South Africa's energy future

WWF inputs for the IRP/IEP Stakeholder consultation

December 2016

Overview

- NDC perspective & potential
- Costs
- Assumptions
- Opportunity & scenarios

Paris Agreement

- Nationally determined contribution tabled in Paris:

"*Analysis of the incremental costs of mitigation actions indicates that significant finance and investment will be required in the long-term. The following estimates are of total incremental costs required:*

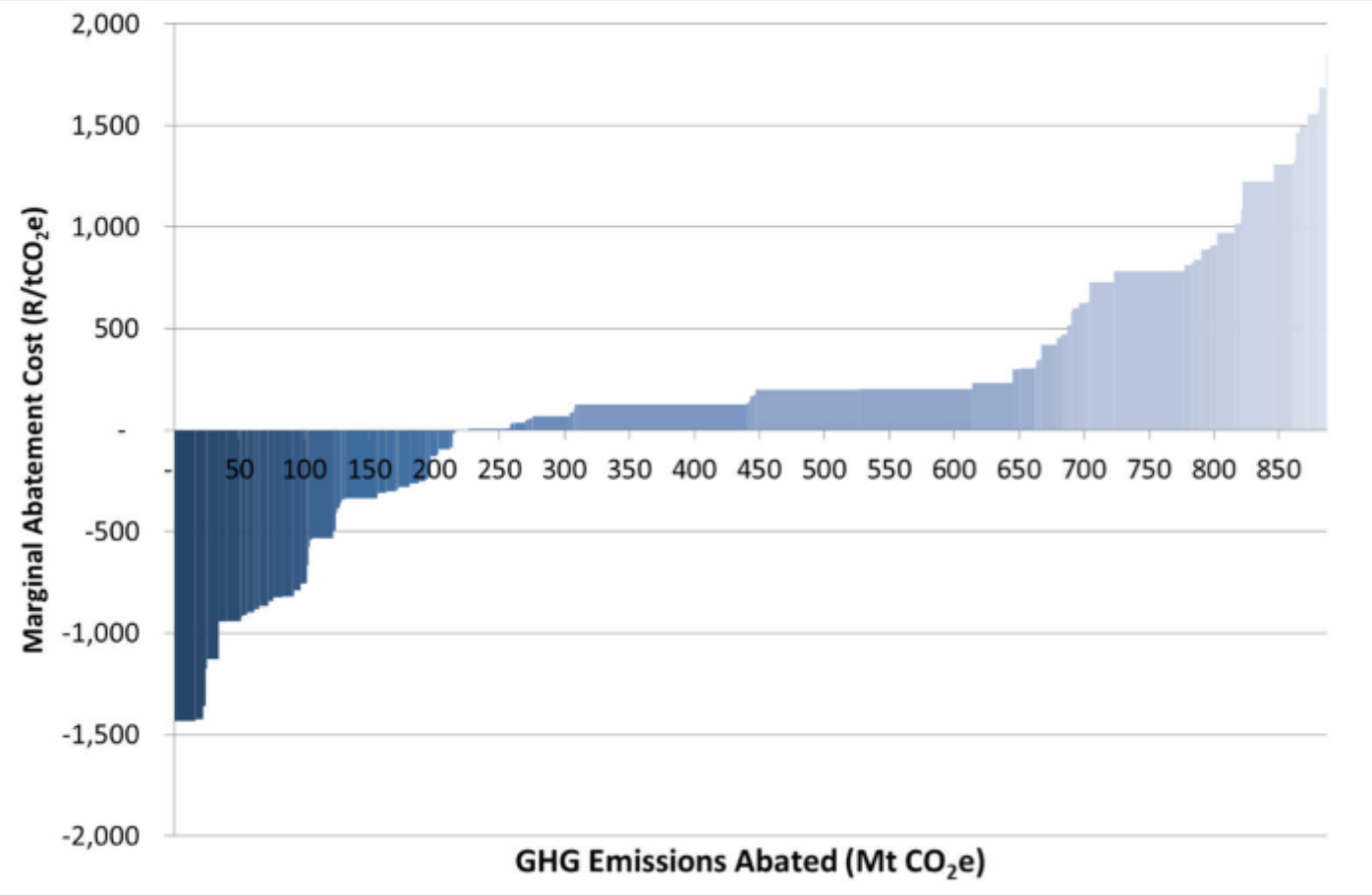
1. *Estimated incremental cost to expand REI4P in next ten years: US$3 billion per year.*
2. *Decarbonised electricity by 2050 - estimated total of US$349 billion from 2010.*
3. *CCS: 23 Mt CO_2 from the coal-to-liquid plant - US$0.45 billion*
4. *Electric vehicles - US$513 billion from 2010 till 2050.*
5. *Hybrid electric vehicles: 20% by 2030 - US$488 billion*"

