

Module 1 – Different pathways towards inclusive green economies

Course: Inclusive Green Economy (IGE) modelling

Date / Place / Name

OVERVIEW

- 1 Rationale for advancing inclusive green economies
- 2 Policy instruments
- 3 Simulation models and how they support decision making
- 4 Group exercise

1 Rationale for advancing inclusive green economies



THE NEED FOR A NEW ECONOMIC MODEL

The scale of the challenges over the coming decades is clear:



Population keeps growing, and so do ecological scarcity and environmental degradation.

An inclusive green economy is an alternative to today's dominant economic model, which led to:



Inequalities, waste creation and resource scarcities, and generates widespread threats to the environment and human health.



WHAT IS THE OBJECTIVE? THE SDGS

“ We, the Heads of State and Government and High Representatives, meeting at the United Nations Headquarters in New York from 25-27 September 2015 as the Organization celebrates its seventieth anniversary, have decided today on new global Sustainable Development Goals. ”

17 objectives, 169 targets to be achieved by 2030.



POLL



You have all heard about climate change. **By how many degrees do you think global mean surface temperature has risen since the industrial revolution (1880)?**

- A. 0.2°C
- B. 0.8°C
- C. 2.5°C

POLL

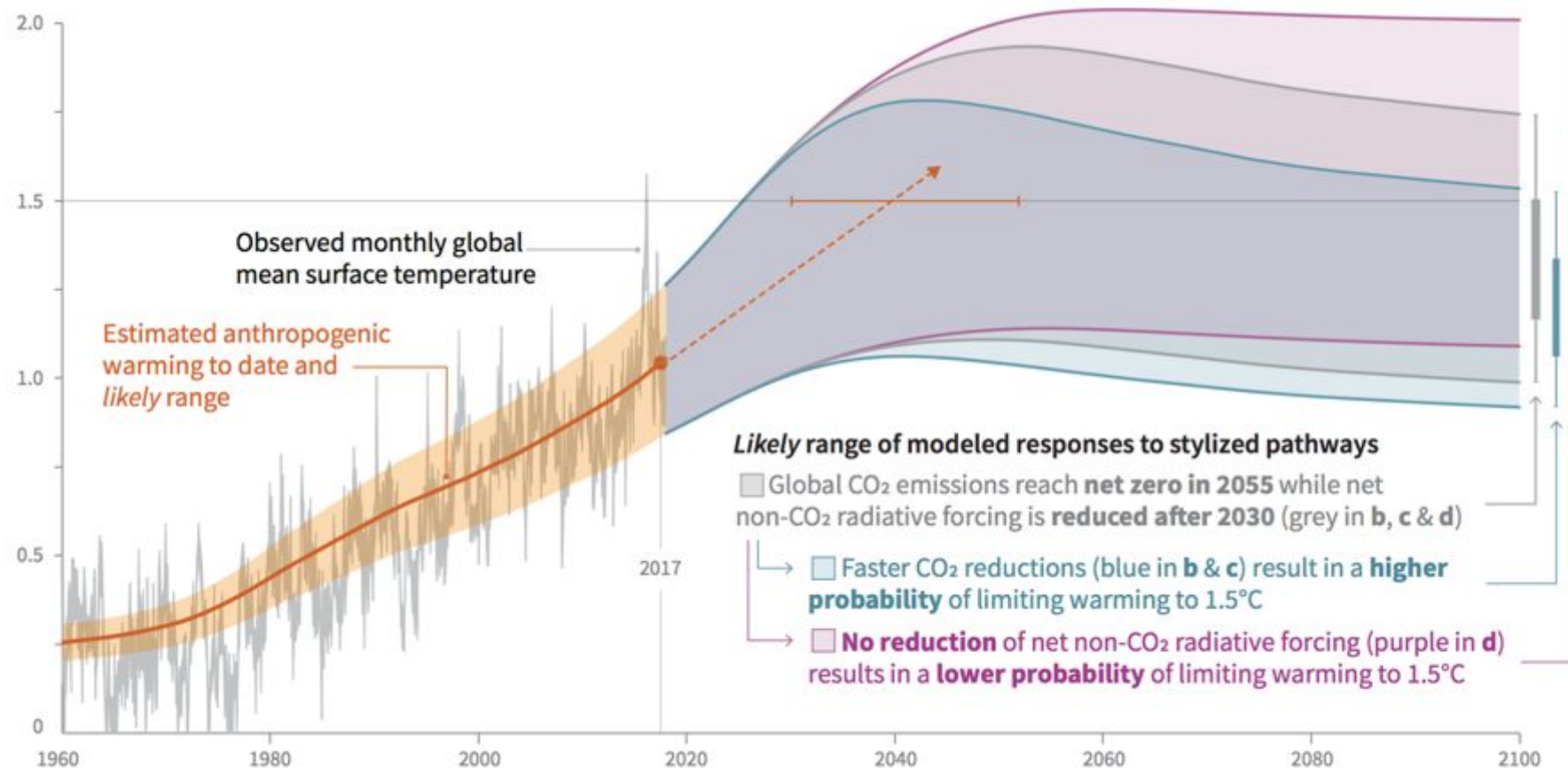


And **what are the projections for 2100 under a business as usual scenario?**

- A. 4.1 - 4.8 °C
- B. 2.8 - 3.2°C
- C. 1.3 - 1.4°C

WHAT ARE WE UP AGAINST? GLOBAL WARMING

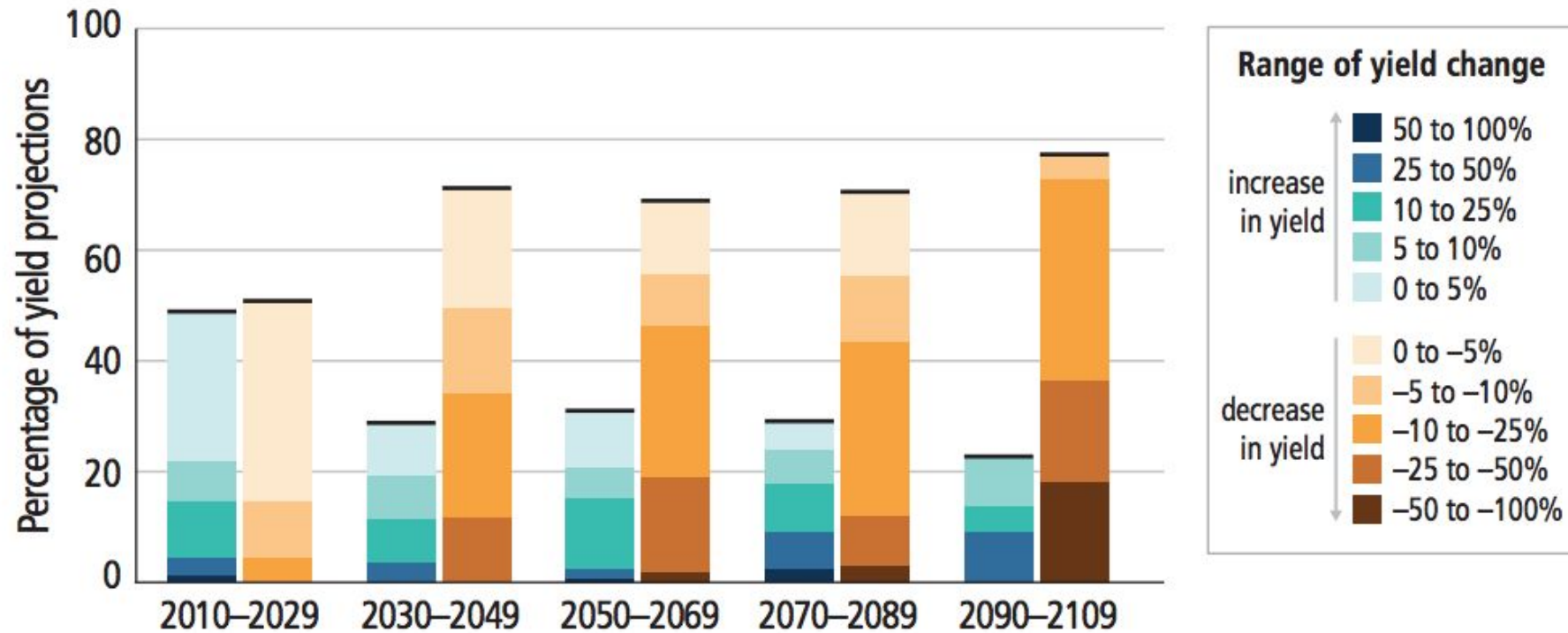
Global Warming relative to 1850 -1900 (°C)



Source: IPCC, 2018

WHAT ARE WE UP AGAINST? LAND YIELD IS GENERALLY EXPECTED TO DECLINE

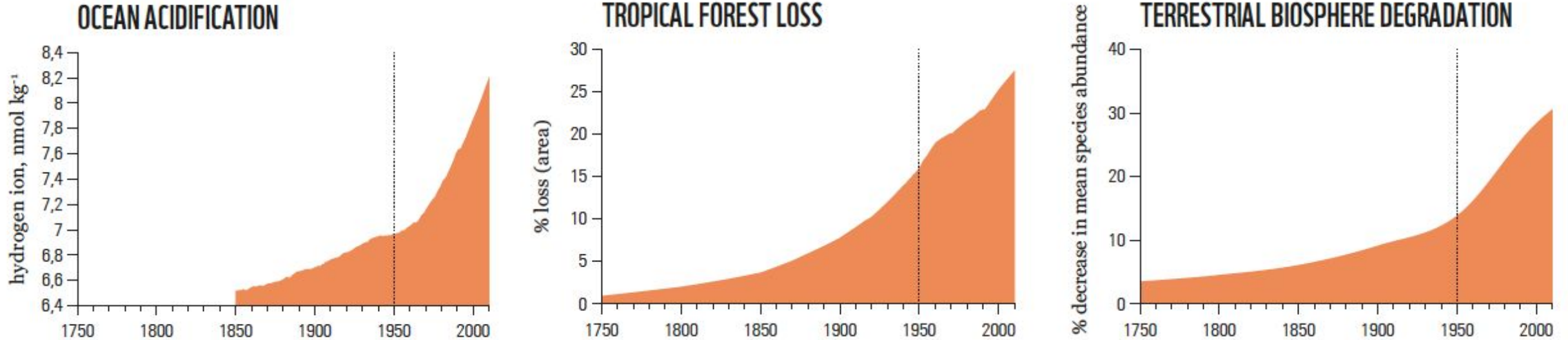
Summary of projected changes in crop yields due to climate change over the 21st century.



Source: IPCC, 2014

SEVERAL ADDITIONAL UNDESIRABLE TRENDS ARE ON THE RISE

Earth System Trends



Source: WWF, 2018

HOW TO TURN CHALLENGES INTO OPPORTUNITIES?

