WWF South Africa

Living Planet Unit

transformation to a climate-safe future
through people-centered development

Green Infrastructure, environment and climate change: the opportunity

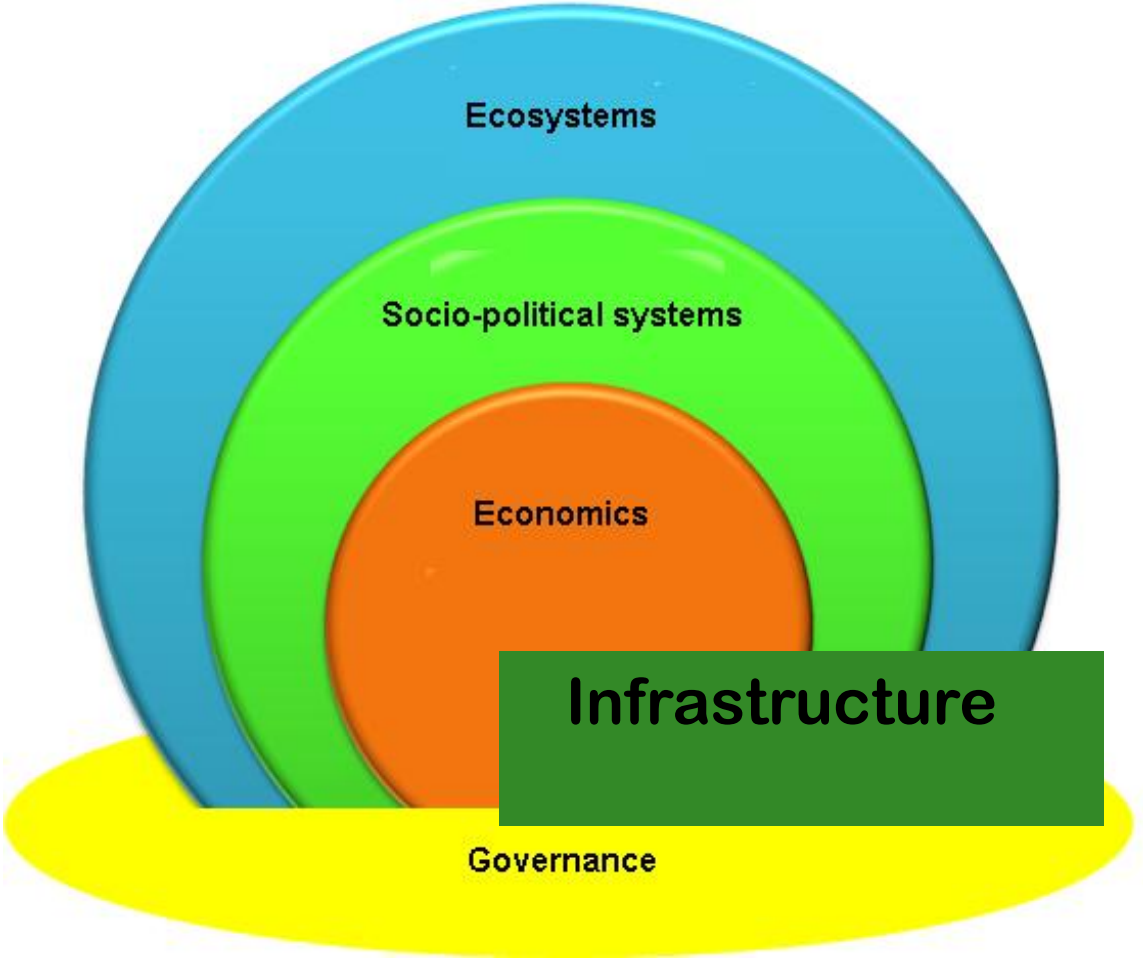
presentation by Richard Worthington,
Climate Change Programme Manager
drawing on work of various colleagues





