



# Eskom's performance in international perspective: governance, institutional and pricing reforms

David Newbery, University of Cambridge

*CDE Workshop on the SA electricity crisis*

5 May 2008, Johannesburg

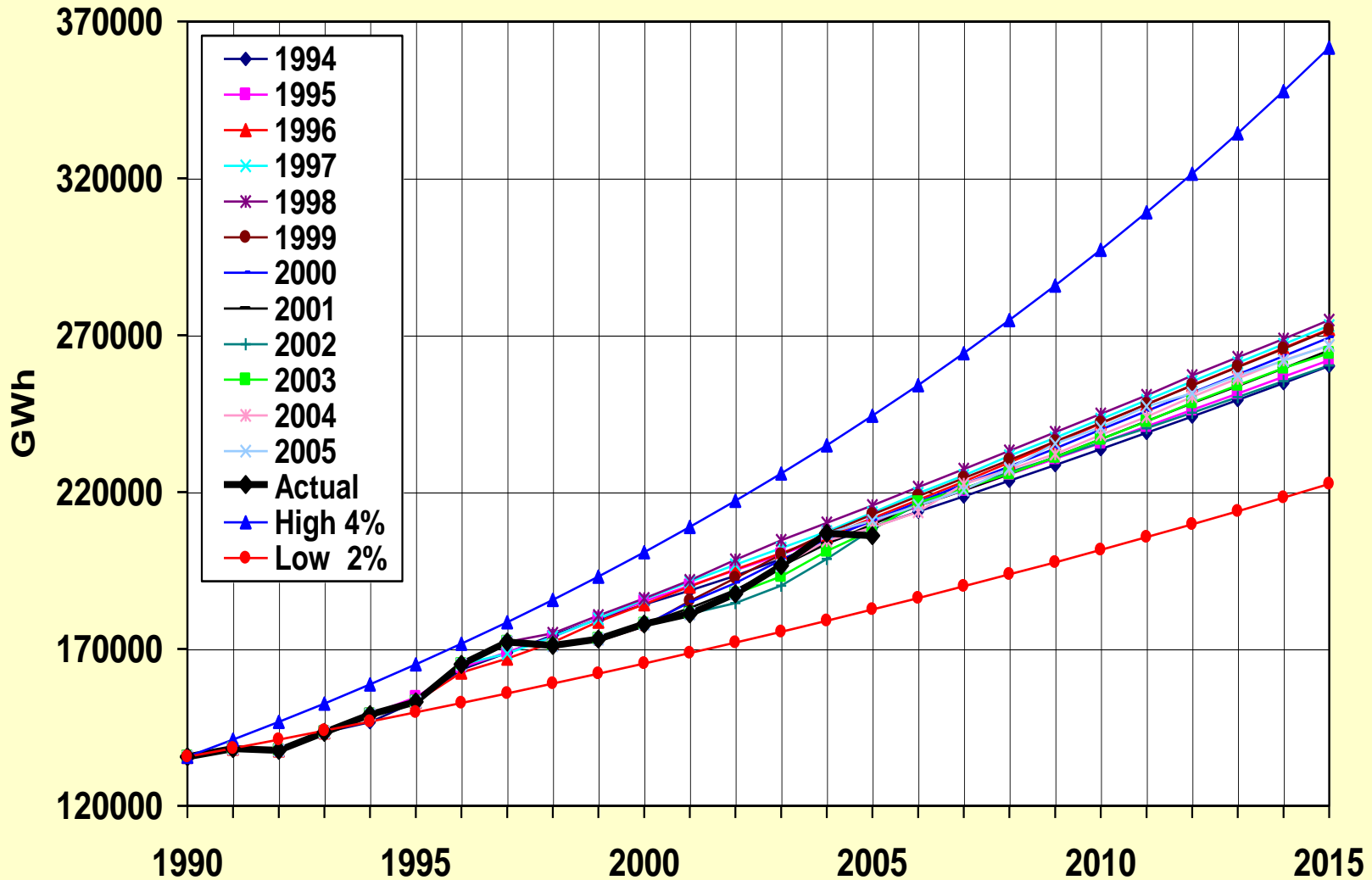
<http://www.electricitypolicy.org.uk>

# The South African electricity crisis

- Energy White Paper 1996
  - presented 1998
  - forecast shortage 2007 unless new capacity ordered by 1999
- blackouts in 2007 winter
- major blackouts in (off-peak) summer 2008
  - large impact on mineral production, foreign confidence