Responding to these challenges requires:



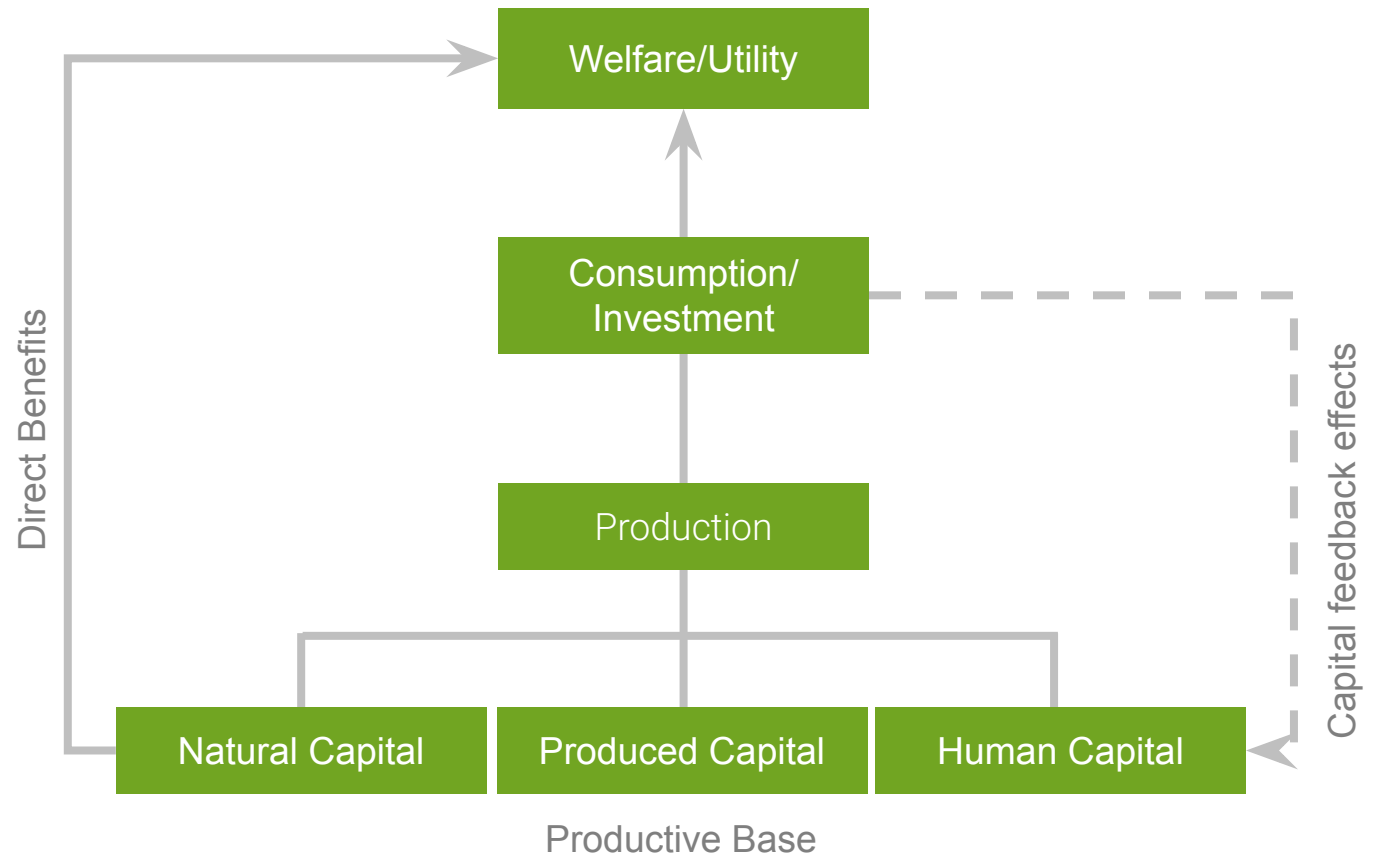
A fundamental economic redesign



Reorientation of financial flows

All with greater emphasis on addressing environmental and societal costs

A three-capital model of wealth creation



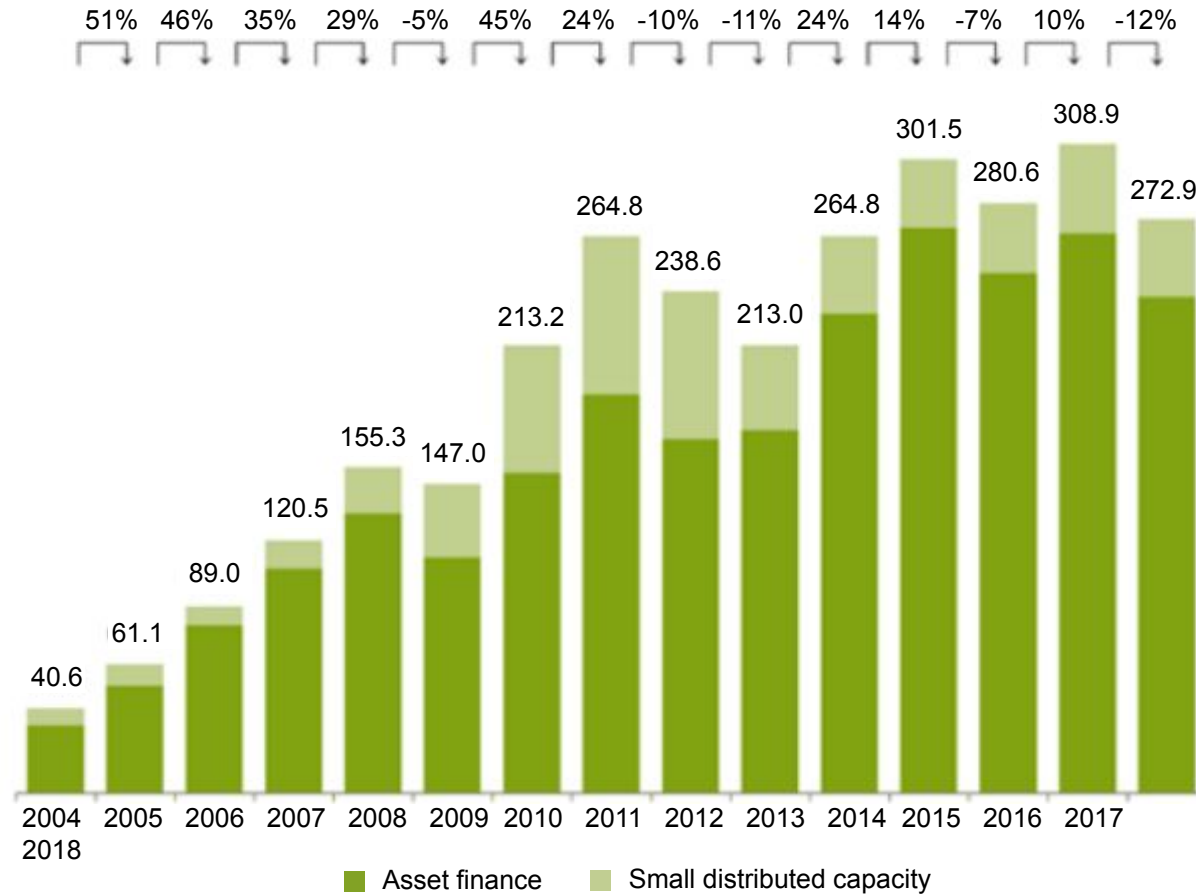
SUCCESS STORIES FOR THE IGE – THE PARIS AGREEMENT

The Paris Agreement aims to strengthen the global response to climate change by keeping a global temperature rise this century to well below 2 degrees Celsius.



SUCCESS STORIES FOR THE IGE – GREEN ENERGY INVESTMENTS

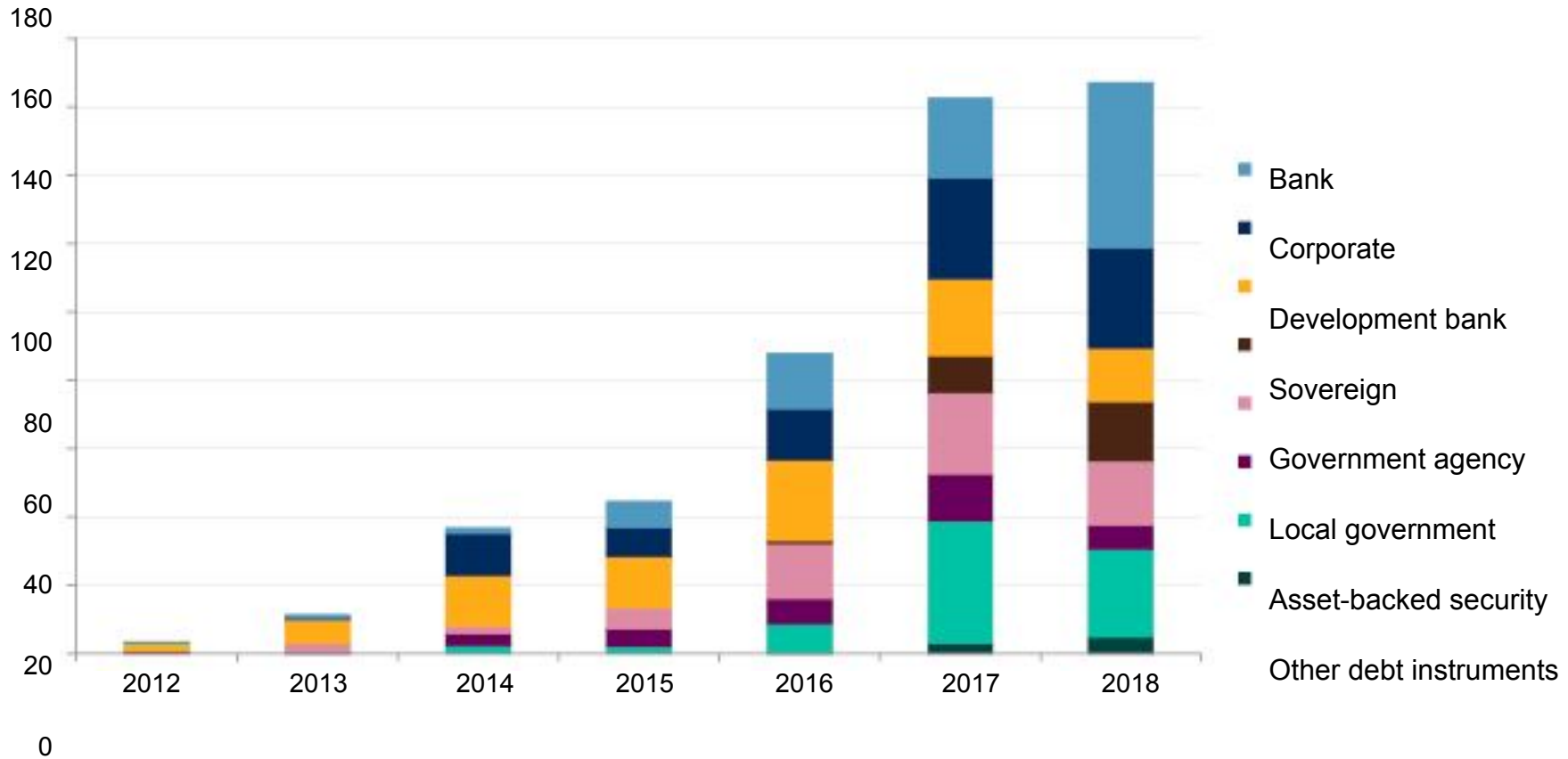
Global Renewable Energy Capacity Investment, 2004 to 2018, \$bn



