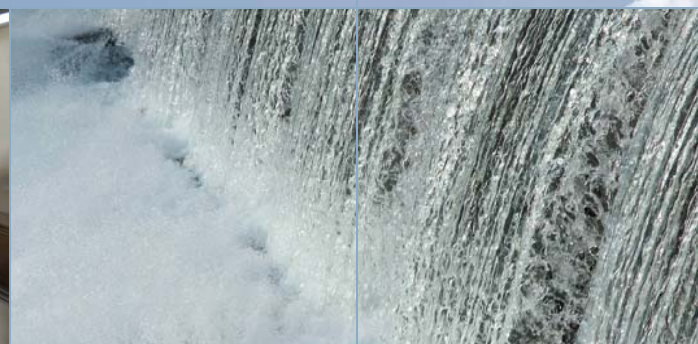
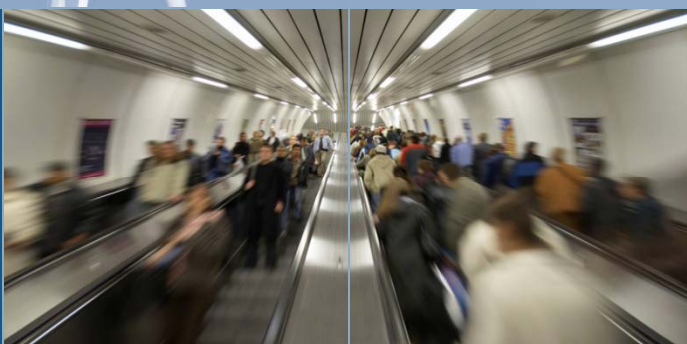


**21<sup>st</sup> World Energy Congress**  
**Montreal, Canada**  
**12-16 September 2010**

**Elena Virkkala Nekhaev**  
**WEC Director of Programmes**

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



**12 – 16 September, Montreal, Canada**

# World Energy Council

## 21<sup>st</sup> World Energy Congress

### World Energy Council:

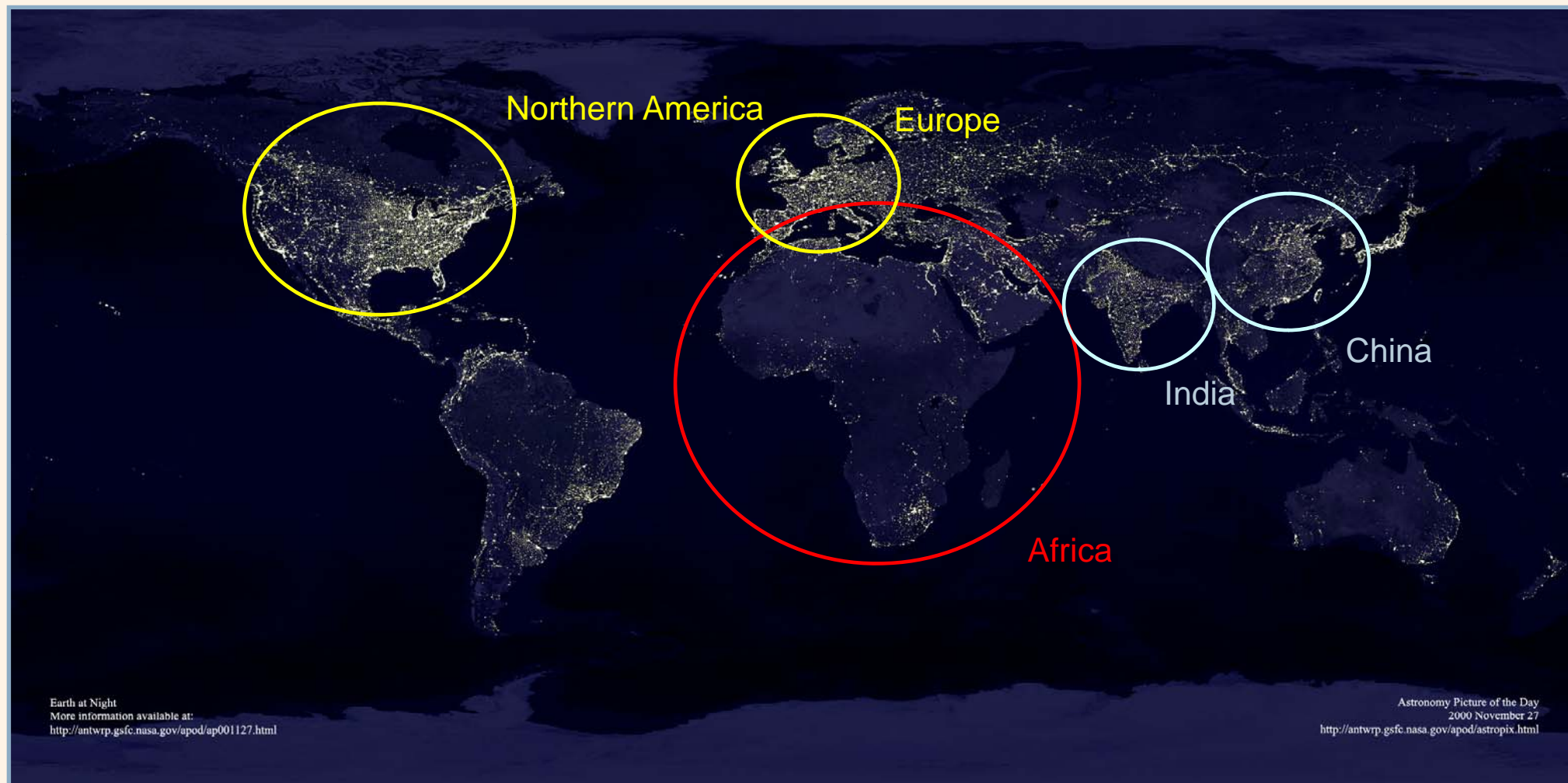
- 1923 founded in London
- More than 90 member committees, covers all sorts of energies
- Members: government officials, industry, energy consumers, research