# Electricity blackouts: bogus arguments

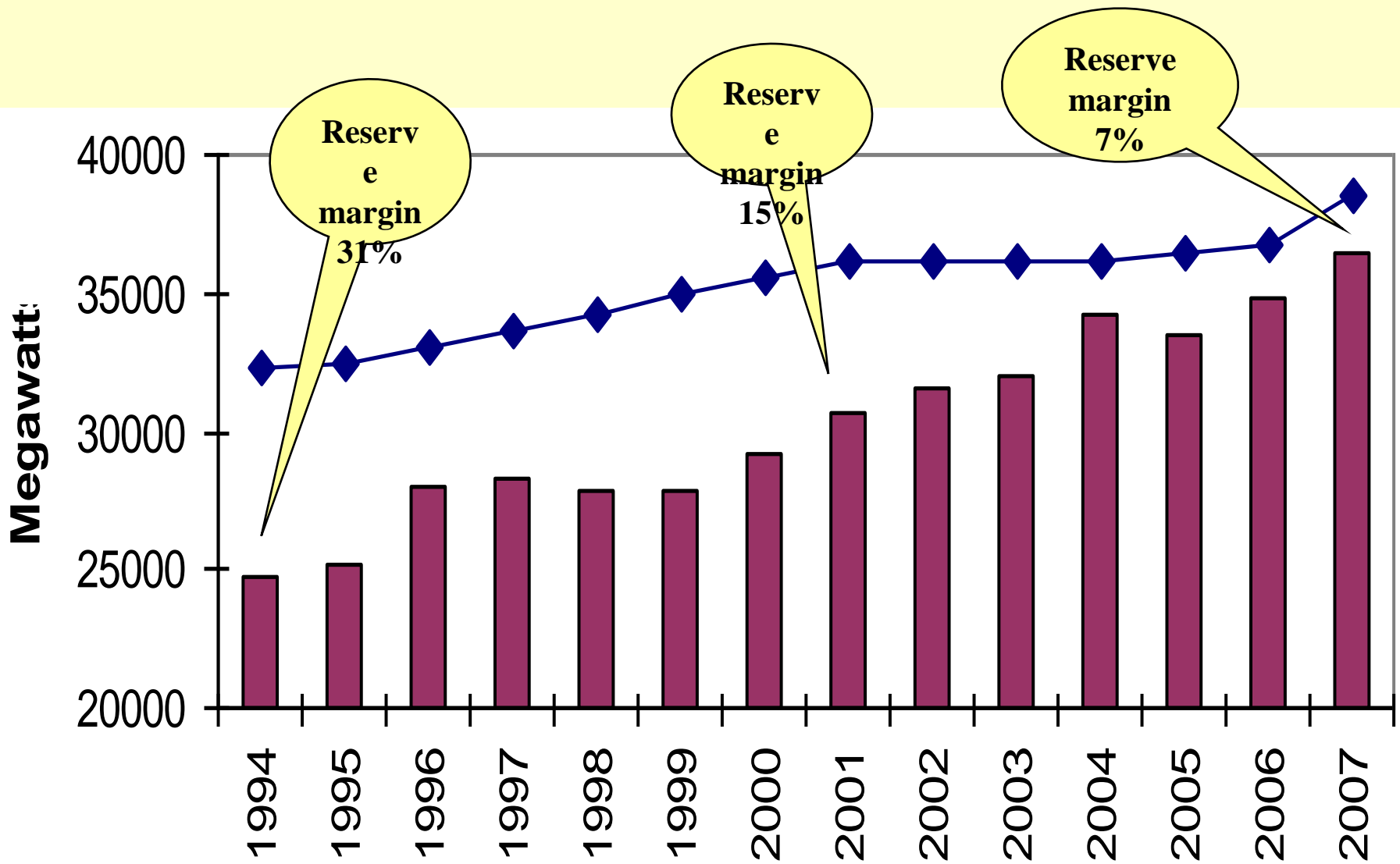
Electricity demand was higher than expected  
Eskom long term sales forecast track record



# Blackouts: ultimate causes (1)

## Insufficient generating capacity

- Eskom's investment programme 4 years behind
  - Moratorium from 2001-2004
  - New build programme has slipped
- DME contracting of IPPs unsuccessful



**Ideally need 20% reserve margin to cater for planned maintenance, unplanned outages and system stability**

# Blackouts: ultimate causes (2)

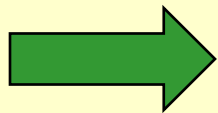
Eskom unable to keep its existing generators working adequately

**90 : 7 : 3**

**plant availability : planned maintenance : unplanned outages**

**86 : 9 : 5**

**76 : 10 : 14**



**Negligence in coal contracting  
Equipment and maintenance failures**

# Example: 28 January 2008

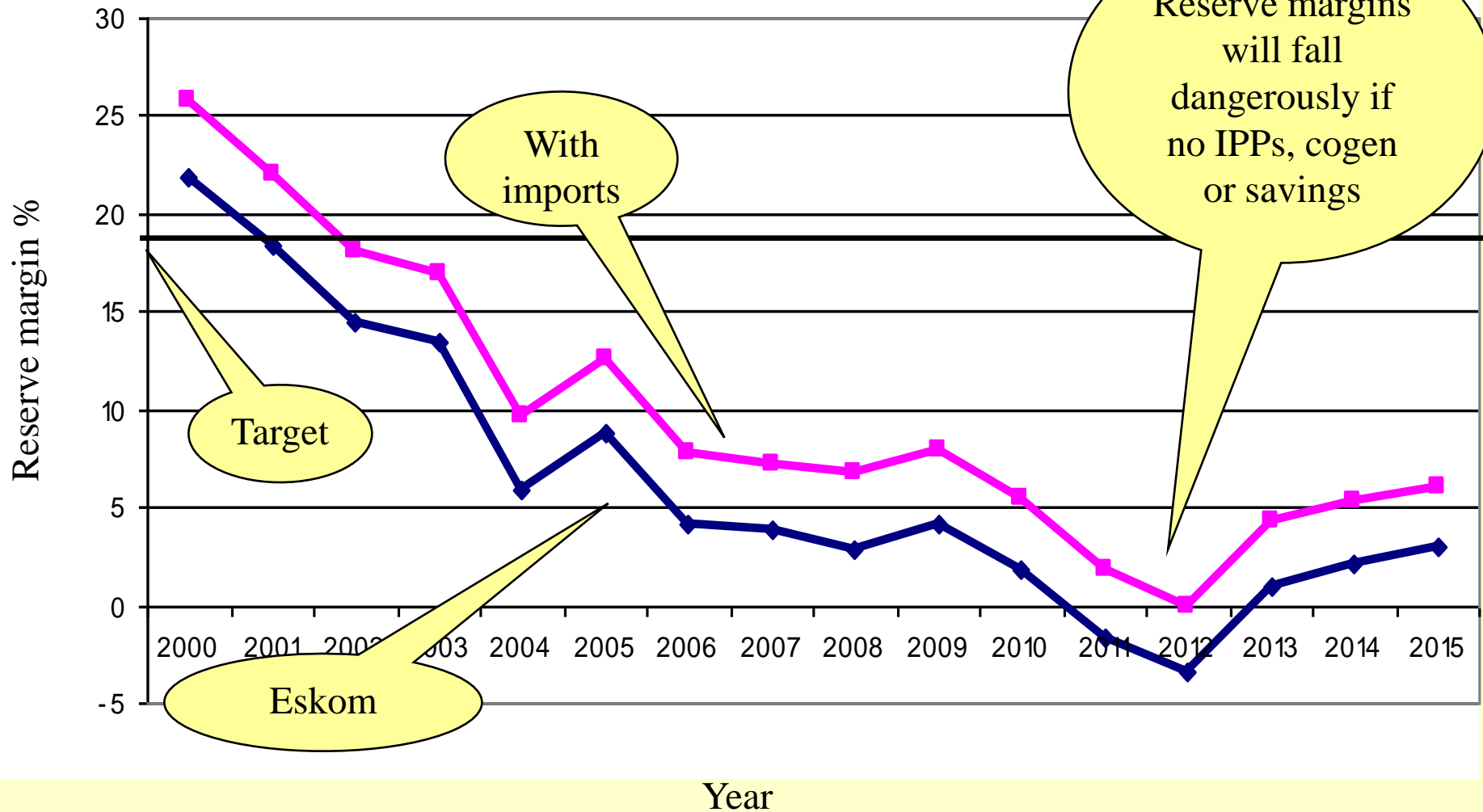
	MW
Eskom capacity+imports	39 855
Operating reserves	1 800
Planned maintenance	3 715
Breakdowns (e.g boiler tube ruptures, etc)	4 235
Reduction in capacity (e.g. wet or insuff coal)	2 694
Total capacity available for supply	27 411
Expected demand	32 000

