

SUSTAINABLE DEVELOPMENT : **HISTORICAL EVOLUTION AND MILESTONES**

Climate Change Seminar

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Scope of this Lecture

Three Questions

- 1. How Sustainable Development Evolved : Key Global Milestones
- 2. What are the Key Focus Areas for Sustainability
- 3. How do you translate principles and concepts in “Real World”

AND SOME TAKEAWAYS

Global Milestones

- ❑ **1950s** - **Charles Keeling & "Keeling Curve"**
 - ❖ Roger Revelle suggested human gas emissions might create a "greenhouse effect" that would cause global warming over time

- ❑ **1970s** - **United Nations Environment Programme, US-EPA**

- ❑ **1972** - **Stockholm Conference**
 - ❖ Creation of UNEP
 - ❖ Formulation of Environmental Legislations/Regulations (Malaysia 1974, Thailand 1975, Philippines 1977, PRC 1979)

- ❑ **1982** - **10 years after Stockholm**
 - ❖ More environmental institutions were established/strengthened
 - ❖ Formulation of environmental legislations
 - **UN Convention on the Law of the Sea**
 - ❖ Defined the rights and responsibilities of nations in their use of the world's oceans

Global Milestones

- **1987** - **Brundtland Commission's "Our Common Future"**
 - ❖ Concept of Sustainable Development as development which "meets the needs of the present without compromising the ability of future generations to meet their own needs"
 - ❖ Integration of environment into macro operations and sectoral policies and creation of environmental cells in sectoral departments or agencies

- **1992** - **UNCED or "Rio Summit"**
 - ❖ Brought "the environment" to political agenda of governments
 - ❖ Committed nations to implementation of Agenda 21,
 - ❖ United Nations Framework Convention on Climate Change
 - ❖ UN Convention on Biodiversity
 - ❖ Agreements on Basic Principles for Managing and Conserving World's Forests

Global Milestones

- **1994** - **Convention to Combat Desertification**
- **1995** - **COP 1 held in Berlin**
- **1997** - **Kyoto Protocol**
 - ❖ established legally binding obligations for developed countries to reduce GHG emissions
- **2002** - **WSSD / Rio + 10**
 - ❖ Stockholm Convention (POPs) in 2004
 - ❖ UNFCCC text adopted
- **2006** - **Stern Review**
 - ❖ Helped galvanize attention to climate change among finance ministers
- **2009** - **UNFCCC Copenhagen Accord (Climate Change)**
 - ❖ Commitments on the establishment of a "Green Climate Fund"
 - ❖ UNFCCC enters into force in **1994**
 - ❖ UNFCCC Secretariat Set up to support the convention in **1996**

Global Milestones

□ 2009 - Declaration on Green Growth (OECD)

- ❖ Pursue green growth strategies as part of response to crisis and beyond

□ 2010 - Incheon Declaration on Green Growth (ESCAP)

- ❖ strengthen efforts to pursue green growth strategies as part of response to the current crisis and beyond”
- ❖ ASEAN Leaders’ Statement on Sustained Recovery and Development – promote green growth, investments in long term sustainability and sustainable use of natural resources
- ❖ PRC, Japan and Republic of Korea pursued green growth initiatives

□ 2010 - Aichi Biodiversity Targets and Nagoya Protocol

- ❖ 20 ambitious targets on biodiversity
- ❖ Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization

Global Milestones

□ 2012 - UNCSD or “Rio + 20”

- ❖ Outcome document: “*The Future We Want*” (green economy as a tool for SD, stronger UNEP, CSR, beyond GDP, SD financing strategy, oceans and marine BD, SCP 10 years framework)
- ❖ Commitment to a process to establish Sustainable Development Goals to be integrated into the post 2015 development agenda

□ 2013 - Minamata Convention

- ❖ Protect human health and environment from anthropogenic emissions and releases of mercury and mercury compounds

MDGs 2000

8 Goals

- Eradicate Poverty
- Achieve universal Primary education
- Promote Gender equality & Empower women
- Reduce Child mortality
- Improve Maternal health
- Combatting HIV/AIDS, malaria, and other diseases
- Ensure Environmental Sustainability
- Develop Global Partnership for development

2015

- SDGs (17 Goals and 169 Targets), Sept
- Paris Agreement (COP21) , Dec



Related and Post 2015

- **New Urban Agenda** (Sustainable cities and human settlements for all),Habitat III, October 2016
- **Sendai Framework** for Disaster Risk reduction(2015-30), June 2015

SDGs Document statement

- SDGs Goals and targets are integrated and indivisible, global and universally applicable
- Targets are defined as **ASPIRATIONAL** and **GLOBAL**
- Each government will decide how aspirational and global targets should be incorporated in National Planning process and strategies
- Challenge of translating into

2015 Addis Ababa Action Agenda

- UN General assembly endorsed at International conference on Financing for Development
- Global Action for Financing Sustainable Development (linkage to SDGs)
- Agreement is a follow up to the Monterrey Conference (2002) and the 2008 Doha Declaration for Financing for Sustainable Development

Spirit of COP 21

Key Elements

- 190 Countries participated
- 160 Intended Nationally Determined Contributions (INDCs)
- Diplomatic Success but Lots of follow Actions needed
- 2 degree C target has not been achieved (aspiration to 1.5 degree C above pre-industrial level)



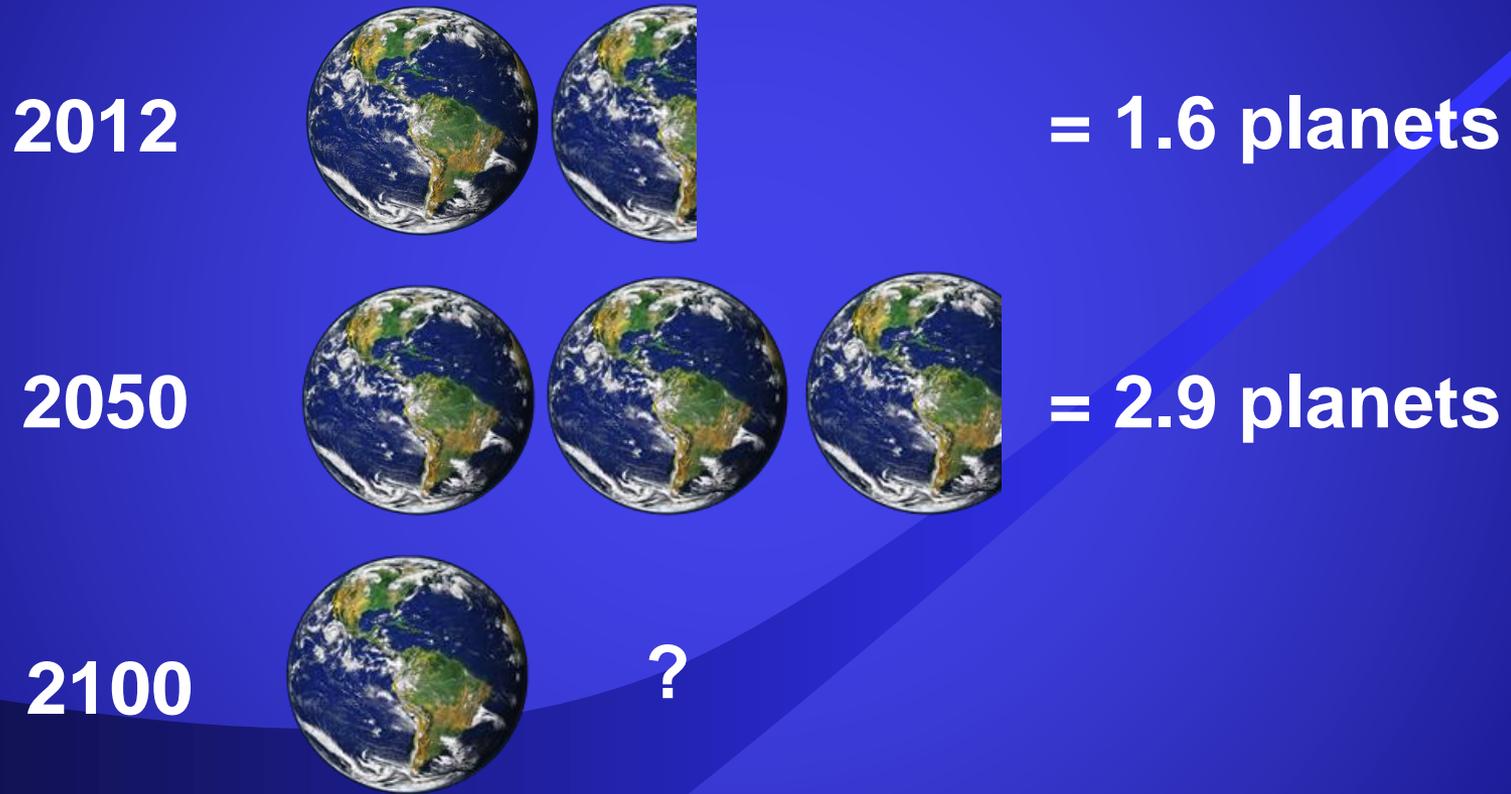
Key Areas of Paris Agreement

- INDCs (Intended Nationally Determined contributions)
- Mitigation
- Adaptation
- Losses and Damages
- Finance (\$ 100 B/year)
- Technology Development and Transfer
- Capacity Building