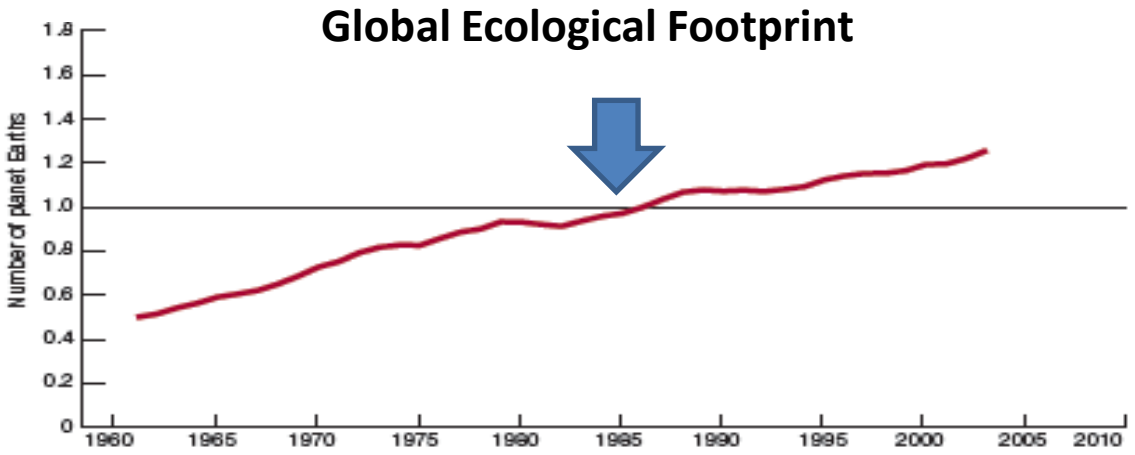


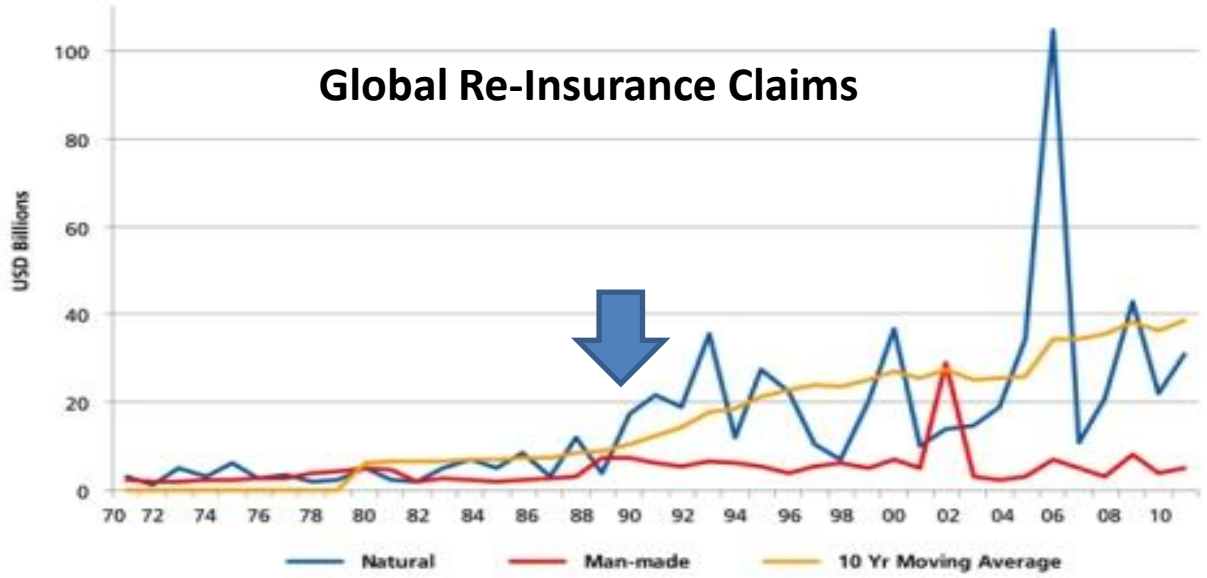
Embedded view of sustainable development for a resilient economy



From: National Strategy for Sustainable Development

Evidence of an embedded world





Some key considerations

- Re-assess assumptions

  serving extractive industry; globalisation **vs** localisation; scale – economic **vs** resource efficiency

- A global GHG budget (2010-2050) for staying below 2 degree requires to retire about 80% of all known conventional fossil fuel *recoverable reserves* by 2050
- Electrification, sp. of rural areas and transport
- Smart Grids (see Business Day 11 October 2011)
- Public finance must leverage private investment

BELOW 2 DEGREES

"…what is required by science, namely to limit global temperature increase to 2°C ..."

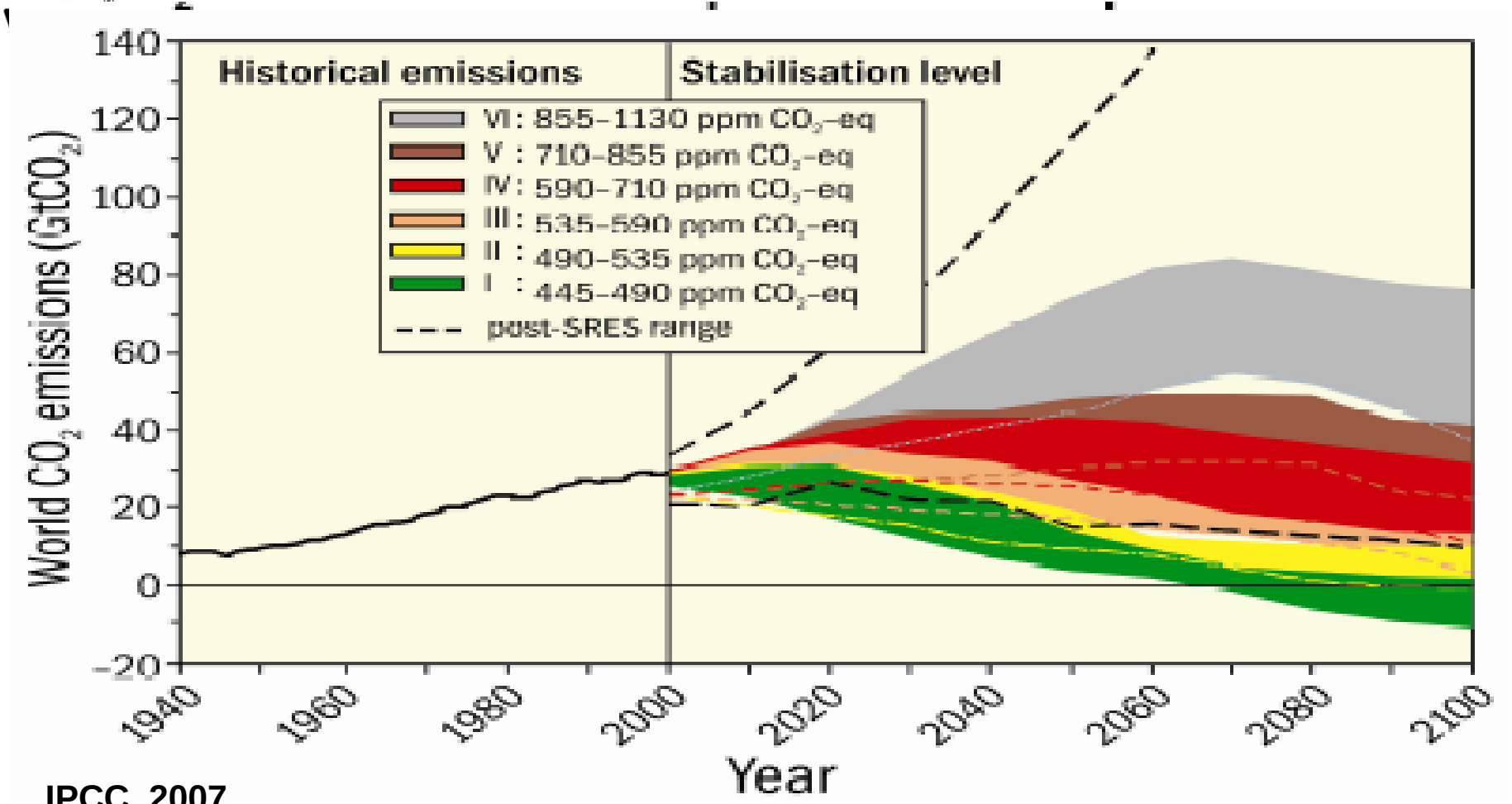
(SA Cabinet July 2008)

