An abstract graphic consisting of several thick, flowing lines in shades of green, blue, and orange. The lines originate from the left side, where they form a circular, swirling pattern, and then extend across the page towards the right, curving upwards and downwards in a dynamic, organic fashion. The background is plain white.

The Green Race in a Resource and Carbon Constrained World

Björn Stigson, Former President of WBCSD

Professor at University of Gothenburg School of Business, Economics and Law,

Chairman , Stigson & Partners AB

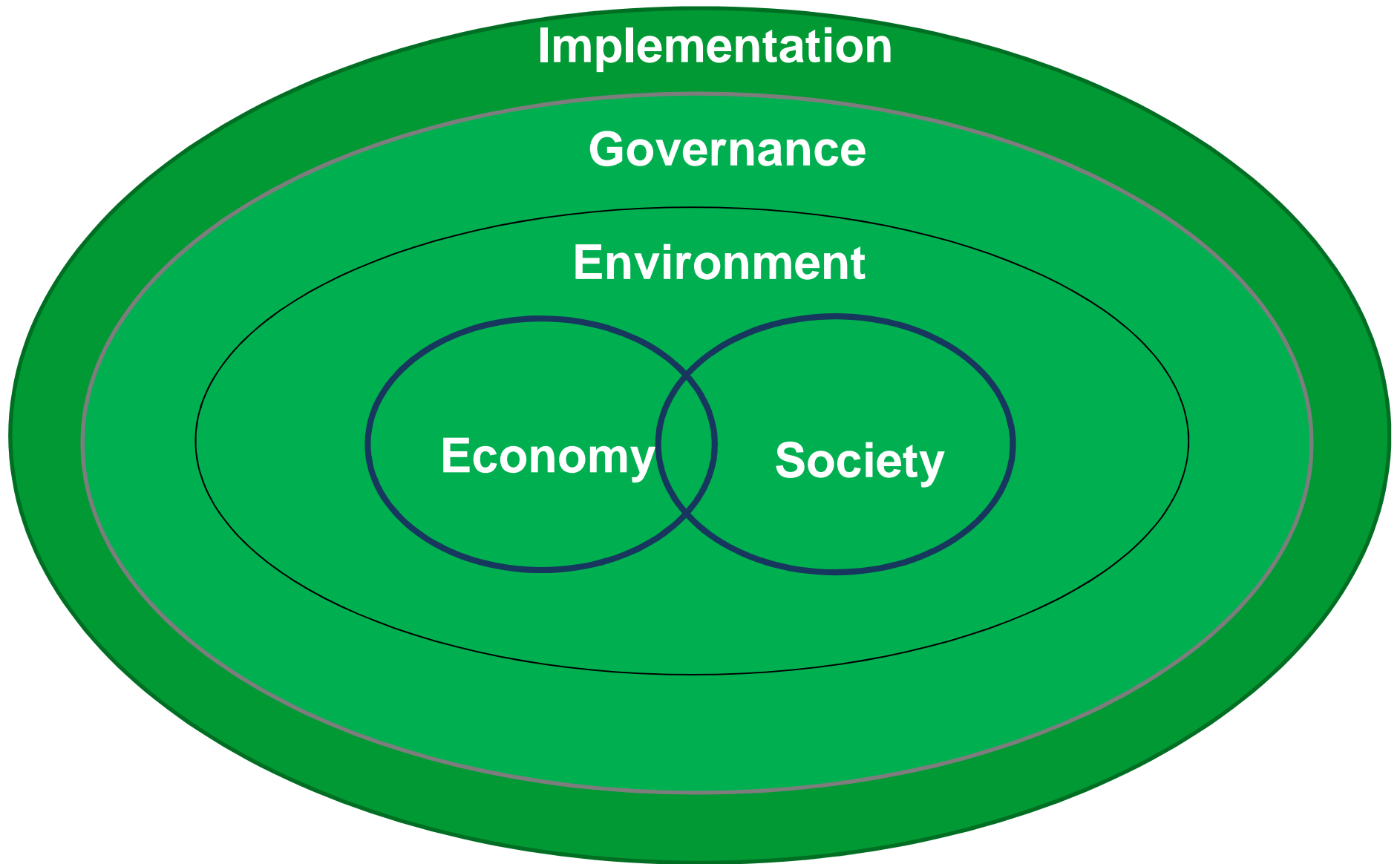
WBCSD

Coalition of some 200 leading companies.

