



Conseil Français de l'Énergie

International Workshop “Carbon and Prospective”

Sophia Antipolis, 16th December 2008

Deciding the Future: Energy Policy Scenarios to 2050

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Deciding the
Future: Energy
Policy Scenarios
to 2050

World Energy Council 2007

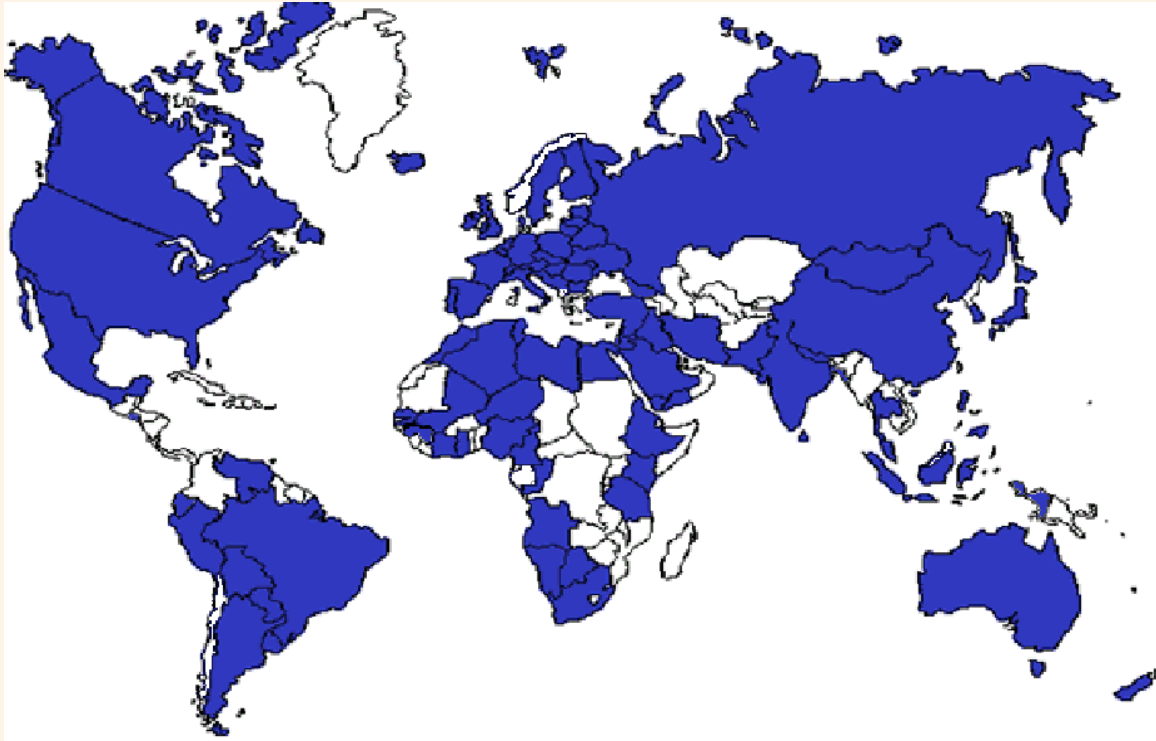
Promoting the sustainable supply and use
of energy for the greatest benefit of all





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What is World Energy Council (WEC)



WEC has Member Committees in about 100 countries in the world, including most of the largest energy-producing and energy consuming countries.
(2/3 of developing countries)

The World Energy Council (WEC) is one of the foremost multi-energy organisation in the world today. Established in 1923, the organisation covers all types of energy, including coal, oil, natural gas, nuclear, hydro, and renewables, WEC is UN-accredited, non-governmental, non-commercial and non-aligned. WEC is a UK-registered charity, headquartered in London.

To promote the sustainable supply and use of energy for the greatest benefit of all people



Approach

Traditional Approach – Top-down

- Many recent in-depth studies of the sustainability of energy systems.
- Strong top-down perspective from experts.
- Focus on macro-economic and global or regional energy aspects.

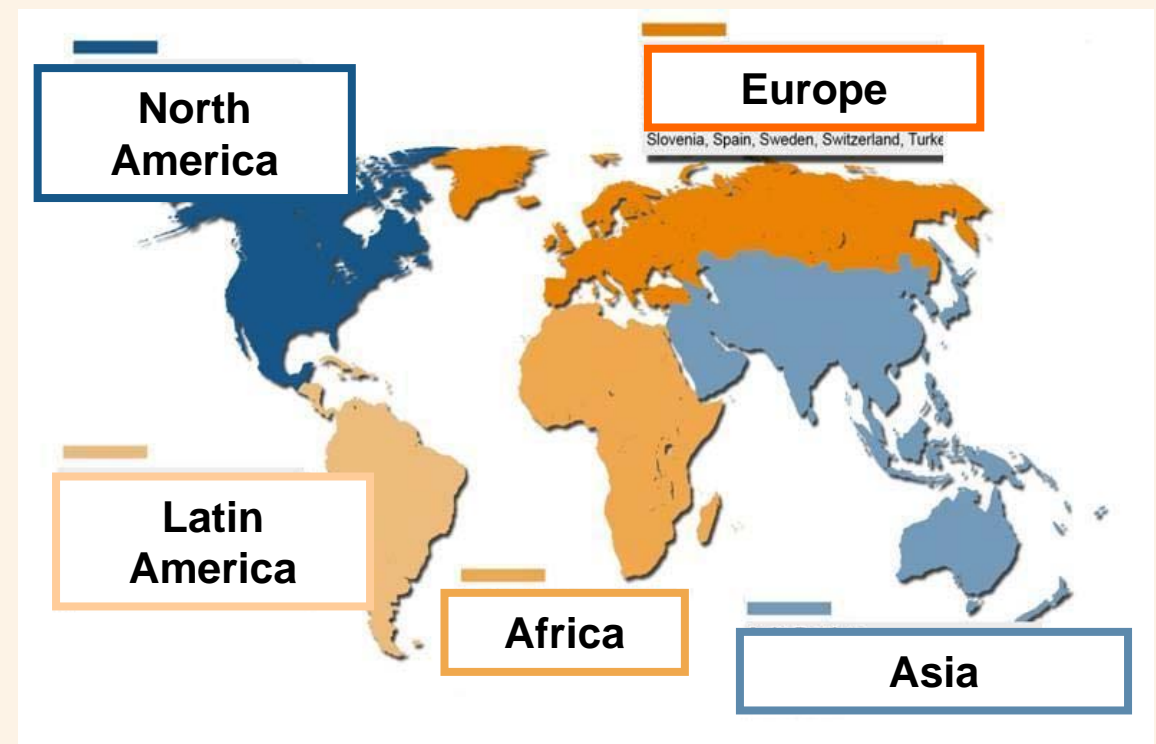
This Study is **Different** – Bottom-up

- Conversely, it is the decision makers that influence, plan, and manage regional and local energy systems on a daily basis.
- These scenarios capture and collate their priorities and opinions, from the bottom up, in each of the five regions of the World Energy Council.



Extraordinary and Invaluable Participation

- 3 years of work
- 5 regions
- almost 70 WEC Member Countries
- 400 individuals; all decision makers
- about 40 Regional forums





Evaluation of the Scenarios

We evaluated each of the scenarios on the basis of positive and negative implications for the achievement of the WEC Millennium Goals.