International Energy Agency (IEA) puts cost of Copenhagen failure at $500bn a year:

11 November, 2009 (www.carbonfinance-online.com)

450 parts per million (CO2e) for a **50% chance** to keep **below** the crucial **2°C** global threshold.

atmospheric concentration requires net zero emissions world before end 21st Century



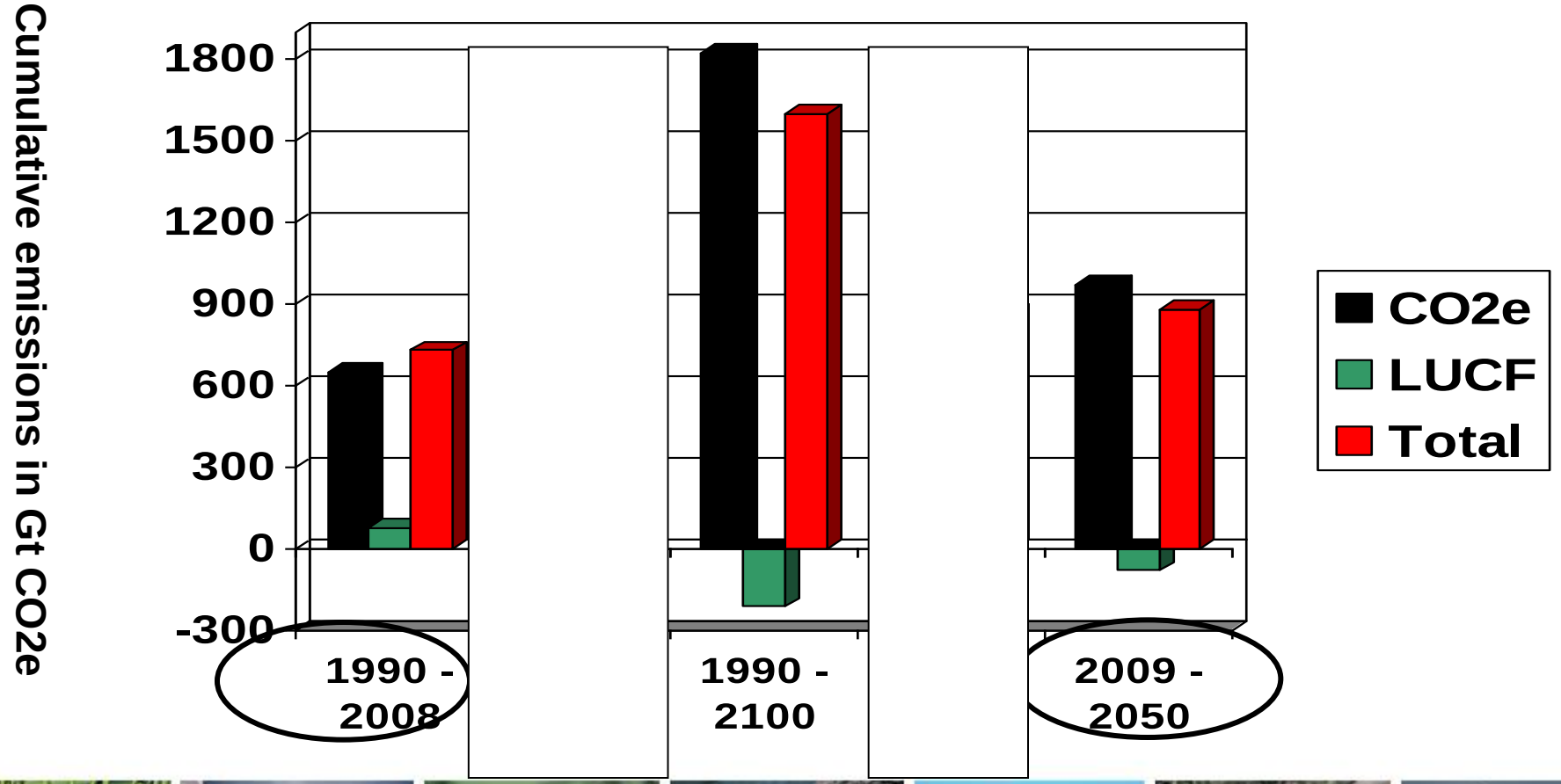
IPCC, 2007







For a global cumulative GHG budget 1990 – 2100,
to stabilise global emissions at 400 ppm CO2e
(roughly 33% probability of overshooting 2°C)
we have already used up 40%