Energy <b>Accessibility</b> :	How can energy demand be covered?
Energy <b>Availability</b> :	What energy system guarantees the best long-term stability?
Energy <b>Acceptability</b> :	What solutions are sustainable and hence acceptable?
Energy <b>Accountability</b> :	How to define the political and regulatory framework, in order to make investments happen in the appropriate way?

### World Energy Congress 2010:

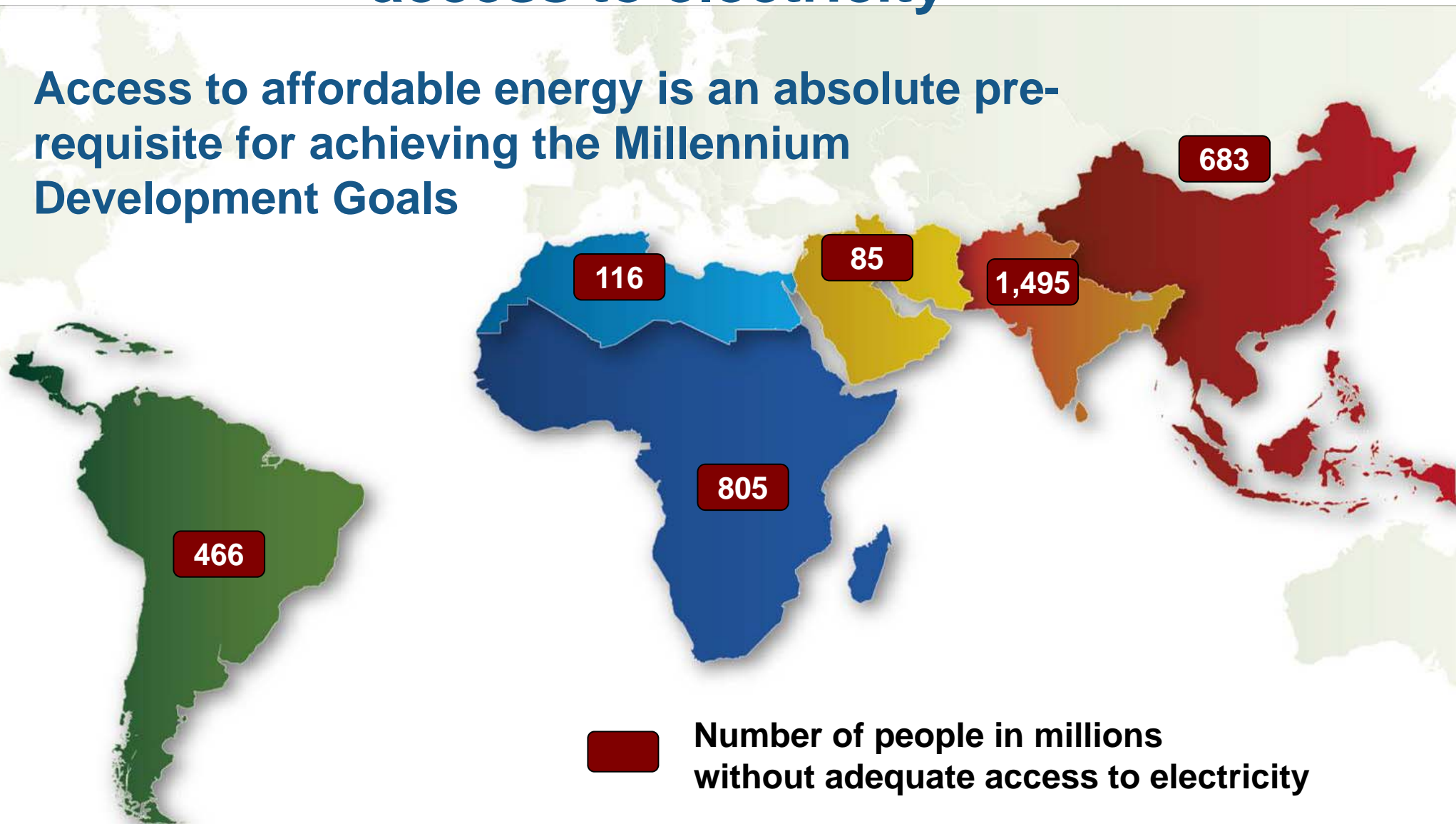
- More than 7,000 participants from over 130 countries (about 1,000 from Europe)
- Over 70 energy ministers

