IRP2010 – a contribution

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What is our energy policy?

- The 1998 White Paper sets energy policy objectives
  - Increasing access to affordable energy services
  - Improving energy governance
  - Stimulating economic development
  - Managing energy-related environmental and health impacts
  - Securing supply through diversity
- The draft IRP2010 ignores the first, does nothing for the second, plays down the third, and contributes only to the fourth and fifth of these objectives

Affordable energy services

- Large investments have been made to take electricity to the poor
  - 30% of homes connected in 1993; over 80% today
- Free basic energy services for the poor
  - 50kWh/month
- However, free basic energy services are only a small portion of the minimum needs
  - At least 250kWh/month needed
- Therefore any increase in the cost of electricity impacts the poor directly
  - All the IRP2010 scenarios have large cost increases

Stimulating economic development

- The 2008 power crisis showed great economic sensitivity

Strategy		Rationing + Market			
Action & Impact	Market	Mining and smelters		Commercial	
Rationing	0%	10.0%	4.3%	10.0%	15.7%
Electricity price increase	71.3%	53.8%	65.0%	37.0%	15.7%
Impact on GDP	-0.9%	-1.6%	-1.1%	-5.9%	-10.1%
Impact on employment	-1.4%	-1.9%	-1.5%	-7.9%	-13.9%
Impact on household income	-1.2%	-0.5%	-0.9%	-6.8%	-11.5%
Impact on consumer price index	2.5%	1.86%	2.25%	1.28%	0.48%

Davies, R. 2008. Electricity Shortages and the South African Economy: Reflections Based on an Economy-Wide Analysis. Development Policy Research Unit, Department of Economics, University of Cape Town

Stimulating economic development

- Any form of rationing was disastrous to GDP and job growth in the commercial sector
  - Even when rationing was ‘cushioned’ by some price increases
- Price increases alone (“Market” in Table) trimmed GDP, job markets and household incomes, and grew inflation
- We are having to live with price increases already in order to avoid disastrous rationing
- Adding further price increases must therefore be avoided

Managing energy-related environmental and health impacts

- IRP2010 attempts to implement LTMS
- However, LTMS had an unrealistic 'business-as-usual' scenario with several coal-to-liquid plants and ongoing coal-fired power stations
  - So the challenge to reduce emissions was overstated
- Therefore the challenge to IRP2010 is also overstated

Managing energy-related environmental and health impacts

- There is only a draft national climate change policy still to be published for comment
- Therefore the agreed national energy policy must take precedence
- This is illustrated by the fact that the Copenhagen Accord requires our actions to reduce greenhouse gas emissions to be supported financially by developed nations
  - The draft IRP completely overlooks this
  - If the draft IRP were to be widely known, it would destroy our Copenhagen position

Securing supply through diversity

- IRP2010 has in it almost every technology
  - Diversity therefore rules
- But our energy policy stresses **security of supply,** not just diversity
- Intermittent sources such as wind are not secure
- Imported fuels are not secure unless sufficient can be imported and stored to last ~1 year

Securing supply through diversity

- New technologies take time (and money) before they can be operated efficiently
- New technologies require time (and money) before they can be maintained efficiently
- We can only conclude that diversity as such does not guarantee security of supply.

Policy conclusions

- IRP2010 does not conform to our energy policy
- It should therefore should be completely redrafted to ensure that it does

Detailed flaws in the Draft IRP

- The >30% assumed capacity factor for wind is overoptimistic (See Fig 10)
  - Worldwide less than 10% of all onshore sites exceed 30%
  - “In Denmark, the capacity factor of the wind turbine fleet ranges between 20% in a “low wind” year (like 2006) and 25% in a very windy year (like 2007). In Germany, it was roughly 20% in 2007, although it is normally about 16%. In the USA, responding to more pragmatic considerations, most wind turbines are built in windy areas where the capacity factor is usually over 30%. The capacity factor of the USA’s wind turbine fleet is 29%”CEPOS 2009, http://www.cepos.dk/fileadmin/user_upload/Arkiv/PDF/Wind_energy_-_the_case_of_Denmark.pdf.