Emissions Trajectory

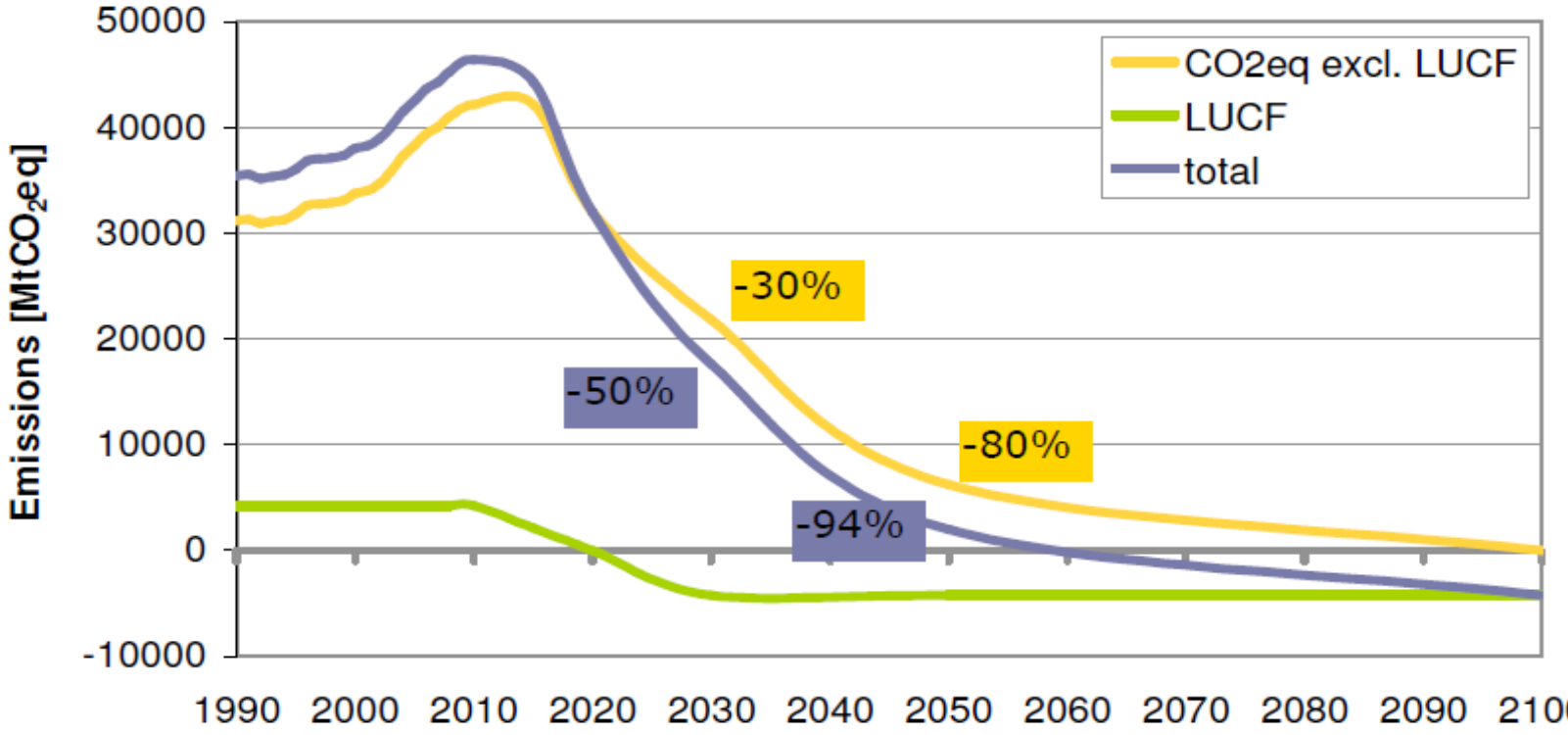
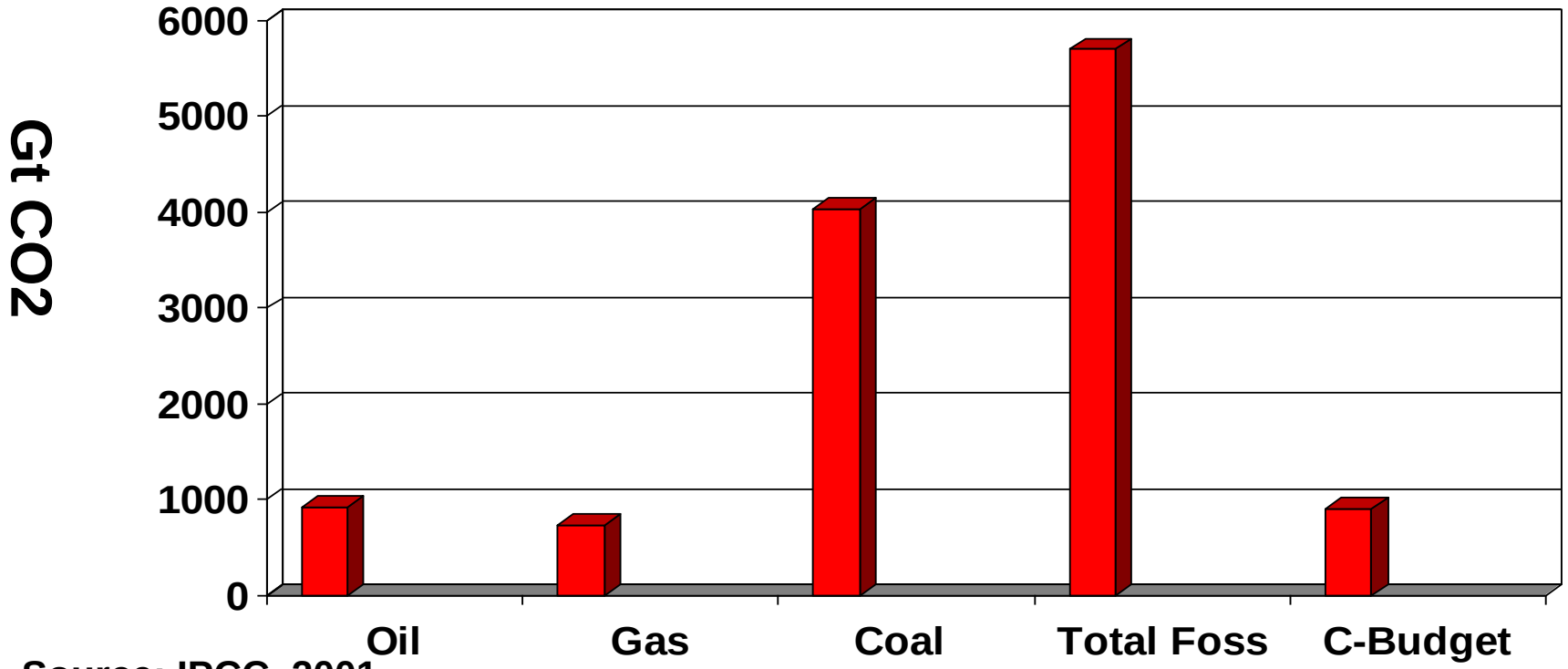


Figure 1. Possible global GHG emissions pathway between 1990 and 2100 according to a global carbon budget of about 1800 Mt CO_2eq (excl. LUCF) and 1600 Mt CO_2eq (incl. LUCF)

Global carbon budget requires not burning a significant proportion of total known fossil fuel *recoverable reserves*



Source: IPCC, 2001

The Energy Report

100% Renewable Energy by 2050

A VISION

A world powered by 100% renewable, sustainable energy by mid-century

A SCENARIO

Extensive electrification of transport; enhanced energy conservation; smart grids; sustainable energy for all

SOLUTIONS

In all of our hands - policy-makers, investors, corporate leaders, communities and individuals.