# Earth at night: Visualisation of energy consumption



# 3.6 billion people have no or only limited access to electricity

Access to affordable energy is an absolute prerequisite for achieving the Millennium Development Goals





# Energy is a major issue in all countries around the world

Industrialised nations:

Transformation of the energy system

→ Problem: Financing

Growing regions:

Construction of the energy system

→ Problem: Making energy available

Poor regions:

Fight against energy poverty

→ Problem: instability

Solution for all regions:

Technology & energy efficiency

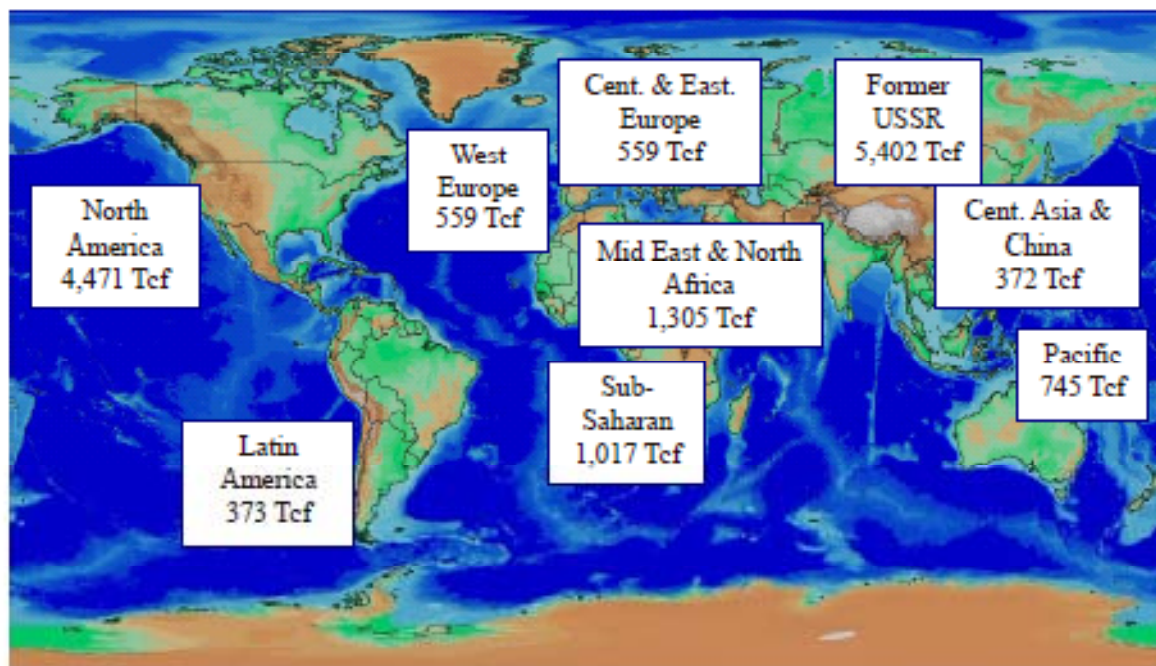
# Energy demand is growing: Global answer are fossil sources