WEC Millennium Goals

Accessibility: access to affordable modern energy for all people

Availability: reliable and secure energy supply

Acceptability: protect and preserve the local and global environment



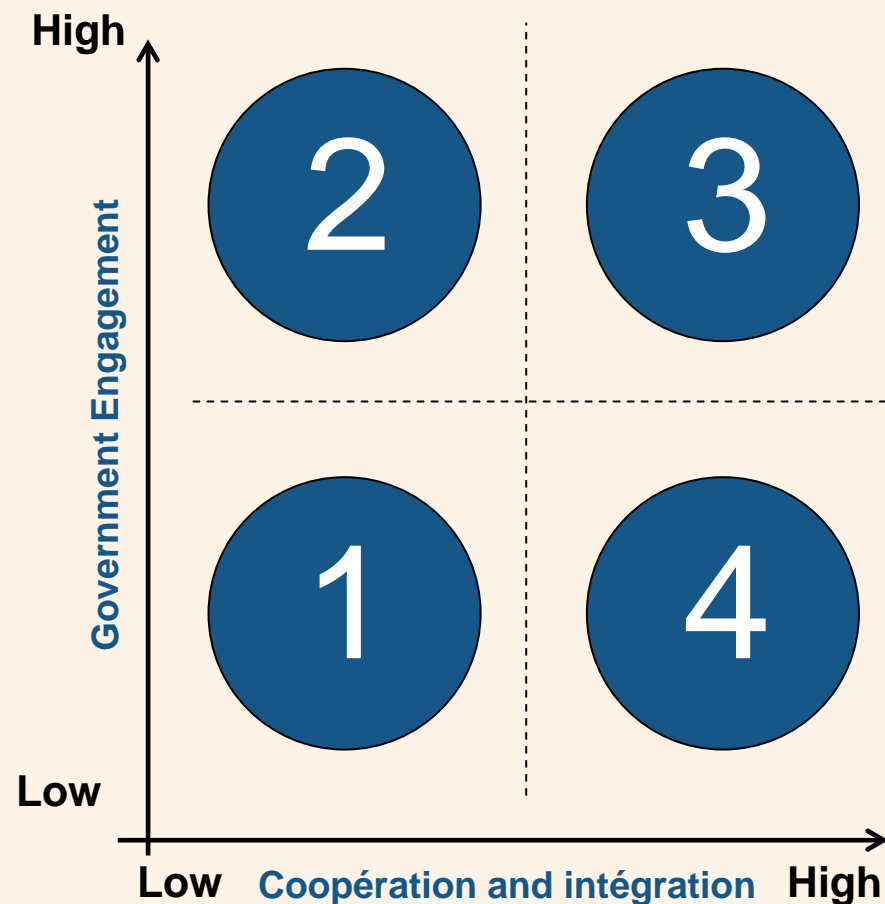
Measures – Study Framework

We studied Energy Policy within the framework of:

- **Government Engagement (High – Low)**
- **Cooperation and Integration (High – Low)**

These dimensions have real interest across the spectrum of WEC member counties.

The study is qualitative, with some quantitative validation.





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Elephant



Lion



Leopard



Giraffe



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Caveat

Modelling gives only a quantitative illustration of WEC qualitative scenarios.



Elephant

- World TPES in 2050 15% below « Leopard »
- Peak oil (conventional) around 2020, 86 Mb/d
- Increase in fossil fuels: +50%
- Power generation in 2050: 50% non fossil

Lion

- World TPES in 2050 5% below « Leopard » despite higher GDP growth
- Peak oil (conventional) around 2035, 97 Mb/d
- Increase of fossil fuels: +60%
- Power generation in 2050: 55% non fossil

- World TPES doubling from 2005 to 2050
- Peak oil (conventional) around 2030, 98 Mb/d
- Increase in fossil fuels: +85%
- Coal: 40% of power generation in 2050

- World TPES in 2050 20% above « Leopard » due to higher GDP growth
- Peak oil (conventional) around 2035, 107 Mb/d
- Increase of fossil fuels: +110%
- Power generation in 2050: 45% non fossil

Leopard

Giraffe



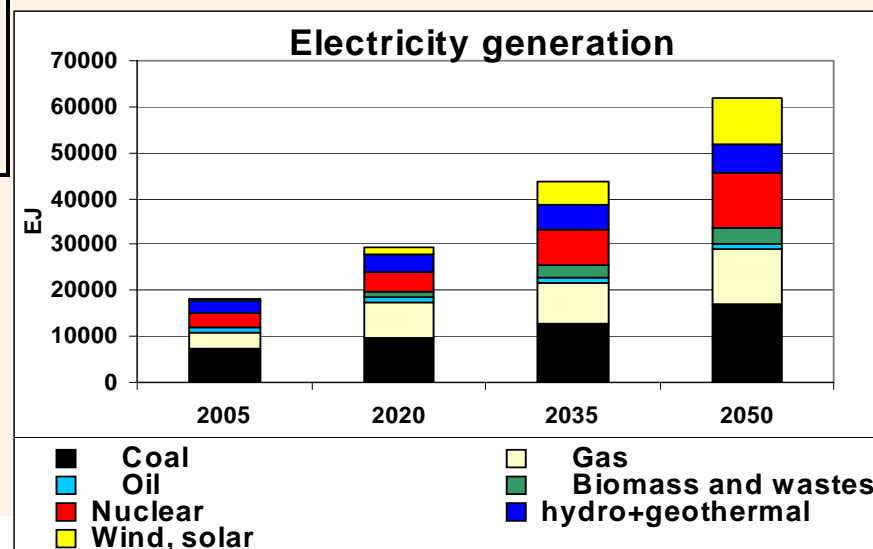
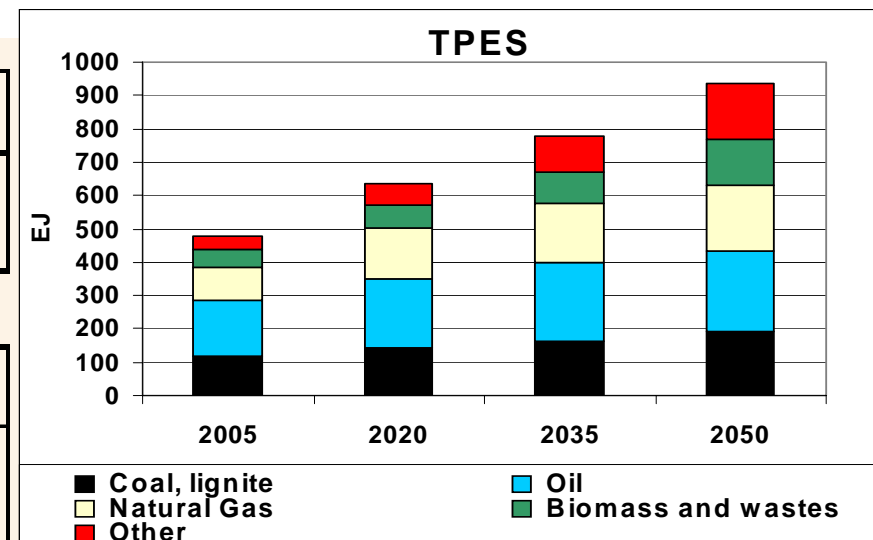
Lion (High Government – High Cooperation)

International energy prices				
	2005	2020	2035	2050
Oil (\$/bl)*	54	54	70	92
Gas (\$/Mbtu)* European market	5,4	6,8	8,9	12,4
Coal (\$/t)* European market	72	91	112	138