**Consequence: massive load-shedding  
diamond, gold and platinum mines shut down**

**What are root causes?**

**Systemic management and governance failures?**

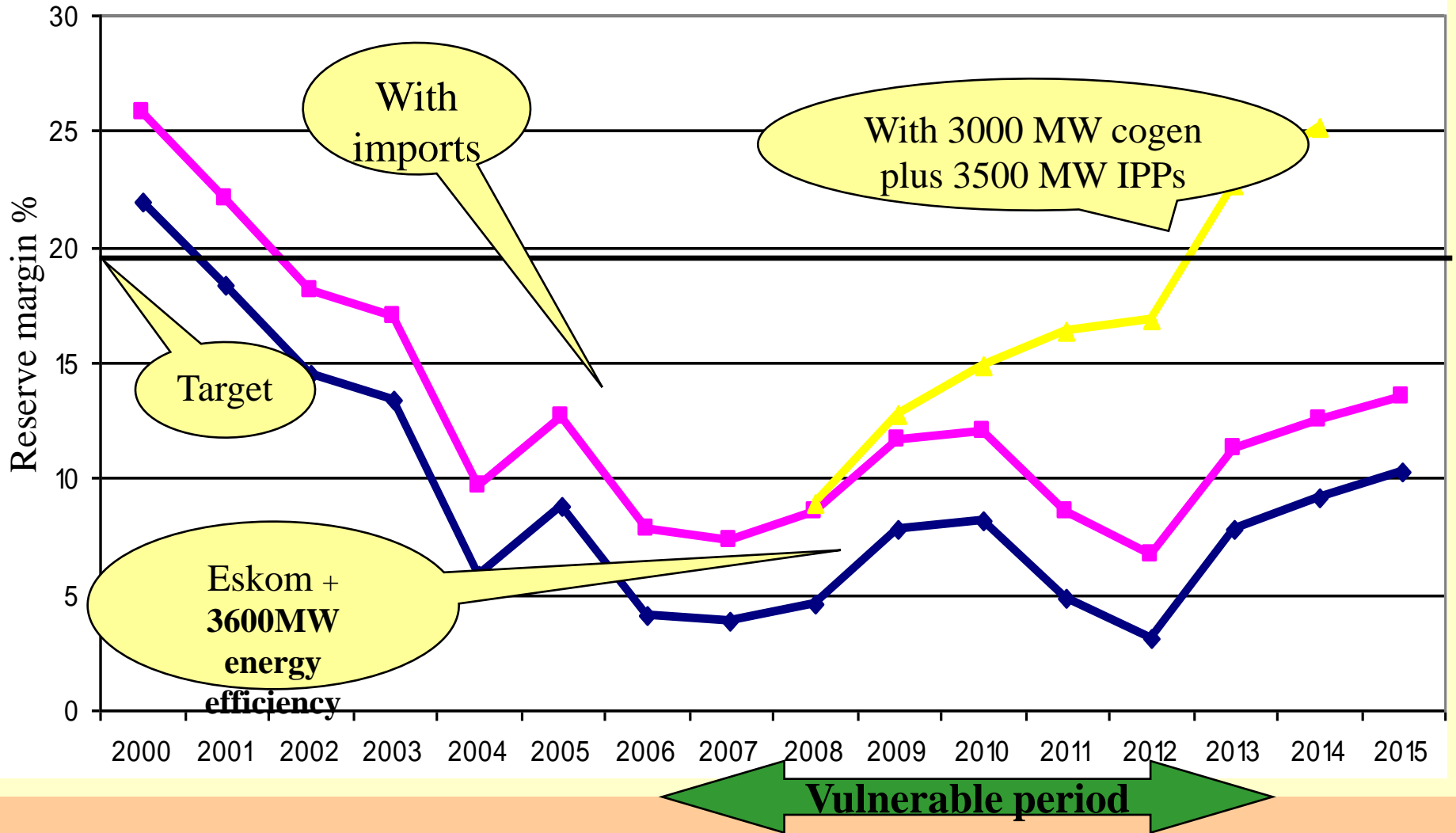
# Reserve margins based on Eskom capacity expansion plans only