- Committed to PPD, but need more ambition than the upper bounds!

Implications

- Paris Agreement requires regular revision and improvement of NDCs
- Carbon budget should be determined to 2050, not just for the 2020-2030 period
- Electricity generation capacity lifetimes are long (30-50 years without extension)
- Conditional component of NDC needs to be clarified, BUT reduction of emissions from electricity generation need not be conditional!

Mitigation potential



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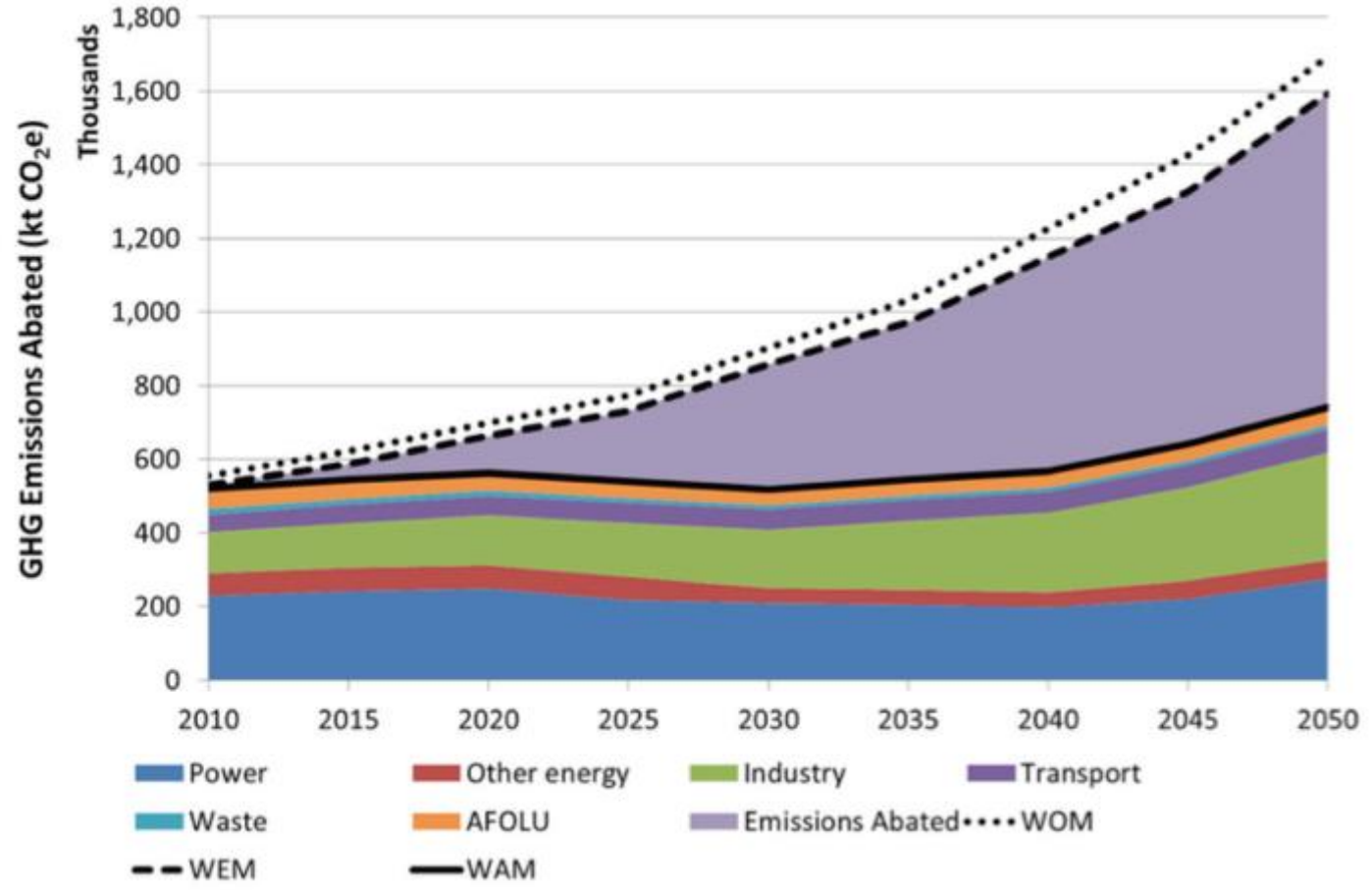