* : all costs are given in constant 2005\$ PPP

Oil & gas production				
	2005	2020	2035	2050
World oil production (Mbl/d), of which :	80	101	115	115
Conventional, of which :				
Gulf countries	78	90	97	91
Non-conventional	2	12	18	24
World gas production (Gm3), of which :	2829	4351	5043	5727
Gulf countries	255	599	1003	1497
CIS	731	946	1232	1393

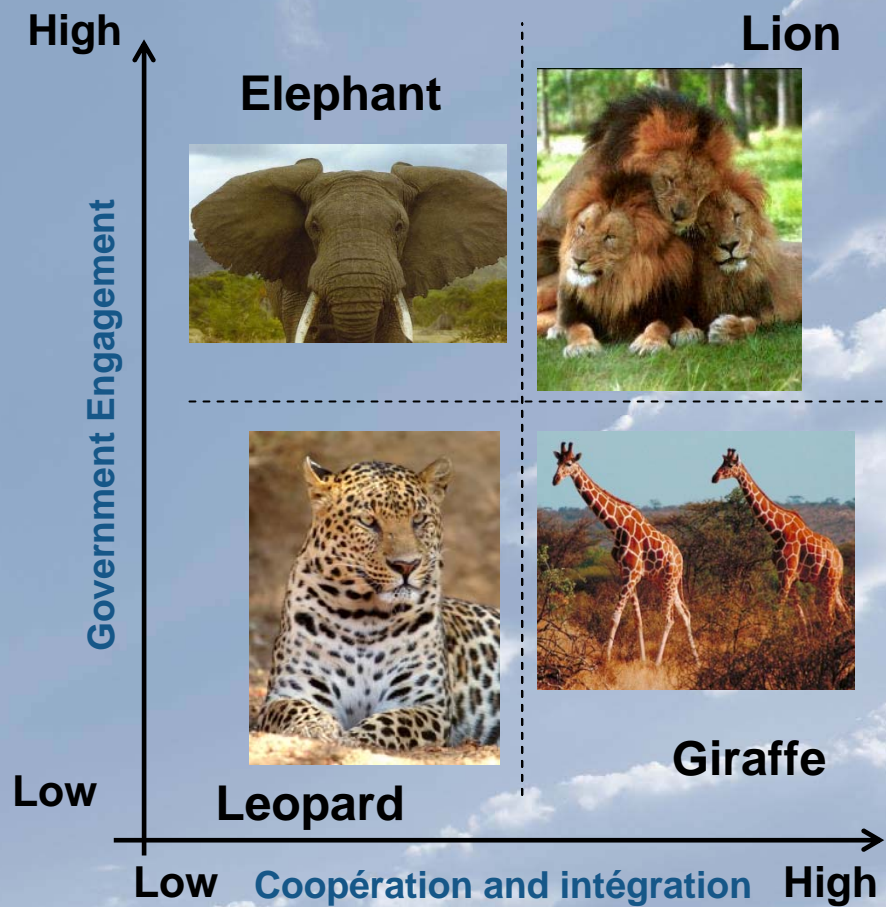
- World TPES in 2050 5% below « Leopard » despite higher GDP growth
- Peak oil (conventional) around 2035, 97 Mb/d
- Increase of fossil fuels: +60%
- Power generation in 2050: 55% non fossil





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Key Messages





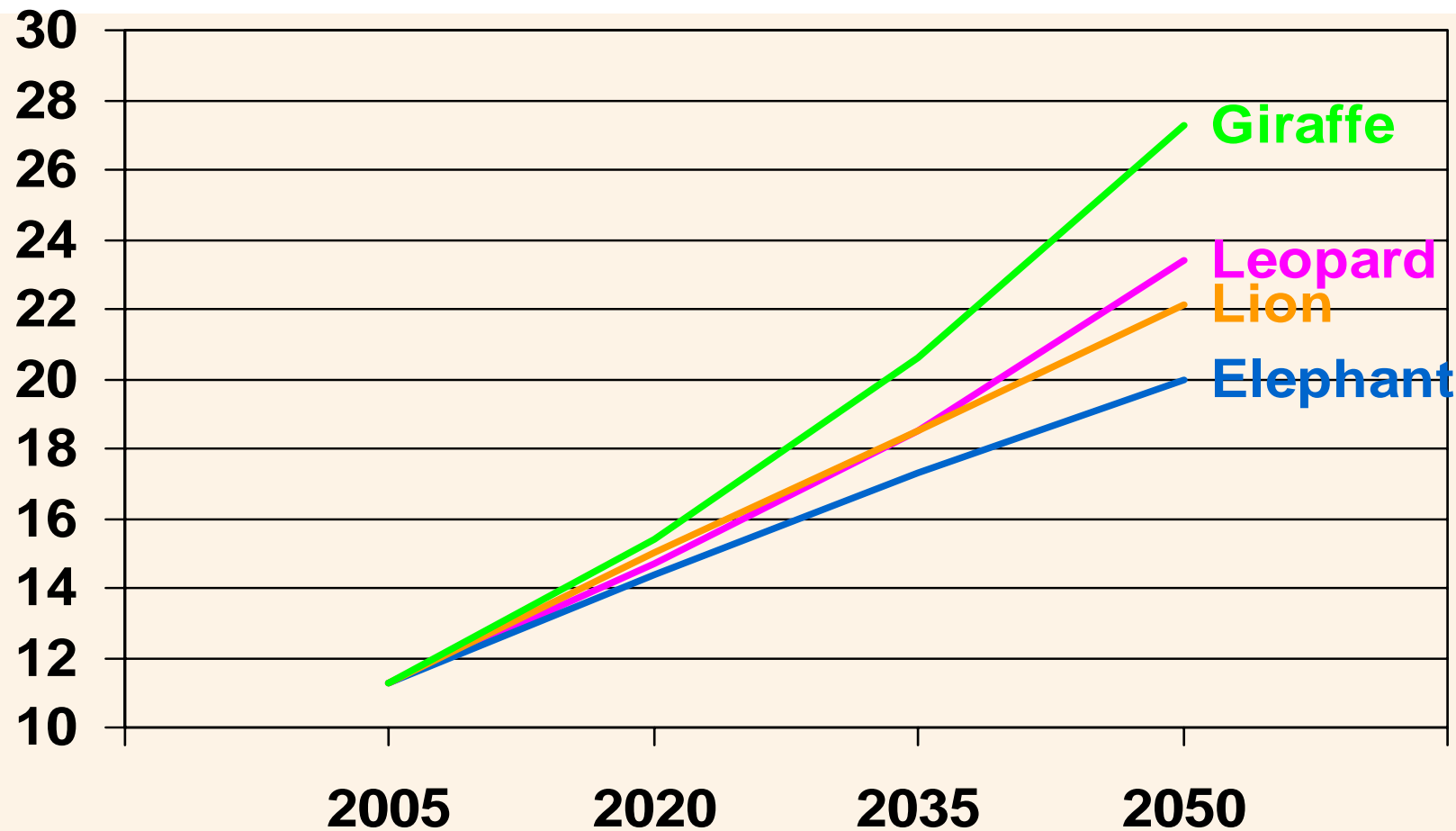
Key Message 1

To meet the energy needs of all the people in the world, global energy supplies will have to double before 2050.