Market capitalization: 6,000 BUSD; 13 M employees



A World with limits in transition to sustainability



The Green Race is on

- “The Green Race is on” between countries to transform to low carbon economies and to become the leading suppliers of resource efficient, low polluting technologies & solutions
- If you want to win the Race:
 - Transform your home market to build domestic demand and thereby create competences and scale for exports of these technologies and solutions

The Green Race is on



China

- About to become the leader in the Green Race
- Key component of 12th 5-Year Plan (2011-2015)
- Renewable energy investment: no 1 rank globally

‘We are going to declare war against our inefficient and unsustainable model of growth and way of life’ –
Li Keqiang

The Green Race is on



Korea

- “1 of 5 Green Powerhouses globally”

The Green Race is on



Japan

- Most energy efficient economy
- Has a good technology platform for green solutions
- The nuclear shutdown is pushing innovation and solutions
- Major importer of gas (30% of global trade) at high cost
- Considers restart of nuclear

The Green Race is on



US

- Overall: falling behind China in the Green Race
- Mobilizing the US innovation capability for the Green Race?
- Political regulatory deadlock in Washington – very inward looking
- A lot is happening in states and cities
- The shale gas revolution
- Export of cheap US coal to Europe
- Gas export to EU following the Ukraine crisis ?
- IT companies getting engaged in decentralised electricity generation

The Green Race is on



EU

- Market leader today on green technology exports (30% market share of which 15% is Germany)
- Transformation of the internal market?
- German Energiewende ?
- Ukraine crisis – dependence on energy imports from Russia ?

Green Race Consequences for Global Business

- Availability of resources will be more limited and more expensive
- Pollution will carry a price
- Resource efficient, low-polluting solutions will be strategic priorities for companies
 - A condition for staying in business
 - Strong demand for innovations

WBCSD Vision 2050

2008 - 2010

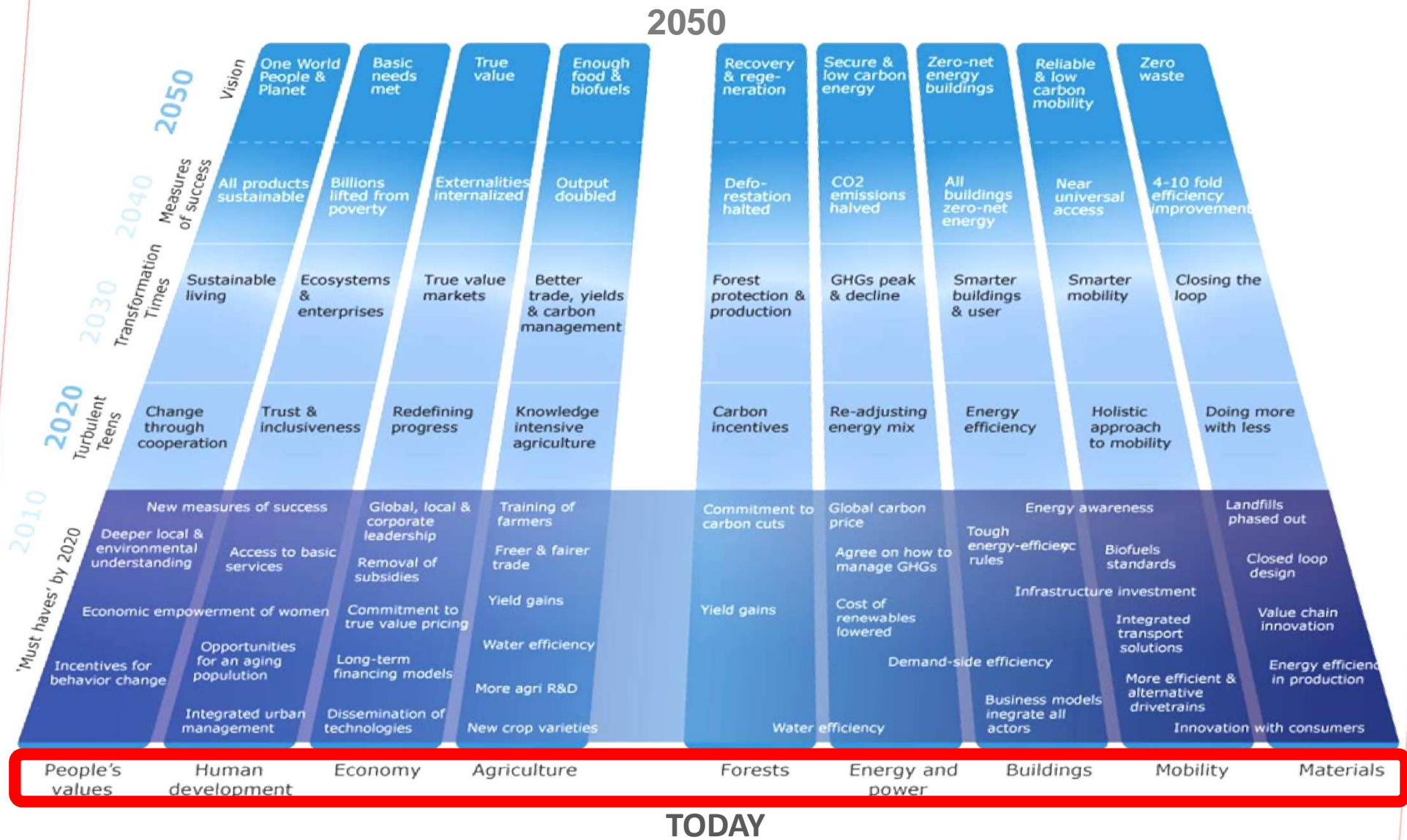
A platform for dialogue about the role of business in a resource & carbon constrained world.