Source: Frankfurt School-UNEP Centre/BNEF, 2019

SUCCESS STORIES FOR THE IGE – GREEN BONDS

Annual green-labelled issuance by issuer type (\$bn)




Source: S&P Global Ratings, 2019

REFLECTION POINT



**What opportunities
do you see in your
country for moving
towards an inclusive
green economy?**



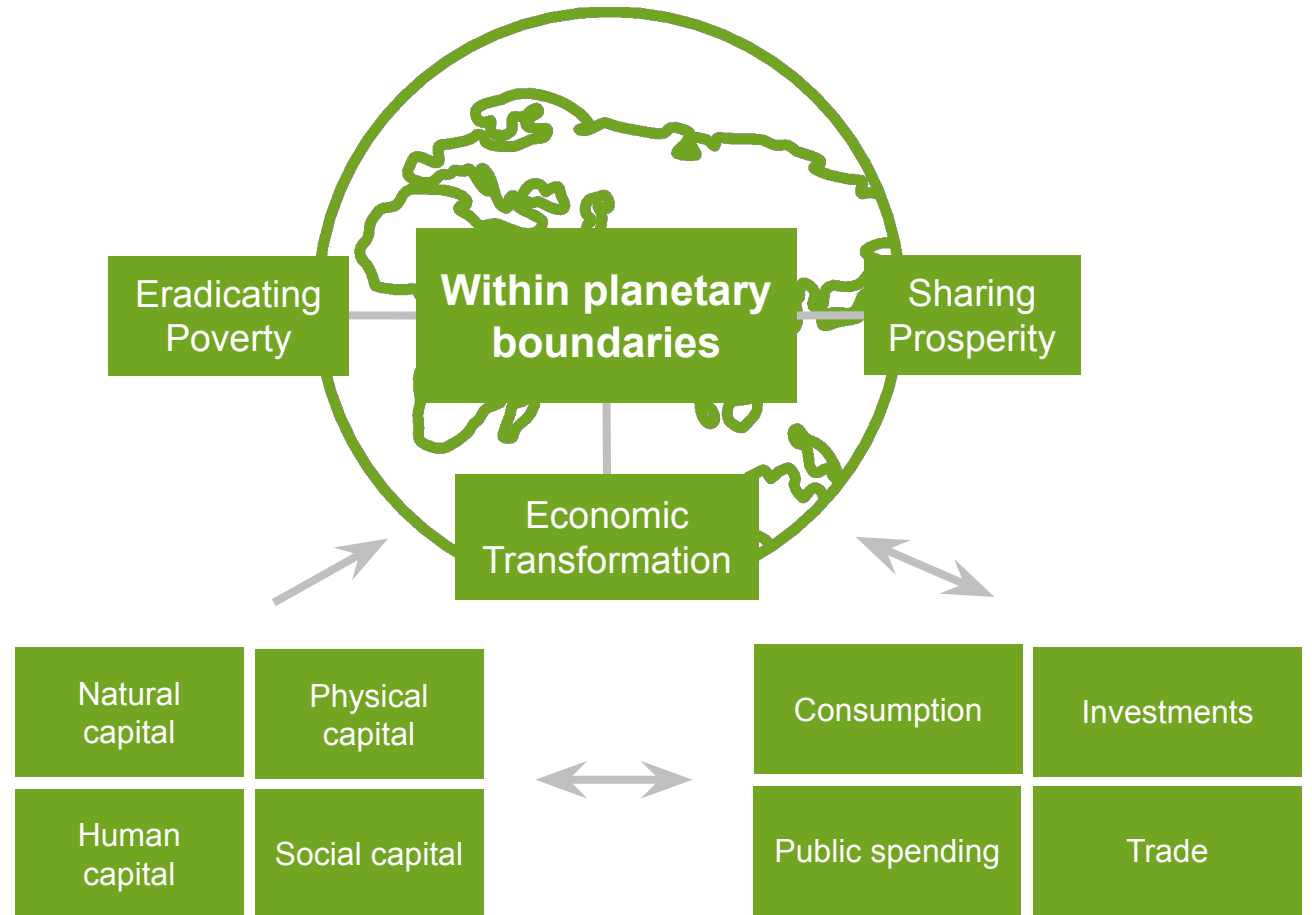
**“At a visionary level, a
Green Economy is one that
results in increased human
well-being and social equity,
while significantly reducing
environmental risks and
ecological scarcities”
(UNEP, 2011)**

THE IGE: WHAT TYPE OF ECONOMY?

Sets of challenges that an Inclusive Green Economy aims to answer

IGE as an economy that is:

- Low carbon.
- Efficient and clean in production.
- Inclusive in consumption and outcomes.
- Based on sharing, circularity, collaboration, solidarity, resilience, opportunity and interdependence.



HOW IS THE IGE INCLUSIVE?



IGE and Green Growth

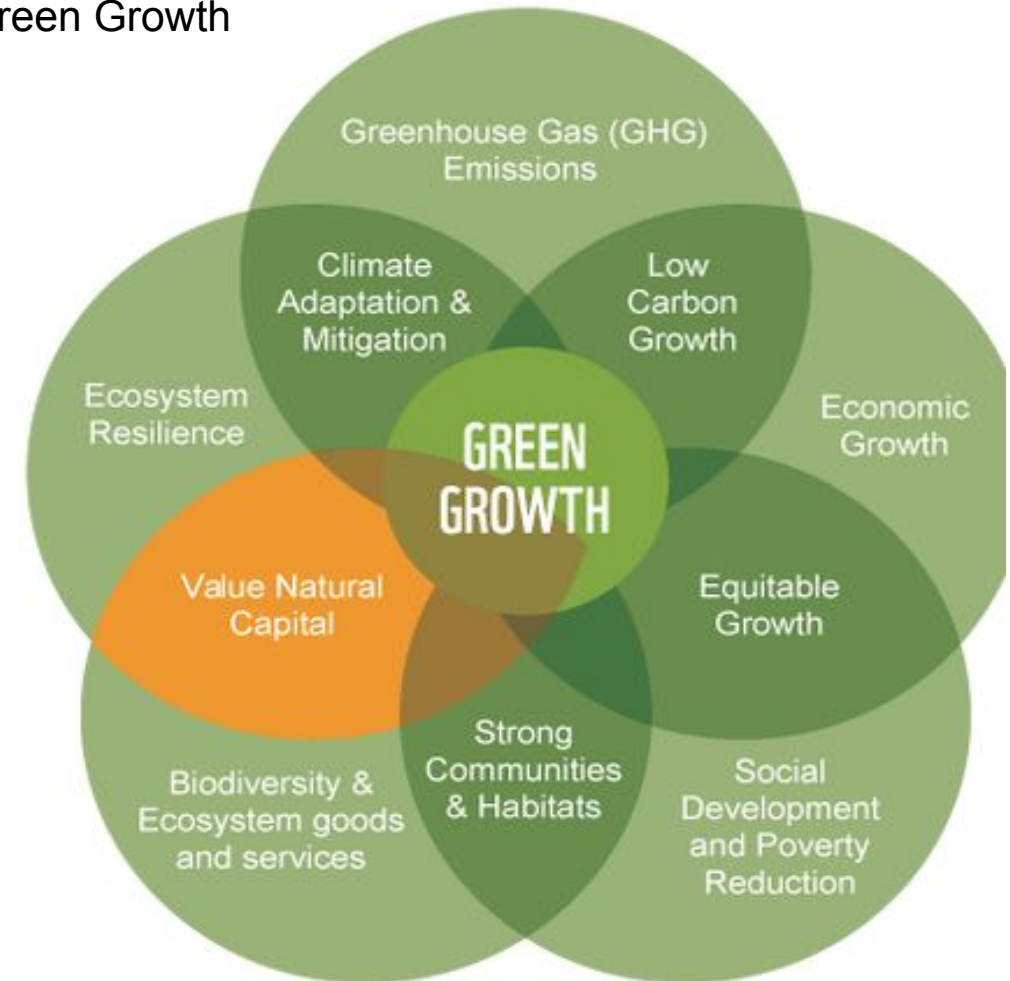
“ *Economic progress that fosters environmentally sustainable, low-carbon and socially inclusive development* ”

UN-ESCAP et al., 2010

“ *Green growth means fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies* ”