**Eskom's new build programme has slipped**



# Reserve margins: Eskom + energy efficiency + cogen + IPPs



**Eskom investing as fast as it can, but now also needs imports, IPPs, Co-Gen and**

# The stalled reform discussion

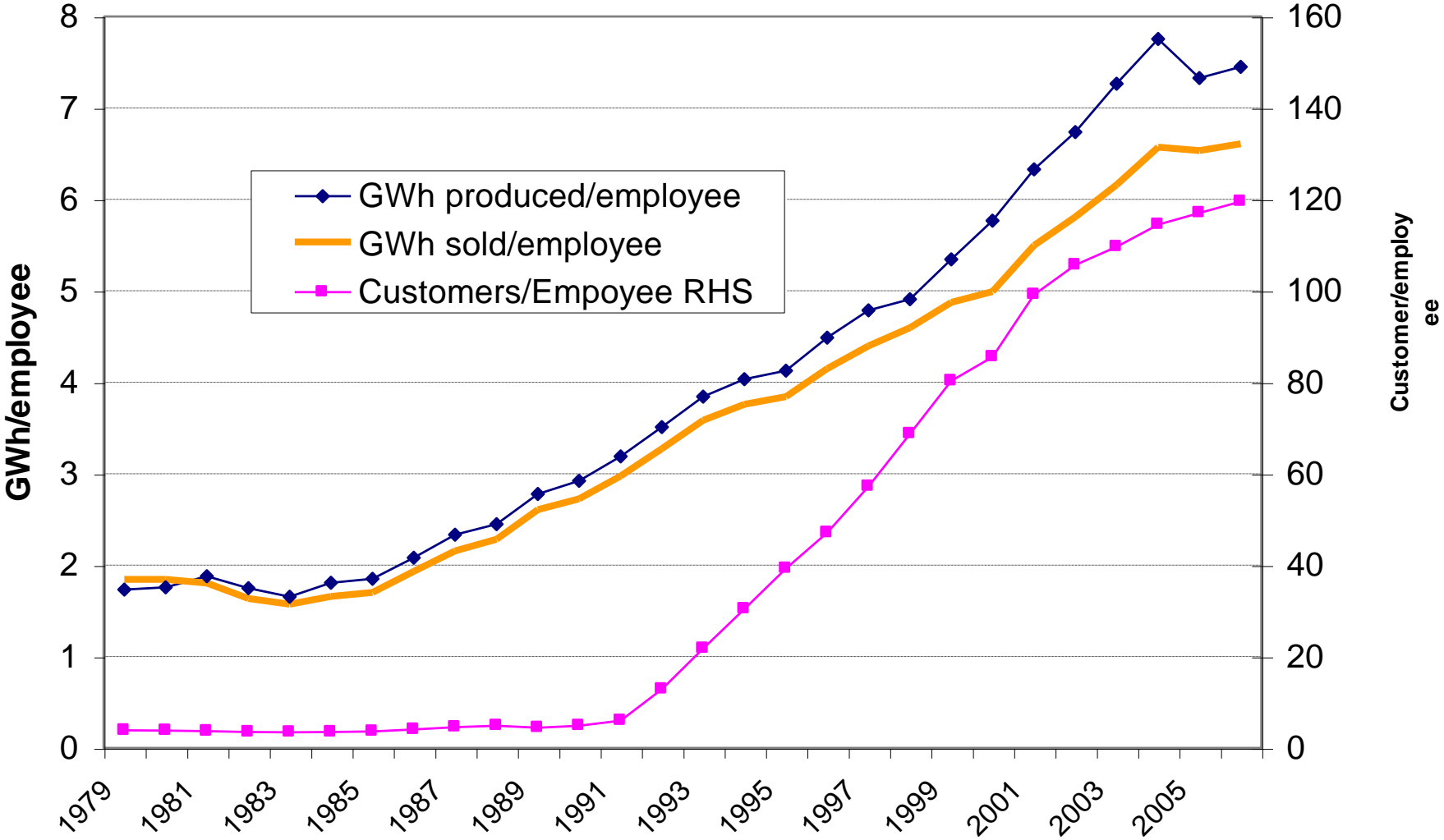
- Reform discussions ignore pricing
- International experience
- Requirements for liberalisation
- costs and pricing
- reforms and governance