BENEFITS

Stop fossil fuel pollution; save money; address climate change; improve health; no nuclear risks; new jobs; innovation; protect nature

CHALLENGES

Conserving energy & reducing demand; electrification; equity; investment; land/water/sea-use implications; governance; lifestyle choices - behaviour changes & public attitudes; innovation and R&D

Why 100% Renewable Energy?

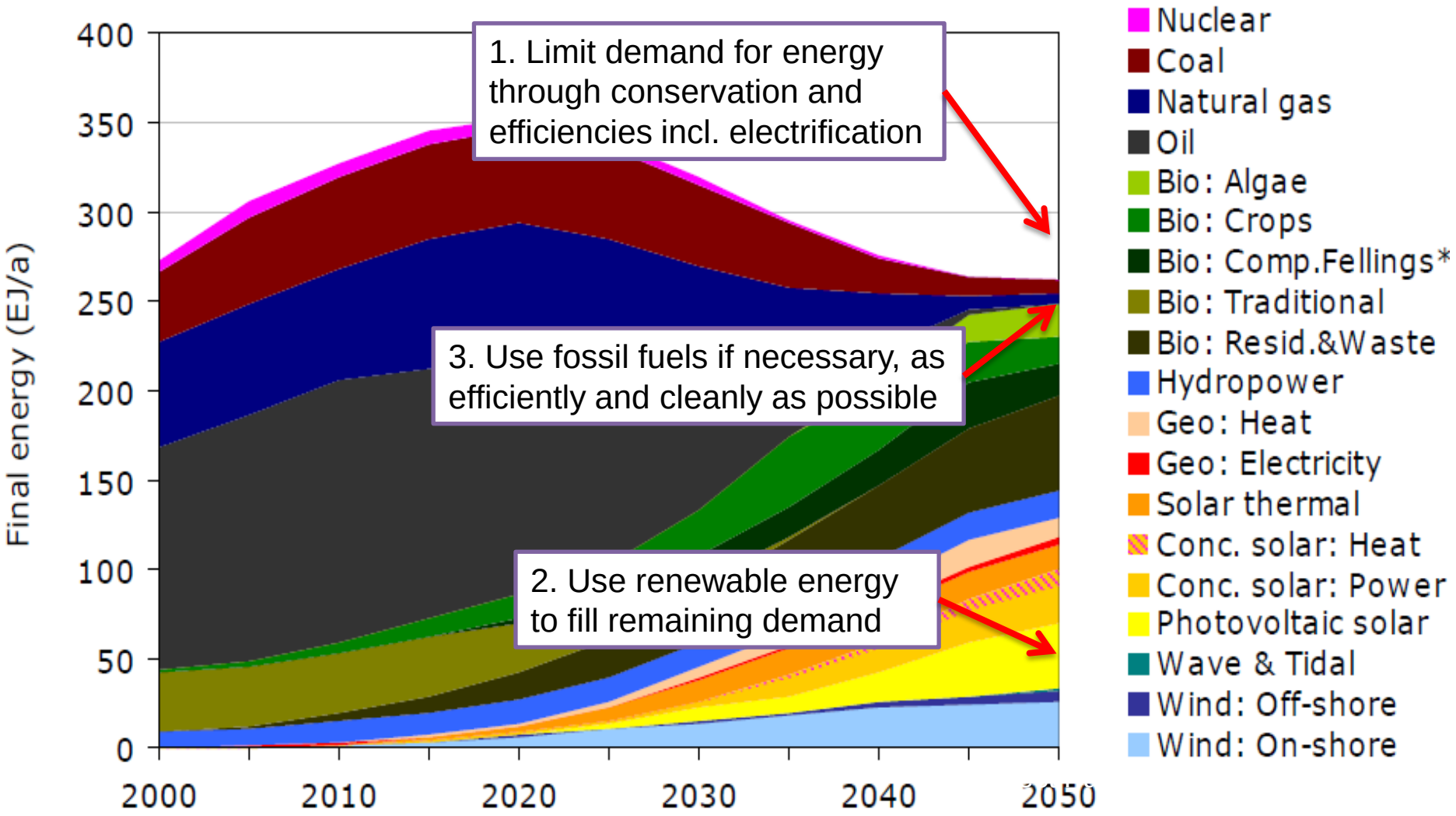
1. **Climate**
   - at least 80% less Greenhouse Gas globally by 2050
2. **Conventional oil/gas scarcity**
   - we need “4 times Saudi Arabia and 4 times Russia for 2030”
3. **Threats of unconventional fuels**
   - CTL, GTL, deep water oil, shale gas, tar sands - more impacts than just carbon

CTL: Coal To Liquid
GTL: Gas To Liquid

4. **Nuclear development**
   - What to do with 100,000 tonnes toxic waste for next 10,000 years?
5. **Equity**
   - 1.4/2.7 billion people lack access to electricity/safe cooking energy
6. **Costs**
   - No-regret technologies, easy to implement, hardly any fuel, avoid stranded assets and minimised adaptation costs

Mobility or mortgage?