KEY FOCUS AREAS FOR SUSTAINABILITY

**DRIVERS OF CHANGE, SETTING OPERATION
PRIORITIES & PRIORITIES AND ACTION AGENDA**

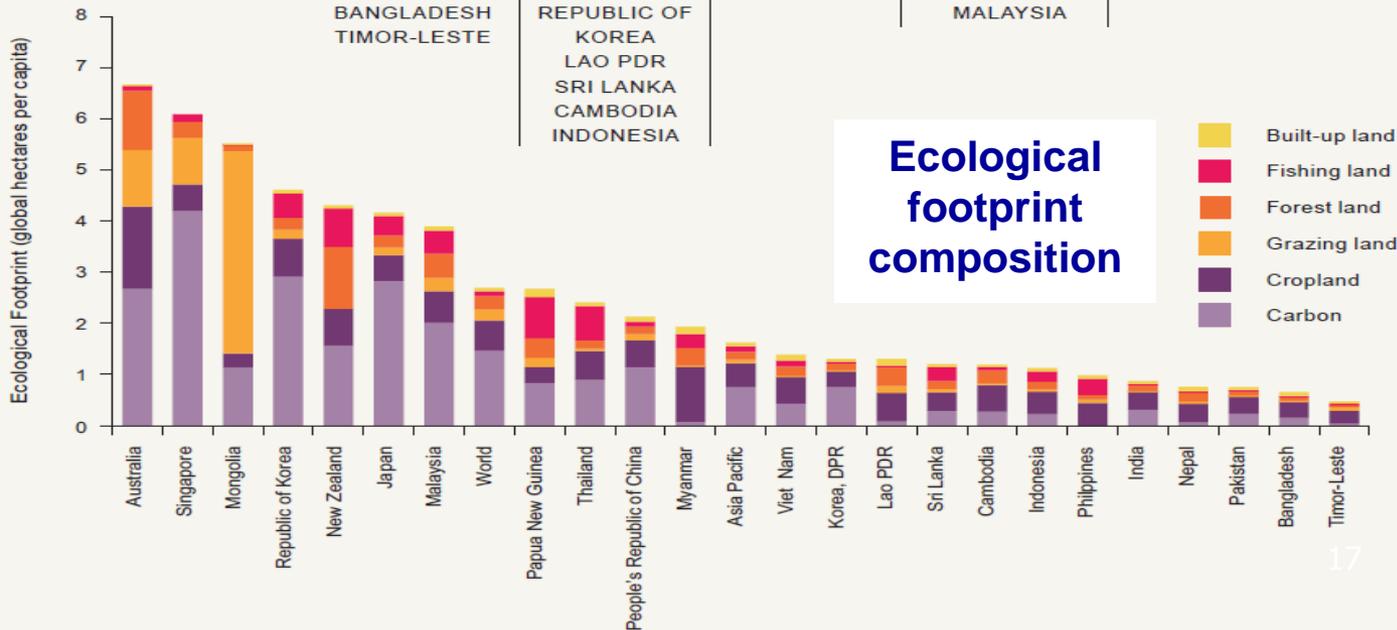
How many planets do we need? - Ecological Footprint (2012)



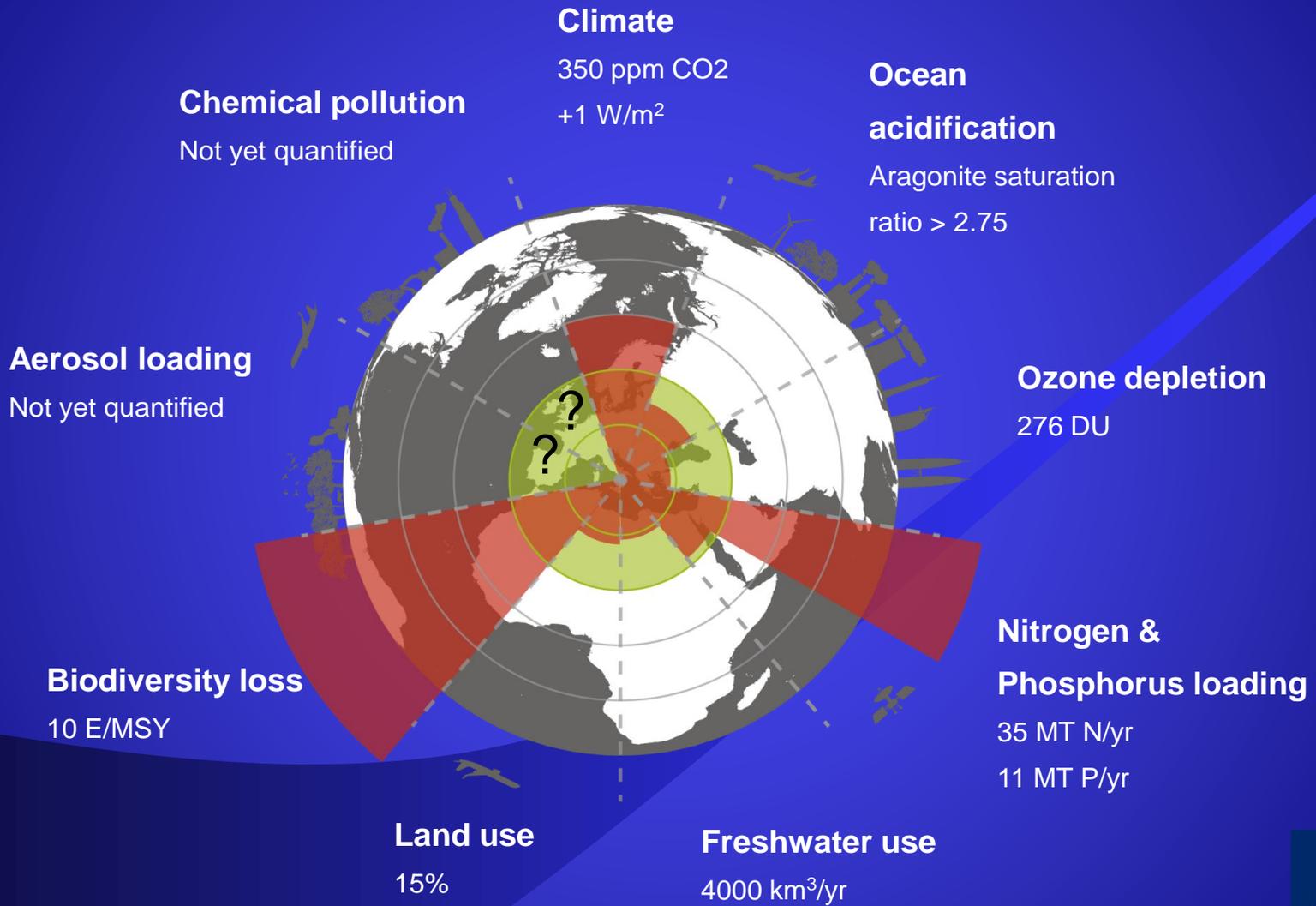
Source: WWF, 2012

Ecological footprint per capita

Ecological footprint per capita by country →



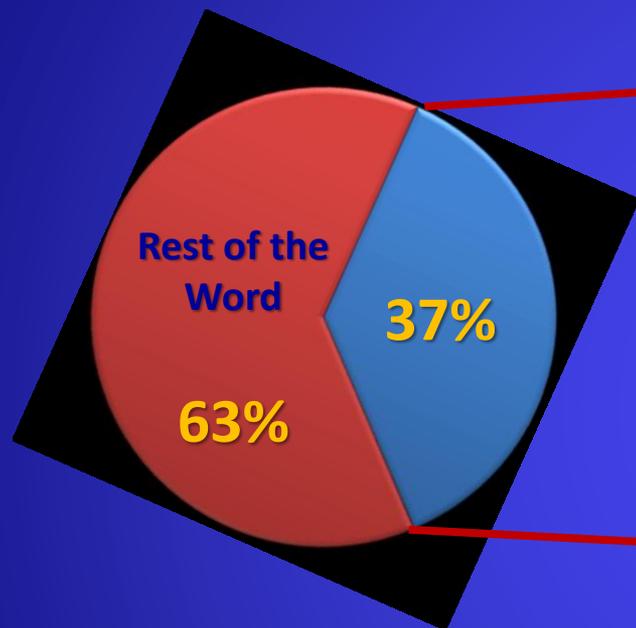
Environmental Context for the SDG? Planetary Boundaries



Focus for Asia-Pacific Region

- 1. Energy:** demand is projected to almost double in the Asia and Pacific region by 2030.
- 2. Transport:** Asia's fastest growing source of CO₂. Vehicle fleet has more than doubled in the past decade.
- 3. Urban/Cities:** 44 million people/yr are added to Asian cities.
- 4. Water Security:** Demand is expected to significantly exceed sustainable supply in India and PRC by 2030.
- 5. Biodiversity:** Key populations declined by 60% in 30 years. Trends likely to continue without mitigation
- 6. Climate vulnerability:** 7 of the world's 10 countries at greatest vulnerability to climate change and variability.
- 7. Sustainable Consumption and Production/Circular Economy:** Life-style change and industrial design change (for example, 3R, Industrial Ecology).
- 8. Technology and ICT :** Potential to leapfrog and disruption , efficiency and effectiveness , power of big data, AI, drone and robotics etc

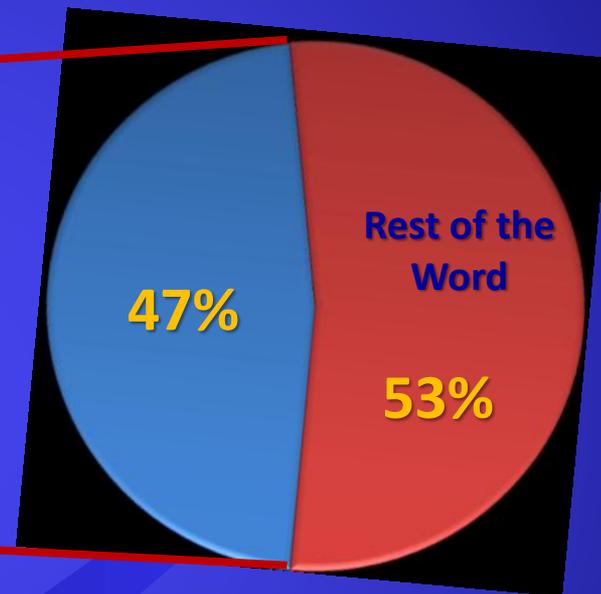
1. Energy: Developing Asia's Share in Global Energy-Related CO₂ Emissions



2010

Actual (World)