# Reform discussions post 1994

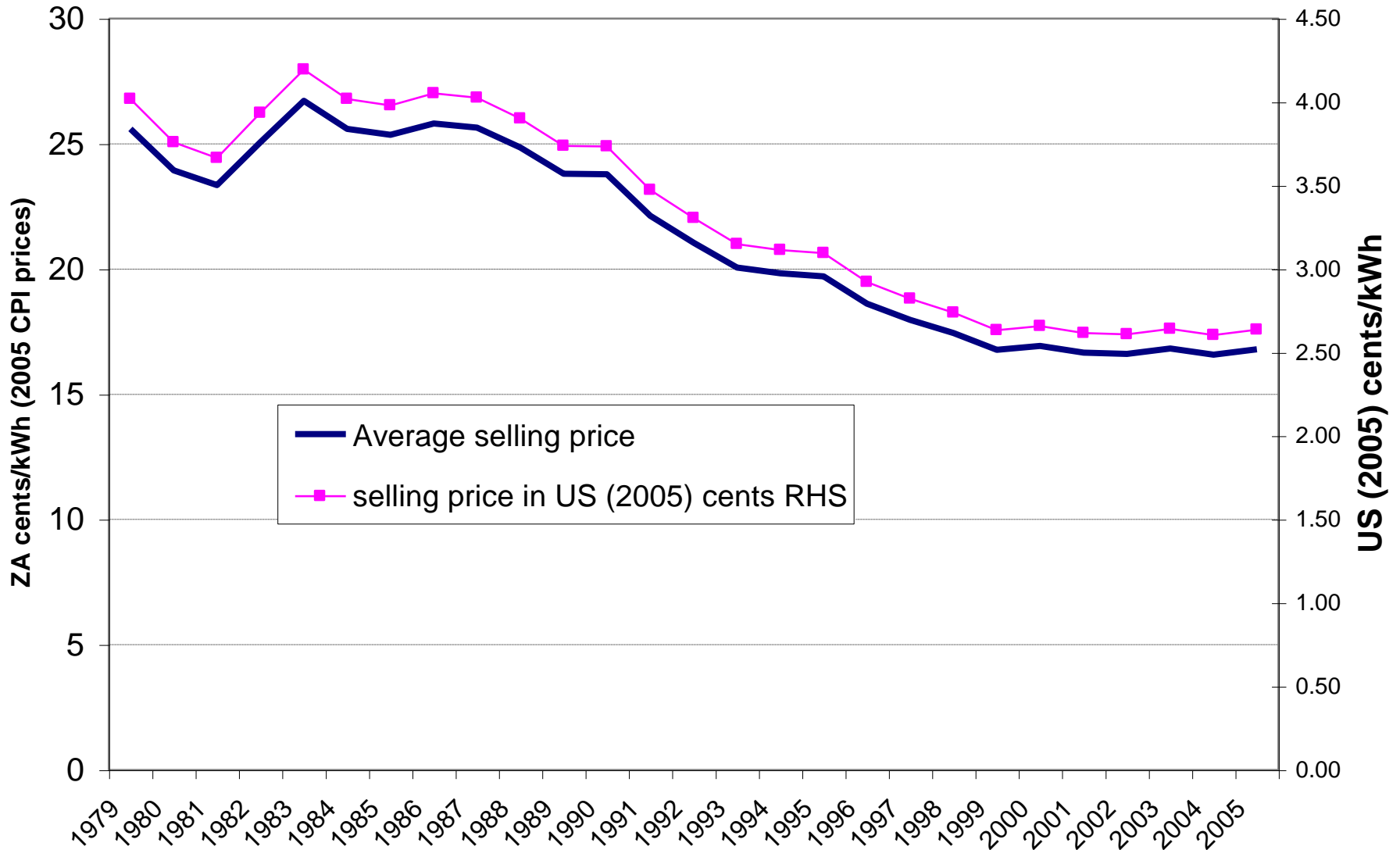
- SOEs increasingly criticised for inefficiency
    - Particularly for investment
  - SA Debate on reform starts – conferences, reports, models,.....
  - Eskom Conference 3-5 April 2000
    - presents international experience
- => Consensus model – liberalise, unbundle, encourage new IPPs, privatise, regulate ...

*But pricing issue neglected*

# Eskom Productivity 1979-2006



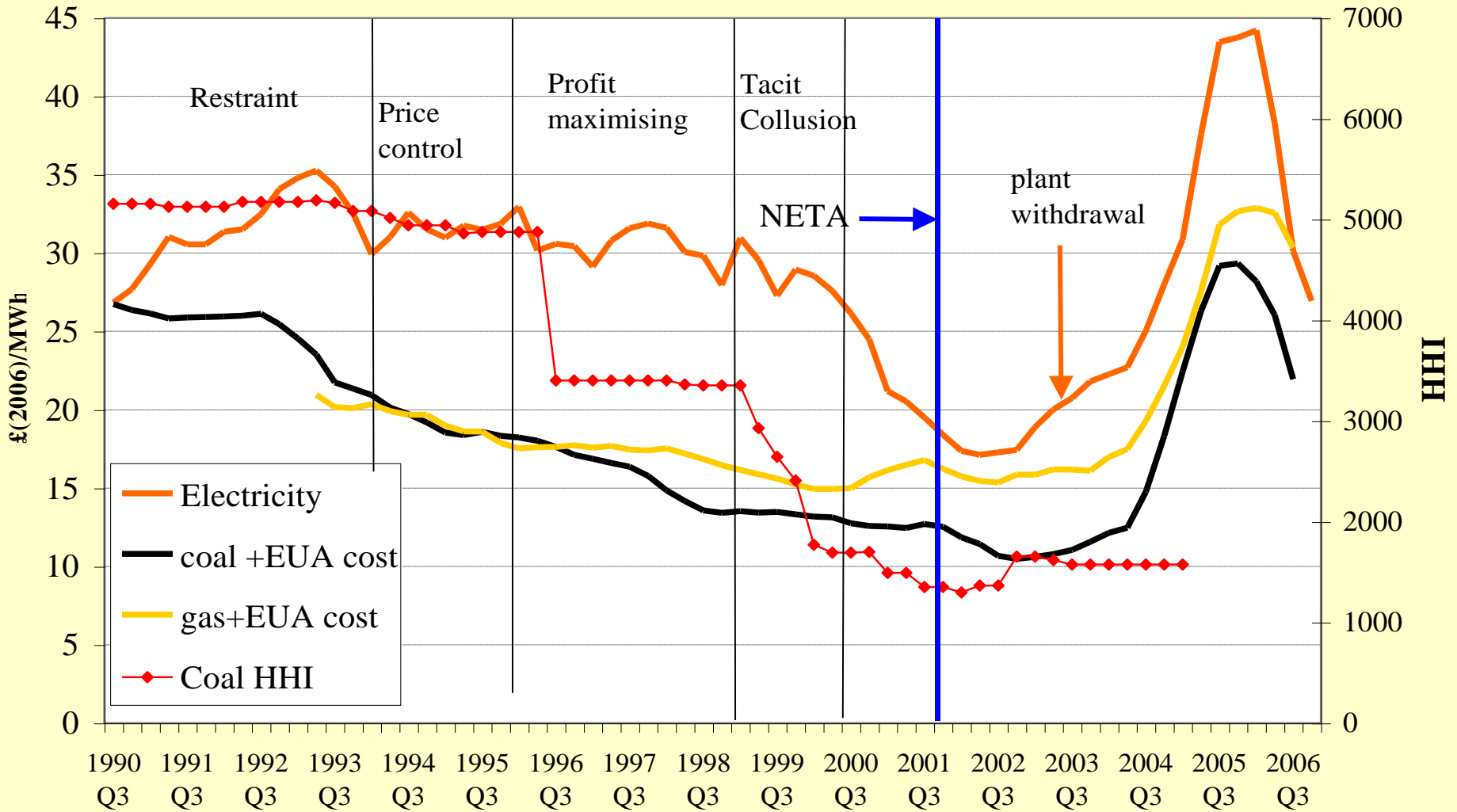
# Eskom's average selling price deflated by CPI