OECD, 2011

Green Growth



Source: GGGI

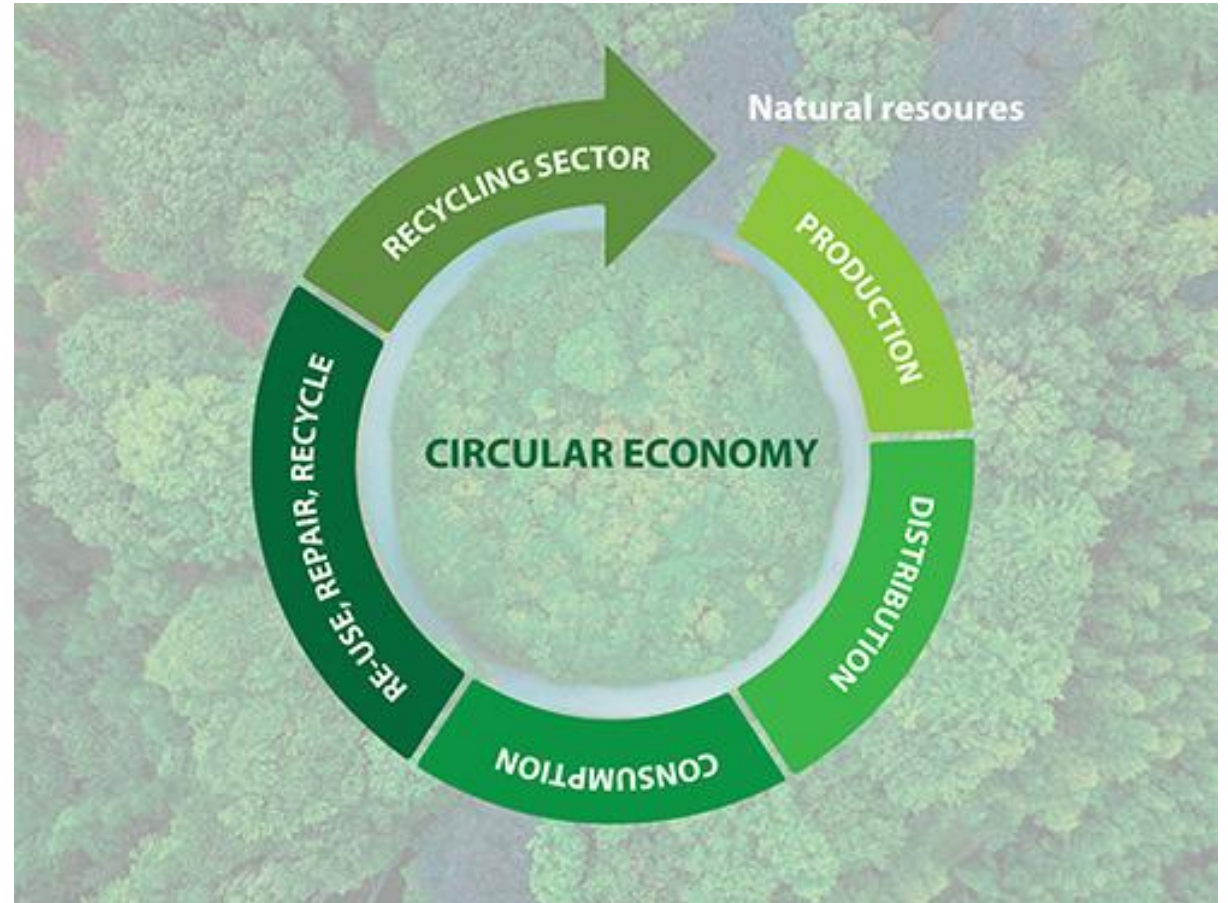
IGE AND CIRCULAR ECONOMY

An economy that:



reduces the consumption of resources and the **generation of waste**, and **reuses and recycles** waste throughout the production, distribution and consumption processes.

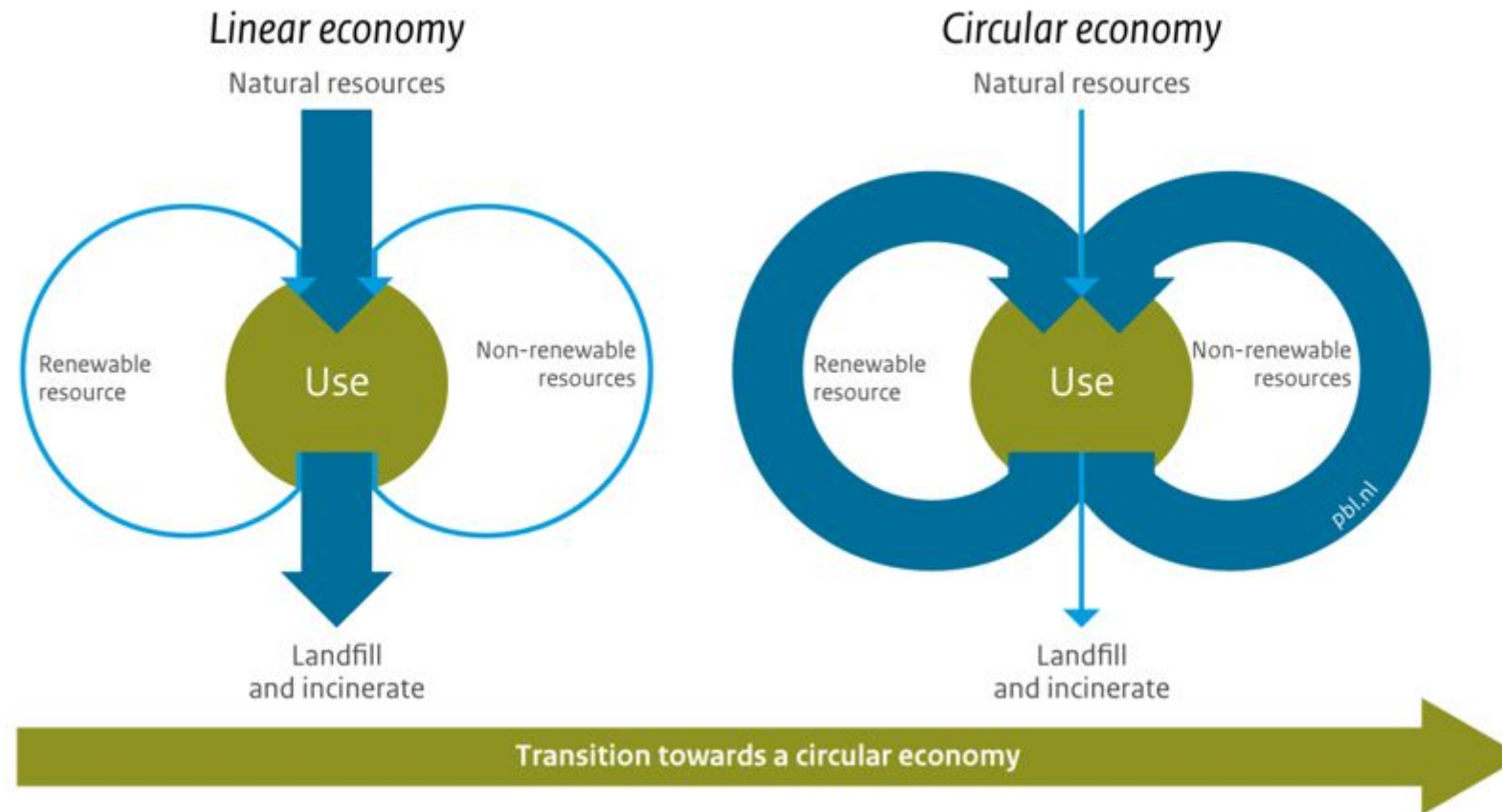
Circular Economy



Source: UN Environment, 2018

IGE AND CIRCULAR ECONOMY

From a linear to a circular economy



IGE AND GREEN JOBS

Green jobs are jobs that are (ILO, 2019):

- **Good for the environment**
- **Good for the economy**
- **Good for people**

Greener Business Approach



Source: ILO, 2016

REFLECTION POINT



**What differences
do you find when
comparing these
definitions?**

DEFINITIONS OF THE IGE – CONSIDERATIONS

There is no single or universal approach to an IGE.

Common characteristics of IGE definitions
(global and national):



In an IGE, change is driven by public and private investments;



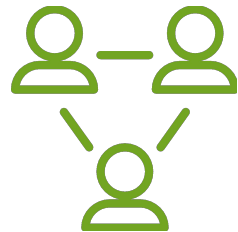
An IGE recognizes natural capital as a critical economic asset.

DEFINITIONS OF THE IGE – CONSIDERATIONS

A green economy must be aligned with national priorities and development targets:



Developing specific national strategies and action plans;



Engaging a broad variety of national stakeholders;



Creating knowledge and national expertise to support the shift to new production and consumption patterns.

2 Policy instruments



THE CENTRAL ROLE OF INVESTMENT

At the operational level, a Green Economy is seen as one where growth in income and employment is driven by **investments** that (EMG, 2011):



Reduce carbon emissions and pollution;



Enhance energy and resource efficiency;



Prevent the loss of biodiversity and ecosystem services.

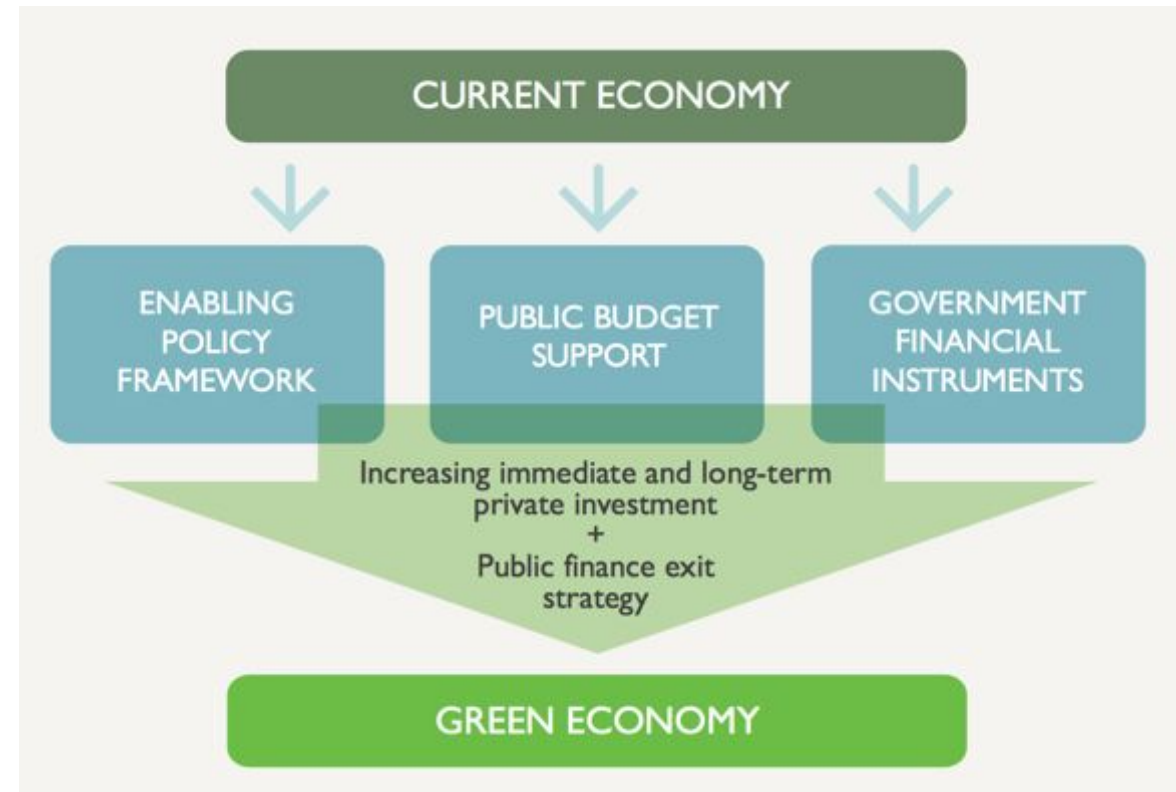
INVESTMENT AND ITS ENABLING CONDITIONS

How to achieve those goals?

Trigger investments, with three main enabling policies:

- Incentives and disincentives
- Public targets mandated by law
- Social interventions

Role of public policy and finance in unlocking private investment in green growth



INVESTMENT



Public investment, from budgetary allocation, for public infrastructure and related services.