Total = 31,305 million tons CO₂



2035

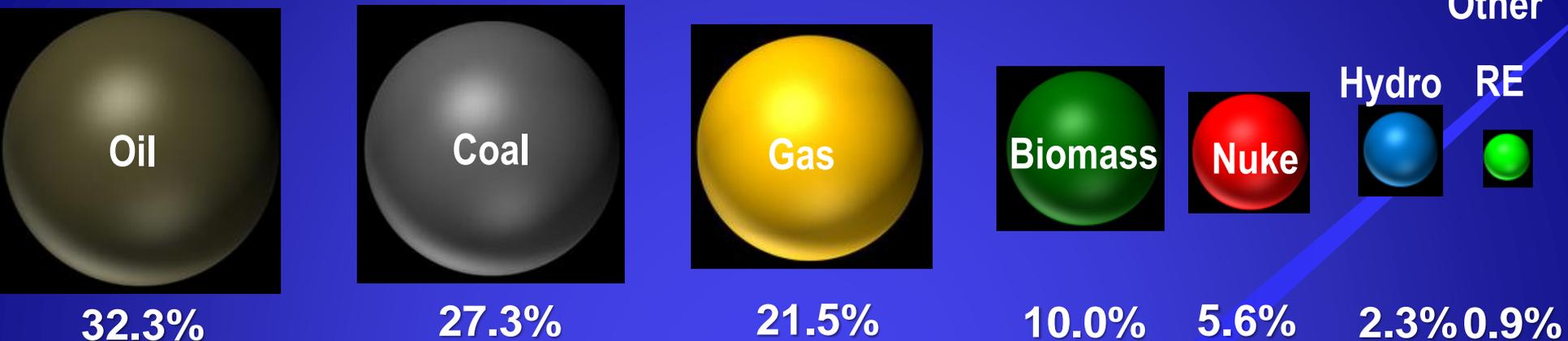
Projection (World)

Total = 43,220 million tons CO₂

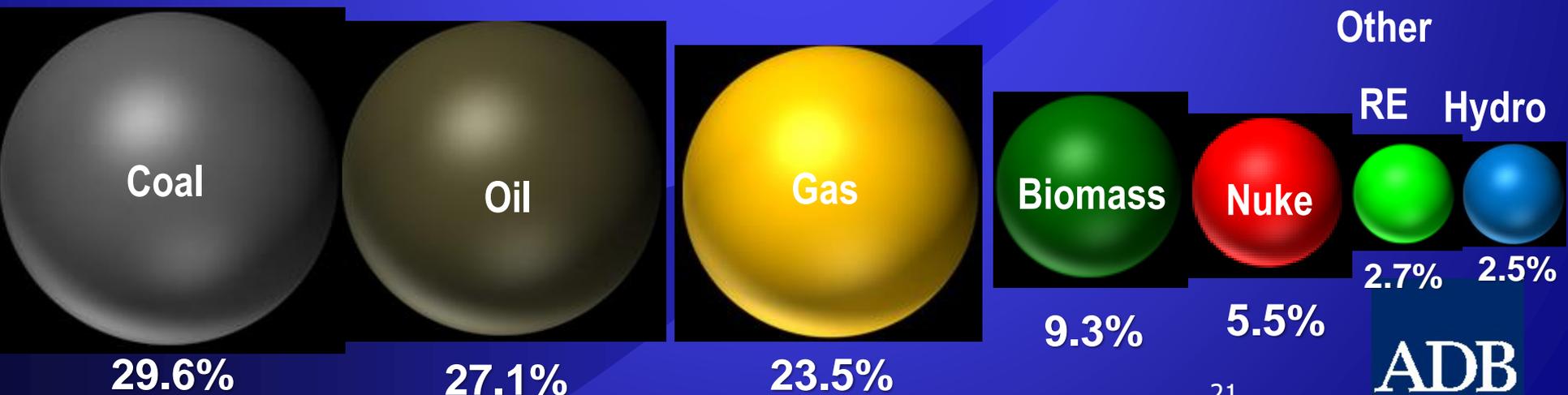
Source: ADB, APERC 2013

Asian Energy Outlook: Next Two Decades

2010: 12,730 MTOE



2035: 18,677 MTOE

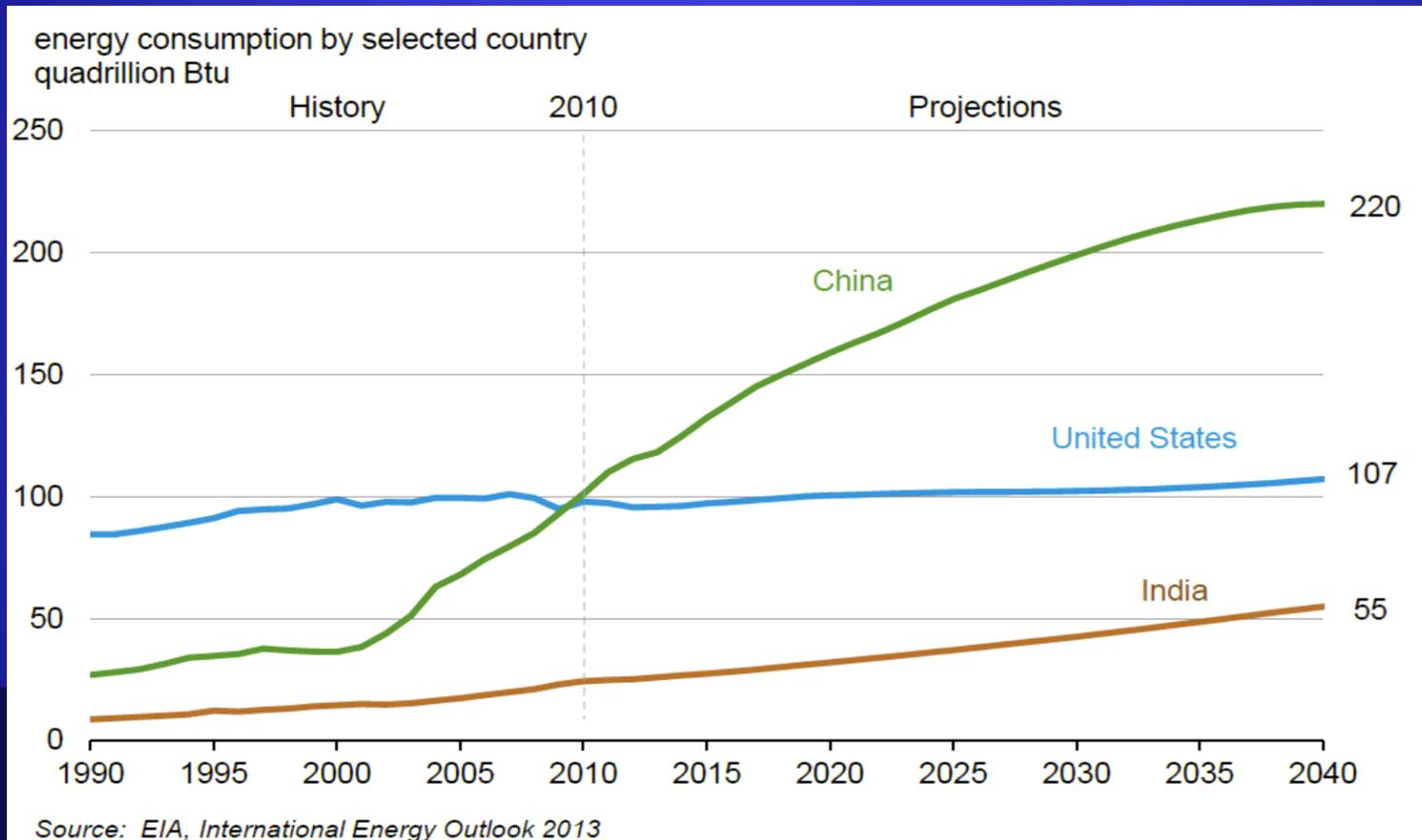


21
Source: IEA, 2013

ADB

China and India are driving world energy consumption energy

- 56 percent in the next three decades

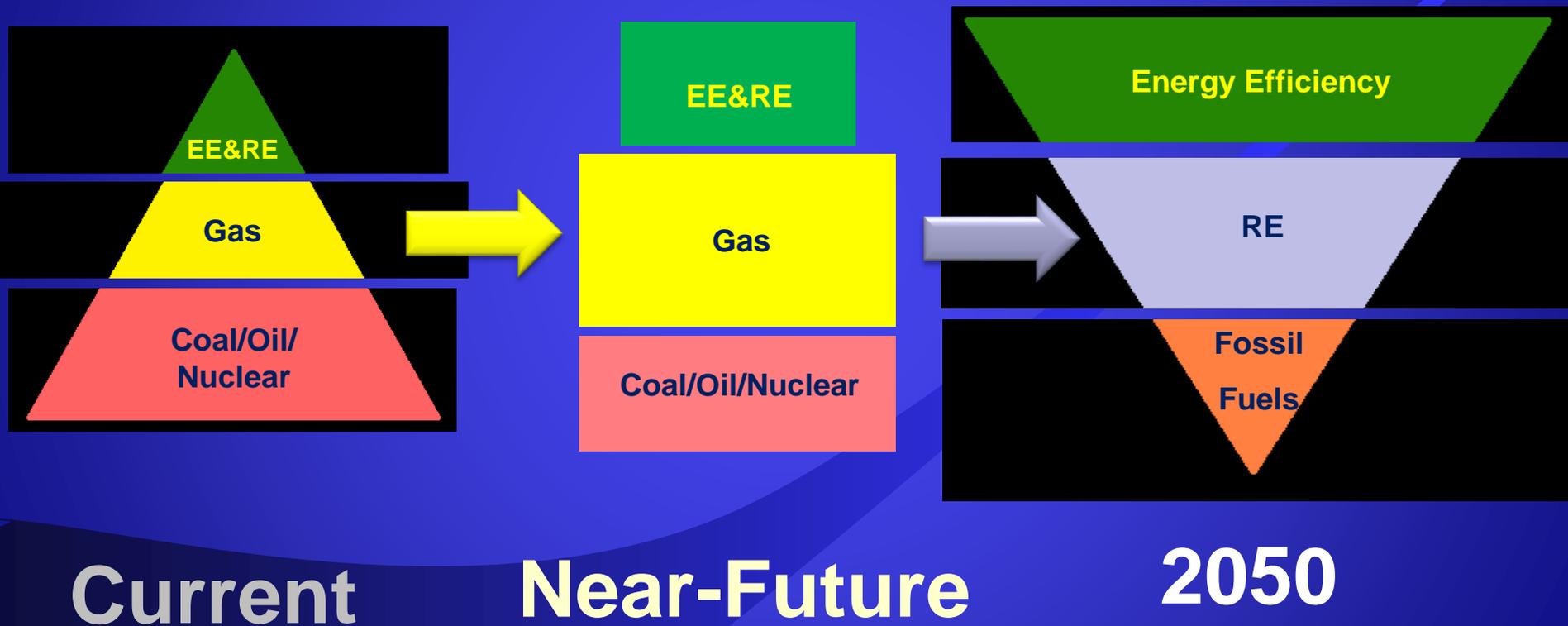


Asian Energy Outlook 2018(WEO 2018)