TPES



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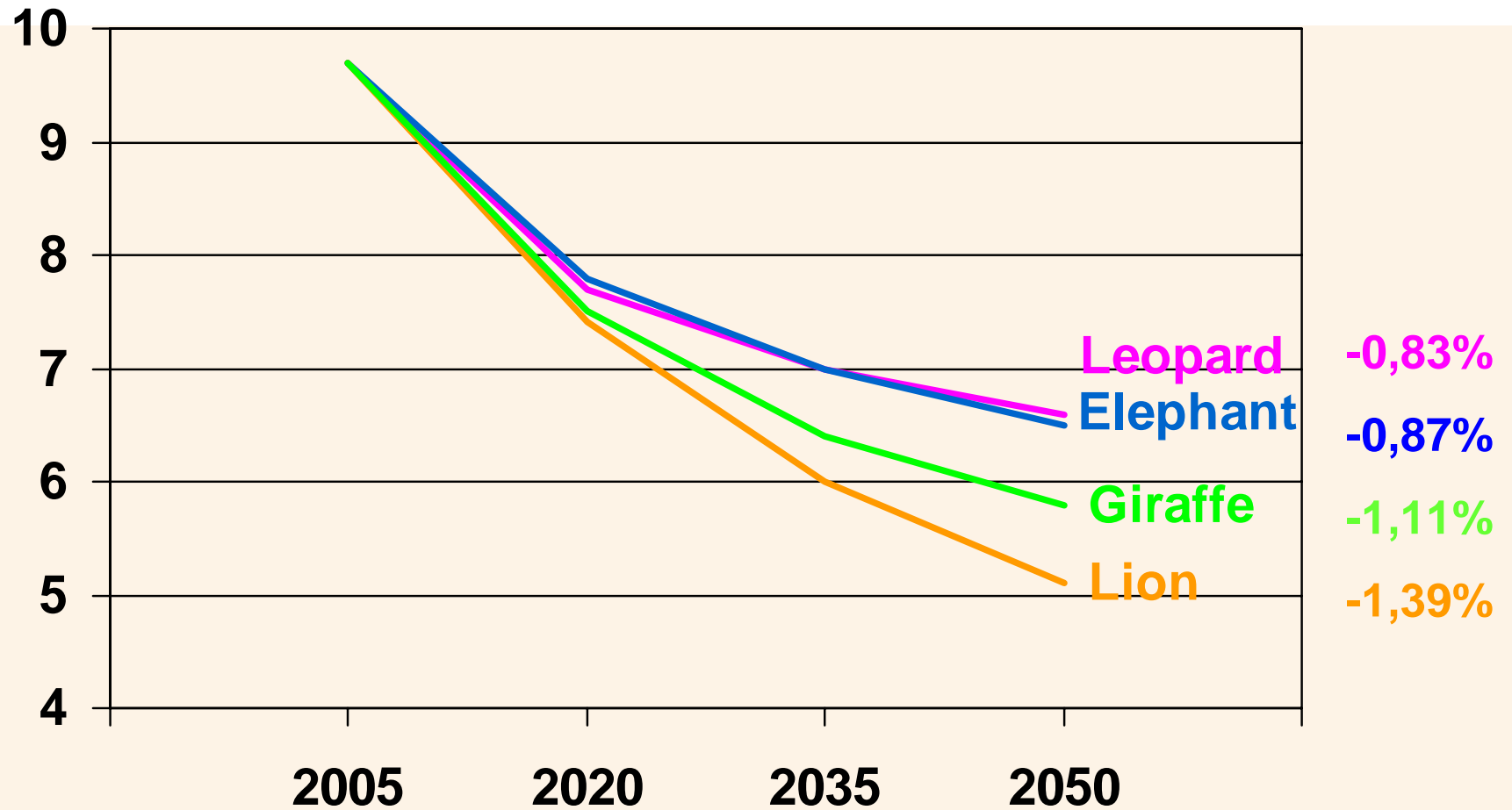


Gtep

Energy intensity



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MJ / \$2005 ppa



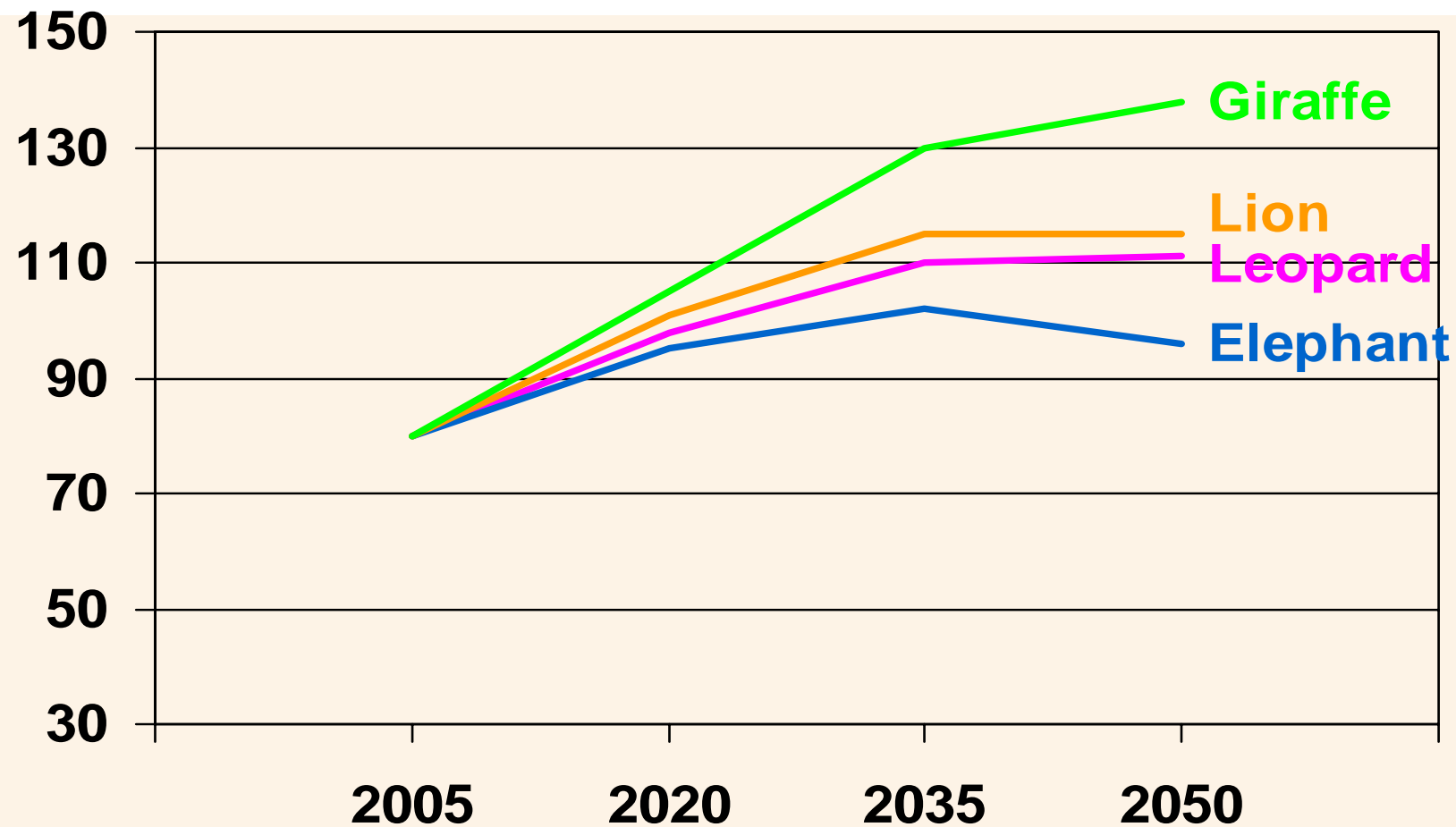
Key Message 2

The world has sufficient energy resources, knowledge, skills and capital to meet the supply needs; the challenge is to get them from where they are plentiful to where they are needed most.