Detailed flaws in the Draft IRP

- Accordingly the risk assessment of wind is wrong and the costs are severely understated
  - The draft IRP places all wind at the coast
  - Many proposed wind farms are inland where average temperatures are higher and altitude reduces density (and therefore available power) further
- A national wind atlas is in preparation
- Until it is available, it would be irresponsible to base any reliance on this potential source of power

Detailed flaws in the Draft IRP

- The estimated long-term prices for natural gas are overoptimistic
  - In the longer term prices per GJ must reflect the utility of the fuel
  - Natural gas will always have significantly more utility than oil, and oil more than coal
- These considerations nullify much of the claimed advantage of CCGT fuelled by natural gas over oil
- We already possess the infrastructure to import the oil that would be needed for an extended CCGT system
  - Available oil storage would provide needed security

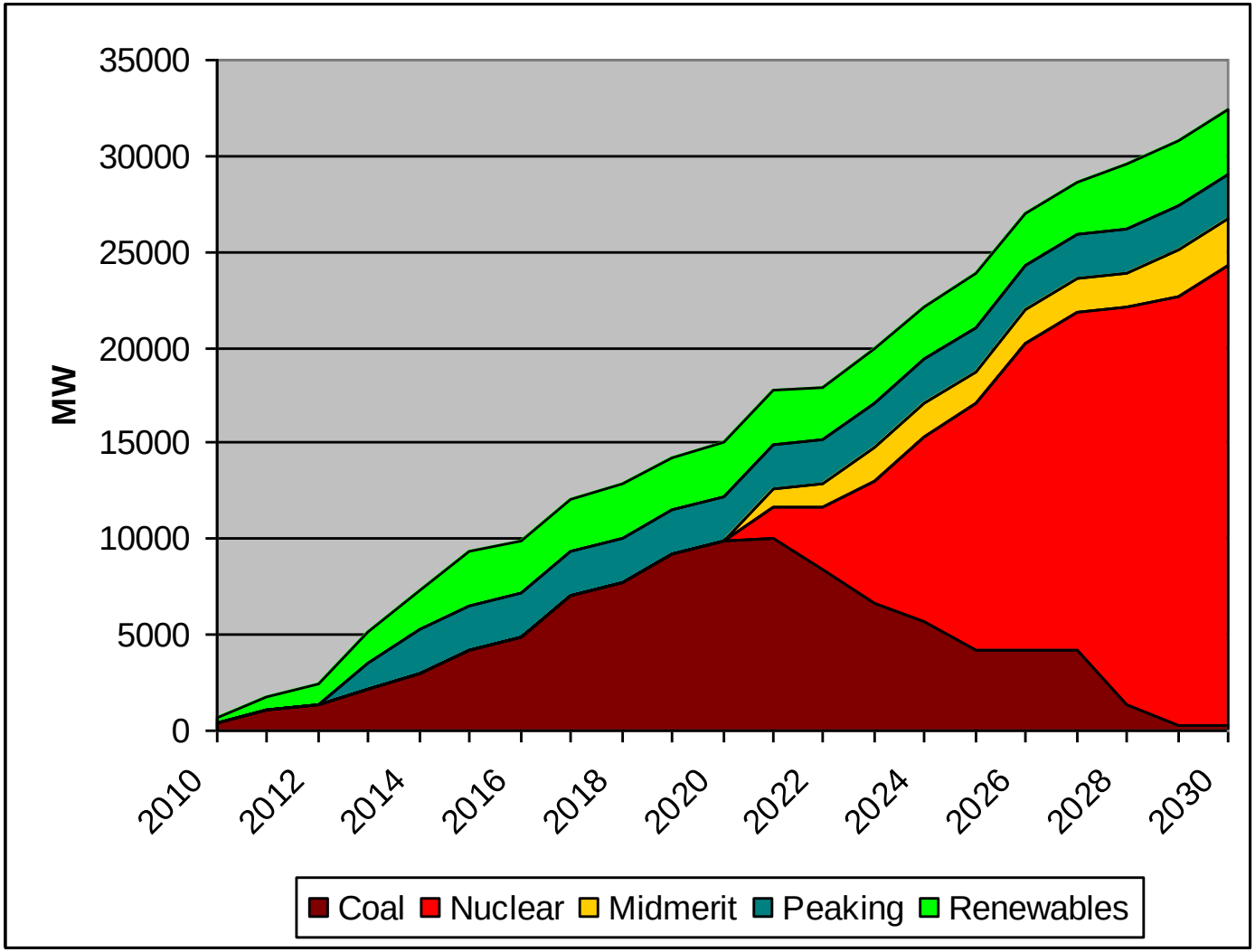
Detailed flaws in the Draft IRP

- There is minimal consideration of the impact on transmission
  - There is not even a definition of ‘Reliable capacity’
  - Or any consideration of intermittency on the grid
- The fact that new transmission costs are approximately equal to the costs of new generation means that any IRP must consider transmission
- Overlooking transmission impacts means that regionalisation benefits are overstated
  - And geographical benefits from, e.g. siting nuclear at the coast, understated