- Asia makes half of global growth in natural gas
- 60 % rise in wind and solar PV
- More than 80 % of increase in oil
- 100%of the growth in coal and nuclear(given decline elsewhere)
- The shale oil and gas supply will make US the worlds largest oil and gas producer

Market Transformation:

Unlock Asia's Clean Energy Future



Current

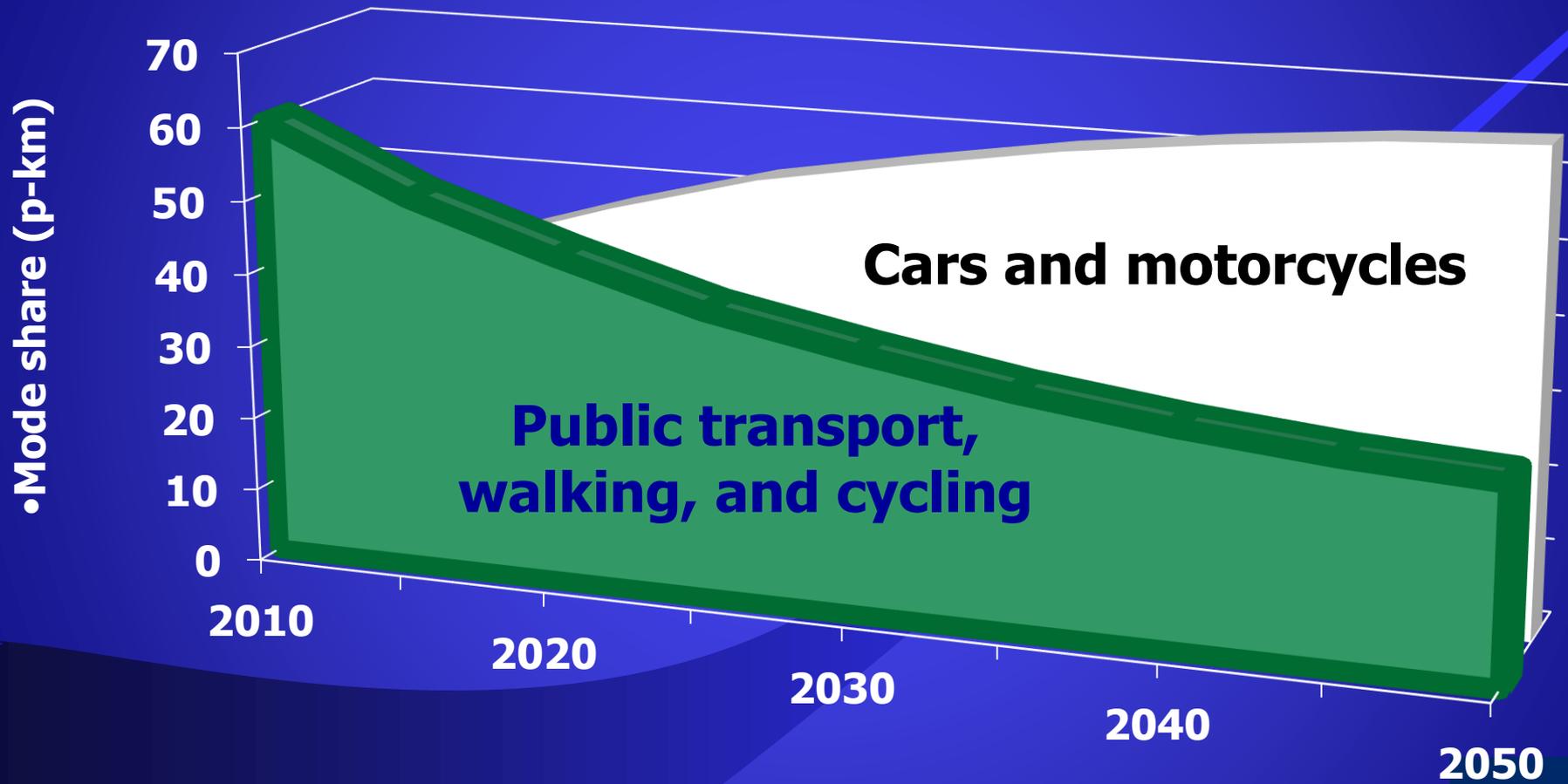
Near-Future

2050

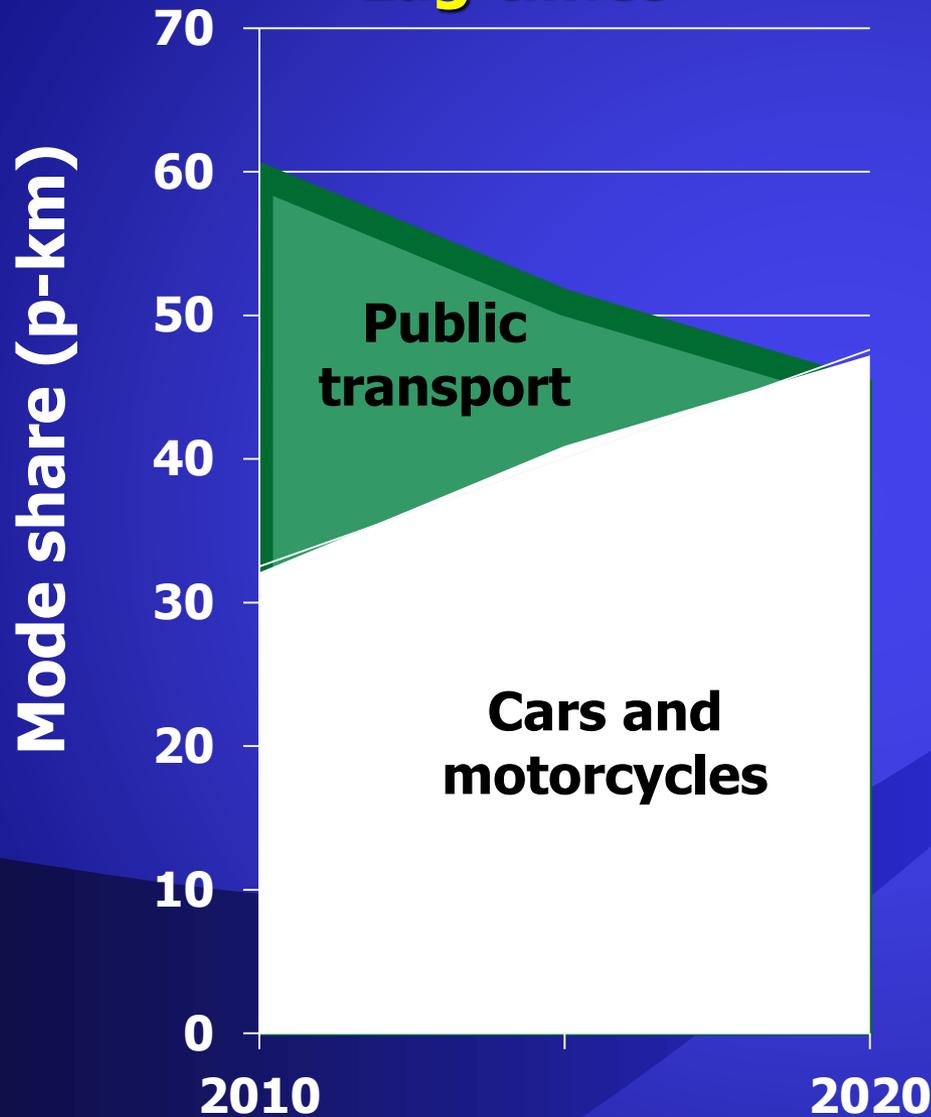
Three Game Changers for Energy

- **New Energy sources** including fuel cells; small ,modular nuclear fusion reactors, and even nuclear fusion (within 2 decades)
- **Mobility** :By 2030 Evs could account 27 to 37 % of new vehicle sales and
- Demand for liquid fuel to drop 8 to 25 %
- **The Shale oil and gas** in US will challenge the ability of OPEC

2. Transport: Asia-Pacific Trends



Lag times



**The trend for
the next 5 to
10 years is
fixed**

Transport

- Need to transform the transport sector(public transport , EVs ,...)
- Metro projects , e-vehicles , Railways, Inland waters ,Non-motorized transport and Integrated Urban transport
- Need for a new approach to transport financing and investment

Electric Vehicles

- Worldwide stock surpassed 2 million units in 2016.
- China, US and Europe account for 90% of all EVs sold around the world.
- Projected 30 million by 2025 and 150 million in 2040(reducing oil demand by around 1.3 mb/day)
- India target 2030, France and UK in the next 20 years , Sri Lanka started charging stations and commitments Manufacturers
- Major car manufacturers (BMW, Ford, Honda, etc) have targets to produce at least 1-2 million EVs by 2025.