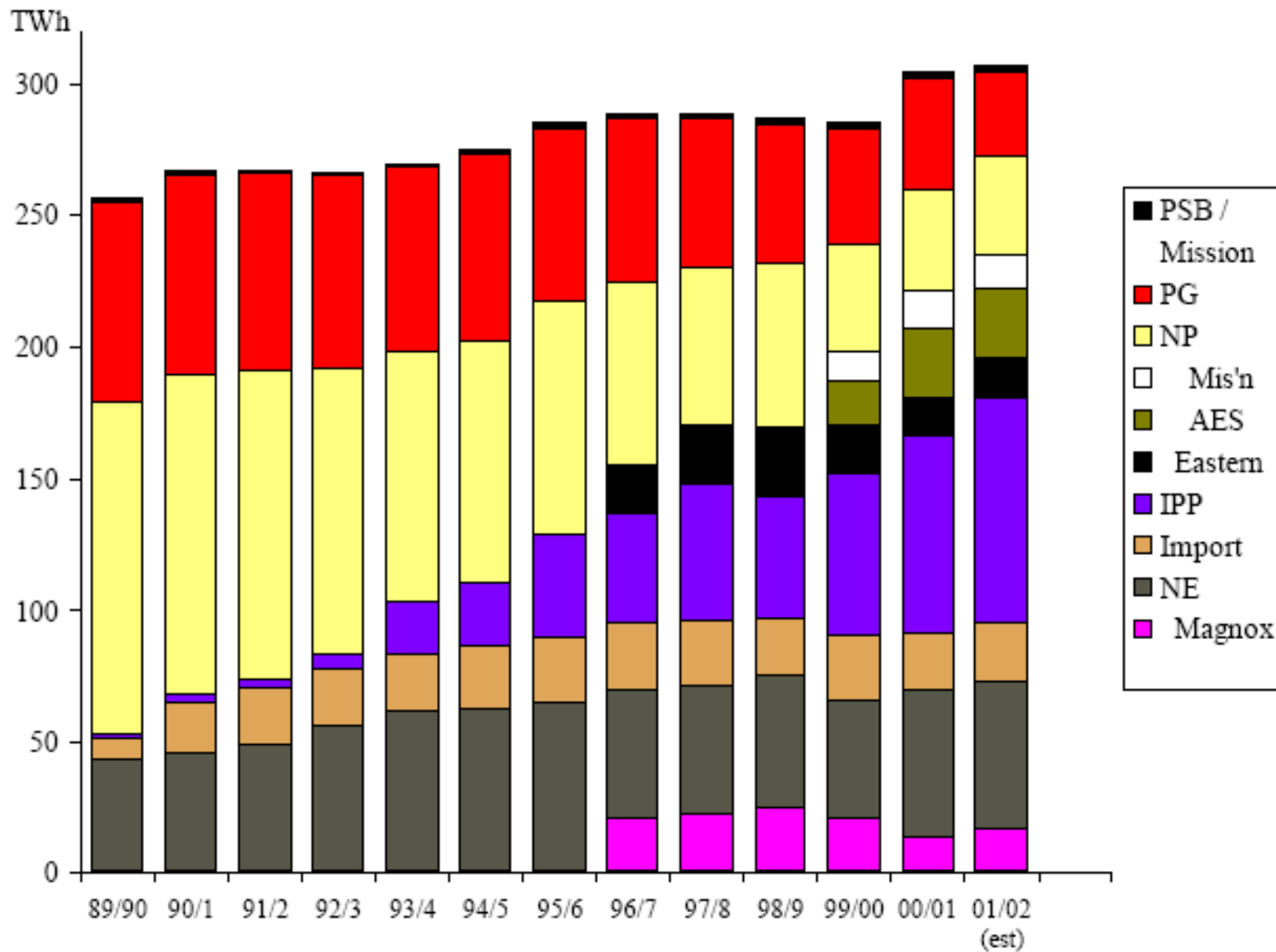
# The UK experience

- Britain restructured from a position of high prices and spare capacity
  - England (+Wales) unbundled: restructuring worth 6% permanent fall in cost
    - = 100% on sale value; consumers lose, buyers gain
- => Large investment in new generation E&W
- Scotland - unrestructured, no net social gain