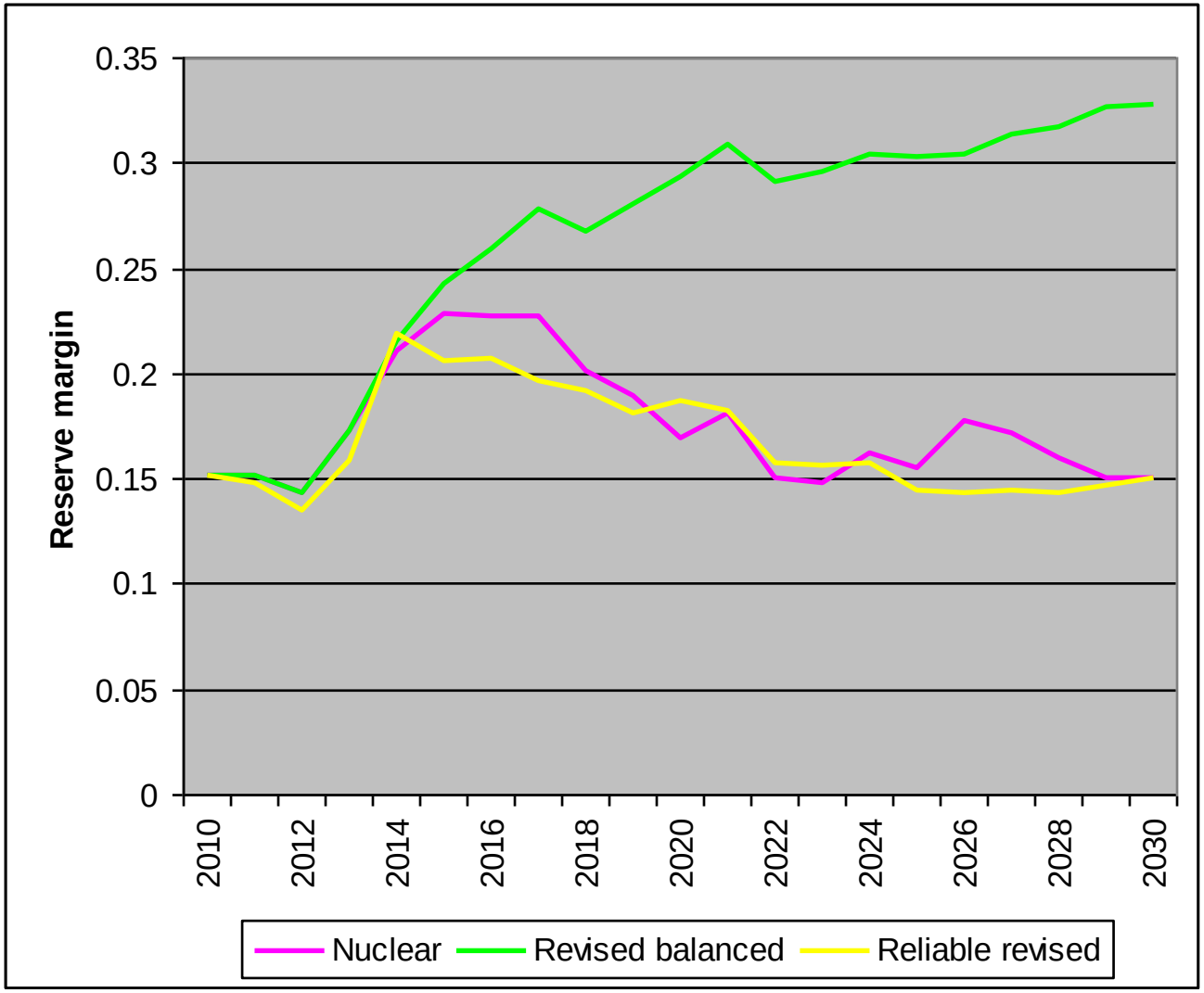
Synthesis

- Use lowest cost options as far as possible
- Use low carbon options as far as possible
- Avoid importing hydrocarbon fuels as far as possible
- A simple model was created around these policies
  - It reproduced the Revised Balanced scenario in most respects
  - A Nuclear scenario was an improvement