3. Urbanization: growth at an unprecedented rate

- Urban areas account for 84% of global GDP
- 600 cities account for 60% of GDP (50% of these cities are in Asia)
- 577 second-tier cities to account for 50% of global GDP by 2025



Asia's Urban Challenges (1)

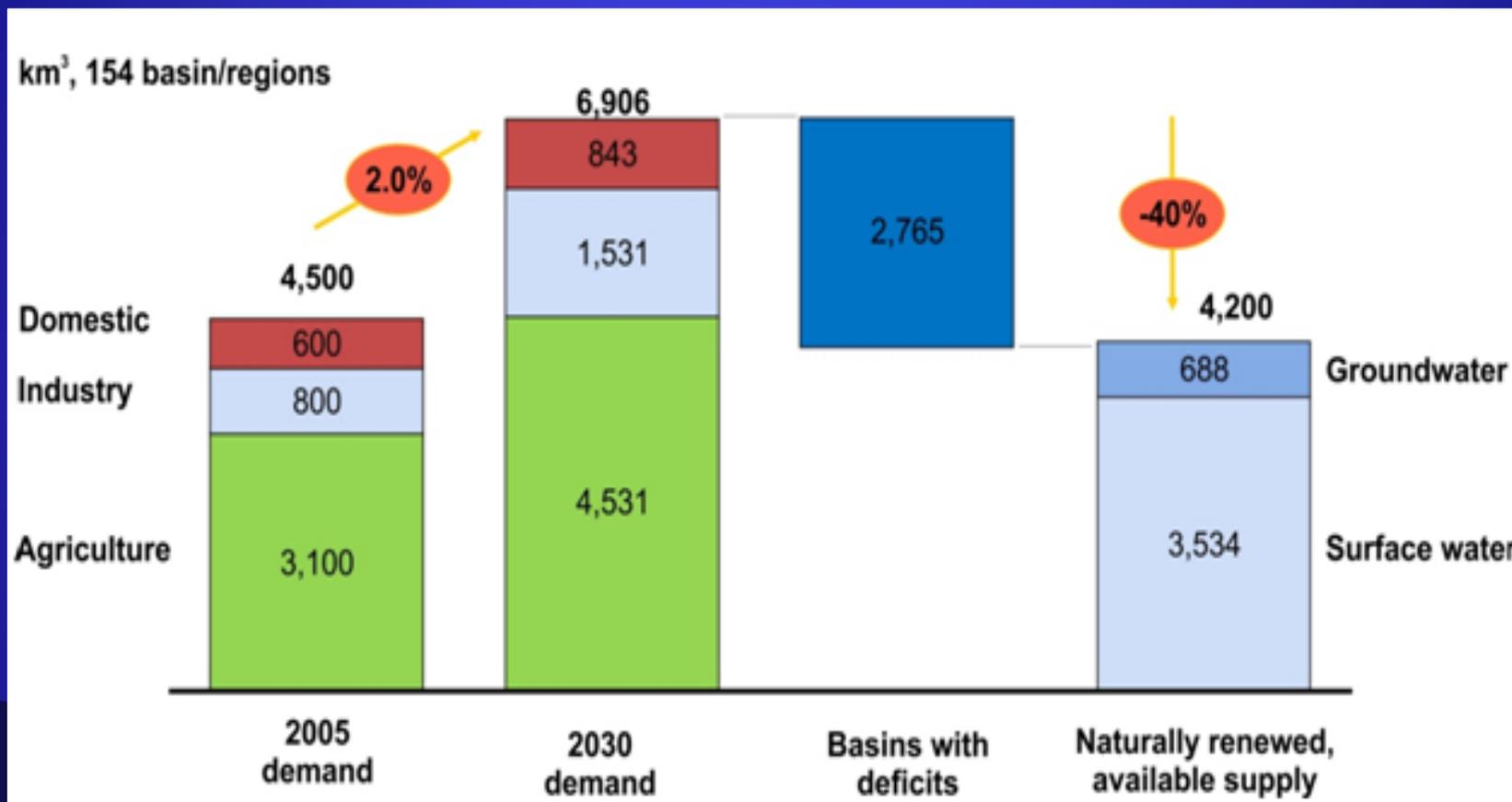
- Two faces of Asian urbanization: economic prosperity of cities and increasing urban poverty
 - ✓ Out of 1.6 billion urban people in Asia, more than 500 million are urban poor
 - ✓ Growing inequality
- High levels of environmental stress
 - ✓ Urban areas account for 60-80% of energy consumption and 75% of carbon emissions.
 - ✓ Climate change brings a new layer to environmental unsustainability.

Urbanization

- Need to turn cities to green, smart, inclusive and competitive cities
- Make them livable cities
- Need for a New Urban Agenda

4. Water demand & security

40% supply gap projected by 2030

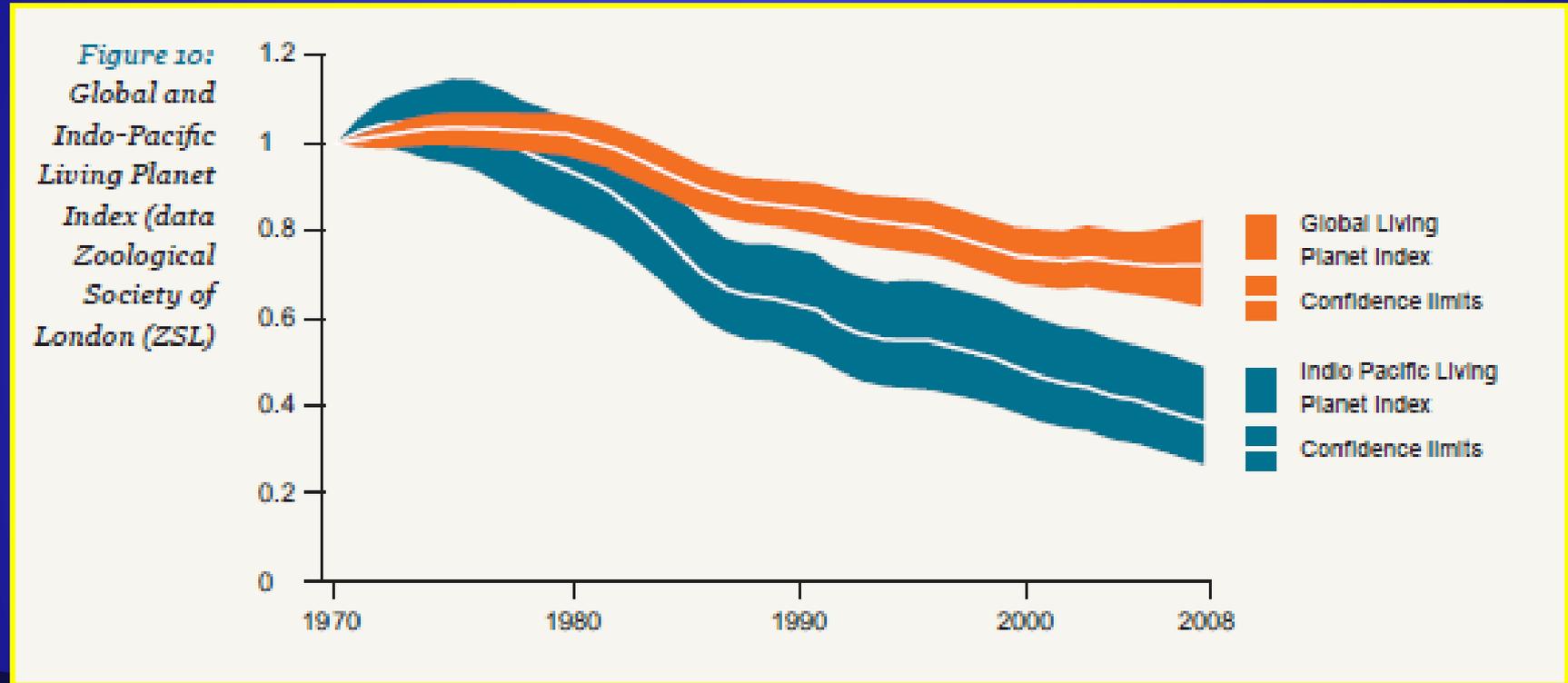


Source: The 2030 Water Resources Group. 2009. *Charting Our Water Future*

Water Security



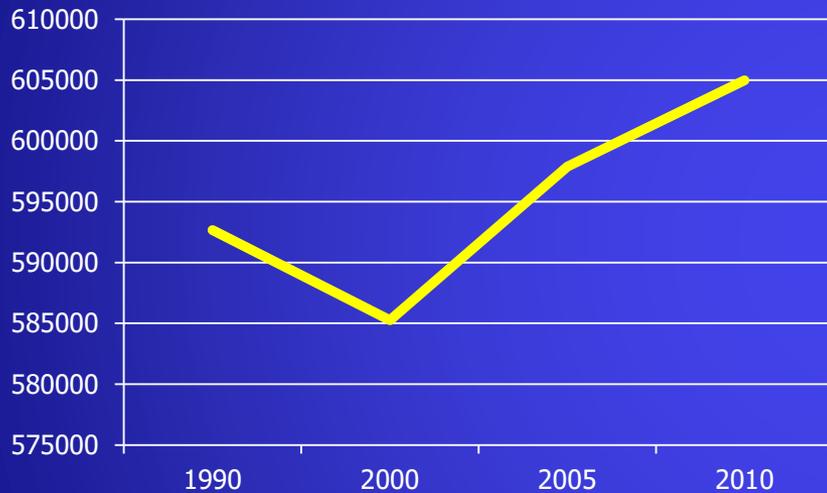
5. Declining biodiversity



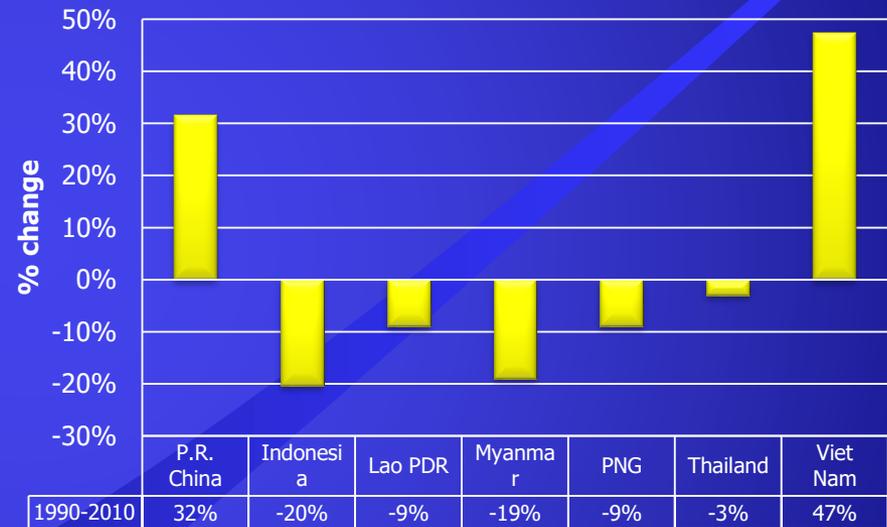
- Populations of mammals, birds, fish, reptiles & amphibians have declined by 64% in Asia-Pacific (twice the global average!)

