Strategic innovations toward green industrial development: the lessons from a twenty-year implementation for sustainable development

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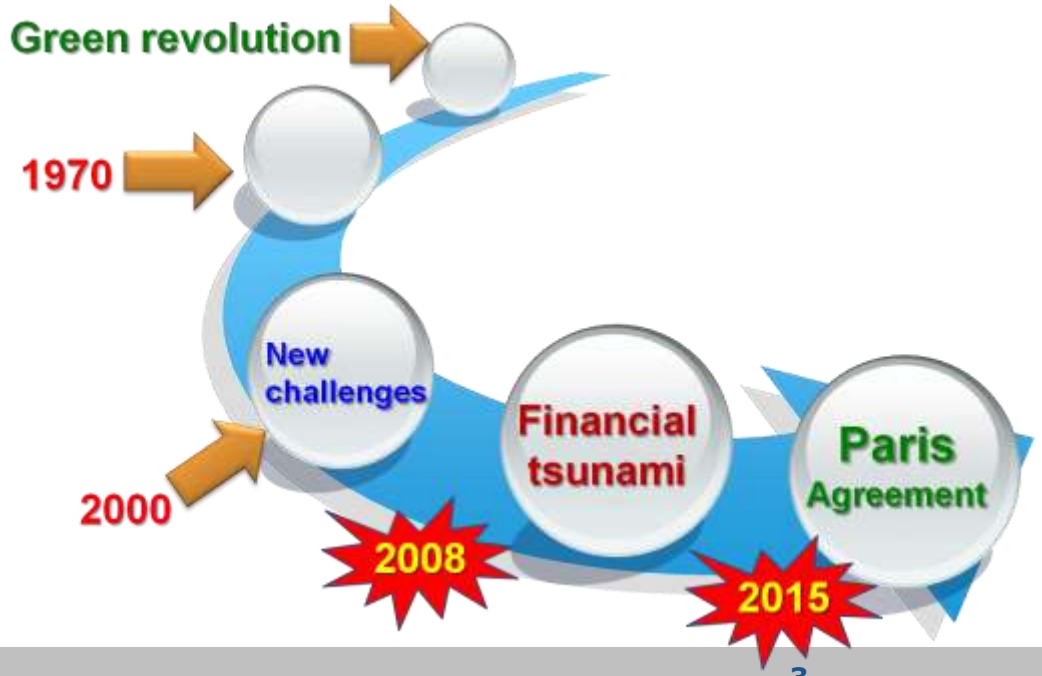
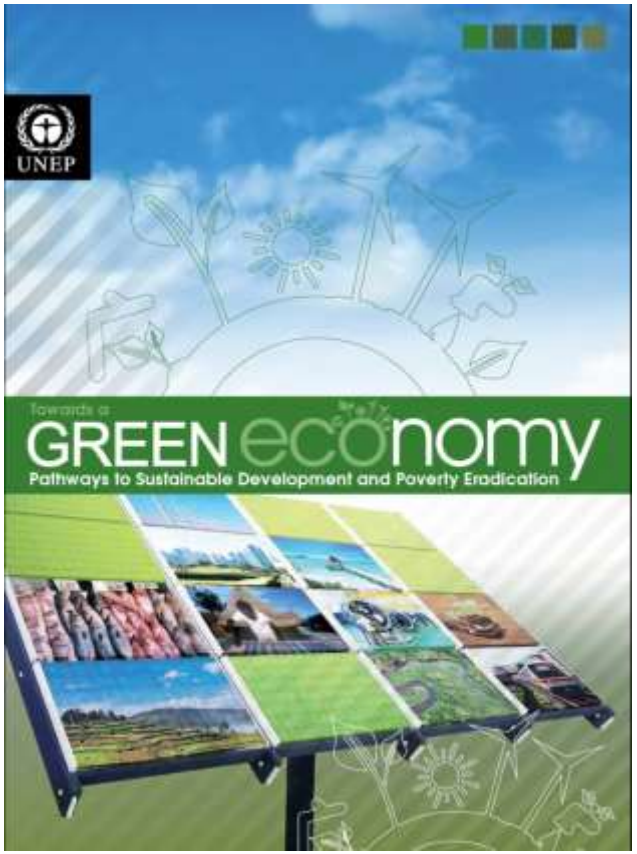
- Inspiration from **Rio+20**
- A course of change from **sustainable development**