Oil production



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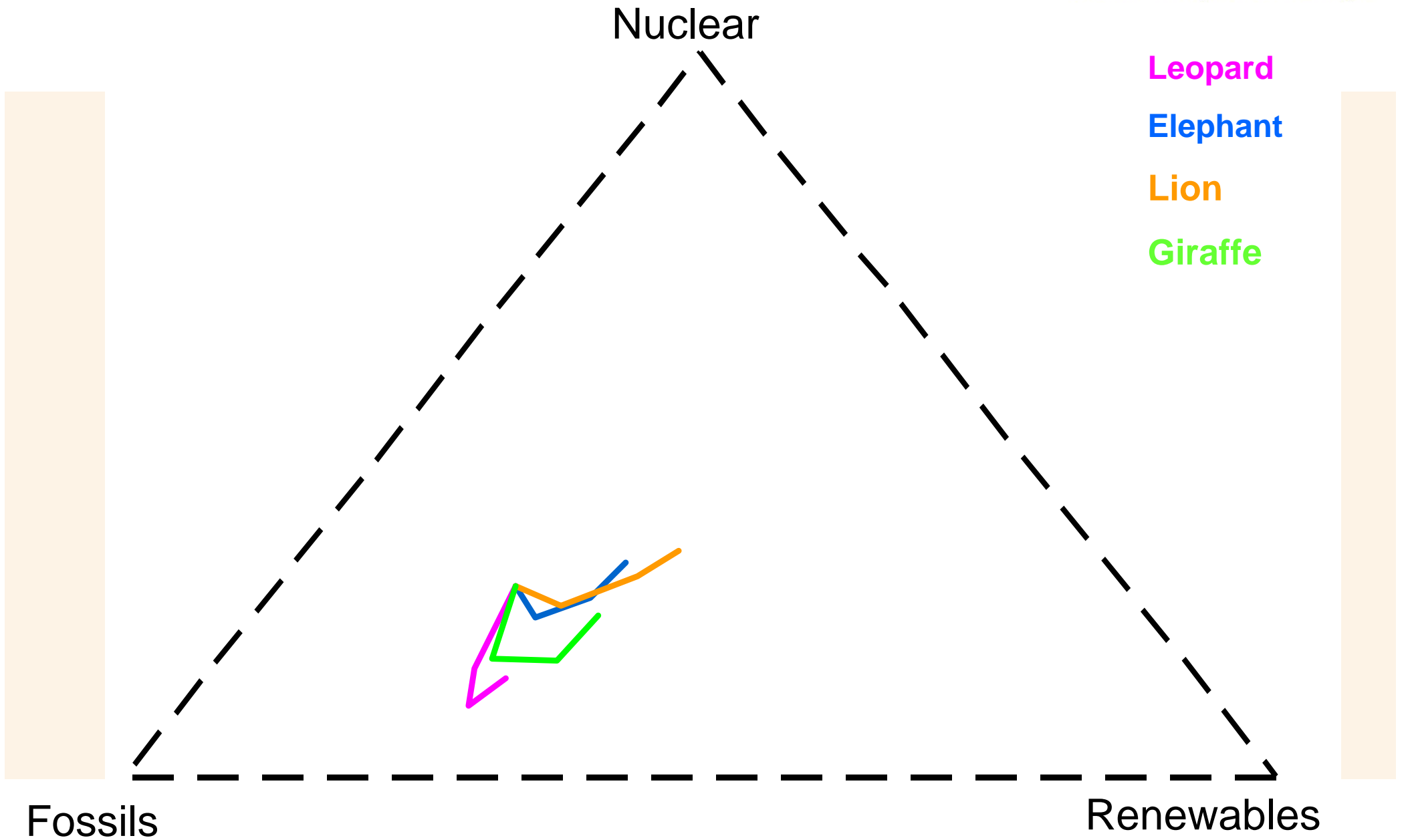


M bl / j

Electricity mix



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Energy mix



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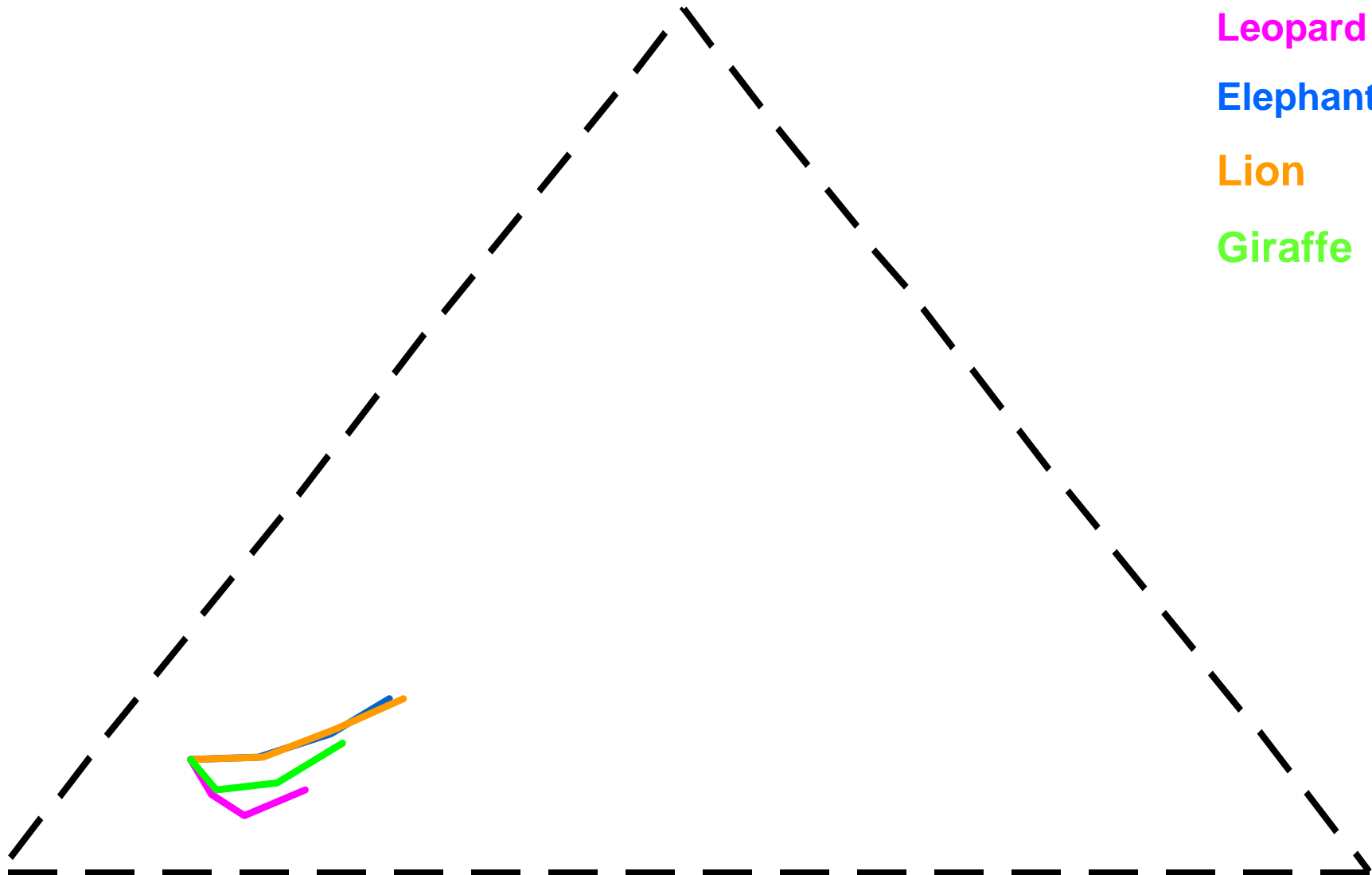
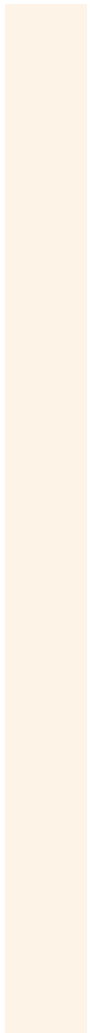
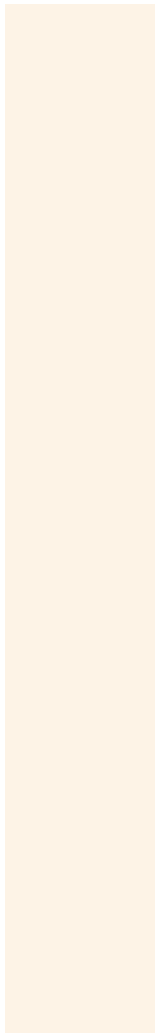
Nuclear