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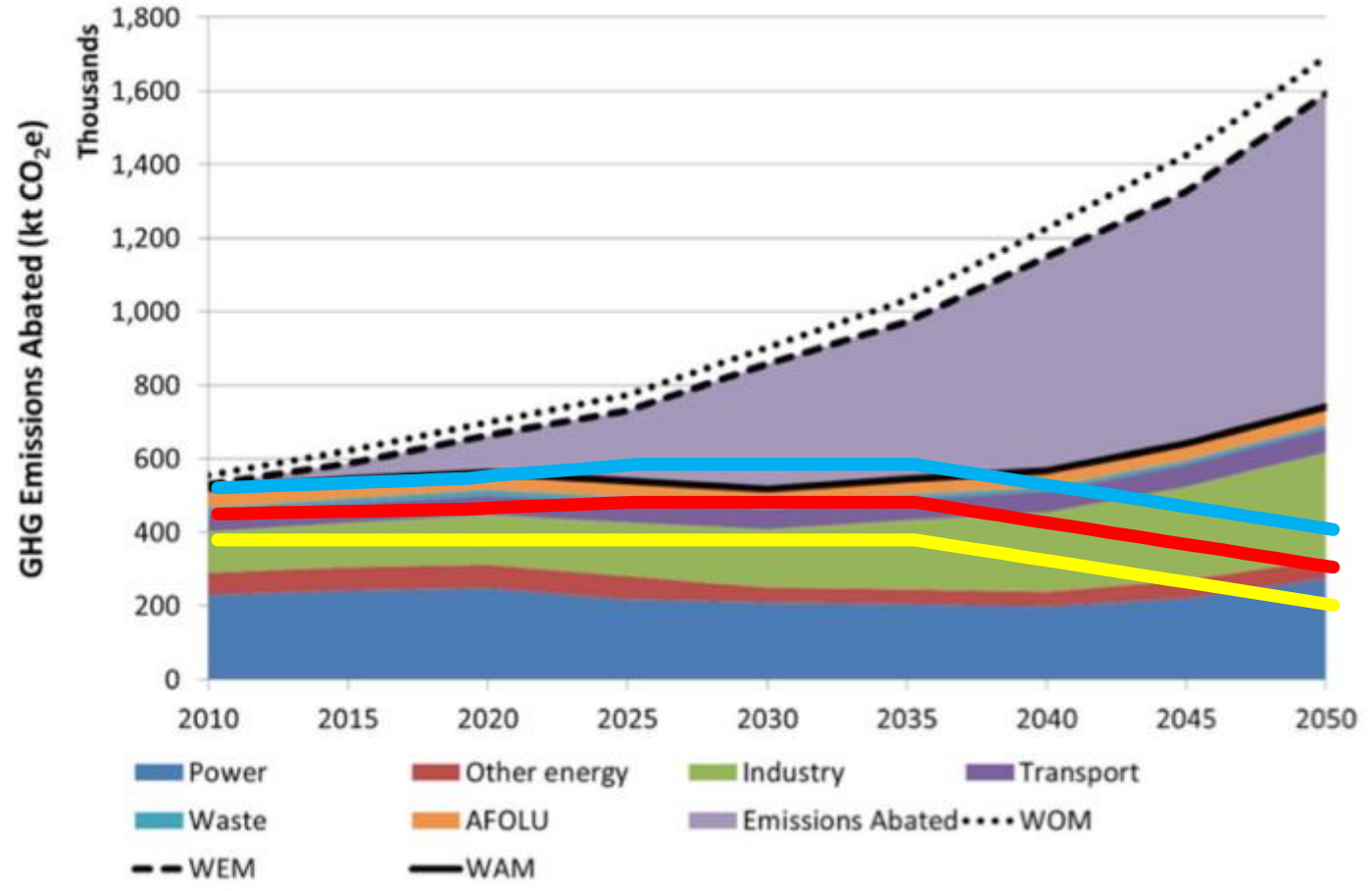