Vision 2050: 9 Billion people, living well, within limits of the planet

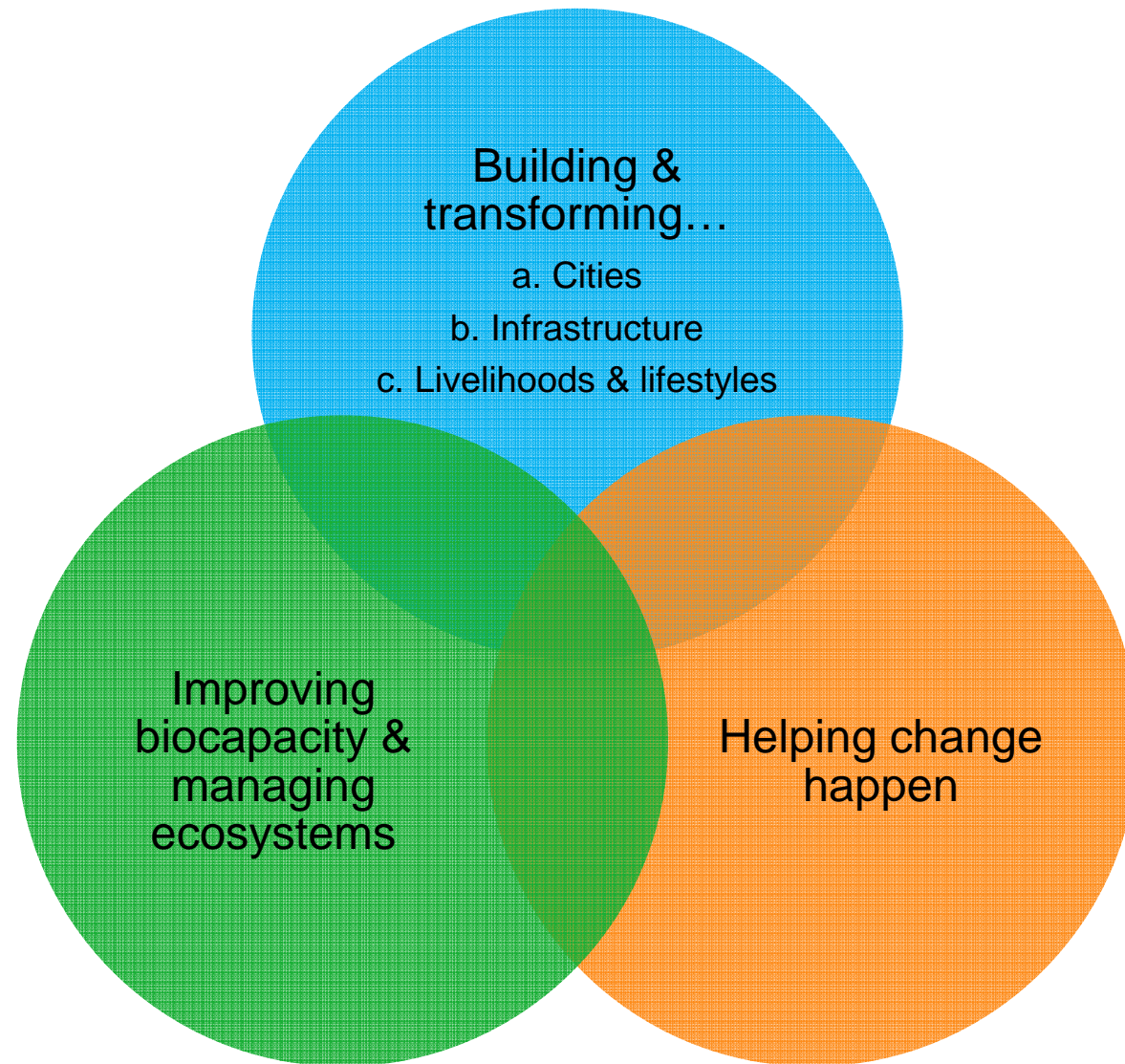


Vision 2050 Pathway: 9 elements

The pathway to *Vision 2050*



Business Opportunities in Vision 2050



Energy & Climate

IEA World Energy Outlook 2013

- Global energy demand up one third to 2035.
OECD countries no increase
- Major shifts in the energy system and energy costs will impact economies
- Export of energy intensive goods to 2035