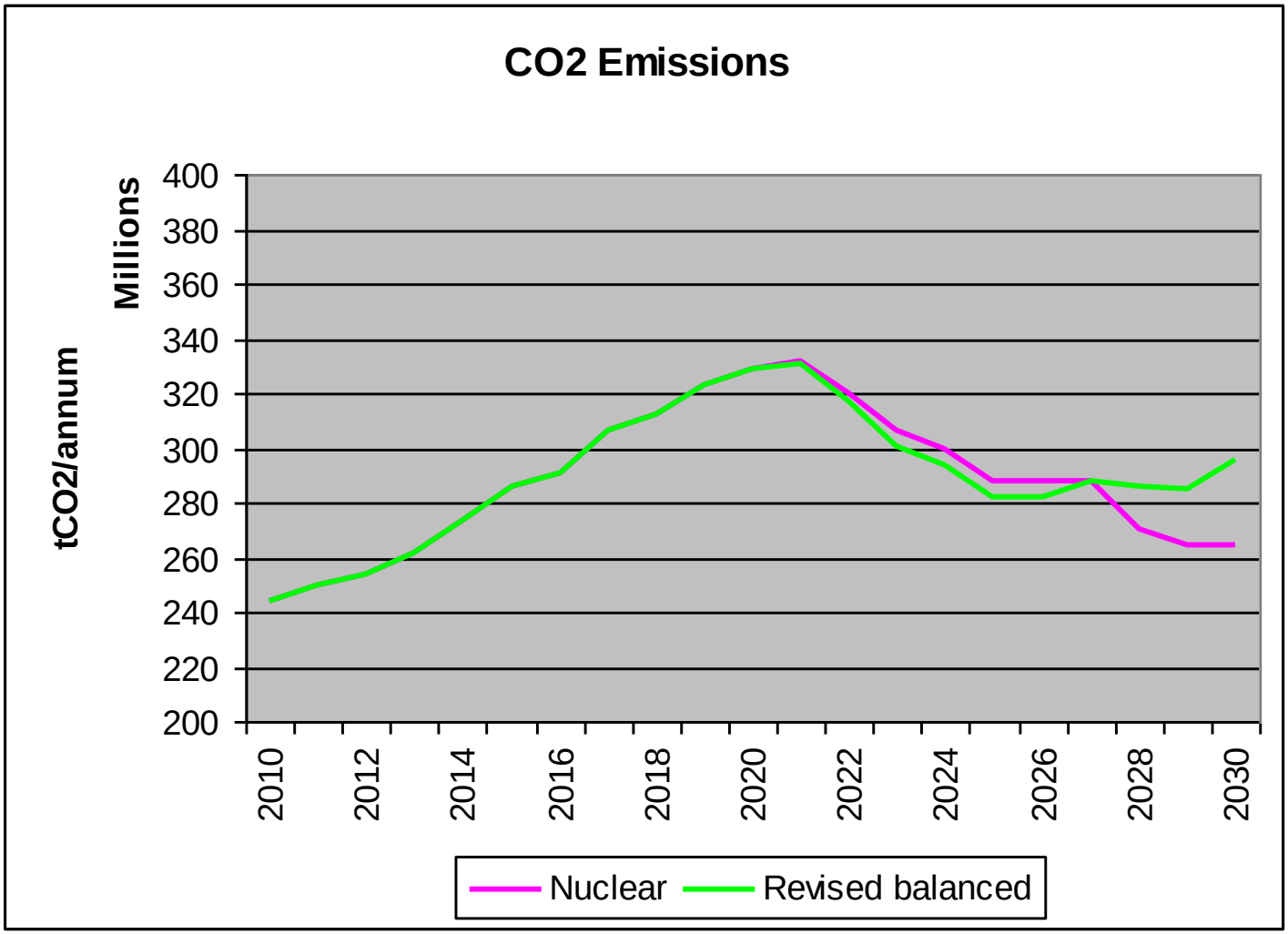
Comparison of supplies



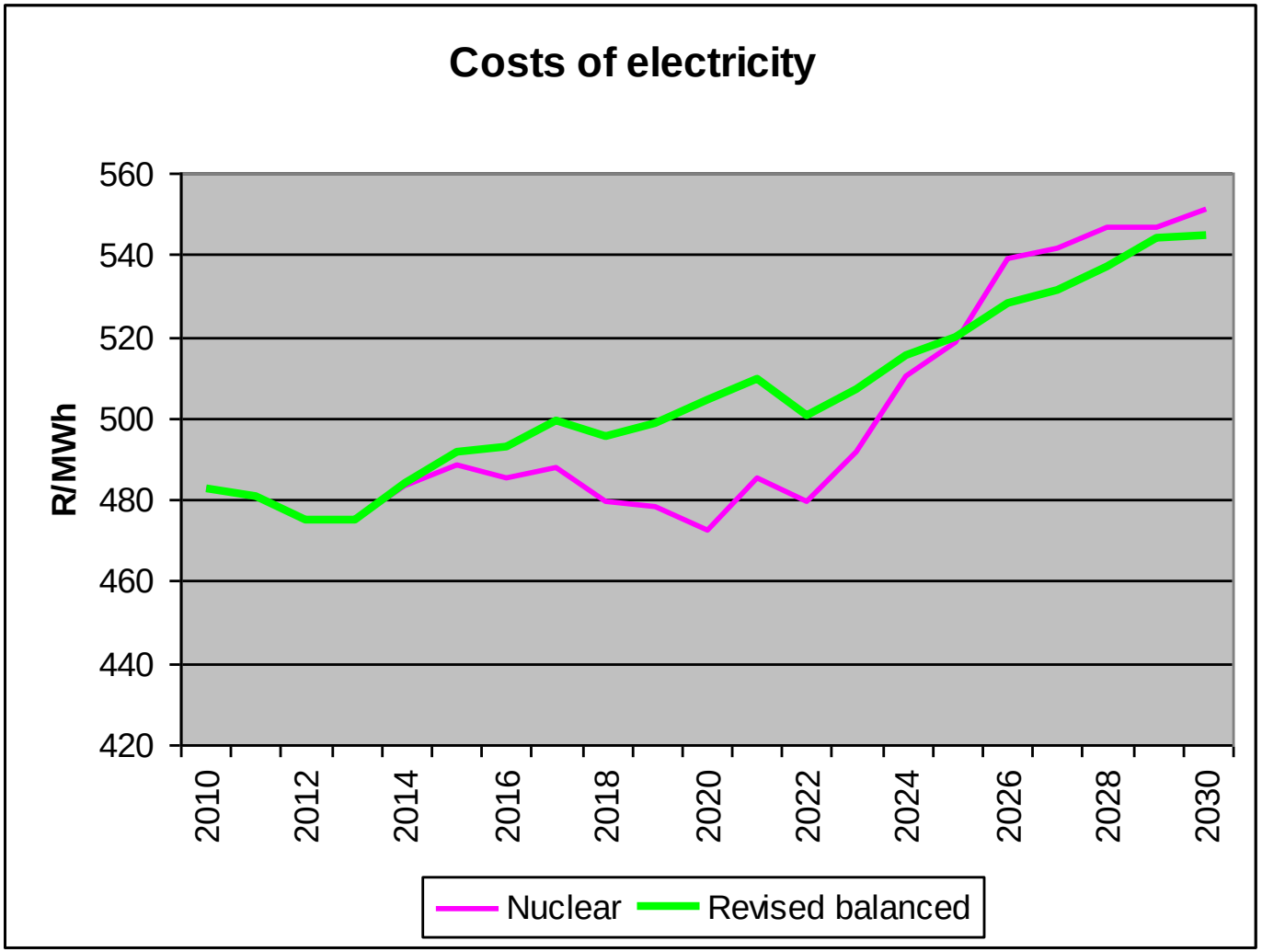
Comparison of reserve margin



Comparison of CO_2 emissions



Comparison of cost of electricity



Conclusions

- Policies based on primarily on cost can readily achieve the same result as those driven by CO_2 restrictions
- They achieve results required by energy policy
  - While improving on emission limits
- The draft IRP requires drastic revision

Thank you for your attention

Any questions?