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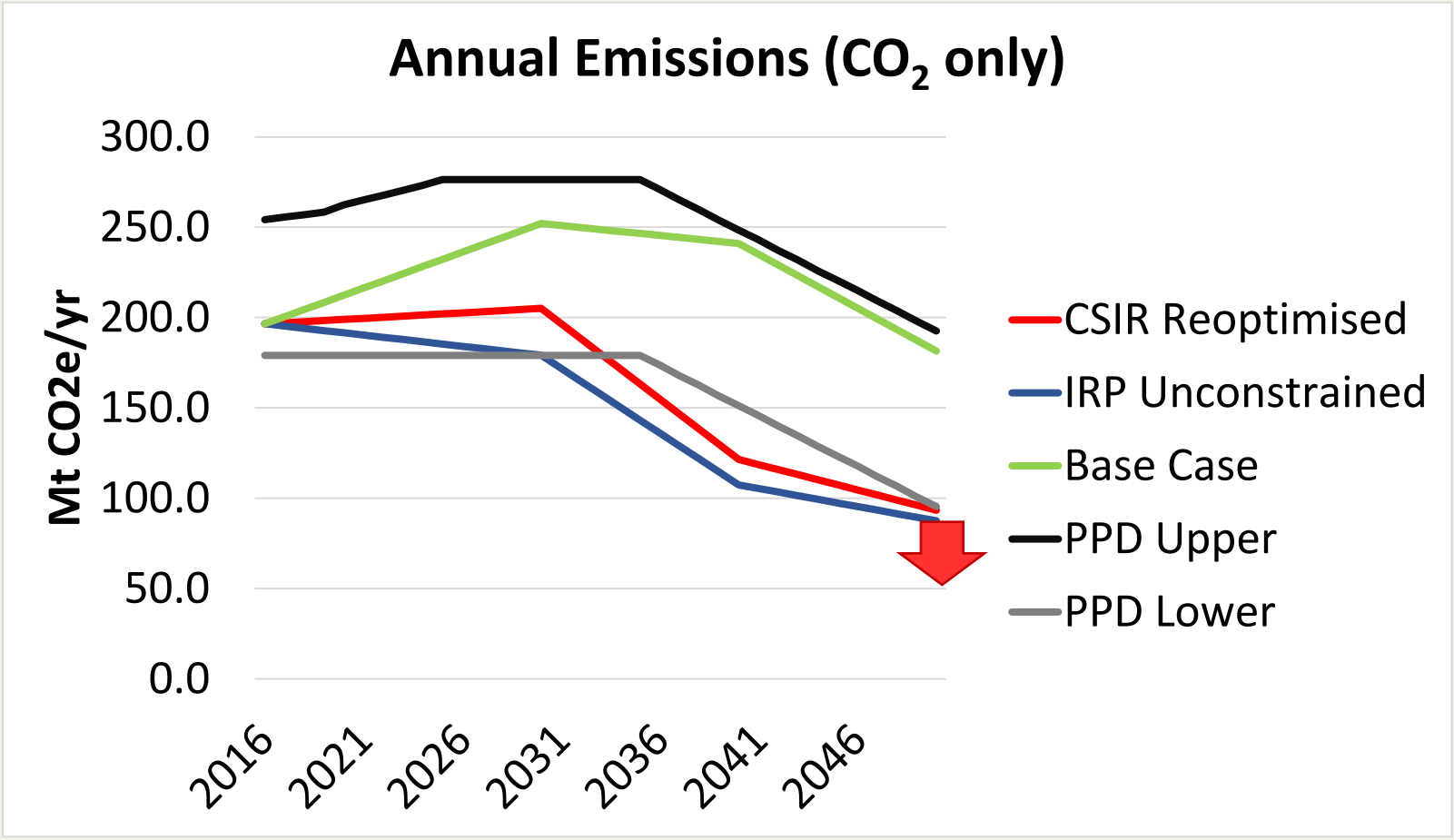
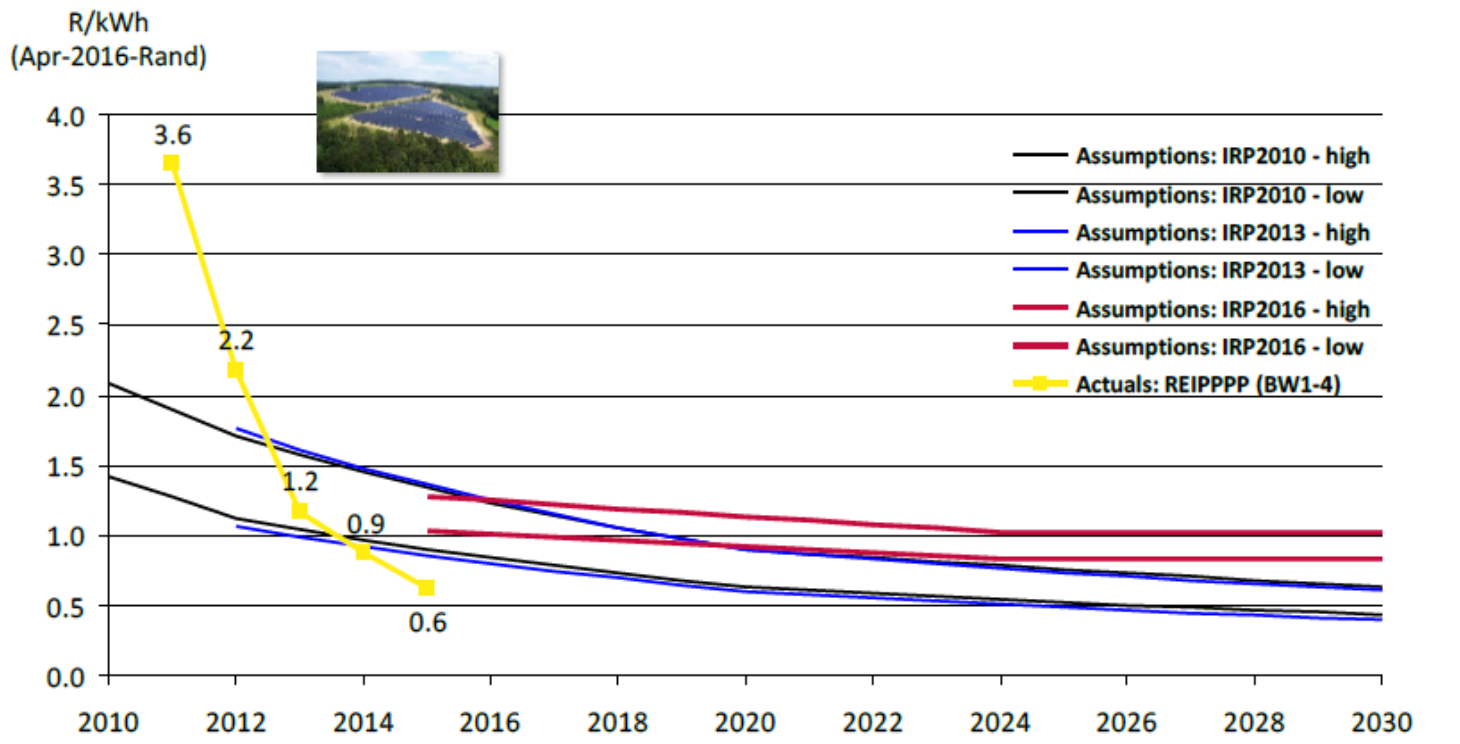