# Real GB electricity and fuel costs 1990-2007



# Generation in England and Wales





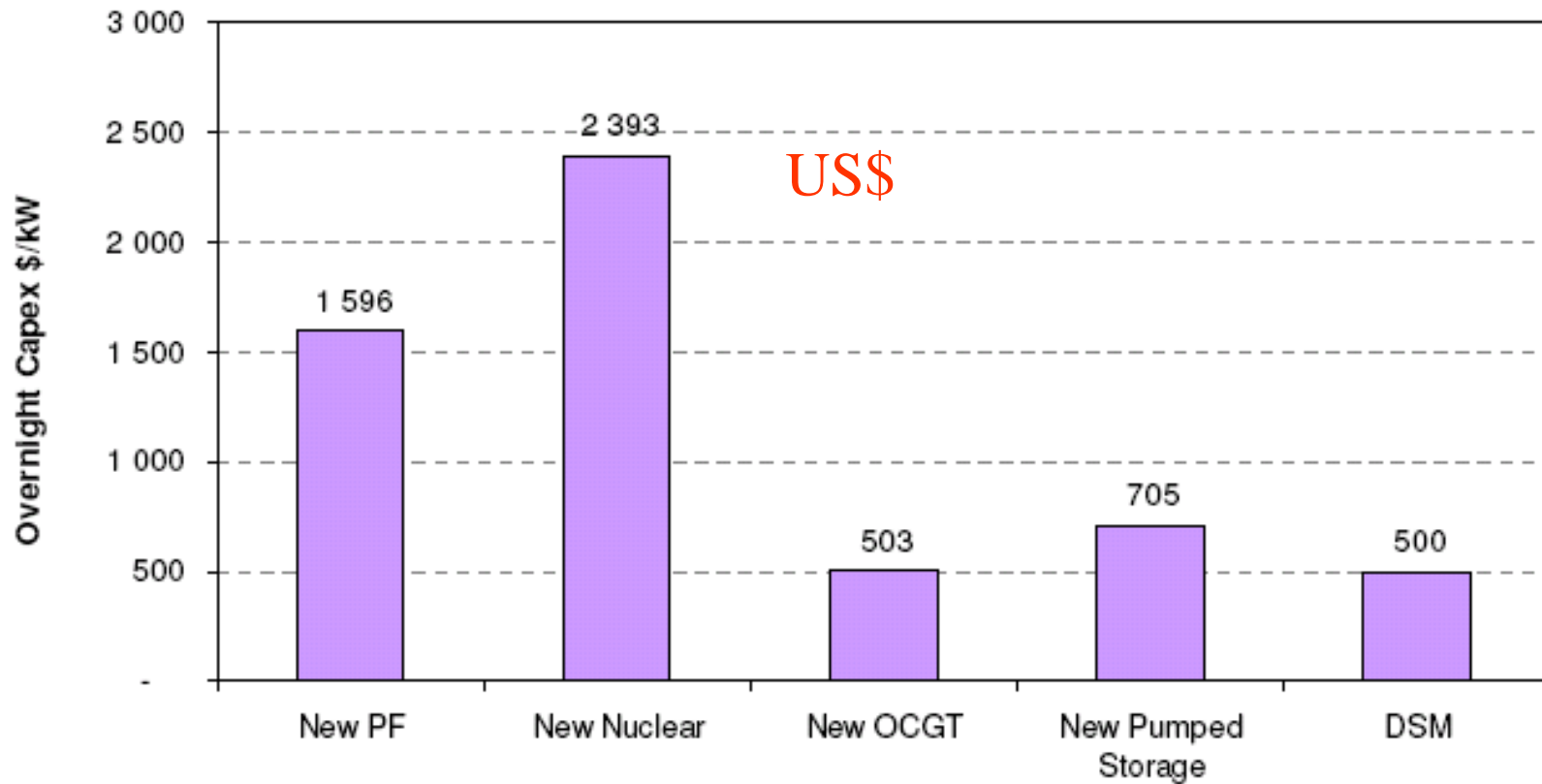
# Requirements for liberalisation

- Enough generation stations for competition
- Investors need assurance that price = LRMC when new capacity needed
- confidence that markets allow scarcity pricing and control of market power is justified
  - challenging for regulators & competition authorities
- financially viable distribution companies
- credible regulation for wires, access

# Requirements in South Africa

- remunerative pricing to reward investors
- timely, efficient procurement of generation
  - planning, contracting, dispute resolution
- efficient pricing to guide energy intensive investments (e.g. aluminium)
- incentives for availability and reliability
  - to hire the right staff
  - to ensure they work effectively
  - to deliver quality of service