US –slight increase in global market share
EU and Japan –loss of one third of present market share

Energy & Climate - Emerging Economies

- How fast can the emerging economies transform to modern energy efficient, low carbon energy systems ?
- They represent:
 - 60 % of global GDP by 2025
 - 85% of global population by 2050

Energy & Climate –Long term

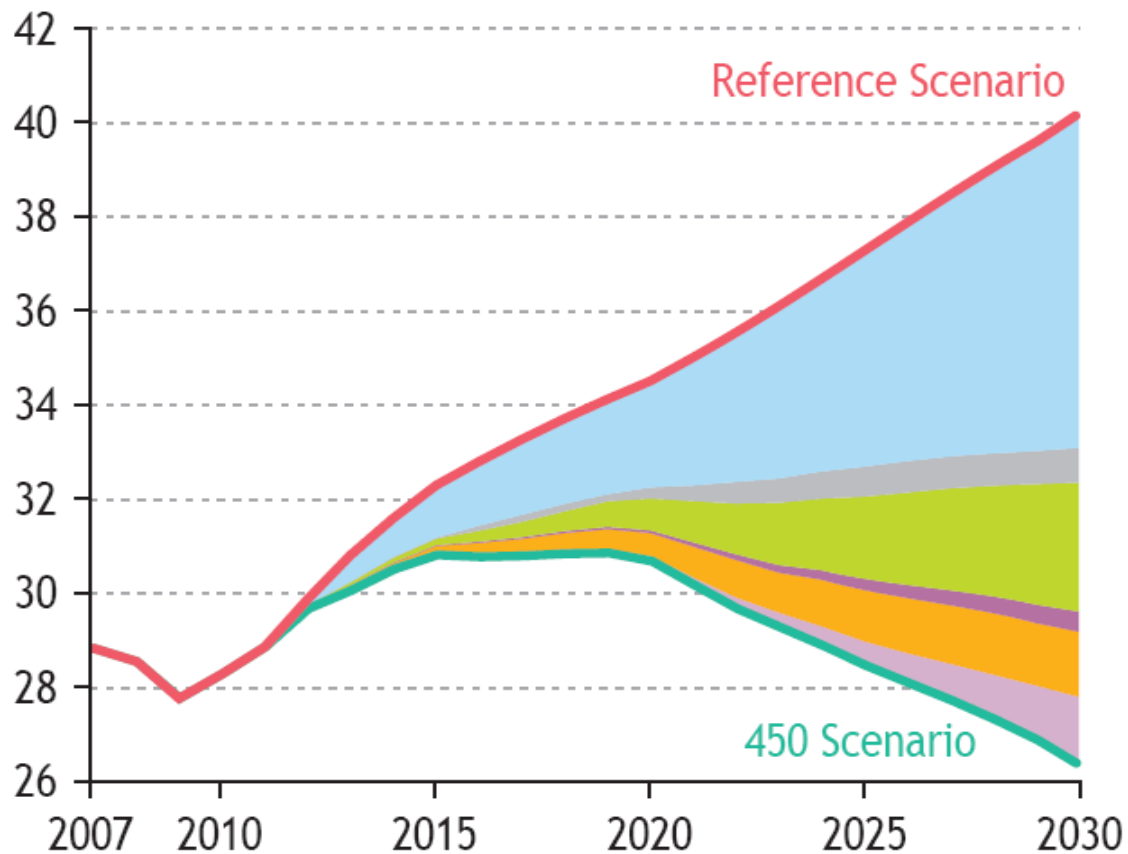
The energy system and energy mix –a rigid system