Source: Ministerial Advisory Committee on Energy report on IRP assumptions (31 October 2016)

Costs



Source: Ministerial Advisory Committee on Energy report on IRP assumptions (31 October 2016)

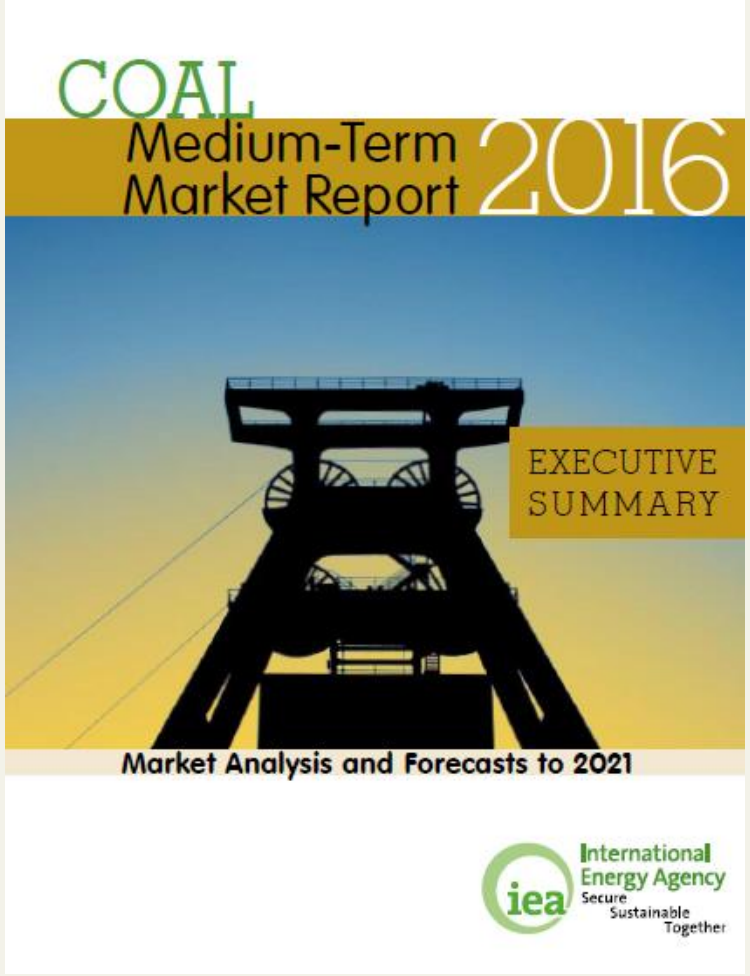
Coal is on the way out

Some countries have already committed to a coal-free future:

- France: 2023
- Finland: 2030
- Canada: 2030
- Portugal: 2030
- UK: 2025
- Austria: 2025*
- Germany: 50% 2030/100% 2050
- Netherlands: 2030*
- China is world's largest consumer: consumption dropped 4% per annum over the last 3 years.

Even HELE coal use is incompatible with limiting climate change to 2°C. Ecofys, 2016

Coal is on the way out



- Some countries are already coal free:
  - Belgium
  - Cyprus
  - Luxembourg
  - Malta
  - Estonia
  - Latvia
  - Lithuania
- Coal demand to drop 5% by 2020
- Coal power will likely become MORE expensive for SA power production

IEP Scenarios

- *"South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources." IEP*
- *"Coal should continue to play a role in electricity generation"* IEP
- Reconsider resource potential
- Scenarios must explicitly consider the carbon budget
- Should not shy away from significant investment

IRP inputs

- Costs MUST be revisited
- Base case should be least-cost option
- Artificial build restraints should be removed in base case
- Policy constraints can be applied to present different options, but be clear on the cost implications
- Carbon budget needs to be adhered to; bear developmental potential in mind

WWF

SUMMARY

HK

2016

NO MIDDLE ROAD

CLIMATE CHANGE AND FINANCIAL RISK: THE GROWTH OF ELECTRIC VEHICLES AND THEIR IMPACT ON OIL

Key conclusions of the report *No Middle Road*:

- The cost of EVs is likely to fall, due to continued improvements in battery technology.
- We expect cost parity with internal combustion engine (ICE) vehicles in the mid-2020s.
- As a direct consequence of EV proliferation, 1 million b/d of crude oil could be displaced by the late 2020s.
- Facing the risk of holding a permanently impaired asset, rational oil producers would have no choice but to offload their oil reserves quickly.