Forest Trends (1990-2010)

Total Forest Cover (km²)



Forest Cover Change



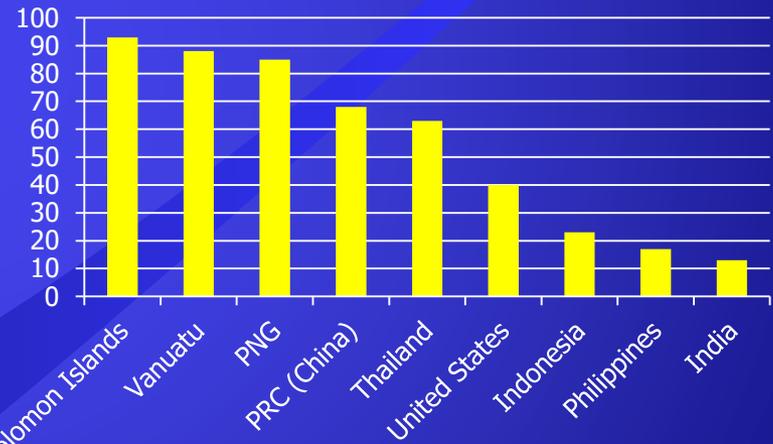
- **Overall: Forest cover increase since 2000**
- **Significant reforestation in the PRC driving regional trends**
- **Ongoing loss of primary forest in Indonesia, PNG, Lao PDR**

(Asian performance. MIXED)

Ocean Health Index

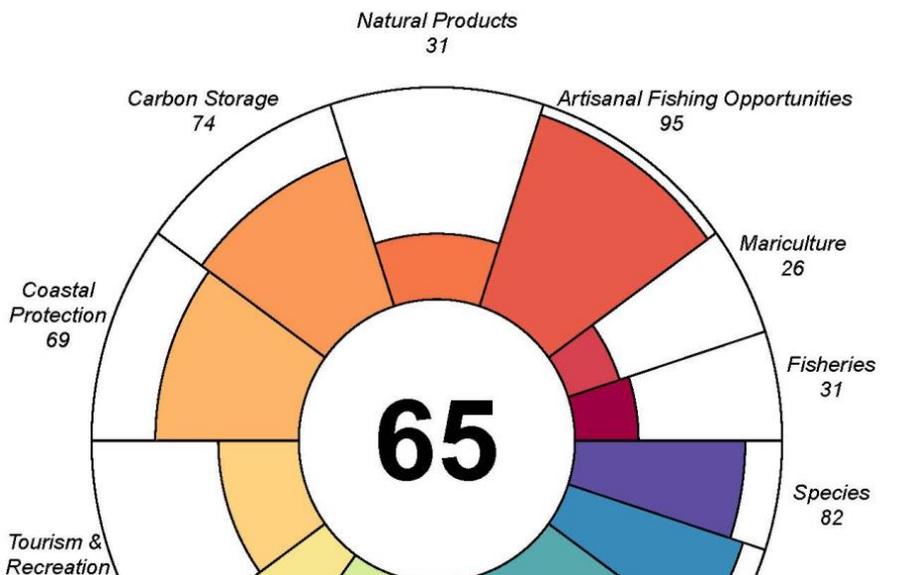
Seafood captured or raised in a sustainable way

Food Provison Index



← Increasing sustainability

Global 2013



Source: Ocean Health Index, 2012
<http://www.oceanhealthindex.org>



Biodiversity

- Need to protect, restore and enhance the management of ecosystems
- Greater attention needed on oceans and coasts
- Economic valuation of ecosystems services needs to be integrated in decision-making

6. Climate vulnerability in Asia

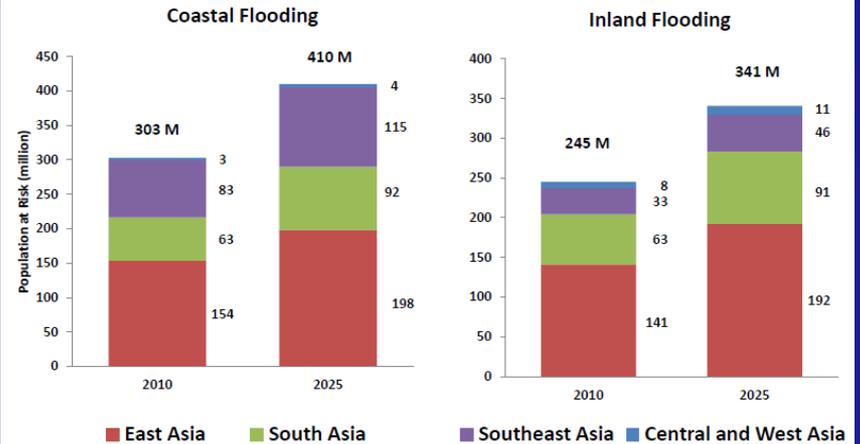
Asia is more vulnerable to coastal flooding

Risk of Coastal Flooding by Region, 2000

	Urban population at Risk (million)	Share of Population at Risk (%)	Urban Area at Risk ('000 km ²)	Share of Area at Risk (%)
Africa	32	11	18	6
Asia and Pacific	251	18	129	11
Latin America	24	8	42	6
Europe	40	7	56	7

Source: ADB estimates based on McGranahan et al. 2007.

Vulnerability will rise with urbanization



Source: Balk and Montgomery (2012).



Most Affected Asian Countries by Climate-Related Threats

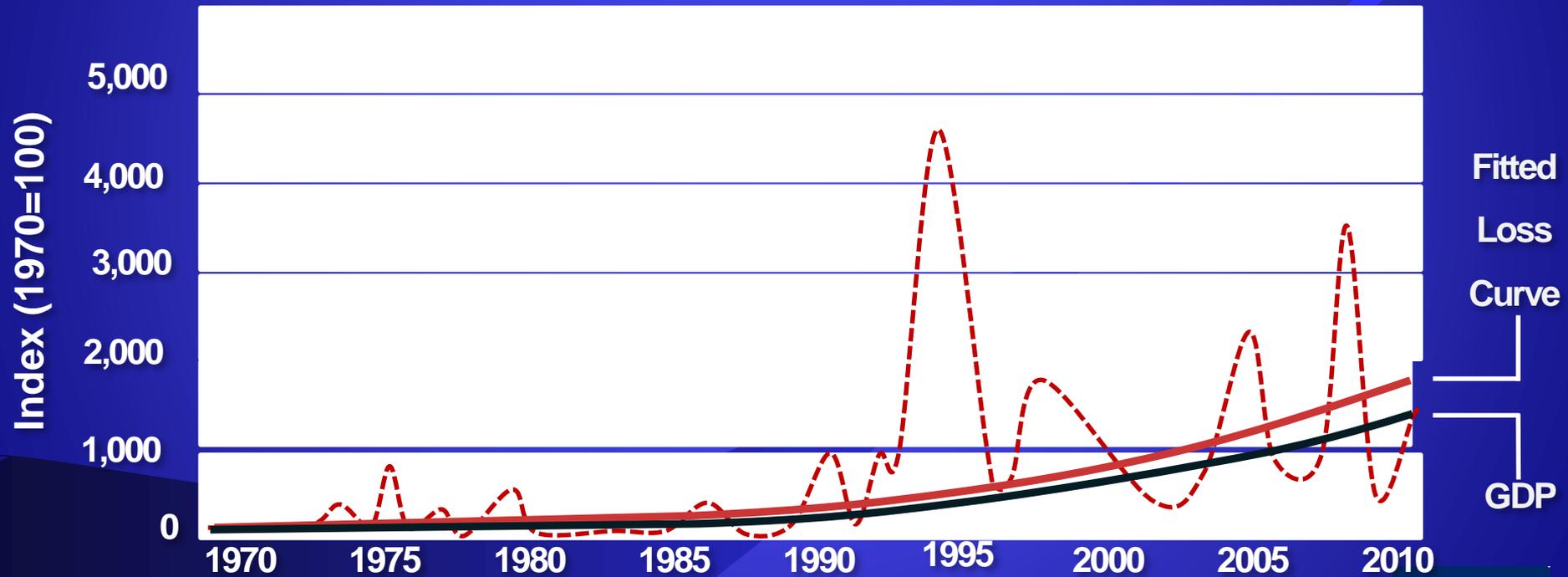
<i>Droughts</i>	<i>Floods</i>	<i>Storms</i>	<i>Sea Level rise (1m)</i>	<i>Agriculture</i>
Malawi	Bangladesh	Philippines	low-lying Island States	Sudan
Ethiopia	China, PR	Bangladesh	Viet Nam	Senegal
Zimbabwe	India	Madagascar	Egypt	Zimbabwe
India	Cambodia	Viet Nam	Tunisia	Mali
Mozambique	Mozambique	Moldova	Indonesia	Zambia
Niger	Lao PDR	Mongolia	Mauritania	Morocco
Mauritania	Pakistan	Haiti	China, PR	Niger
Eritrea	Sri Lanka	Samoa	Mexico	India
Sudan	Thailand	Tonga	Myanmar	Malawi
Chad	Viet Nam	China, PR	Bangladesh	Algeria
Kenya	Benin	Honduras	Senegal	Ethiopia
Iran	Rwanda	Fiji	Libya	Pakistan

Note: The typology is based on both absolute effects (e.g., total number of people affected) and relative effects (e.g., number affected as a share of GDP). Source: IPCC data

Economics of Climate Change

- The costs and risks of climate change is equivalent to losing at least **5-20%** of global GDP per year
- Economics of containing the global warming below 2°C will mean an **annual cost of 1% GDP**
- **India** and **S.E. Asia** could lose on average 2-3% and as much as a **9-13%** (95 percentile) **of GDP by 2100**
- Based on ADB studies, economy-wide loss by 2100 can be as high as:
 - ✓ **6.7% of GDP per year for Indonesia, Philippines, Thailand and Viet Nam**
 - ✓ **8.8% of GDP per year for Bangladesh, Bhutan, India, Maldives, Nepal, Sri Lanka**
 - ✓ **5.3% of GDP per year PRC, Japan, Republic of Korea, and Mongolia.**

Growth in direct physical losses is outpacing growth in GDP in Asia and the Pacific



Climate Vulnerability

- Need to address climate vulnerability
 - ✓ Mitigation
 - ✓ Adaptation
- Need to strengthen disaster risk management
- Climate Financing

What approaches do we need?