- Coal will be with us for a long time
70% of new power plant orders in China ,India and South East Asia are coal fired
- Shell New Lens energy scenarios to 2100
 - Gas (2035) and solar power (2070)

Energy & Climate –Short term

- Many changes in the energy landscape
 - Nuclear?
 - More renewables and gas
 - More distributed electricity generation
 - Smart grids /electricity storage
 - Changing roles of electricity utilities. Major losses of shareholder value.
 - Electrification of transportation
 - New competitors in the electricity market
 - Importance of end use energy efficiency

The Growing Importance of Energy Efficiency



	Abatement (Mt CO ₂)		Investment (\$2008 billion)	
	2020	2030	2010- 2020	2021- 2030
Efficiency	2 517	7 880	1 999	5 586
End-use	2 284	7 145	1 933	5 551
Power plants	233	735	66	35
Renewables	680	2 741	527	2 260
Biofuels	57	429	27	378
Nuclear	493	1 380	125	491
CCS	102	1 410	56	646

SOURCE: IEA WEO 2009

Total(2030) = 13840 MT
Efficiency= 57%

IEA World Energy Outlook 2013

- Two thirds of economic potential for energy efficiency remain untapped in 2035 unless change in market barriers ,in particular fossile fuel subsidies (544 BUSD 2012 globally)

Energy & Climate

The Stress Nexus

- Many critical systems solutions/trade-offs to be solved
 - Energy – Water – Food – Land use
 - Urban infrastructure – Buildings – Land transport
 - Life styles and consumption patterns for societies vs individuals

GERMANY

German Energiewende 1

Main points

- Stop nuclear by 2022
- 40-45% renewables by 2025 ,55-60% 2035
- 60% more installed electricity generation capacity needed
- More transmission capacity needed

IEA World Energy Outlook 2013

- Expansion of solar and wind raises fundamental questions about design and ability of power markets

German Energiewende 2

- Unintended Consequences and Challenges
 - Energy prices
 - Security of supply
 - Base load capacity
 - Transmission capacity and management
 - Role of electricity utilities
 - Short term climate goals

German Energiewende 3

- However, the Energiewende will strengthen Germany in the Green Race and drive innovations in energy generation, transmission, systems solutions and efficiency in consumption

Global Climate Change Actions

Status beginning of 2014

New IPCC report

- very high probability of manmade impacts on future climate
- climate consequences less certain ,+ 2C ?

COP 19 Warsaw, December 2013

- difficult to reach a binding global action program
- major disagreement on who is paying for what

Kyoto Protocol vs Copenhagen Accord

- Kyoto Protocol
 - Binding ? Canada and Japan opting out.
 - 15 % of global emissions included
 - 16 years of negotiations. With what outcome?

Kyoto Protocol vs Copenhagen Accord

- Copenhagen Accord /Cancun Agreement
 - voluntary pledges
 - non binding
 - 80% of global emissions. US, China and India included
 - most countries have transformed this into some kind of national regulations

Climate actions

- No implementation actions happen on the global level
- Actions are based on national or local legislation /regulations
- A climate agreement sets limits for economic development and transfers money and technology between countries

National situations

China

- Priorities
 - national security
 - communist party staying in power
 - economic growth
 - reduced local air pollution
 - transformation of electricity generation from coal with massive investments in renewables and nuclear
 - water availability
 - electric mobility

China

Will continue to increase emissions up to 2030

USA

- Priorities
 - national security
 - domestic politics
 - economic development /energy prices
 - shale gas and unconventional oil (Canada ?)
 - phasing out coal

USA

Will meet its GHG emission reduction targets for 2020

-not by design

EU

- Priorities

- Historically

- morale leadership /example for the world on climate responsibility and emission reductions

- Now

- economic development
 - energy efficiency
 - energy prices
 - energy security

Global climate negotiations

A global binding climate agreement is unlikely.

Key challenges

- Priorities - poverty alleviation and jobs versus climate change?
- Who is going to pay for what?

Global climate negotiations.