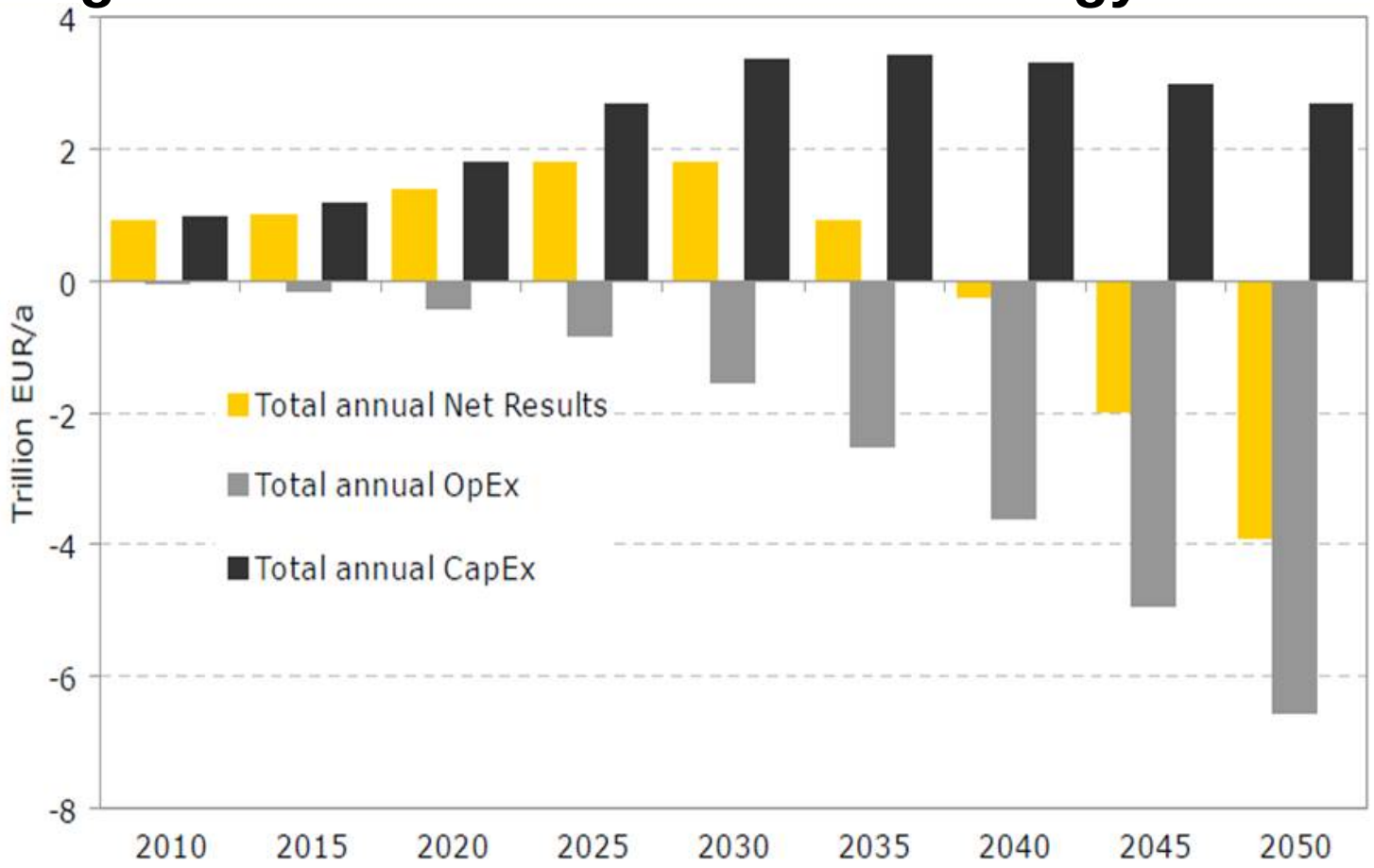
The Scenario



SOURCE: Ecofys Energy Scenario, 2010

Total Investments and Savings

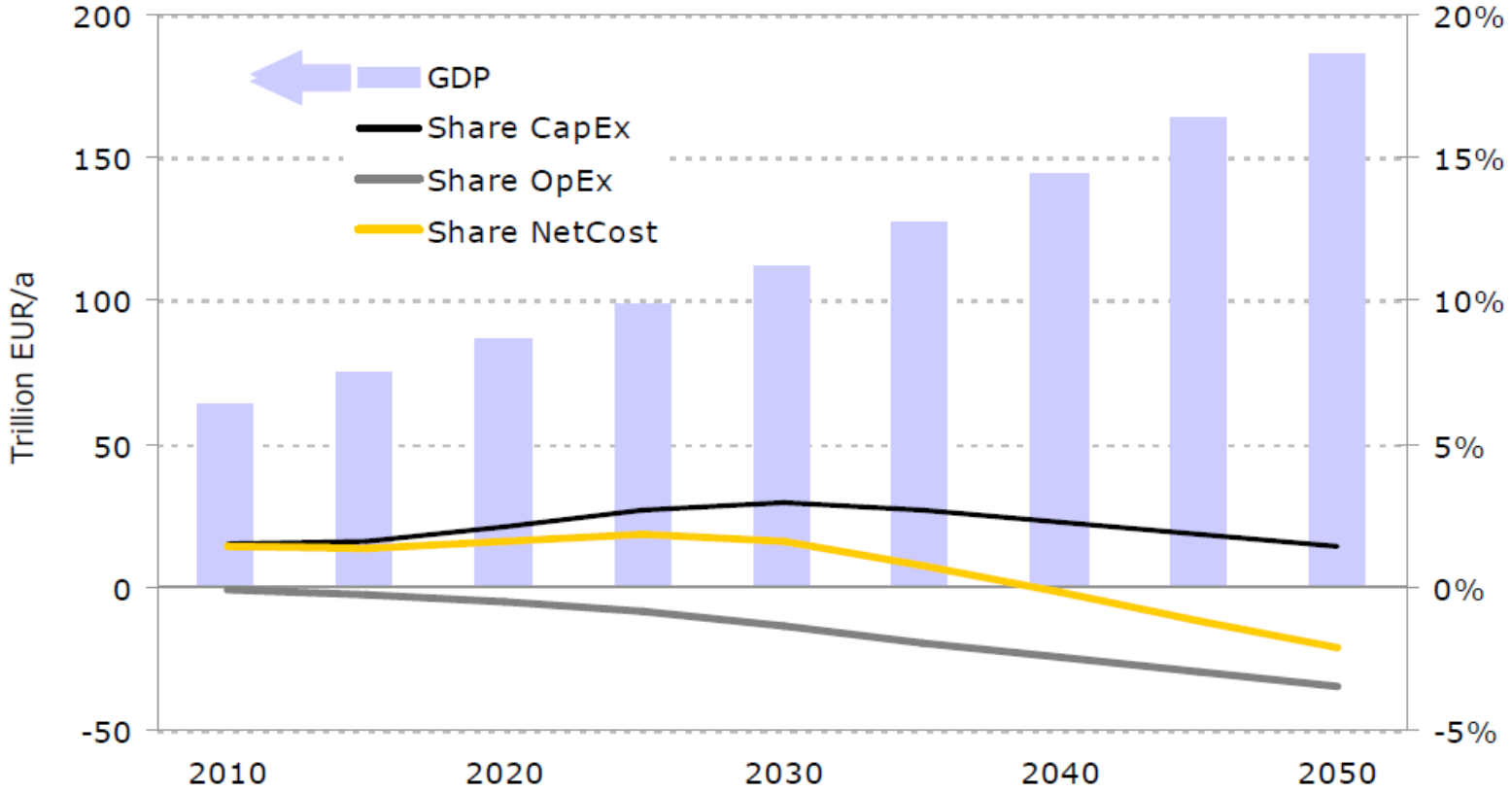
Total global annual cost results for Energy Scenario



