>	<b>40%</b>
<b>Capex</b>	£80.45	£68.96	£60.34
<b>Opex</b>	£12.00	£12.00	£12.00
<b>Fixed</b>	£0.00	£0.00	£0.00
<b>Cost</b>	£92.45	£80.96	£72.34
<b>Energy</b>	£25.00	£25.00	£25.00
<b>ROC</b>	£33.00	£33.00	£33.00
<b>CCL</b>	£4.00	£4.00	£4.00
<b>Income</b>	£62.00	£62.00	£62.00
<b>Profit</b>	<b>-£30.45</b>	<b>-£18.96</b>	<b>-£10.34</b>
<b>Extra ROC</b>	1.92	1.57	1.31

Indicative numbers only

## Banding Redistribution

- @ 35% If – 10% RoR requires extra £443m pa
- Assumes 7600MW of Round 2 schemes
- In 05/06 Established ROC's = 7.8m
- Extra funds / Established ROC = £65/MWh
- Therefore redistribution from Established ROC's is not sufficient to support all round 2 offshore

## Band Setting

- Independent Advisory Committee – reflect principles of grandfathering, notification, transparency and reliability
- Account for full project costs & income
- Deliver max deployment for given level of support
- Maintain investor confidence and value for money
- Not intended to restrict cost effective renewables or permanently high support for expensive ones
- Review 5 yearly – with triggers for extreme cases

# Planning

- Scottish Planning Act 2006
  - Strengthen involvement of communities
  - Speed up decisions
  - National Planning Framework
  - Quicker investment decisions
  - SPP6
- Planning White Paper
  - Very similar to above

## Concluding Remarks

- Some object to nuclear in principle and others to renewables in practice
- This White Paper is a milestone with signposts – not a destination
- Need to read in great detail
- No-one disputes the objectives
- It sets long term investments therefore critical it gets it right