- **Further increase of the global energy demand from 32% to 40% by 2030**
- **Fossil fuels will play an important role globally for decades to come**
- **Scarcity of capital is a more constraining bottleneck than reserves of crude oil, natural gas and coal**
- **Reserves of fossil fuels substantially greater compared to previous estimates – the role of shale gas**
- **Access to affordable energy and energy as a driver of economic growth more in the focus than climate change**
- **The expected outcome of Cancun will not deliver a binding climate change treaty**

# Unconventional gas improved resource situation dramatically

- Voser (Shell):** Sufficient natural gas for more than a century  
 Expects demand increase: +25% by 2020, +50% by 2050.
- Gazprom:** Dramatic increase of exports by 2030, Offers 25-year-contracts
- Yergin (CERA):** Shale gas came not suddenly – but after 20 years research

## Estimated Shale Gas Resource Potential - 2010



## USA 2008:

Production of unconventional gas in the US has almost the same size as the total Russian natural gas production

# Nuclear energy – CO<sub>2</sub>-free and secure

## Global growth visible

Nuclear power and renewables are globally seen as complementary & compatible to reach a CO<sub>2</sub>-free and secure supply with energy

**Fatih Birol (IEA):**

A positive example for transformation is the life-time extension of nuclear power plants in Germany

**Ferland (Westinghouse):**

Globally 60 nuclear reactors under construction

**S. Mori (Kansai, JP):**

In Japan by 2020 nine new nuclear power plants

**S. Kim (KEPCO, Korea):**

Growth of nuclear share from 28% to 40% by 2030

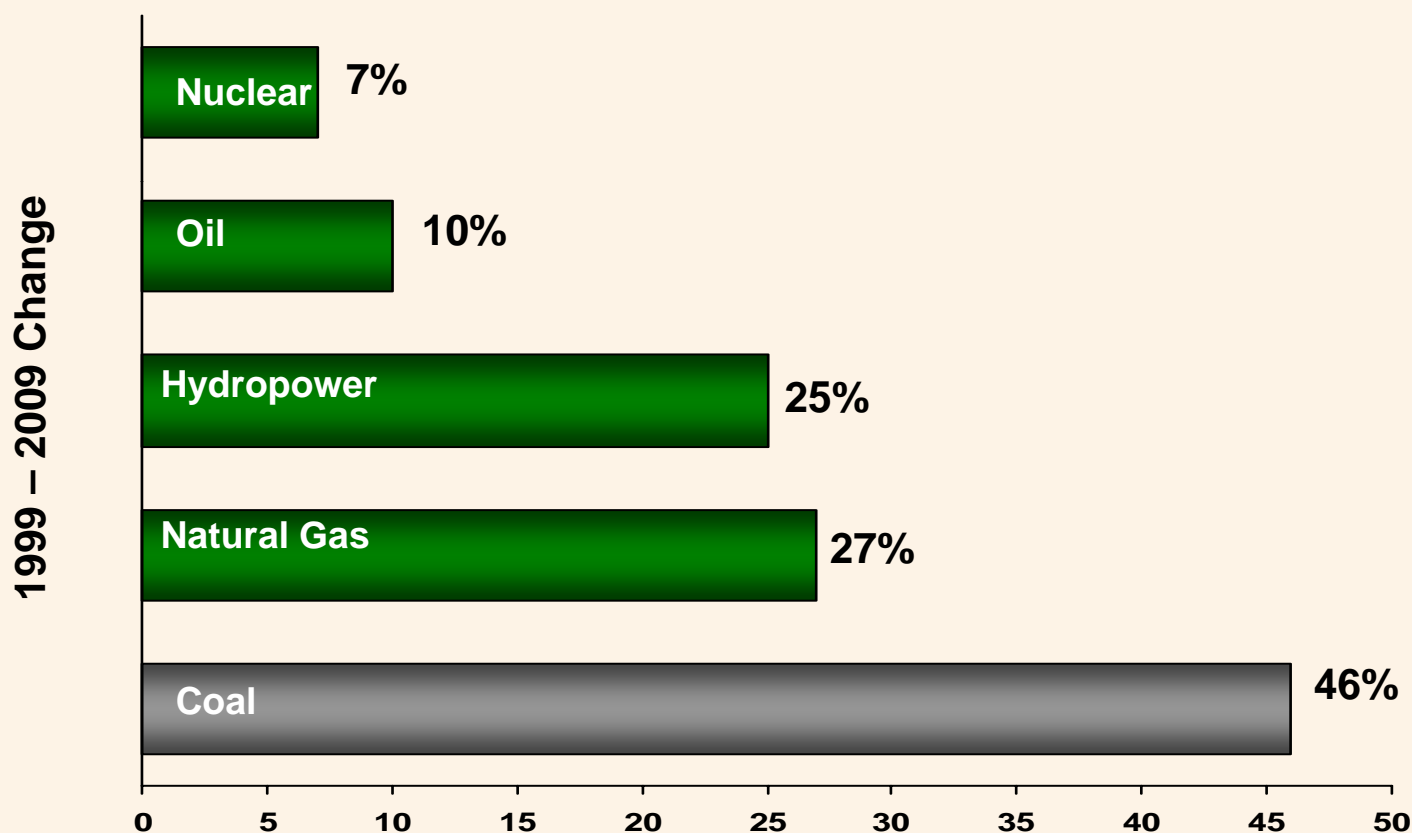
**Huaxiang (China Nat. Nucl.):**

22 under construction, 12 approved,  
In the long-run 10 nuclear power plants per year.