Leopard

Elephant

Lion

Giraffe



Fossils

Renewables



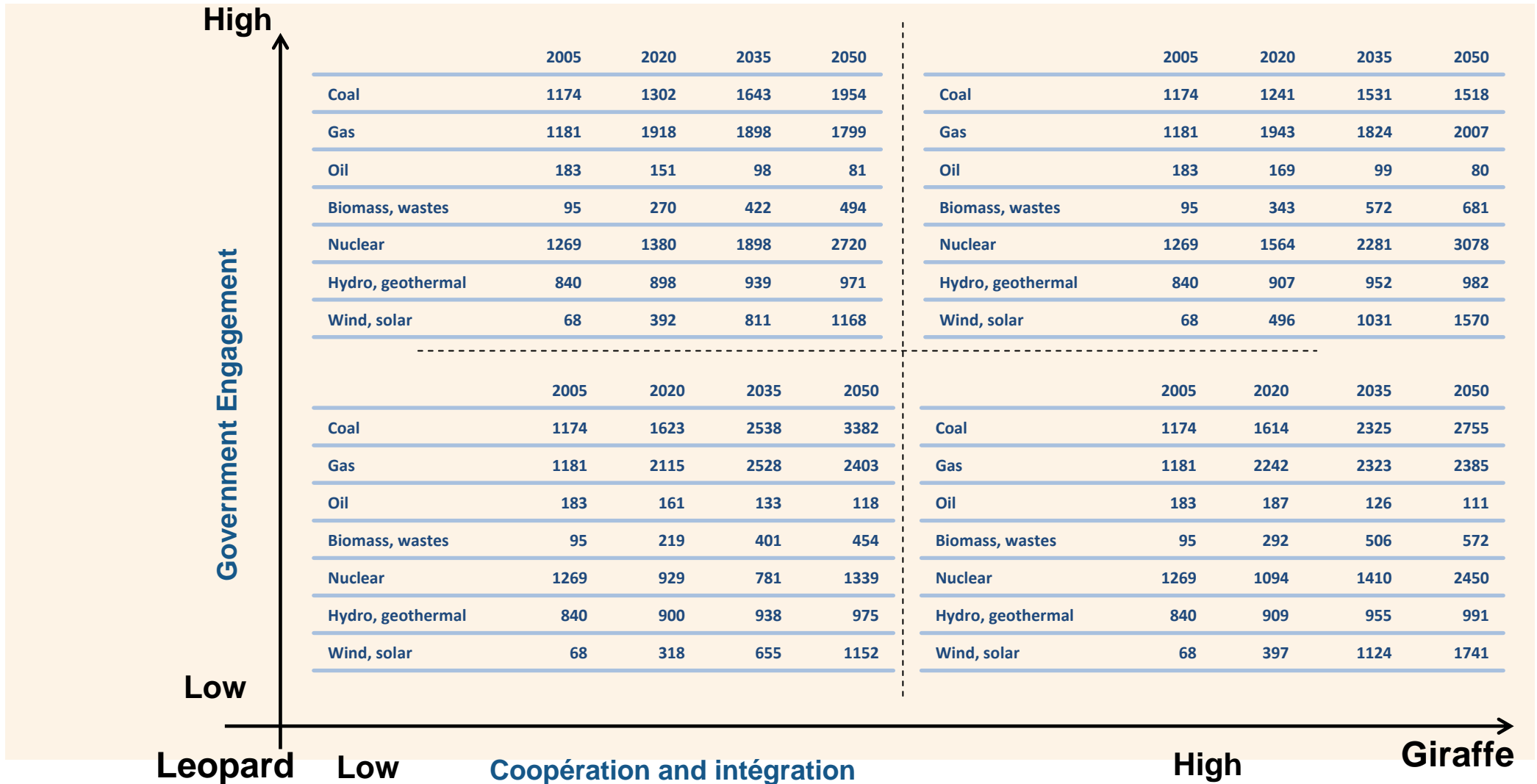
Electricity generation (TWh)

Elephant



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Lion





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Caveat (again !)

Modelling gives only a quantitative illustration of WEC qualitative scenarios.