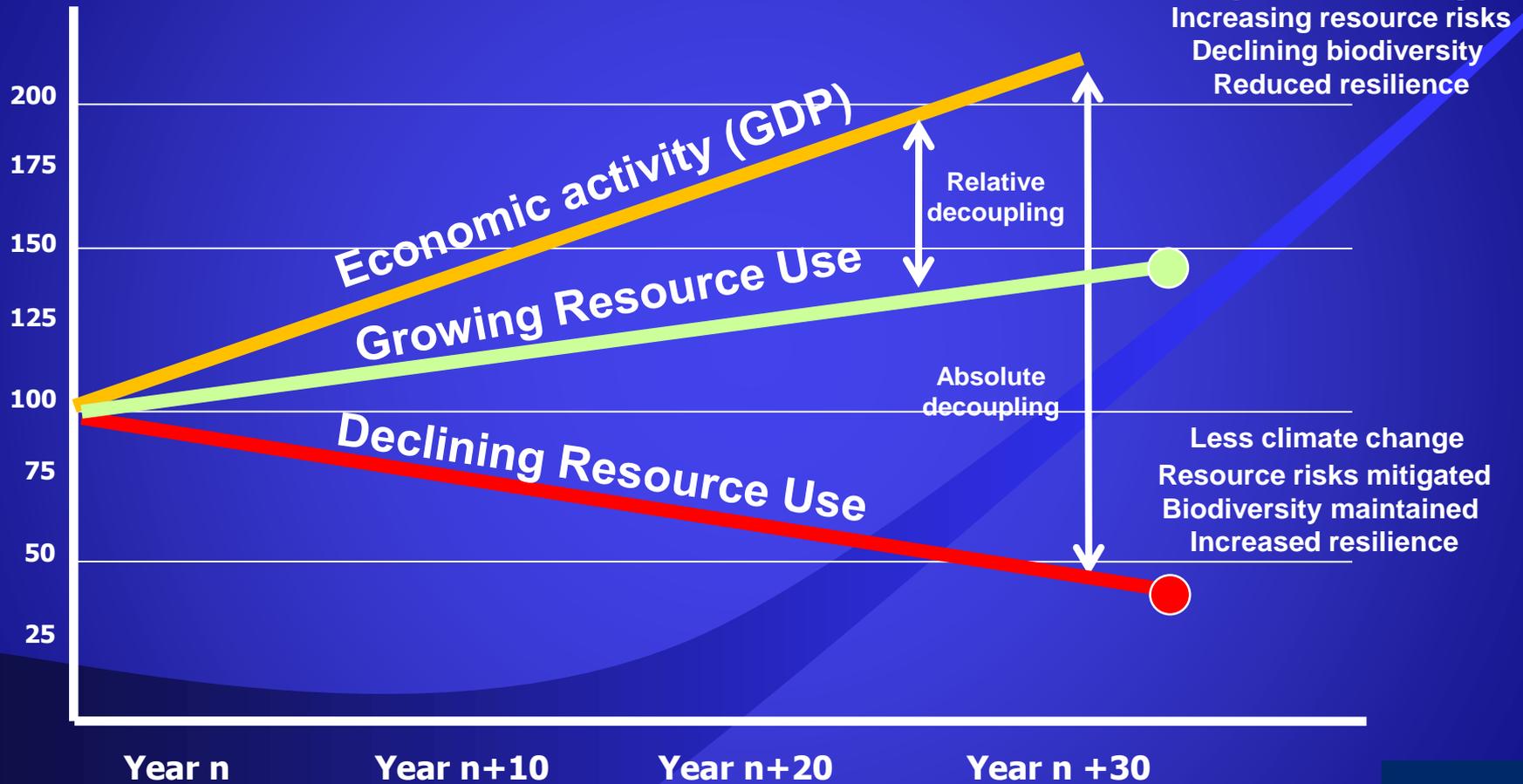
PATHWAYS TO GREEN GROWTH

Green growth

- Alternative paths that will bring about transformational change
 - ✓ Shift to more resilient infrastructure development
 - ✓ Achieve gains in resource-use efficiency
 - ✓ Achieve resilience against climate change and other shocks and stresses
 - ✓ Life-style change
 - ✓ Adopting green technologies
 - ✓ Others

Decoupling growth?