SOURCE: Ecofys Energy Scenario, 2010

Upfront Investment

High upfront investments needed, Saving money long term



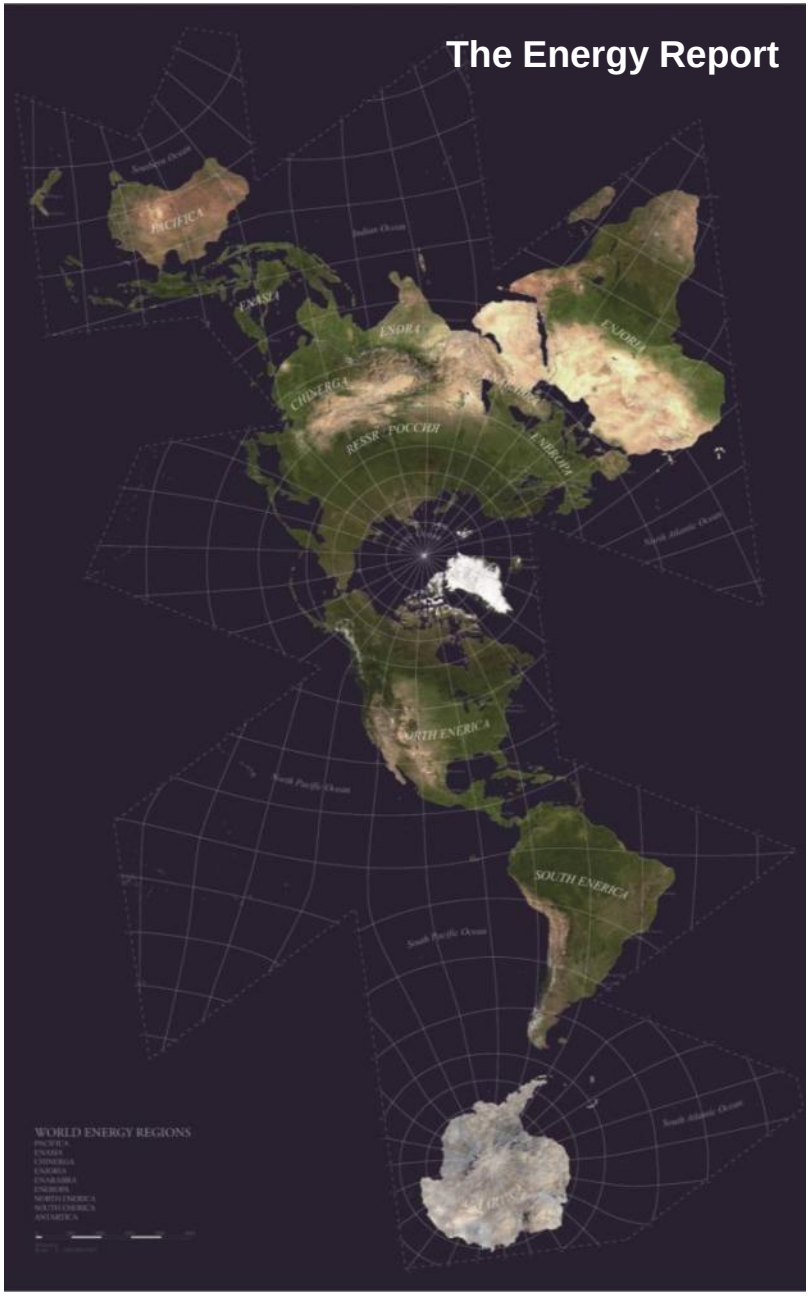
Comparison of cost results with global GDP