Key Message 3

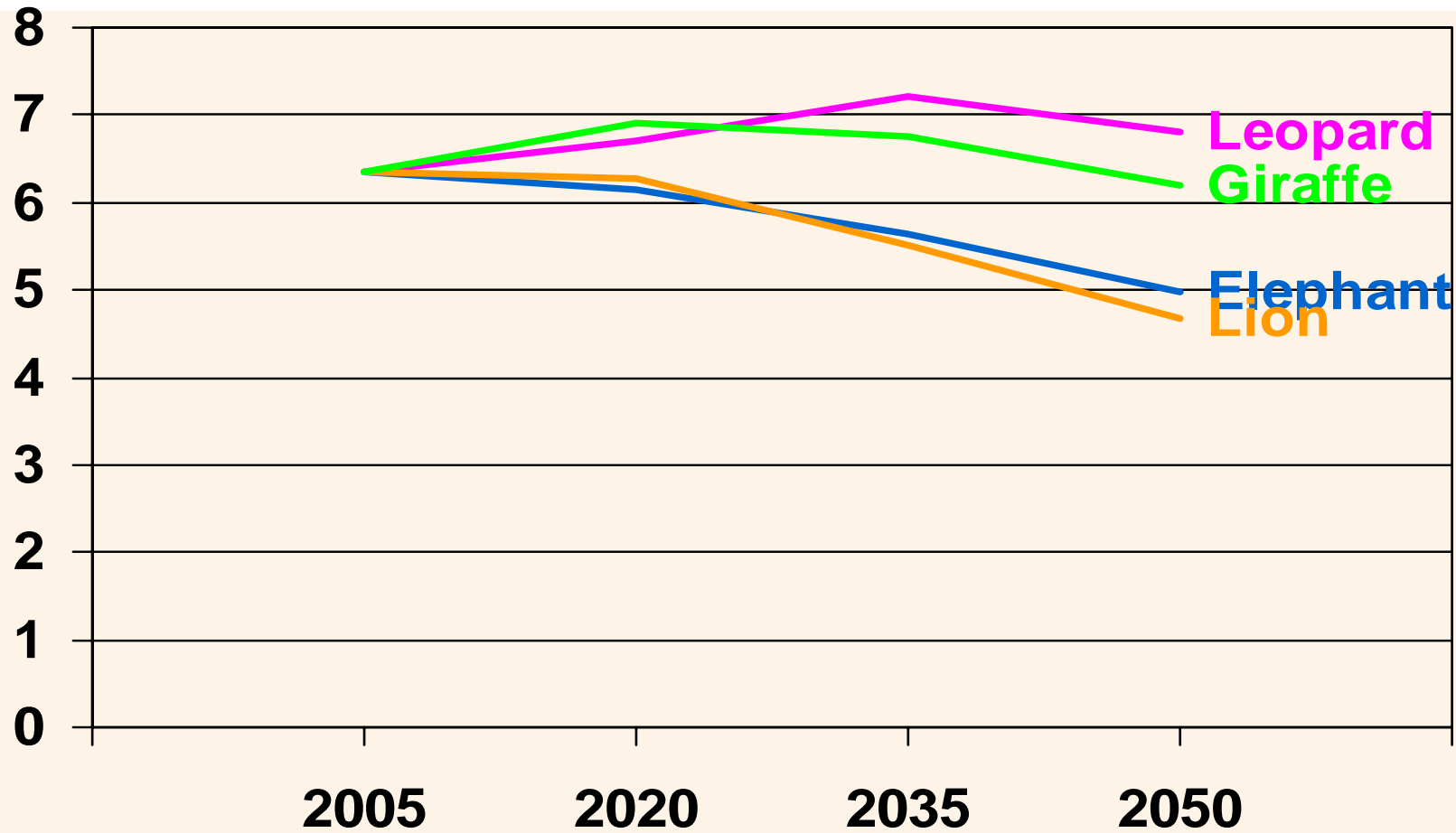
We can address the world's accessibility needs in harmony with the effective management of acceptability, thereby mitigating against both social and environmental degradation.



CO₂ emissions (Gt CO₂)



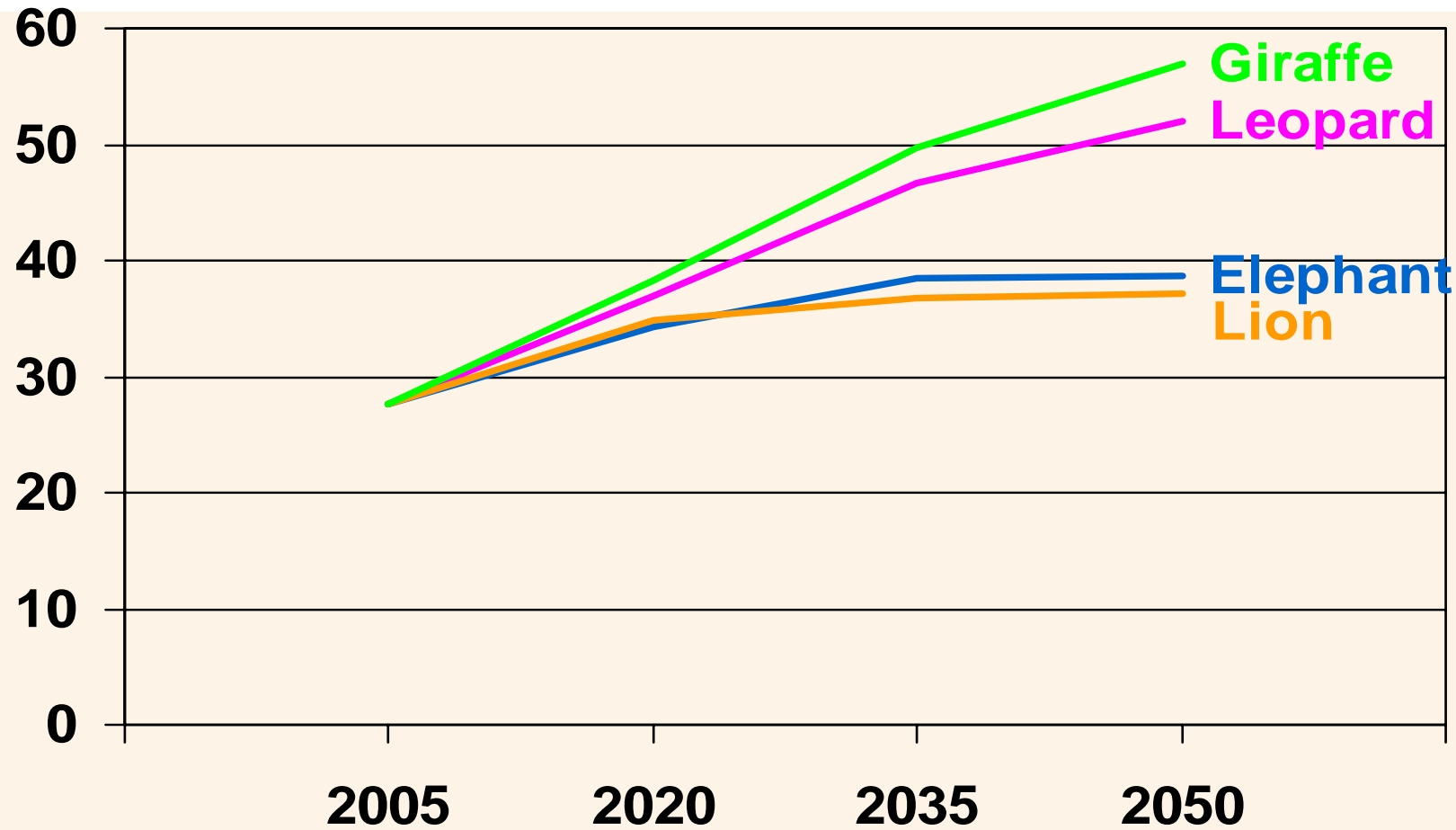
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CO₂ emissions