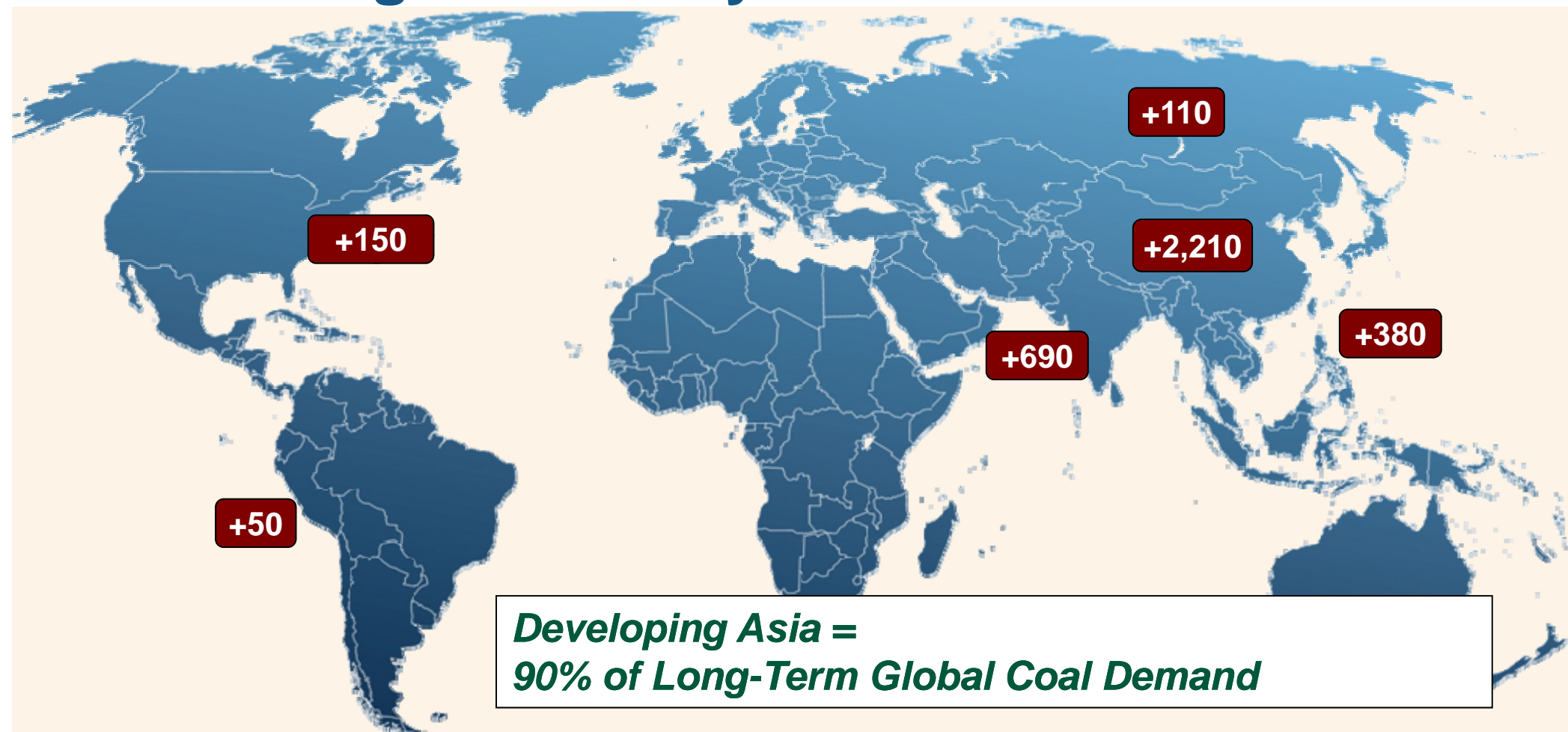



# Coal: The World's Fastest Growing Fuel for the Past Decade

## *Change in Global Energy Consumption*



# Global Use of Coal is Expected to grow 53% by 2030



 Growth 2007 - 2030 (Million tonnes)

Source: World Energy Outlook 2009, International Energy Agency; Annual Energy Outlook Forecasts, Energy Information Administration; Peabody analysis.

# Zero Coal? No Replacement Alternative

*To Replace Coal's Contribution, The World Would Need...*

**Solar\*:** *1,800 x Current Solar Generation*

**Wind\*:** *2.5 Million Wind Turbines*

**Nuclear:** *1,150 Nuclear Plants*

**Natural gas:** *70 tcf = 3X Russia's Production*

**Hydro:** *2,250 Dams*

\* Requires backup baseload generation for cloudy and calm periods.

Source: International Energy Agency, World Energy Outlook 2009.

# The World's Largest Economies Are Fuelled by Coal

	<i>China</i>	<i>India</i>	<i>United States</i>
<b>Electricity from Coal</b>	<b>80%</b>	<b>71%</b>	<b>50%</b>
<b>Projected GDP Increase through 2030</b>	<b>380%</b>	<b>290%</b>	<b>95%</b>
<b>Projected GDP in 2030 (Trillion Dollars)</b>	<b>\$33</b>	<b>\$11</b>	<b>\$25</b>

# Montreal – Selection of statements

## Transport:

One billion cars are on the road now and another billion will join by 2035. (IEA)

## Oil:

China's energy policies will determine the future of the oil price. (IEA)

## Rick George (Suncor):

„I've long believed the future is **about expanding energy choice, not restricting it**. First we need to get increasingly creative about finding and developing conventional energy sources, whether it's oil, gas, coal or nuclear – and do so in ways that are environmentally and socially responsible. Second, we should use these conventional sources to help drive research and development of alternative energy and new environmental technologies.“



# Politics of Energy



**Y. de Boer, KPMG, former UNFCCC Ex. Director:**  
*“We need to put the rhetoric aside and focus on **implementation...**”*

**Anne Lauvergeon, CEO AREVA (France):**  
*“We need to **build trust**. Ignoring the fears of the people encourages irrationality.”*



**P. Duhaime, CEO, SNC-Lavalin (Canada):**  
*“The population will grow and so will the carbon-intensive economy, but sustainable growth will be difficult with the current atmosphere in increasing tension and **distrust among industry, government and the public.**”*