Private investment, for purchasing assets, such as solar panels, energy efficient LED lights and electric vehicles.



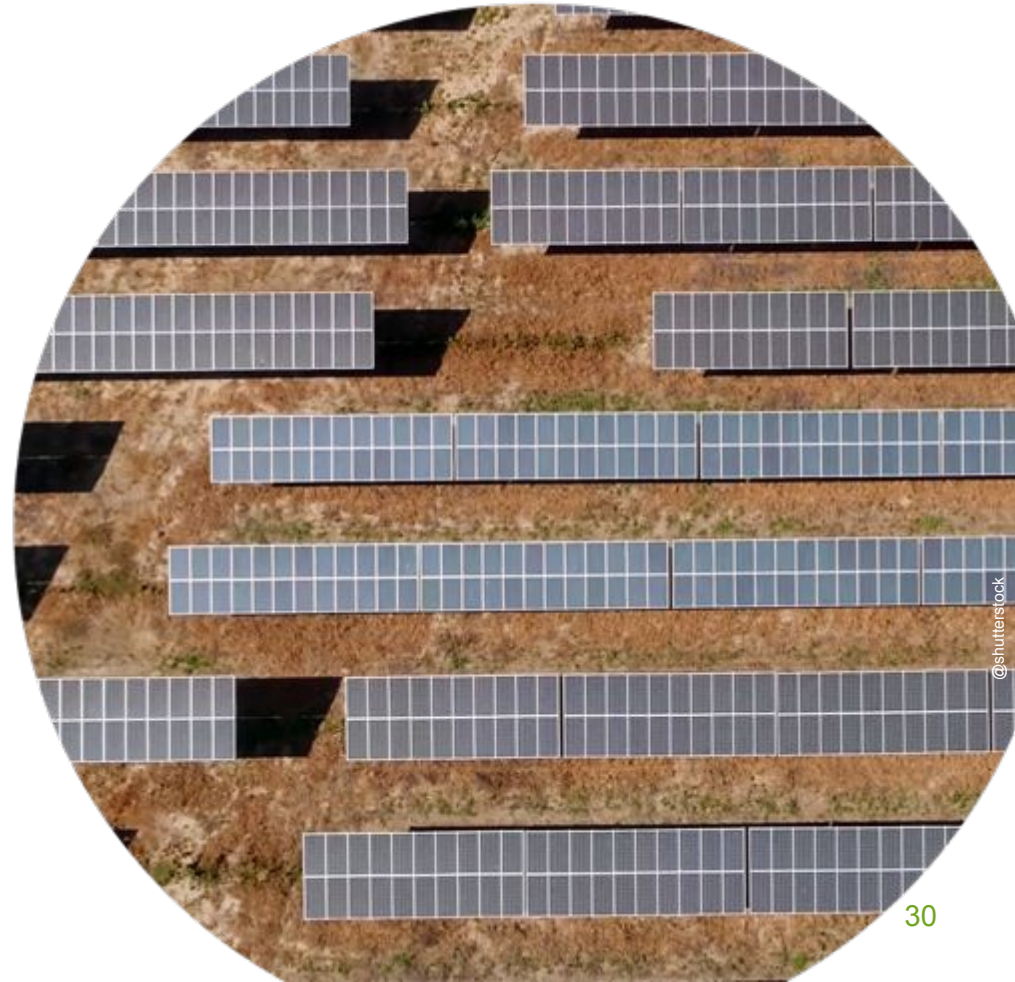
Goal: ensure adoption, lead by example.

EXAMPLES

Morocco

direct public investments in clean energy (Plan Solaire, with \$ 9bn committed), has created a market for renewable energy and delivered socio-economic benefits at the same time.

Source: World Bank, 2012; Invest in Morocco, 2016; UNEP, 2018



EXAMPLES

Brazil

the 'PAISS Industry' programme combined credit, equity and non-reimbursable support for projects aimed at improving ethanol supply chain productivity and reducing CO₂ emissions.

Source: Nyko et al., 2010; Milanez et al., 2015; CGEE, 2016



POLICY INSTRUMENTS – INCENTIVES/DISINCENTIVES



Introduction of fiscal measures.



Goal: stimulate or dissuade private investments.



These instruments guide the market through price signals, towards more sustainable production and consumption.

EXAMPLES

Germany

under the Energiewende programme, Germany introduced feed-in tariffs complemented by low-cost loans for renewable energy.

Source: Lütkenhorst & Pegels, 2014



EXAMPLES

Brazil

Incentives, such as sales tax reductions, for ethanol-powered vehicles and a price cap on ethanol significantly contributed to Brazil's success in establishing bio-fuels in the late 1980s and early 1990s.

Source: BNDES & CGEE, 2008; Meyer et al., 2012



POLICY INSTRUMENTS – PUBLIC TARGETS MANDATED BY LAW



Establishment of laws, regulations and standards as the formal enactment of targets.



Goal: to ensure enforcement and compliance.

EXAMPLES

Morocco

a favorable legal framework, such as Law 13-09, providing access to the grid, was critical for establishing a market for renewable energy.

Source: Daouda, 2016



EXAMPLES

China:

in 2017, China imposed an electric vehicle quota on carmakers, mandating 8% of new cars to have an electric engine in 2018 and 12% by 2020.

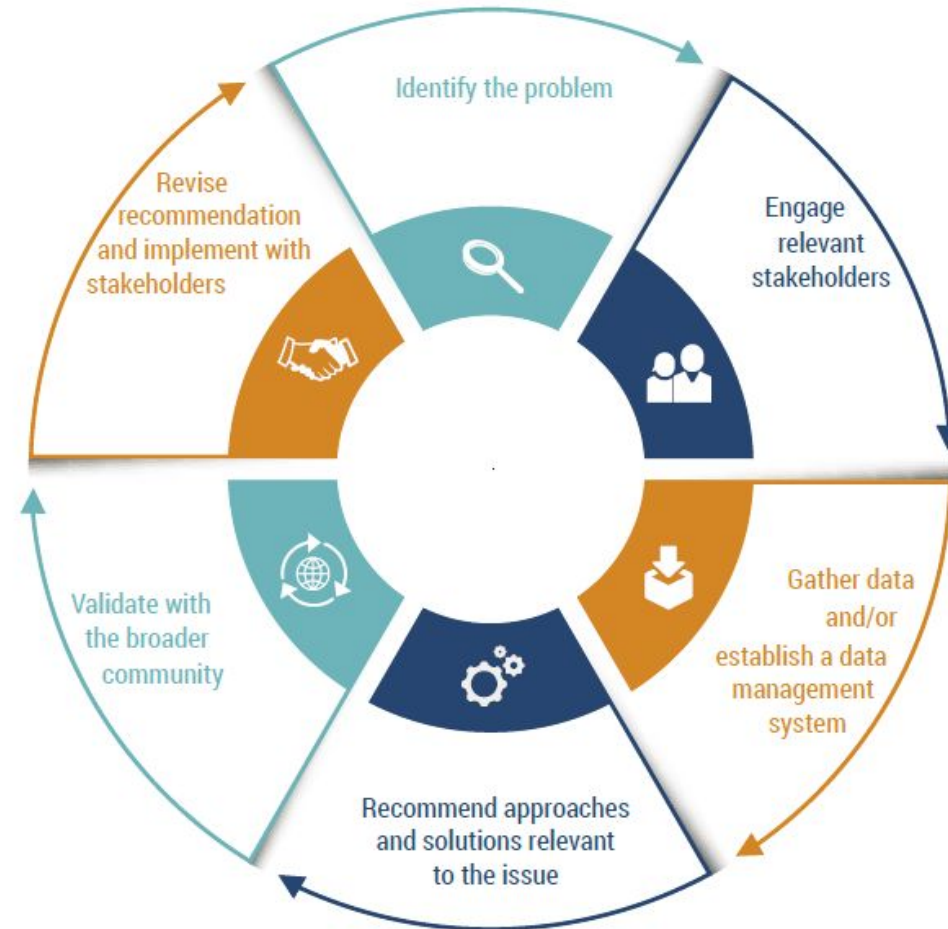
Source: The Guardian, 2017; UNEP, 2018



POLICY INSTRUMENTS – SOCIAL INTERVENTIONS

- Aimed at informing the public
- **Goal:** stimulate voluntary changes in behavior
- **Interventions:** capacity building (personal and institutional) and awareness raising
- No reliance on economic incentives

GI-REC pilot process



Source: UNEP, 2019

EXAMPLE

China

in 2009, the ‘Ten Cities, Thousand Vehicles’ programme launched electric vehicle demonstration projects in 13 Chinese cities and added 12 more later on.
(ADB, 2009)



Source: Asian Development Bank (ADB), 2009

REFLECTION POINT



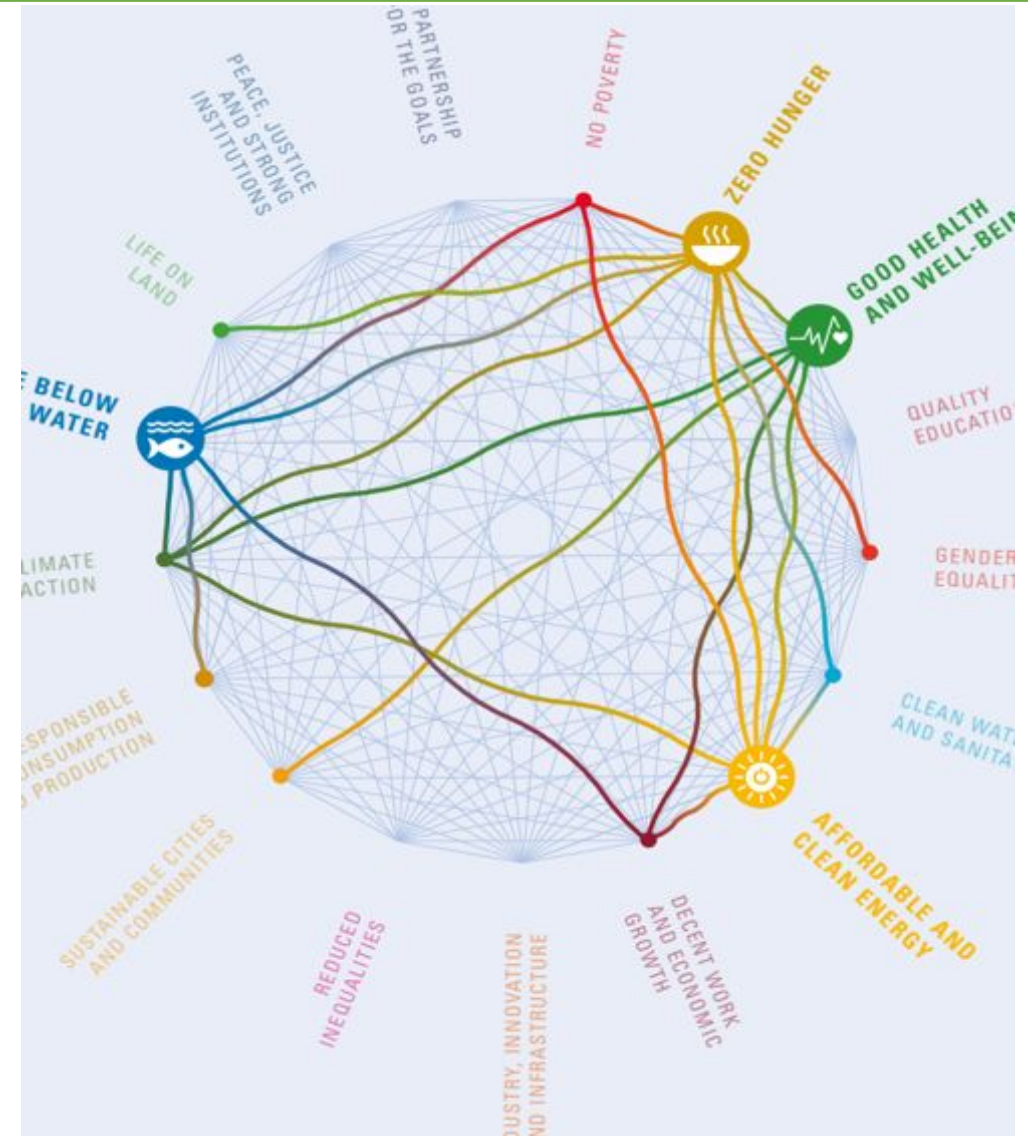
What IGE policy instruments have been implemented in your country/region?