Key challenges

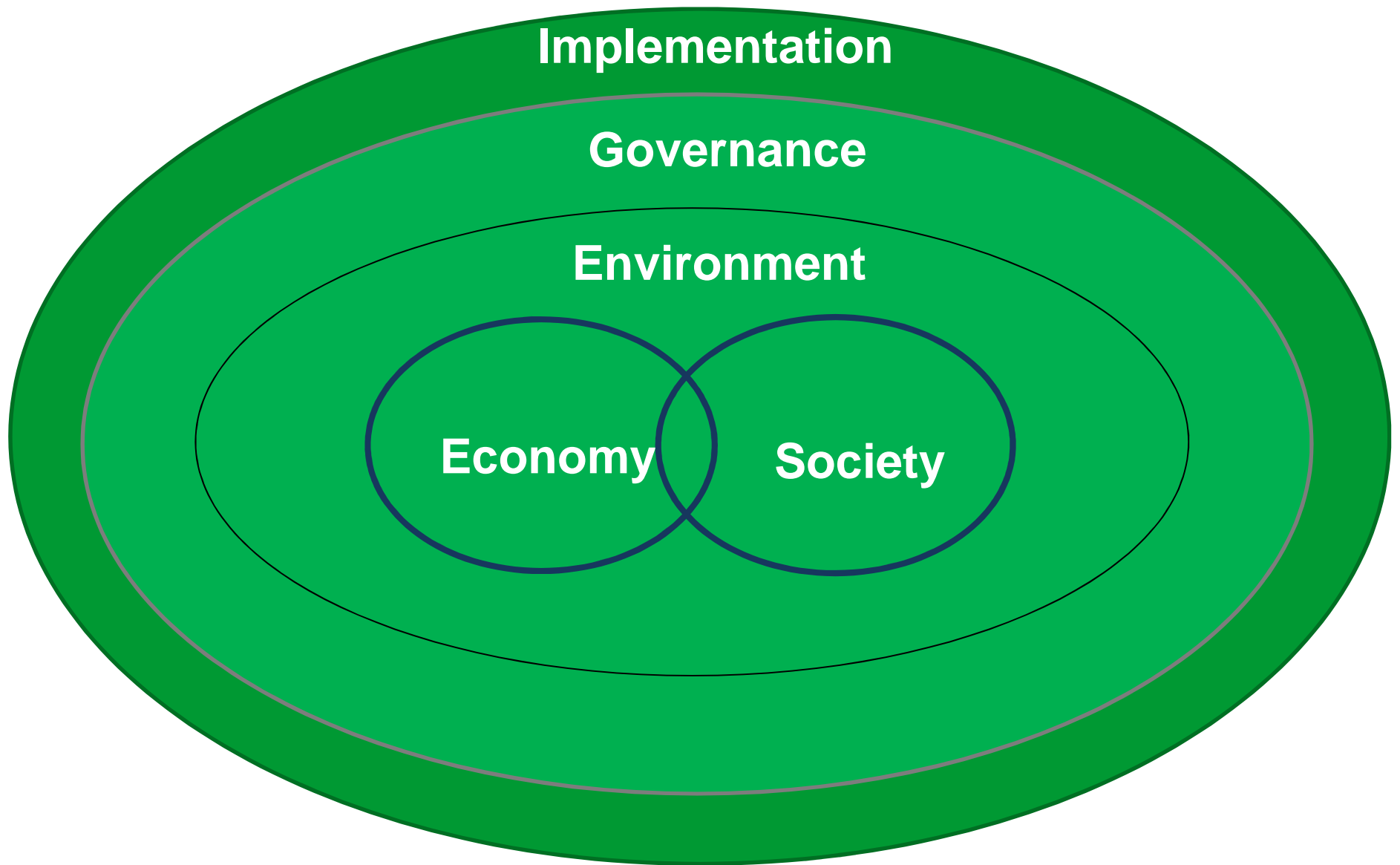
- A sense of urgency ?
- Efficiency of the UN led process?
- Whose responsibility is it to protect ecosystems?

Who is in charge ?

What will drive the climate agenda going forward?

- Competition/ The Green Race
- Resource constraints/efficiency
- Energy efficiency
- A carbon price
- Low carbon technologies for infrastructure and lifestyles
- Technology innovations for CO₂ management – CCS? CO₂ as a raw material ?

A World with limits in transition to sustainability



New Public Private Partnerships needed

- Between governments and business
 - Both globally ,nationally and locally
 - Business is playing a major role as solutions provider ,innovator and implementer
- Business to business
 - Cooperation within industry sectors across country borders will grow in importance
 - Between companies via platform like WBCSD to jointly address green growth and sustainability
- With civil society
 - To establish trust for difficult trade offs and transformations
- With academia
 - To build knowledge and skills for implementation
 - To stimulate research and innovative solutions



Business cannot succeed
in a society that fails.

The global society cannot succeed without
business as a committed solutions provider.