1.3m EVs ON THE ROAD IN 2015 GLOBALLY

2025 EVs WILL BE CHEAPER TO OWN

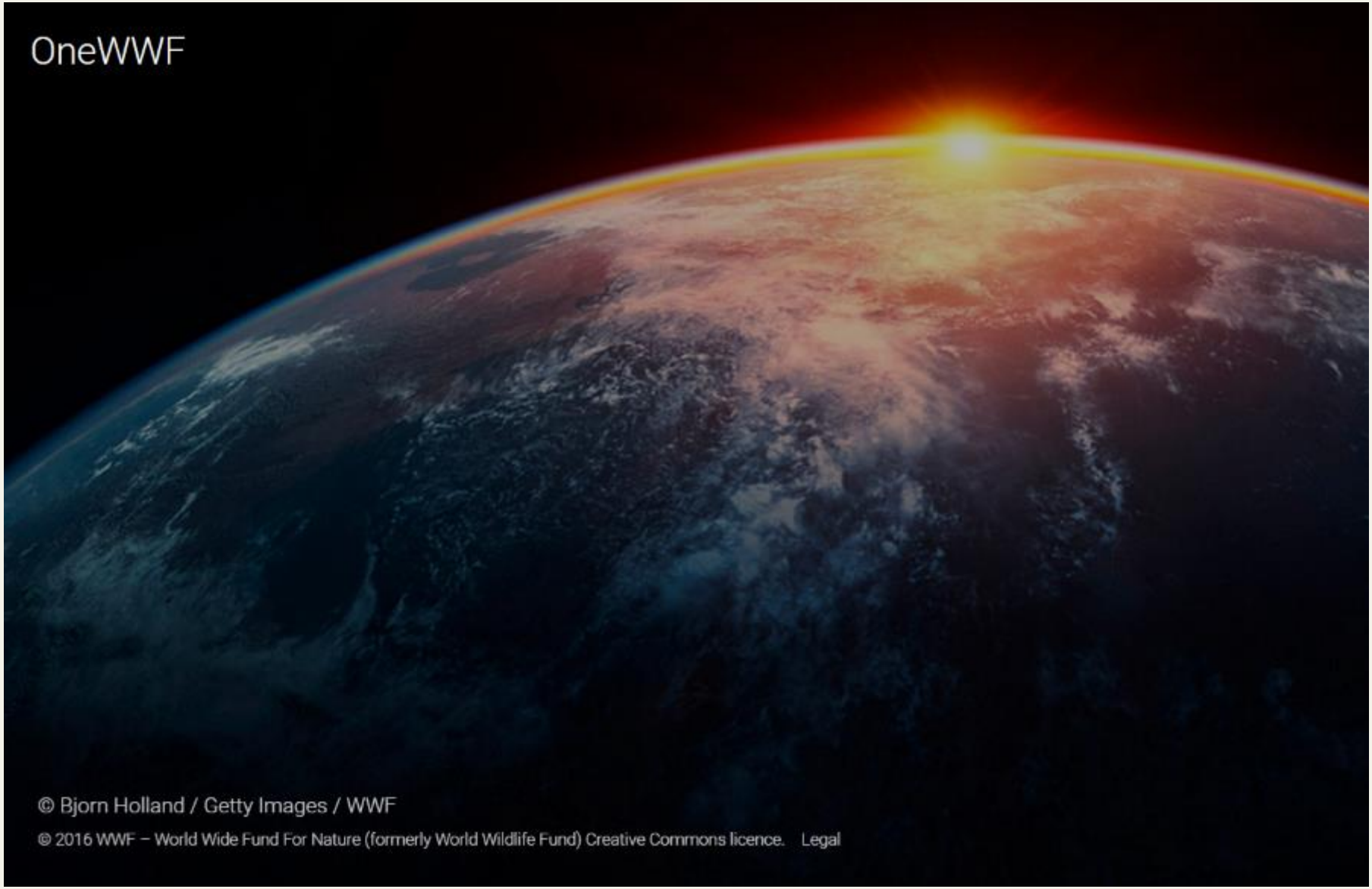
1m b/d OF OIL DISPLACED IN CHINA IN LATE 2020s

25% OF EVs ARE FOUND IN CHINA

2045 100% PENETRATION IN CHINA

Additional inputs

- Comment period too short for complete analysis of paper
- Assumptions and calculations MUST be provided to enable input
- Additional consultation after alternative scenarios have been developed is necessary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