3 **Simulation models and how they support decision making**



WHY USE SIMULATION MODELS?

- Society, the economy and the environment are more and more interconnected.
- Simulation models can help us anticipate change and tackle complexity.



POLICY QUESTIONS THAT MODELLING SHOULD HELP TO ANSWER



How can the impact of investments and policies be assessed?
Are the impacts likely to be long or short-term?



What benefits might investments and policies generate across sectors in terms of economic opportunities, inclusiveness and environmental sustainability?



Which labour interventions deliver more and better green jobs? Which approaches create better access for the unemployed and underemployed?

POLICY QUESTIONS THAT MODELLING SHOULD HELP TO ANSWER



How will green subsidy reforms likely impact productivity in GE sectors?



How will green tax reforms and removing fossil fuel subsidies mobilize domestic revenues for green investment? What will be the implications of such reforms on environmental, economic/fiscal and social fronts?



How do trade policies and regulations enhance investments in GE sectors?



What types of industrial policy measures are in place to support the transition towards a green economy?

A SYSTEMIC APPROACH IS REQUIRED

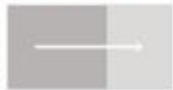
Potential synergies and trade-offs between the sectoral portfolio of climate change mitigation options and the Sustainable Development Goals (SDGs).

Shades show level of confidence

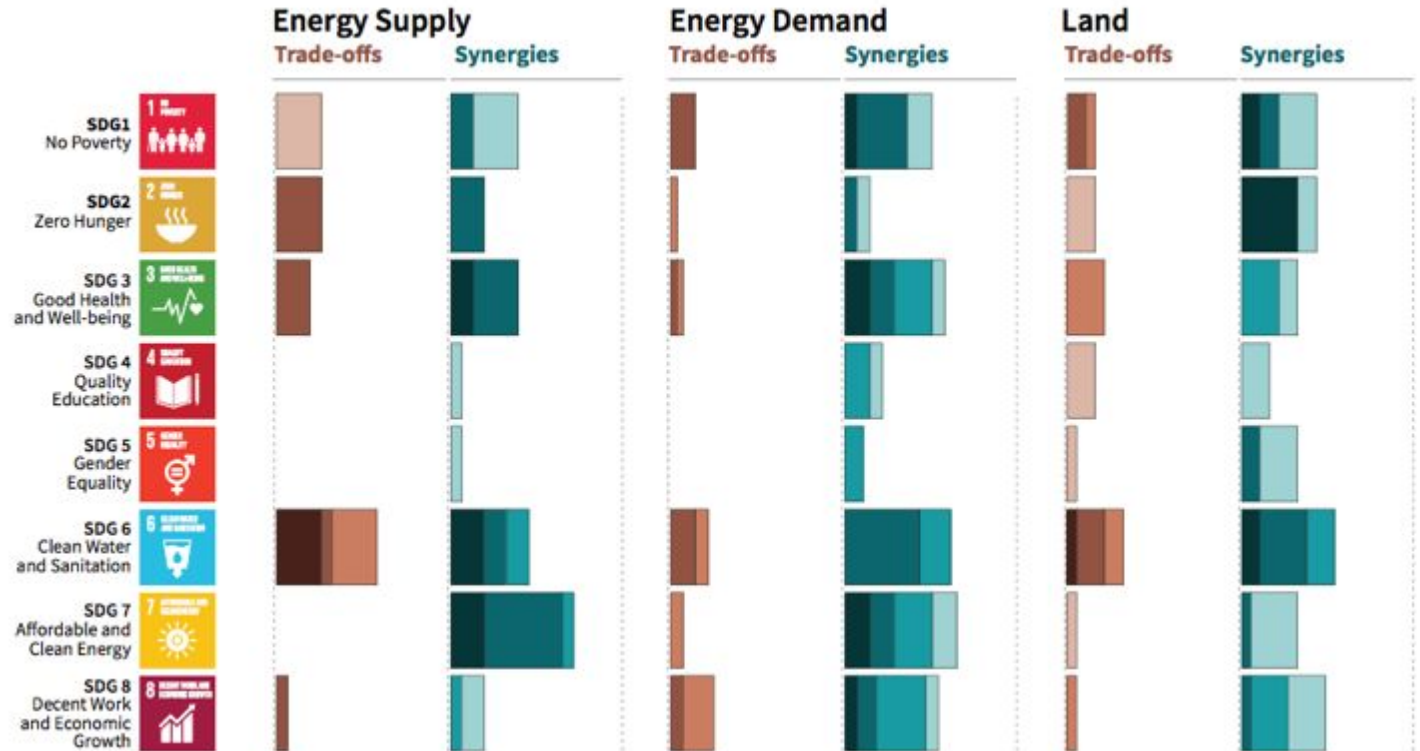


The shades depict the level of confidence of the assessed potential for Trade-offs/Synergies.

Length shows strength of connection



The overall size of the coloured bars depict the relative potential for synergies and trade-offs between the sectoral mitigation options and the SDGs.



Source: IPCC, 2018

A SYSTEMIC APPROACH IS REQUIRED

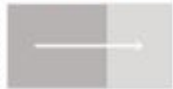
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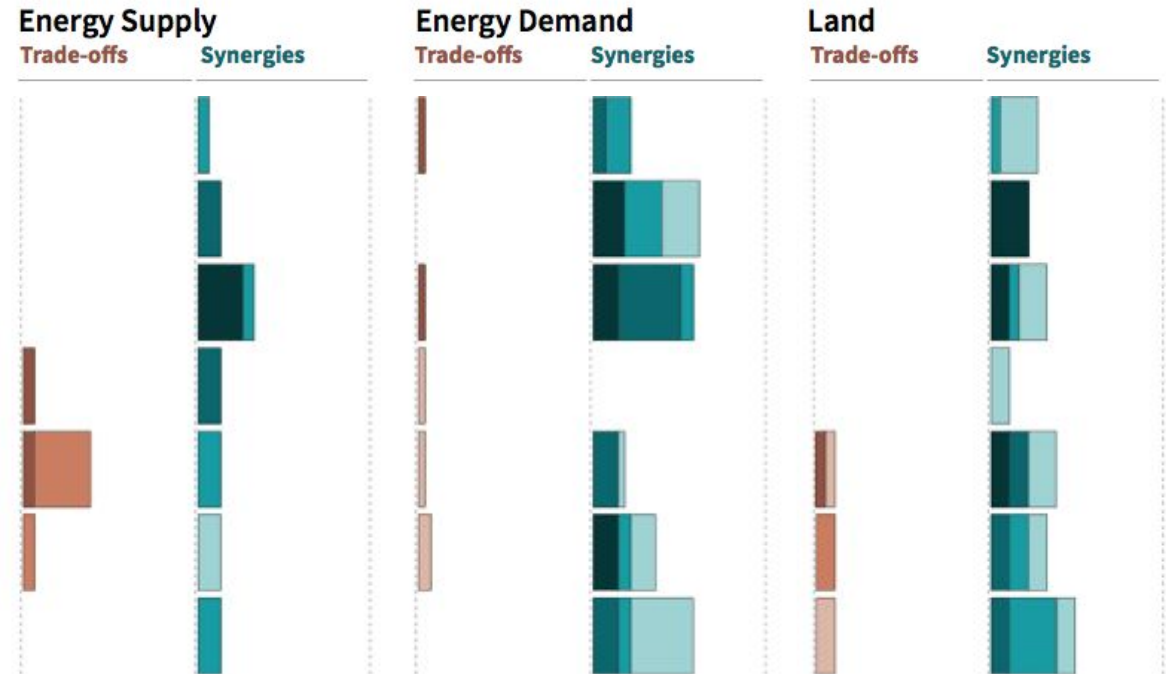
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- SDG 10 Reduced Inequalities
- SDG 11 Sustainable Cities and Communities
- SDG 12 Responsible Consumption and Production
- SDG 14 Life Below Water
- SDG 15 Life on Land
- SDG 16 Peace, Justice and Strong Institutions
- SDG 17 Partnerships for the Goals