# Finance/Investments



**D. Yergin, Chairman IHS CERA (USA):**

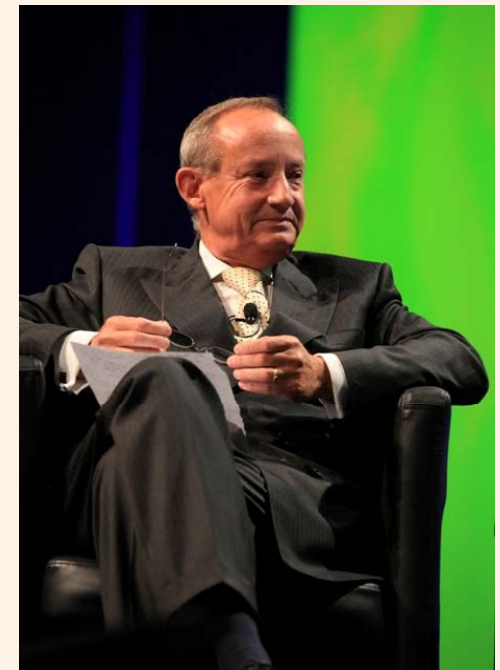
*"...there remains one law that we all must adhere to where energy is concerned, that is **the law of long lead times.**"*

*"It is very sobering to realize that much of the infrastructure that will be needed in 2030 to meet the energy needs of a growing world economy is still to be built."*

**Y. de Boer, KPMG, former UNFCCC Ex. Director:**

*"85% of the investment is coming from the private sector and the rest from the public sector."*

***"Finance is the big question."***



# Energy poverty



## D. Kaberuka, President AfDB:

*“The whole African continent has less energy capacity than the country of Spain.”*

*“...for the last 10 years, **economic development** is the best that it has been in the last 50 years.”*

## G.H. Boyce, CEO Peabody (USA):

*“Study after study – and pure common sense – tell us that access to electricity helps people to live longer and better. Yet each year we **lose more than 1.5 Million people to the effects of energy poverty. We can no longer turn our heads from these brutal statistics. We must put people first. That is the first value.**”*



# Oil



## K. A. Al-Falih, CEO Saudi Aramco (Saudi-Arabia):

*“From my perspective, there are significant opportunities to make petroleum more environmentally friendly, including cleaner burning fuel formulations, **CCS**, and a host of other advanced technologies that are still in their infancy, and I believe it is incumbent on our industry to do its utmost to realize those enhancements”*



## D. Yergin, Chairman IHS CERA (USA):

*“...**oil’s share of the overall energy mix will decline.**”*  
*“Oil demand will pose many puzzles for years to come.”*

# Gas



**P. Voser, Chairman Shell (Netherlands):**

*“We believe there is **enough recoverable natural gas** to last for more than a century.”*



**D. Yergin, Chairman IHS CERA (USA):**

*„...this (**shale gas**) is perhaps the biggest energy innovation since the beginning of the 21st century.“*



**O. Aksyutin, Gazprom (Russia):**

*“Gas, from the point of view of energy security, is **the most safe option**”*



# Coal



**V. Kumar Singh, Chairman Northern Coalfields Ltd. (India):**

*“**Coal is the only solution** for the energy to elevate the standard of living.”*

**Rob Whitney, CEO CRL Energy (New Zealand):**

*“New Zealand with 15 billion metric tonnes, has more **coal per capita** than any other country in the world.”*



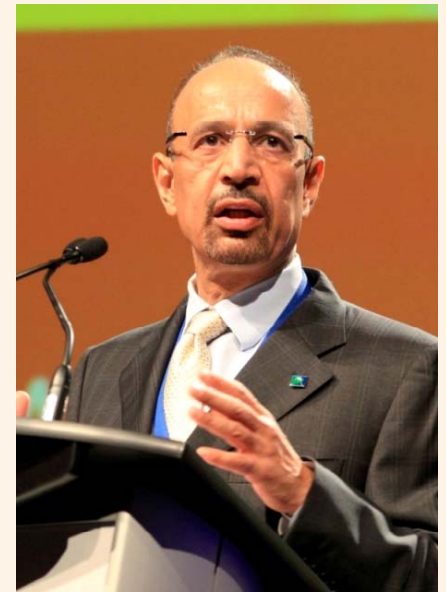
# Renewables



Hélène Pelosse, interim Director General,  
IRENA (Abu-Dhabi):