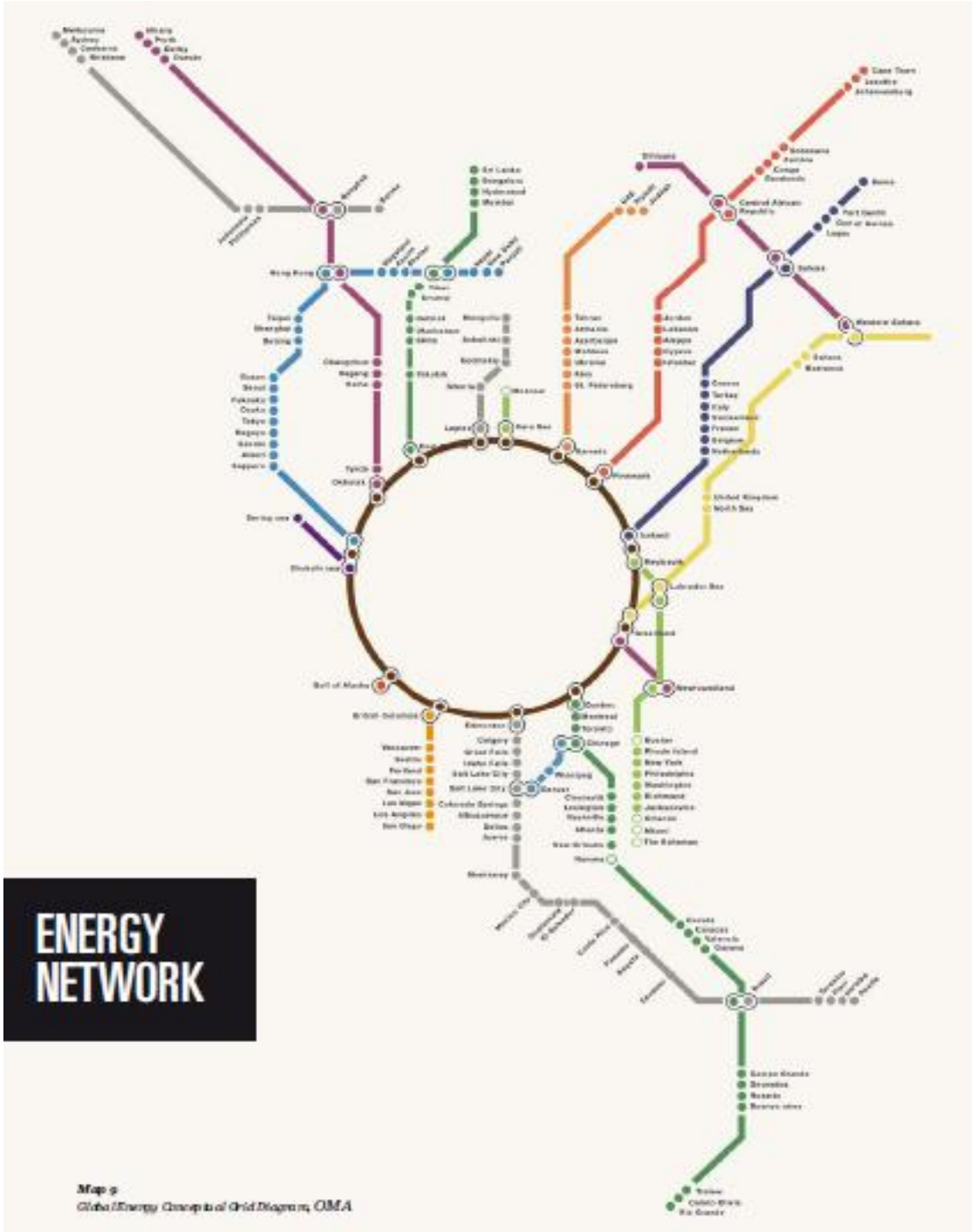
SOURCE: Ecofys Energy Scenario, 2010

NB: Cost savings do NOT include avoided damage costs from climate change, reduced health costs and other monetary environmental impacts from using fossil fuels

The Energy Report

Pathway to a fully sustainable global energy system by 2050





Map 9
Global Energy Conceptual Grid Diagram, OMA

Smart Grid Technologies

Lungile Mginqi, Accenture SA Executive Director, Business Day 11 Oct :

- Eskom: improving network reliability a priority
- Infrastructure refurbishment costs over R30 billion
- "…over-all efficiency across the electricity network by better deploying resources and balancing load, and promoting healthier management of equipment across generation, transmission and distribution and customer operations."

Barriers: lack of appreciation of value of the technologies… when and how to start… [lack of] regulatory incentives and the ability to couple new smart-grid technologies with legacy infrestructure

Working for Energy as infrastructure intervention

- Develop human/governance and skills development infrastructure
- Decentralised infrastructure to reduce urbanisation drive and retain value (and cash) within communities; stimulate SMMEs
- Modularity – learning by doing and developing local resilience; incl. Multiple mini-grids & thousands of biogas digestors (scale of people involved, rather than physical transformations)







Ways forward

- Incorporating externalised costs (Carbon tax)
- Patient capital (climate / ethical bonds; underwriting - public finance to leverage private & innovative sources)
- Paradigms –

  Shareholder Satisfaction - Quality vs Quantity

  Indicators of success / growth – HDI vs GDP

  Circular vs linear – resource management

  Demand management vs supply increase

  Fundamental shifts, not just incrementalism (elect vs biofuel)

Total revenues generated
(Total costs of levy)
$25 billion/year in 2020

Bunker fuel levy
$25/tonne
(Raises fuel costs by 10%)

Compensatory rebates to developing countries
According to %share of global imports by sea

Green Climate Fund
>$10 billion/year in 2020
(a portion of revenues could remain in the maritime sector)

Rebates to developing countries
$10 billion/year in 2020, eg:
Bangladesh: $40m/year
South Africa: $200m/year







www.panda.org - www.wwf.org.za

Thank you for your attention

Greenhouse Gas impact

- ***IEA – The Golden Age of Gas Scenario:*** **An increased share of natural gas in the global energy mix will put us on a carbon emissions trajectory reaching 35 Gt in 2035, consistent with stabilising greenhouse gases at around 650 ppm, resulting in a likely global temperature rise of over 3.5°C, well above the widely accepted 2°C target.**
- **This is because lower prices for natural gas will lead to an increased demand for gas. In this scenario, gas will not only displace coal but also nuclear power and suppress renewable energies.**

Facts

that have yet to permeate public consciousness,
or relevant boardrooms

- **There is more than enough renewable energy (RE) for all human needs**
- **Inefficiency is our core failing and is destroying our life-support systems (Lord Stern: "Climate change is the greatest market failure in human history")**
- **We can't keep growing fossil supply this century**
- **Can't afford to burn currently available fossil hydro-carbon *reserves* (the portion of known resources considered economically viable under recent market conditions)**

Stop using fossil hydro-carbons as 'cheap' fuel - Energy from burning fossils fuels should not be our point of departure or benchmark

Measurement of development must embrace resource efficiency, externalised costs and real wealth... ≠ GDP growth

Context

Jobs per $1 million invested				
Industry	**Direct**	**Indirect**	**Induced**	**TOTAL**
Solar	5.4	4.4	3.92	13.72
Biomass	7.4	5.0	4.96	17.36
Smart Grid	4.3	4.6	3.56	12.46
Coal	1.9	3.0	1.96	6.86
Oil and gas	0.8	2.9	1.48	5.18
Nuclear	1.2	1.8	1.2	4.2

Source: Heidi Garrett-Peltier and Robert Pollin,
University of Massachusetts Political Economy and Research Institute.

Note: Multipliers derived using IMPLAN 2.0 with 2007 data. Infrastructure multipliers and assumptions are presented in "How Infrastructure Investments Support the U.S. Economy: Employment, Productivity and Growth," Political Economy Research Institute, January 2009, http://www.peri.umass.edu/236/hash/efc9f7456a/publication/333/