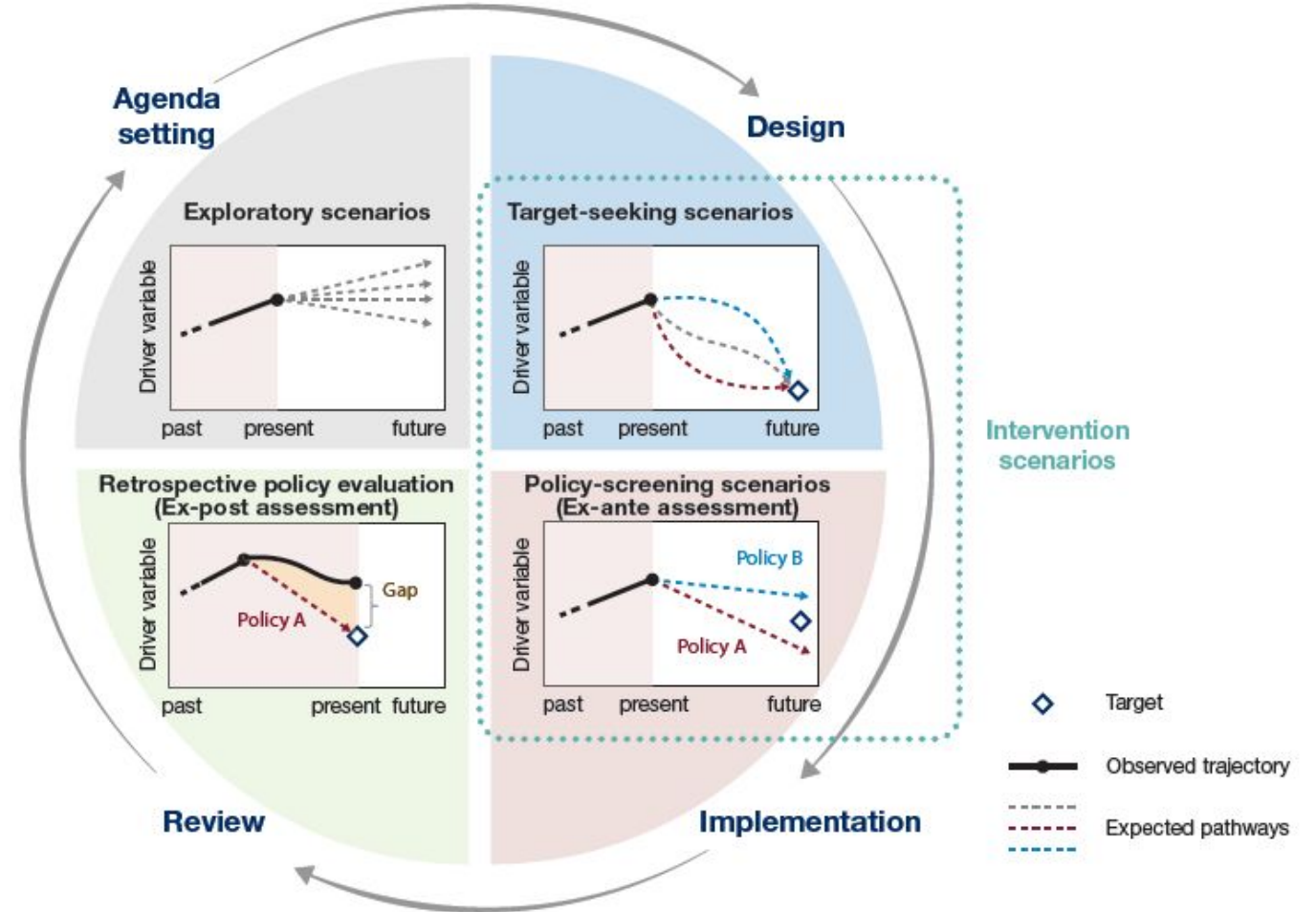
Source: IPCC, 2018

SIMULATION MODELS AND HOW THEY SUPPORT DECISION MAKING

Simulation models can support various steps of the policymaking cycle.

- What models are needed?
- What specific policymaking steps can each model support?

Simulation model



REFLECTION POINT



**Are you aware of
any simulation
models used for
sectoral/national
analysis?**

WHAT MODEL FEATURES ARE REQUIRED FOR AN IGE?

The green economy is defined by UNEP as

“ *An economy that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.* ”

The misallocation of capital in the last two decades has been identified as one of the main causes contributing to the manifestation of several concurrent crises.

To curb negative trends and trigger the transition, investments are needed. These would target behavioral change, through the implementation of targeted public expenditure, policy reforms and regulation changes.

WHAT ASSESSMENTS CAN BE CREATED WITH SIMULATION MODELS?

Five main types of assessments can be found to inform policy formulation and assessment.



Economic assessment



Social assessment



Environmental assessment



Governance assessment



Integrated assessment

Each of these assessments makes use of tools.

REFLECTION POINT



**Have you come
across any of these
assessments in your
studies? Could you
provide examples?**

WHAT MODEL FEATURES ARE REQUIRED FOR AN IGE?

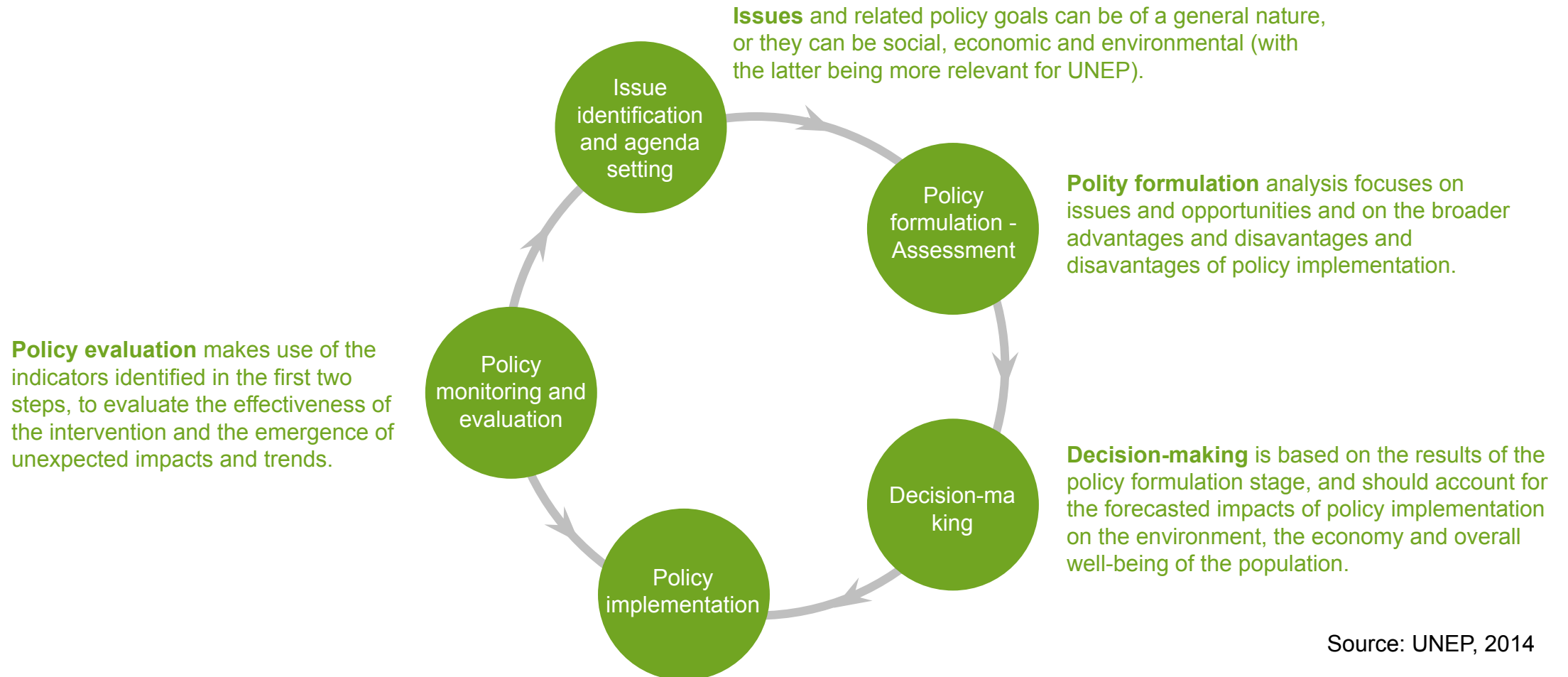
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SIMULATION MODELS AND HOW THEY SUPPORT DECISION MAKING



Source: UNEP, 2014

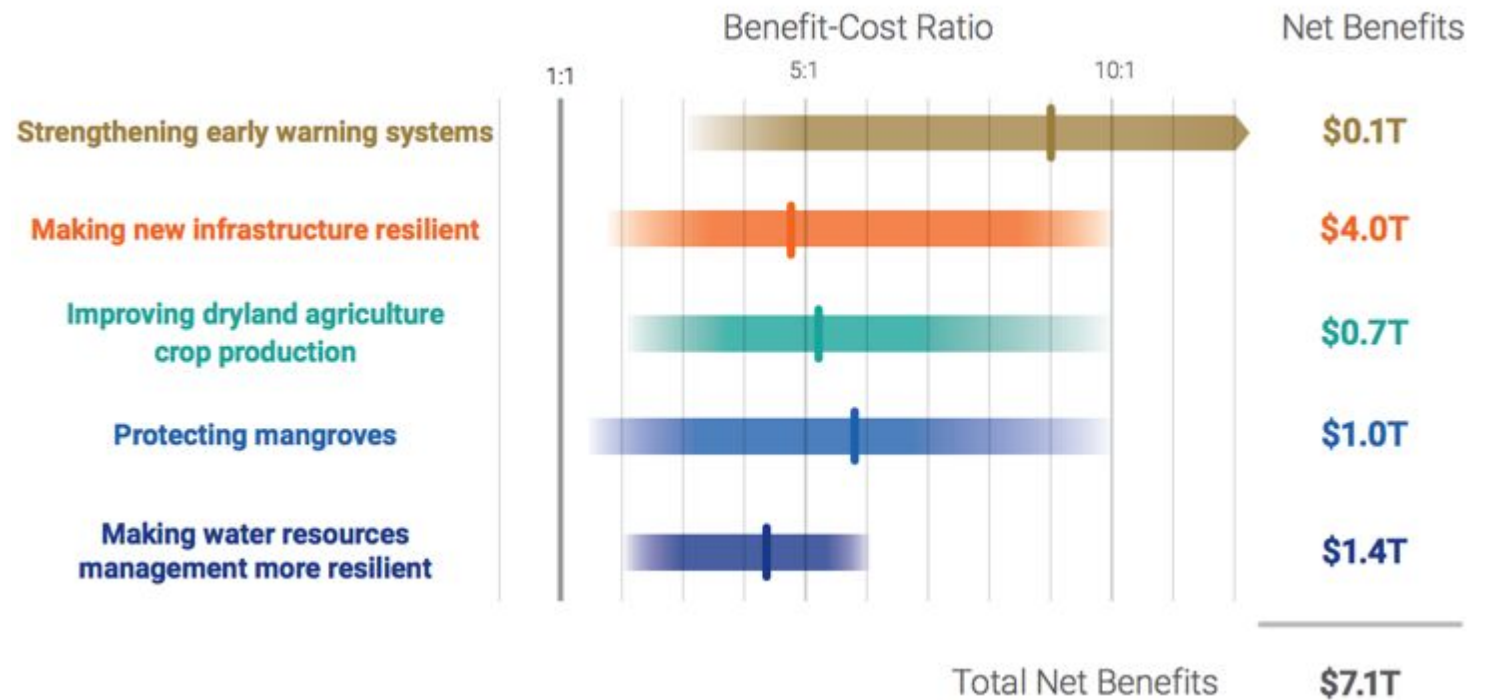


ECONOMIC ASSESSMENTS

- Designed to support the analysis of policies, projects and investments.
- Focuses on expected economic outcomes.