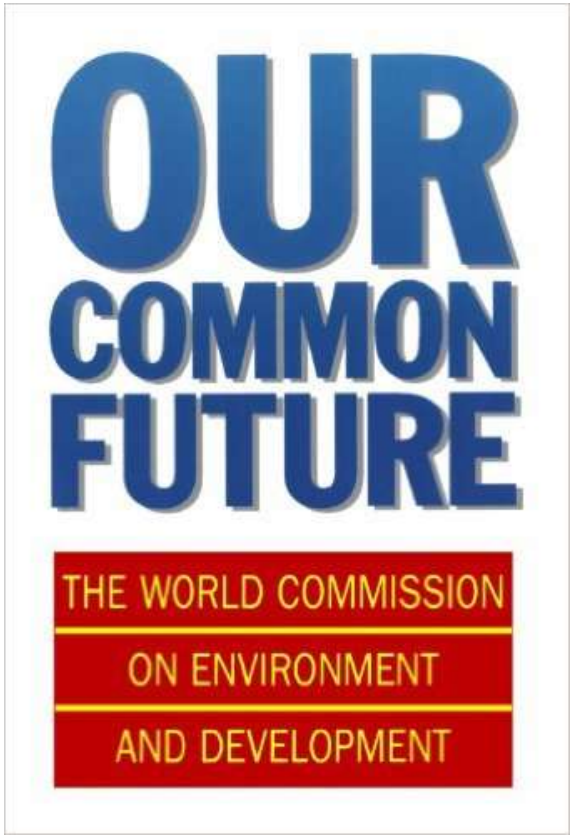


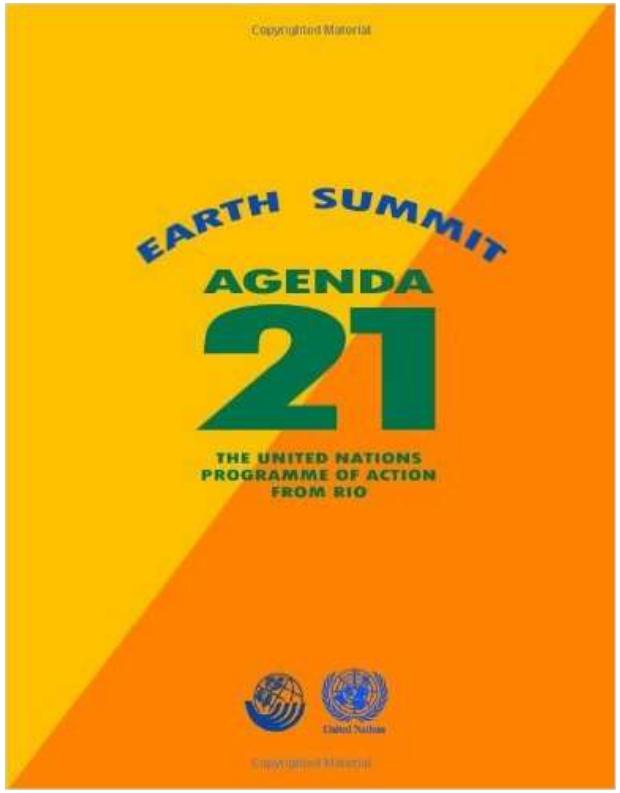
Inspiration from Rio+20 (2012)