# Energy and capital costs 2006



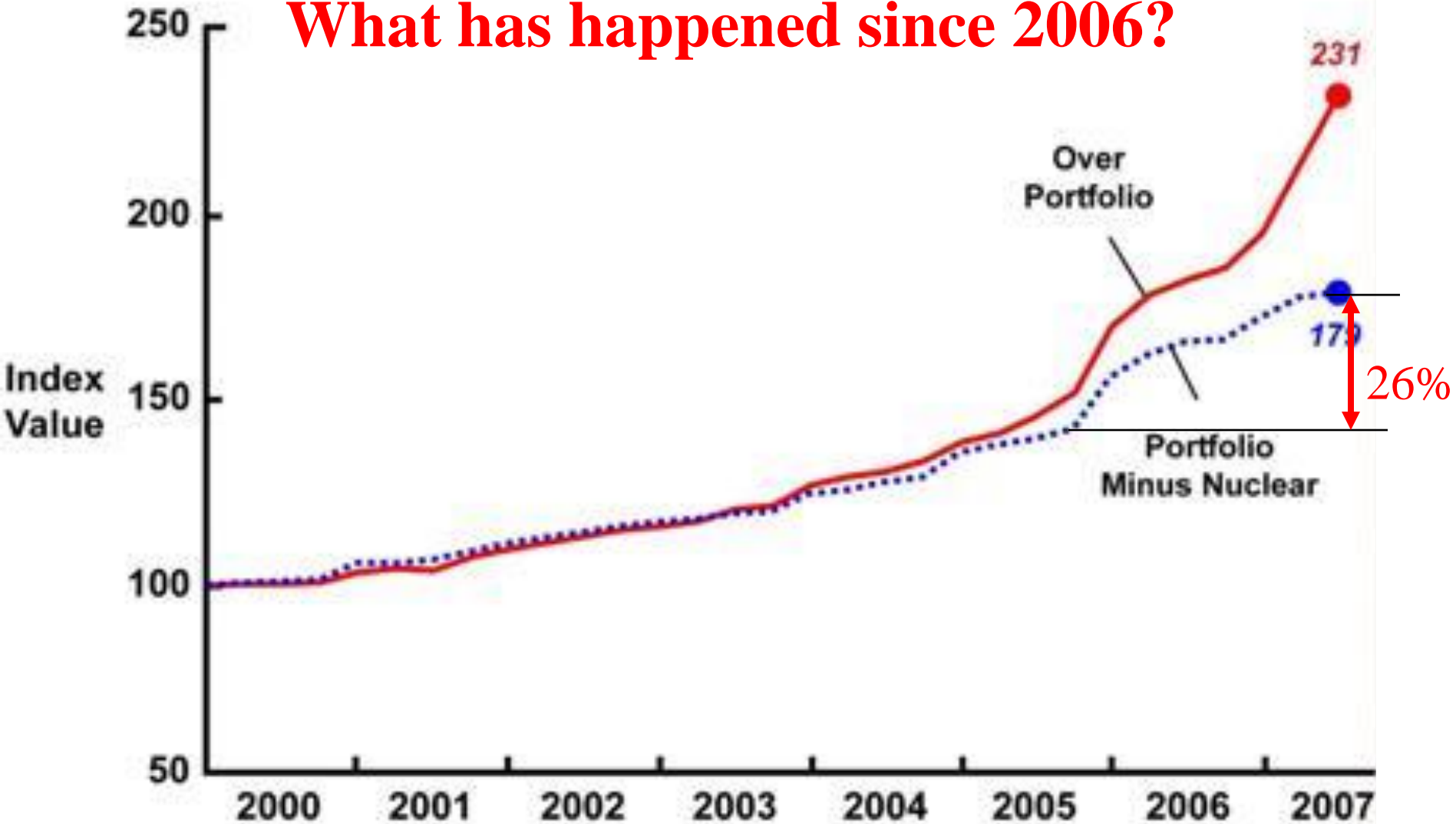
Variable costs: Coal US\$1-5/MWhe

LNG: \$56/MWhe, distillate in CCGT \$77/MWhe, in OCGT = \$130/MWhe (at \$7/mmBTU for gas, oil \$61/bbl)

Peak price (Megaflex) = \$63/MWh

# IHS\CERA Power Capital Costs Index USA

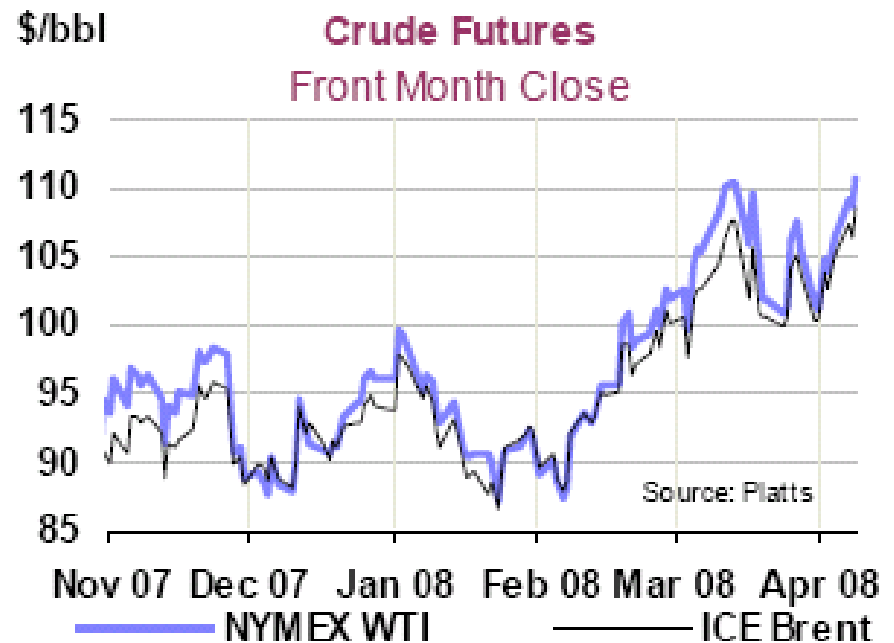
**What has happened since 2006?**



Source: IHS Inc. and Cambridge Energy Research Associates

# Energy costs 2008

- Oil now \$100+ /bbl
- LNG: \$12-13/mmBTU?  
= \$100/MWhe
- distillate in CCGT \$140/MWhe?
- distillate in OCGT = \$230/MWhe
- T&D losses at peak amplify these



# Eskom's asset values (2006)

= 60 ZAR bn historic cost

= 130 ZAR bn inflation adjusted

Optimal Deprival Value > 330 ZAR bn (?)

of which generation > 200+ ZAR bn (?)

Economic return < 2.3% on ODV

*Suggests serious under-pricing*

# Approaches to pricing

- ODV value + WACC of 8% prices should increase 60% from 170 to 270 ZAR/MWh
  - Still 3<sup>rd</sup> cheapest of 14 countries at \$40/MWh
  - and this excludes any CO<sub>2</sub> cost
- Generation LRMC > 250 ZAR/MWh (2006)  
+ T&D = 320 ZAR/MWh (\$48)
- Capacity price: VOLL x LOLP
- SRMC = marginal fuel cost + capacity price

# Pricing

- Efficient pricing for marginal demand
  - => PPA contracts new energy-intensive users
    - benchmark against IPP PPAs
    - High value exporters to face LRMC/SRMC
    - Other customers offered old contract to 80% of 2007 demand, above that at LRMC/SRMC
    - raise peak prices, energy prices relative to fixed charges, shift to locational pricing?

***Eskom should be a cash cow, not a hungry dog***



# Reform priorities

- Under-pricing deters liberalisation
- Investment requires Eskom's full attention
  - the unbundled model would not work now
  - timely decisions about IPPs required
  - and improving availability, reliability
- Active efforts on cogen, DSM, etc needed
- Resolve uncertainties in distribution

# Institutional reform options

- Create Single Buyer (SB) office in Eskom?
- Planning transferred to SB subject to scrutiny by stakeholders?
- Commercialise stations
  - with PPA and availability (capacity) payments?
- Medium term: Single Buyer separated
- SB tenders for new capacity, approval subject to transparency and scrutiny

# Conclusions

- Eskom has been adept during the transition
  - in electrification, securing political support, improving performance
  - in setting challenging standards for Muni Discos
  - but performance now slipping
- Requirements: 1) raise (marginal) prices to LRMC
- 2) finance and deliver efficient investment and performance in all segments
- 3) Reduce demand, increase supply (e.g. cogen)
- Regulation & governance:
  - clarify responsibilities for investment, pricing, IPPs



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