Example: project feasibility studies

Benefits and Costs of Illustrative Investments in Adaptation



Source: GCA, 2019

EXAMPLE: AN ECONOMIC ASSESSMENT OF GHG MITIGATION POLICY OPTIONS FOR EU AGRICULTURE (EcAMPA)

Projected changes in consumer prices for selected products (in % compared to the reference [REF] scenario).

	REF	HOM19	HOM28	HOM19ET	HOM28ET	HET19	HET28
	EUR/t	% difference to REF					
Cereals	251	7.2	13.1	6.8	11.8	6.1	11.3
Oilseeds	301	9.5	18.2	8.9	15.8	5.2	10.9
Other arable field crops	124	4.2	7.4	3.6	5.9	4.3	8.1
Vegetables and Permanent crops	869	1.6	2.6	1.4	2.3	1.6	2.7
Beef	5984	35.5	59.9	35.1	60.2	39.8	64.4
Pork meat	2394	21.3	38.3	17.0	29.5	22.9	40.8
Sheep and goat meat	8564	17.3	27.8	20.7	34.3	17.7	26.5
Poultry meat	2131	9.4	16.8	7.9	13.8	9.6	17.0
Cow and buffalo milk	403	37.9	67.9	31.8	55.6	36.7	66.0
Sheep and goat milk	837	21.7	45.0	22.2	38.2	18.9	37.5
Eggs	1595	9.9	17.5	8.6	14.7	10.4	18.0

Source: JRC, 2015



SOCIAL ASSESSMENTS

- Provide guidance on policy impacts for different social groups (i.e., inclusiveness).
- Support the review and monitoring of key governance indicators.

Example: Poverty and Social Impact Analysis (PSIA), which facilitates the assessment of policy inclusiveness and pro-poor orientation.



EXAMPLE: DAR RAPID TRANSIT AGENCY (DART)

Impact Assessment Matrix

Source: DART, 2015

Key:

+3 = major positive impact

+2 = moderate positive impact

+1 = minor positive impact

-1 = minor adverse impact

-2 = moderate adverse impact

-3 = major adverse impact

0 = no impact

Activity Impact	Mobilization phase			Construction phase					Operat ion phase	Demobilization phase
	Land acquisition	Relocation of infrastructures on ROW	Labour force hire	Transportation of construction materials/equipments	Site/land clearance	Diversions/detours construction	Worker's camp construction	BRT roads construction		
Description of Impacts based on project environmental and social components										
Displacement of people and properties currently on the ROW	-3	-3	0	0	-1	-1	-1	-3	0	0
Disruption resulting from relocation of infrastructures	0	-3	0	0	0	0	-1	-3	0	0
Improvement in the economy of the communities along the BRT roads	0	0	+2	0	0	0	0	+3	0	+2
Landscape scarring especially at material borrow sites	0	0	0	-2	0	-2	0	-3	0	0
Loss of urban vegetation through clearance	0	0	0	0	-3	-2	-1	-3	0	0
Impacts from workers' Camps establishment	0	0	0	0	0	0	-1	-3	0	-3
Poor Air quality –emissions and dust	0	-1	0	-3	-2	-2	-1	-3	-1	-2
Ambient Air and noise pollution	0	-1	0	-2	-2	-2	-1	-3	-1	-2
Pollution due to Solid and Liquid waste generation	0	-1	0	-1	-1	-2	-2	-3	-3	-3
Public health and safety impacts from work camps operations	0	0	0	-1	-1	-2	-2	-2	0	-2
Depletion and pollution of water resources	0	-2	0	-1	-1	-2	-1	-3	-1	-2
Soil contamination	0	-1	0	0	-1	-2	-2	-3	-1	-2
Increase in traffic accidents during construction phase	0	0	0	-2	-1	-3	-1	-3	-3	-2
Soil erosion on slopes and embankments	0	-2	0	-2	-3	-2	-1	-3	0	-2
Increase in HIV/AIDs cases	0	-2	-2	-2	-2	-2	-2	-3	-3	-3
Increase of Road carnage	0	-1	0	-2	-1	-1	-1	-3	-3	-2
Encroachment into road reserve	0	0	0	0	0	0	0	-2	-2	0



ENVIRONMENTAL ASSESSMENTS

- Provide the evaluation of the environmental impacts of development strategies, policies, projects and investments.

Examples: Strategic Environmental Assessment (SEA) and Environmental Impact Assessments (EIA)



EXAMPLE: EIA OF A FAST TRACK TRANSPORTATION PROJECT IN CHINA

- An EIA focuses on the impacts of project-related processes on environmental assets, such as air, water, land, flora and fauna.

Contribution of environmental emissions to each lifecycle stage, in % by impact category.

Impact Category	Construction Phase	Maintenance and Repair Phase	Demolition Phase
① Global warming	61.82	1.48	36.70
② Acidification	72.50	10.20	17.30
③ Eutrophication	21.00	1.20	77.80
④ Ecotoxicity	3.98	0.62	95.40
⑤ Smog	85.80	4.06	10.10
⑥ Natural resource depletion	91.40	2.26	6.30
⑦ Habitat alteration	28.30	0.65	71.10
⑧ Ozone depletion	93.20	0.32	6.51

Source: Li et al., 2019



GOVERNANCE ASSESSMENTS

- Support the analysis of the efficiency and transparency of institutional frameworks and processes at both the national and local levels.

Example: UNDP's governance assessment.



Source: UNDP

INTEGRATED ASSESSMENTS

- Integrate multiple data and tools in a unique assessment framework.
- Estimate policy and investment outcomes across sectors, economic actors, dimensions of development and over time.

Example: Decision Support Systems (DSS).



EXAMPLE: SUSTAINABLE ASSET VALUATION (SAVi) OF THE CONTOURNEMENT DE RABAT, MOROCCO

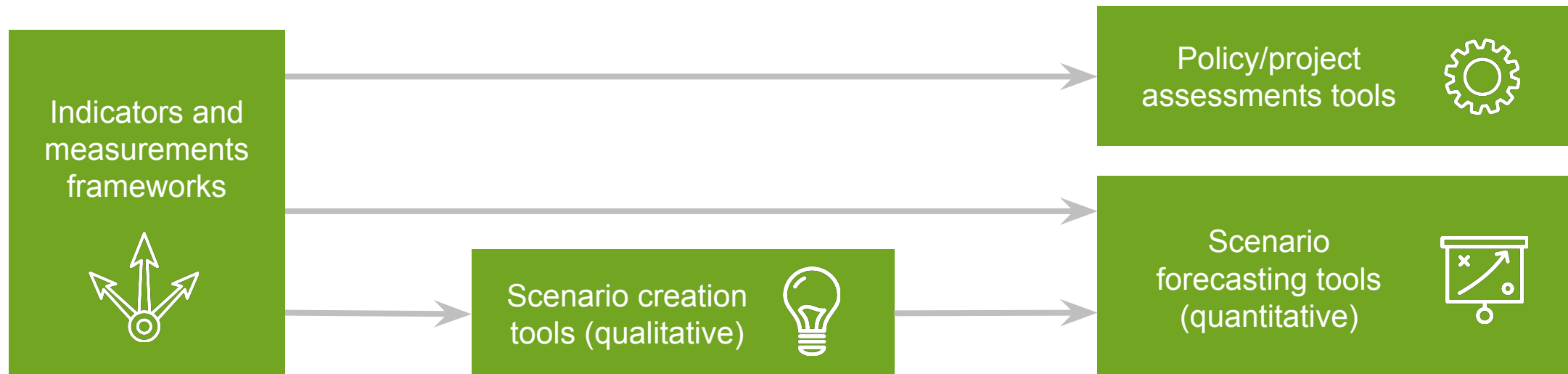
SAVi's Integrated Cost Benefit Analysis (in EUR millions)

Source: IISD, 2019

	Unit	Scenario 1: BAU	Scenario 2: Reduced Maintenance Expenditure	Scenario 3: Increase in Road Works	Scenario 4: Short-Term Traffic Increase	Scenario 5: Increase in Heavy Vehicle Traffic	Scenario 6: Road Damage Due to Climate Change
EXPENDITURE(S)							
Capital investment ¹	mn EUR	329.79	329.79	406.97	329.79	329.79	337.12
O&M expenditure	mn EUR	73.64	65.34	73.64	73.90	80.84	73.66
Total investment and O&M	mn EUR	403.4	395.1	480.6	403.7	410.6	410.8
EXTERNALITIES							
Total cost of accidents	mn EUR	212.2	236.0	212.2	212.5	226.8	211.4
Social cost of carbon	mn EUR	4.61	4.58	5.64	4.61	4.63	4.71
Discretionary spending from labour income	mn EUR	1.26	1.12	1.34	1.26	1.37	1.27
Value of time saved	mn EUR	162.6	162.6	147.1	148.0	159.5	162.2
Total value of externalities	mn EUR	-52.9	-76.8	-69.4	-67.9	-70.5	-52.7
REVENUES							
Total revenues	mn EUR	456.10	456.10	456.10	456.03	464.89	454.68
Conventional CBA (revenues less cost)	mn EUR	52.7	61.0	-24.5	52.3	54.3	43.9
Integrated CBA (incl. externalities)	mn EUR	-0.2	-15.9	-93.9	-15.6	-16.3	-8.8

SIMULATION MODELS AND HOW THEY SUPPORT DECISION MAKING

Four main groups of tools:



4 Group exercise



GROUP EXERCISE



Goal: Development of a qualitative system map.

- This could be a Causal Loop Diagram or a tree diagram.



Scope: select a sector, for a specific geography.

- E.g. country, city or landscape.



Emphasis on the identification of:

- Main drivers of change (internal and external), including problems that could emerge for social, economic and environmental indicators.
- Formulation of solutions (i.e. policy interventions).

GROUP EXERCISE – STEPS TO FOLLOW

1. Identify a problem or opportunity and describe it with one sentence.
2. Open Vensim (www.vensim.com), or draw the diagram in PowerPoint or manually on a flipchart.
3. Identify the key indicator representing the problem or opportunity and add it to your diagram, which is blank at this stage.

GROUP EXERCISE – STEPS TO FOLLOW

1. Add the causes of the problem, one by one, linking them to the first variable considered, and determine the polarity of the causal relation.
2. Continue identifying and adding the cause of the cause, and so forth.

GROUP EXERCISE – CAUSALITY

- A causal link from variable A to variable B is positive if a change in A produces a change in B in the same direction.
- A causal link from variable A to variable B is negative if a change in A produces a change in B in the opposite direction.

Variable A	Variable B	Sign
↑	↑	+
↓	↓	+
↑	↓	-
↓	↑	-

End of Module 1.

Thank you for your attention!