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Gt



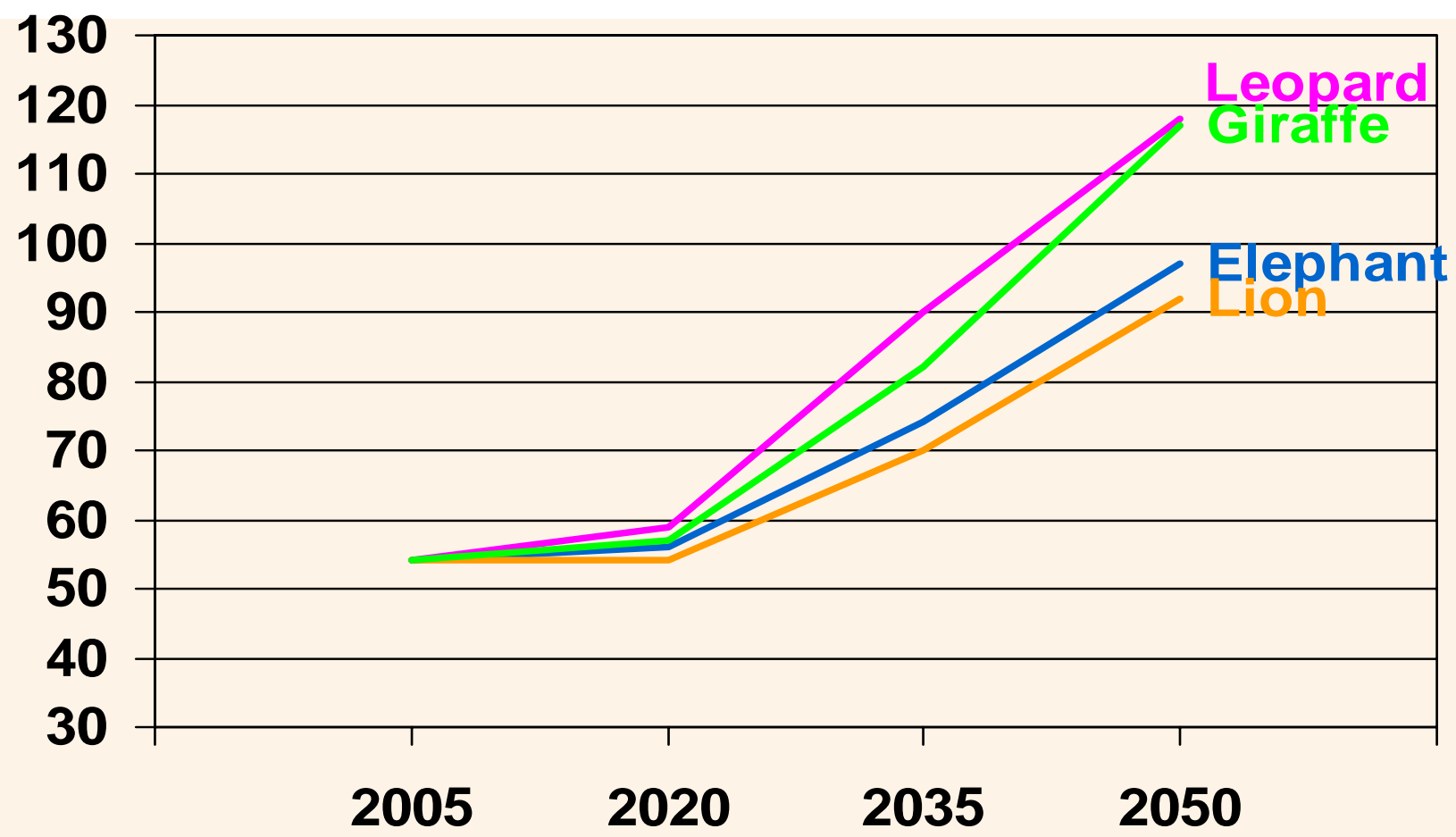
Key Message 4

Higher energy prices (or the specter of the same) will drive efficiency and attract capital investment in developed countries but robust international cooperation and integration is necessary to avoid unintended negative consequences and exacerbating energy poverty in developing countries.

Oil price



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\$2005 ppa / bl



Key Message 5

Private sector engagement is essential – influencing national policy, driving business policy, and ensuring focus on sustained delivery of the policy intent.



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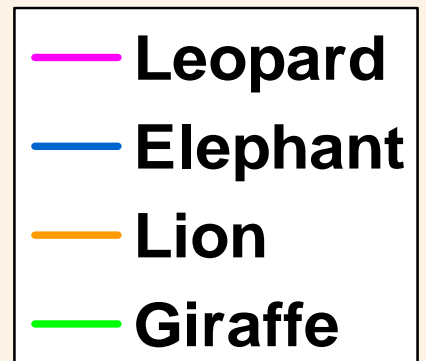
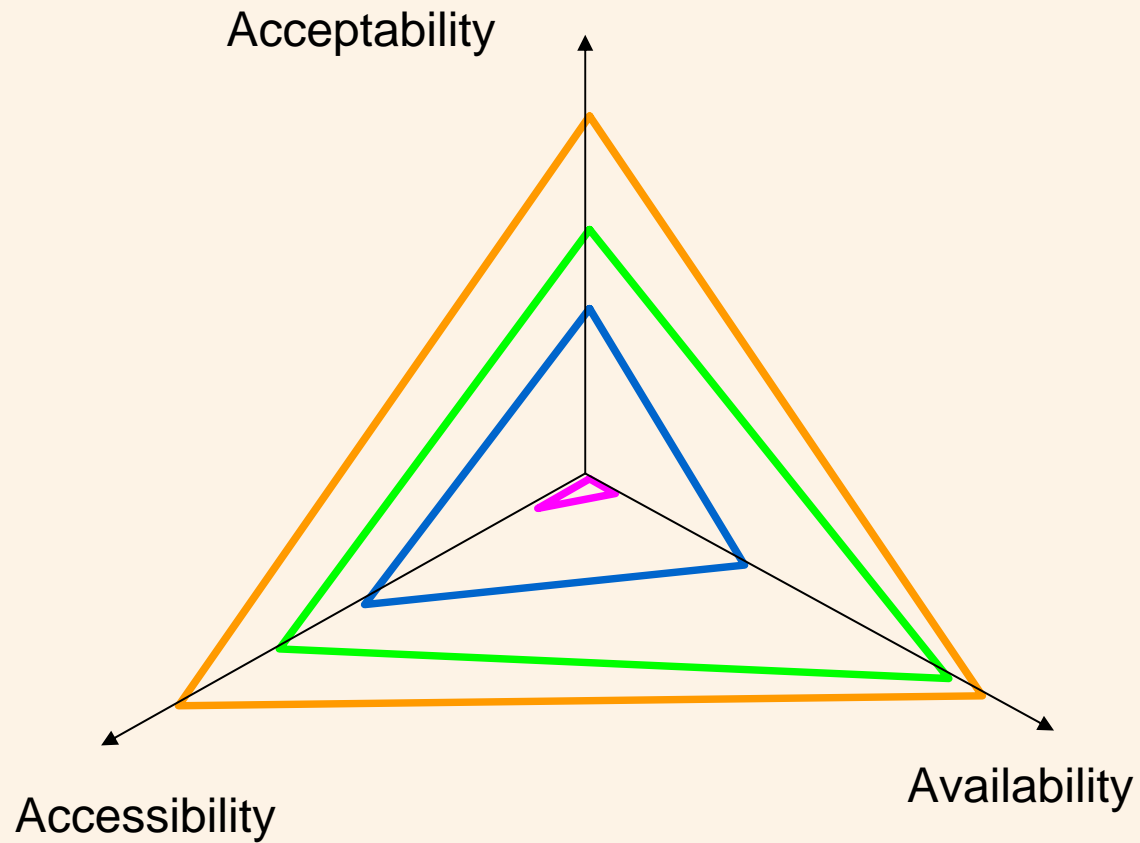


What about WEC 3A ?

The 3A in 2050



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« Yes, We Can »



WEC policy recommendations

1. **Promoting energy efficiency, both on supply and demand sides**
2. **Raising public awareness of important role of transport sector**
3. **Setting a global price for carbon, not too high and not too low**
4. **Closer integration of energy markets, regionally and globally**
5. **Creating a new international framework for technology transfer**
6. **Global dialogue on security of supply and demand**
7. **Taxation, legal and commercial frameworks**

French summary with tables and graphics: www.wec-france.org

Free download: www.worldenergy.org

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