*“**Solar will see the most growth** in the  
period to 2050.”*

*“We expect renewable energy to account  
for 50% of the global mix by 2050.”*

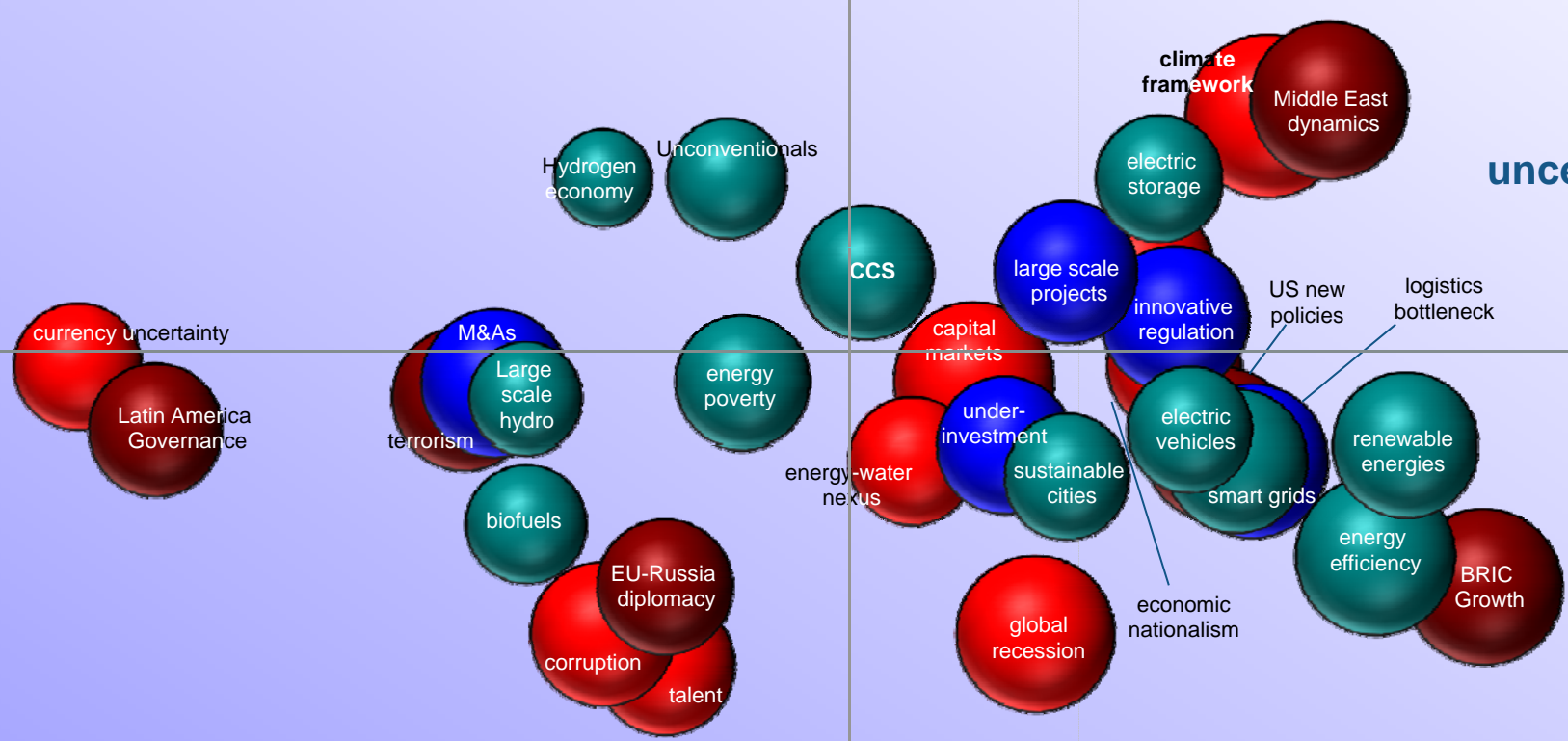


K. A. Al-Falih, CEO Saudi Aramco (Saudi-Arabia):

*“... **alternative sources of energy should grow** – and indeed  
must grow – in order to play their part in meeting that rising  
demand.”*

**For further information contact  
World Energy Council  
[www.worldenergy.org](http://www.worldenergy.org)**

uncertainty



**Critical uncertainties**

**Need for action**

**Weak signals**

impact

- Macroeconomic Risks & Vulnerabilities
- Energy Geopolitics
- Energy Business Environment
- Energy Vision