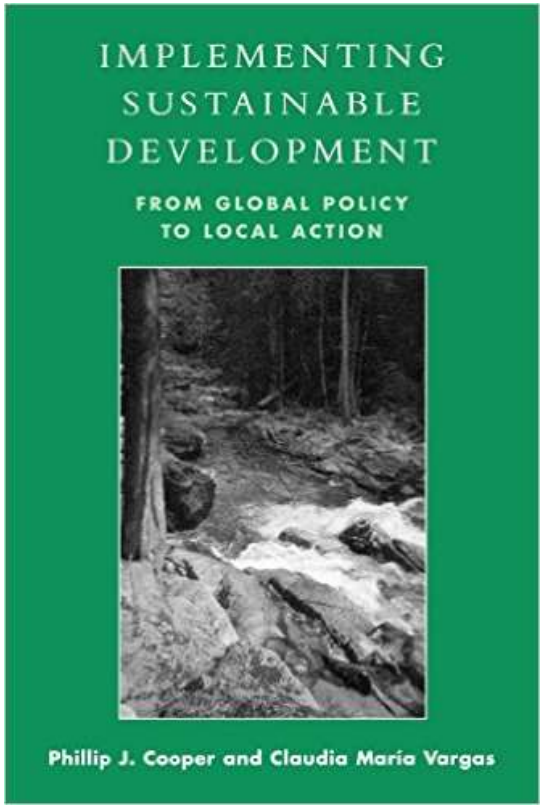
- **encourages businesses to continue to grow** but to do so in an environmentally friendly way.
- fully institutionalized the **shift from seeing industry and wealth as the cause of environmental degradation to viewing them as solutions to environmental problems**.

Industrial transformation, green economy, green growth, green investment, green financing ….

Implementation of SD



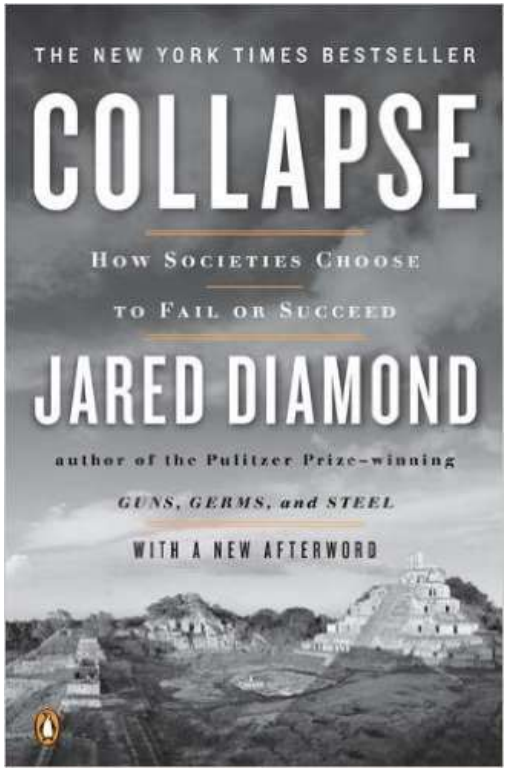




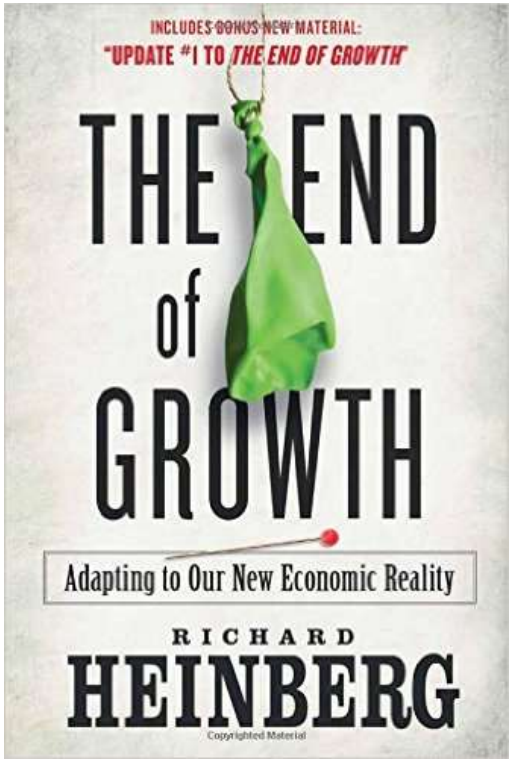
Phillip J. Cooper and Claudia Maria Vargas
(2004)