Year n = 100

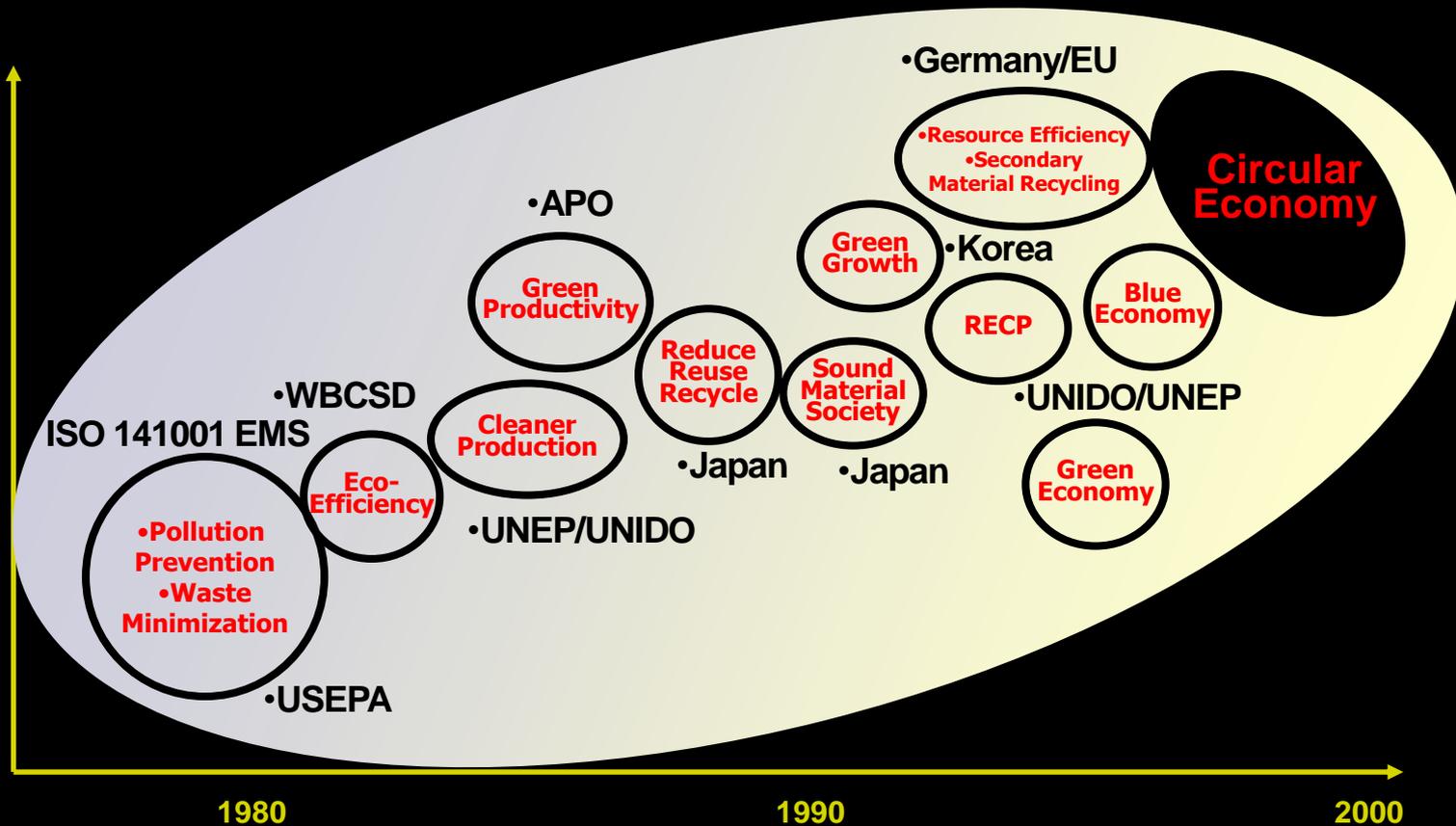


SUSTAINABLE CONSUMPTION AND PRODUCTION/CIRCUL AR ECONOMY

4. Circular Economy: How to Transition



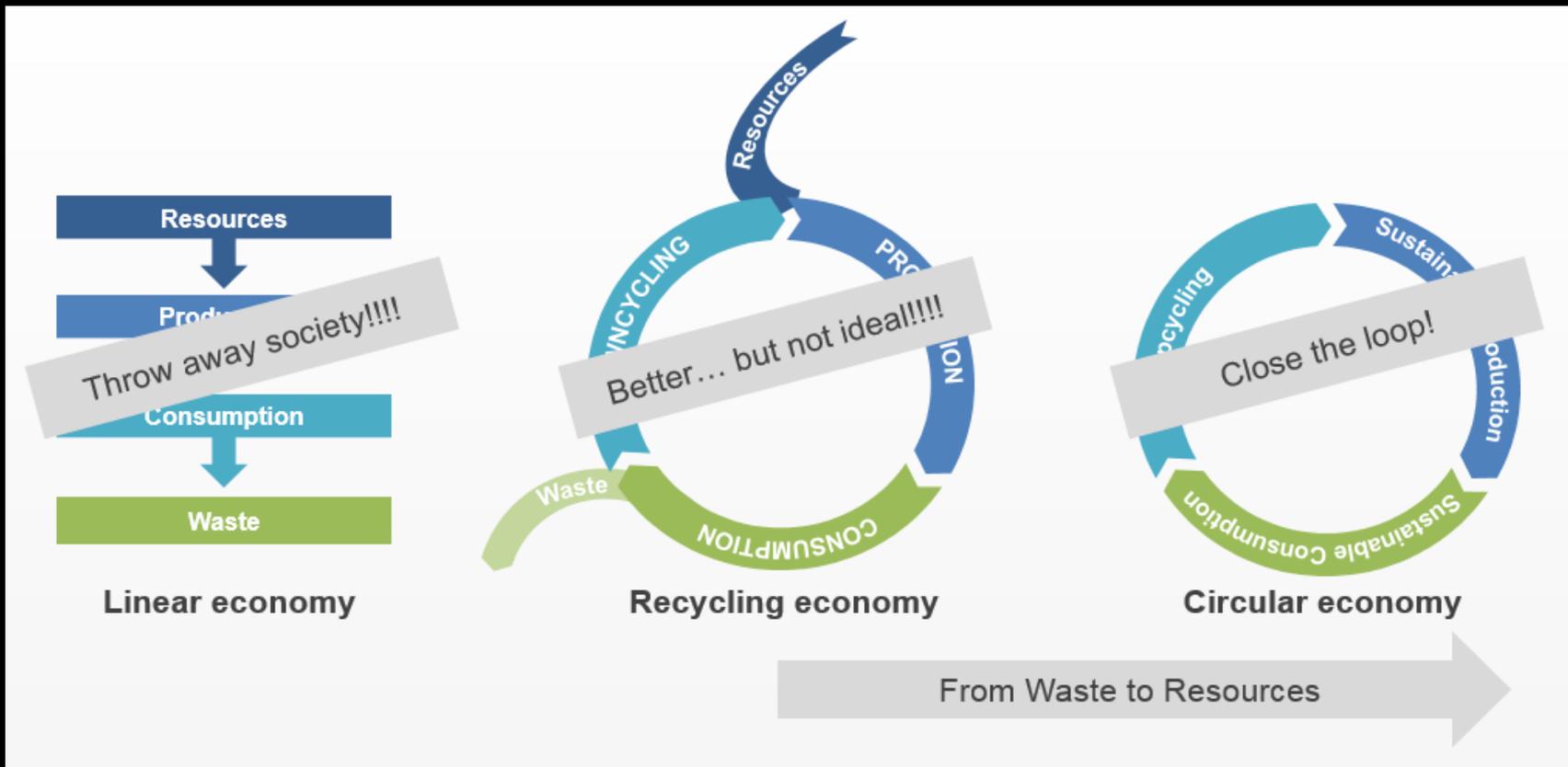
•Evolution of the Concept of Circular Economy



4. Circular Economy: How to Transition



•Transitioning to Circular Economy

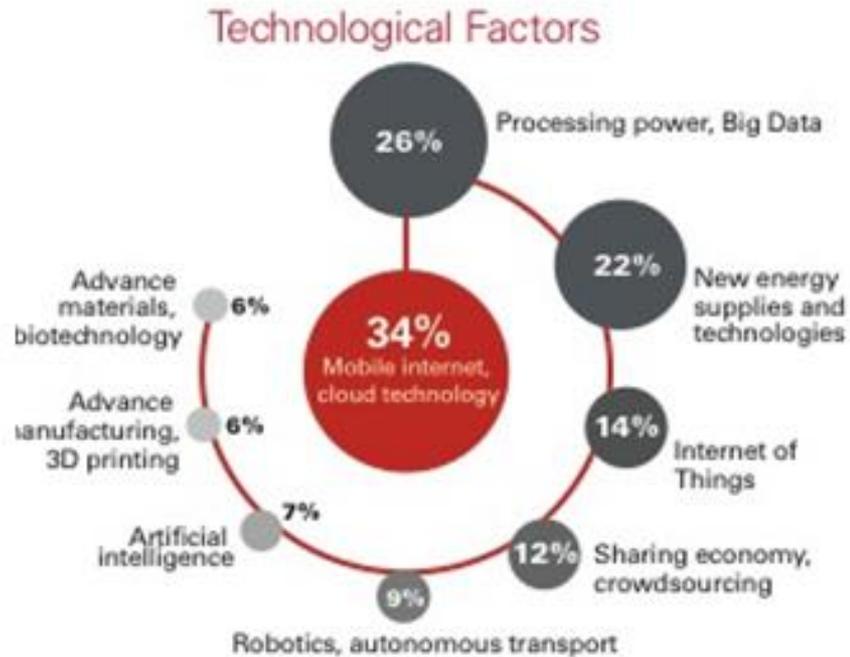


5. ICT & Technology



- **Use of ICT and Technology**
for effectiveness , efficiency and better decision making
- **Life cycle analysis with technology choices**
(including economic and financial analysis)
- **Promoting Smart Business**

Drivers of 4th Industrial Revolution



Source: World Economic Forum, Future of Jobs Survey 2016

ROLE OF TECHNOLOGY :

Examples

- Nuclear : Fusion etc
- Transport: Efficient Battery(alternative materials etc)
- . Food : "Lab Grown meat "
- Carbon Capture and storage (CCS)
- Buildings : Smart technologies

Sustainability Operational Framework : An illustration of an Organization



Promoting a shift to sustainable infrastructure



Investing in natural capital



Strengthening governance and management capacities

Climate change (mitigation and adaptation)

SAMPLE PROJECTS

Bangladesh

- **Title:** Coastal Climate-Resilient Infrastructure Project
- **Impact:** Improved livelihoods in rural coastal districts that are vulnerable to climate change.
- **Funding Source**

Source	Amount (\$ million)
SCF-PPCR loan, via ADB	20.00
SCF-PPCR grant, via ADB	10.00
Asian Development Fund loan	20.00
IFAD loans	59.00
IFAD grant	1.00
KfW grant	8.80
Government counterpart funds	31.20
Total	150.00

India

- **Title:** Rajasthan Renewable Energy Transmission Investment Program–Facility Concept (Rajasthan Solar Park)
- **Impact:** Improved livelihoods in rural coastal districts that are vulnerable to climate change.
- **Funding Source**

Source	Amount (\$ million)
CTF loan, via ADB	198.00
CTF grant, via ADB	2.00
ADB loan (ordinary capital resources)	300.00
Government counterpart funds	300.00
Total	800.00

ADB = Asian Development Bank, PPCR = Pilot Program for Climate Resilience, SCF = Strategic Climate Fund.

Indonesia

- **Title:** Sarulla Geothermal Power Generation
- **Impact:** A subproject under Indonesia's Private Sector Geothermal Energy Program, this initiative will expand geothermal electricity generation capacity by about 1,000 MW.
- **Funding Source:**

Source	Amount (\$ million)
CTF loan, via ADB	80.00
ADB (private sector) loan	250.00
Japan Bank for International Cooperation	533.60
Canadian Climate Fund for the Private Sector in Asia, under the Clean Energy Financing Partnership Facility	20.00
Private sector loan (commercial banks)	784.80
Total	1,668.40

ADB = Asian Development Bank, CTF = Clean Technology Fund.

Philippines

- **Title:** Market Transformation through Introduction of Energy-Efficient Electric Vehicles
- **Impact:** Sustainable transport and energy security as a result of the development of non-tradable domestic renewable energy resources as transport fuel, and accelerated growth of the electric vehicle industry in the Philippines through the demonstration of technology and business models
- **Funding Source**

Source	Amount (\$ million)
CTF grant, via ADB	5.00
CTF loan, via ADB	100.00
ADB loan (ordinary capital resources)	300.00
Government counterpart funds	99.00
Total	504.00

ADB = Asian Development Bank, CTF = Clean Technology Fund...

Thailand

- **Title:** Theppana Wind Power Project
- **Impact:** It entails the construction of a 7.5 MW windpowered electricity generation plant with three wind turbines, each with a capacity of 2.5 MW. The project is expected to generate over 14,000 MWh of electricity per year. It will reduce annual GHG e

- **Funding Source**

Source	Amount (\$ million)
CTF loan, via ADB	4.00
ADB	4.54
Private sector loan (Thai commercial banks)	4.54
Total	13.08

ADB = Asian Development Bank, CTF = Clean Technology Fund.



Vietnam

- **Title:** Sustainable Transport, Ho Chi Minh City (Sustainable Urban Transport for Ho Chi Minh Mass Rapid Transit Line 2)
- **Impact:** Integrated and sustainable public transport system, improved energy security as fuel consumption in the public transport sector drops by a projected 18 million liters per year, and strengthened regulations on public transport.
- **Funding Source**

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Thank You !!!!

Asia's Urban Challenges (2)

- Urbanization is placing an enormous strain on urban mobility
 - ✓ Economic cost of up to 2%-4% of GDP in many countries
 - ✓ 650,000 lives lost annually in region
- Cities face more complex public financial management challenges

Economy



Cities produce 80 % of GDP
Drivers of economic growth
Vulnerable to impacts of CC-
inundation, sea level rise

Asian
URBAN
Challenge

Energy



Cities use about 85% of energy
Asia - 35% CO2 emissions
Air pollution can have estimated
2%-4% negative impact on GDP



Climate Change



Environment

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