Very pessimistic perspectives …

Resource depletion ✖ **Environmental degradation** ✖ **The new four crises** ✖ **Poverty and intergenerational equity**



Jared Diamond (2011)



Richard Heinberg (2011)

Tapio Kanninen (2013)

Our framework policies and action plans

2. The lessons from SD

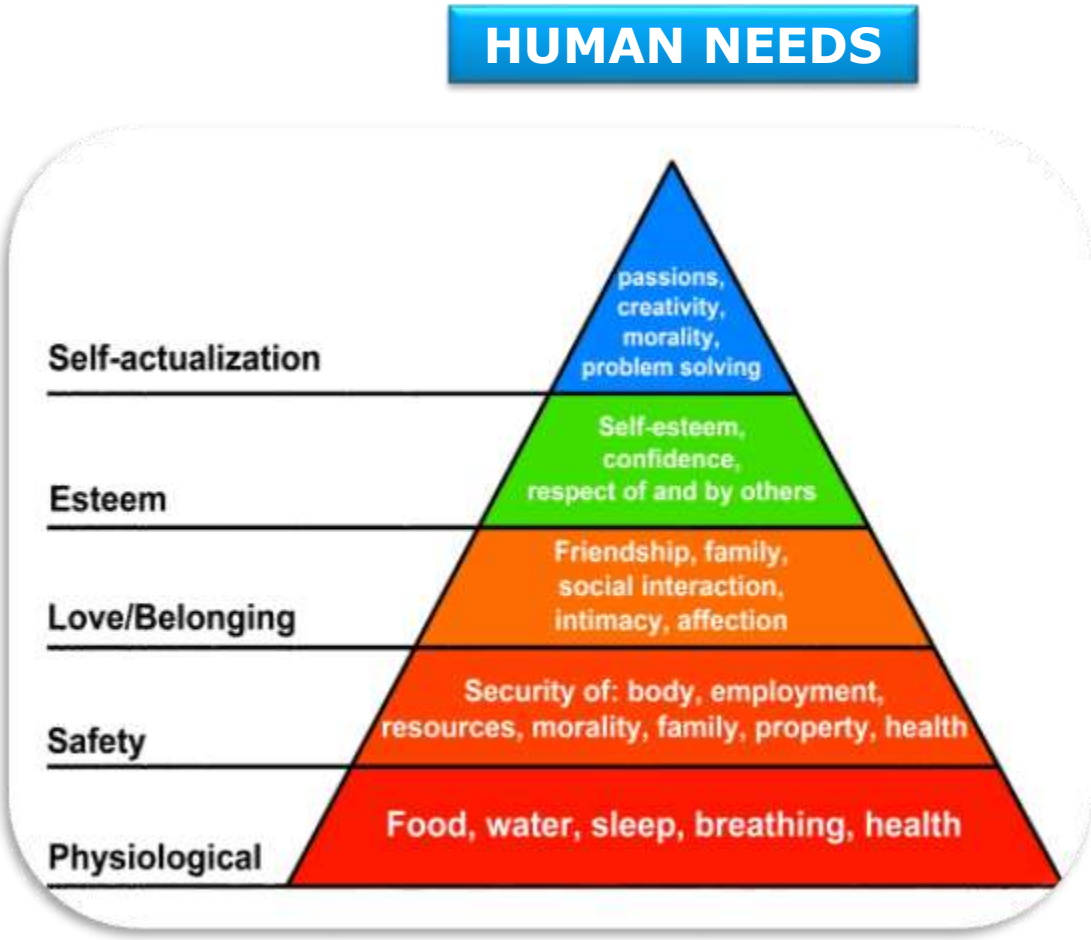
- What are the needs?
- Generations of concern?
  - Implications from the overgeneration model
- Imbalanced growth of the three pillars?
- Socially desirable intergenerational equity?
- Unsuccessful education on SD?
- Failure of policy modeling?

- Definition of sustainable development:

"…development which meets the needs of the present without compromising the needs of future generations to meet their own needs.“

What are the needs?

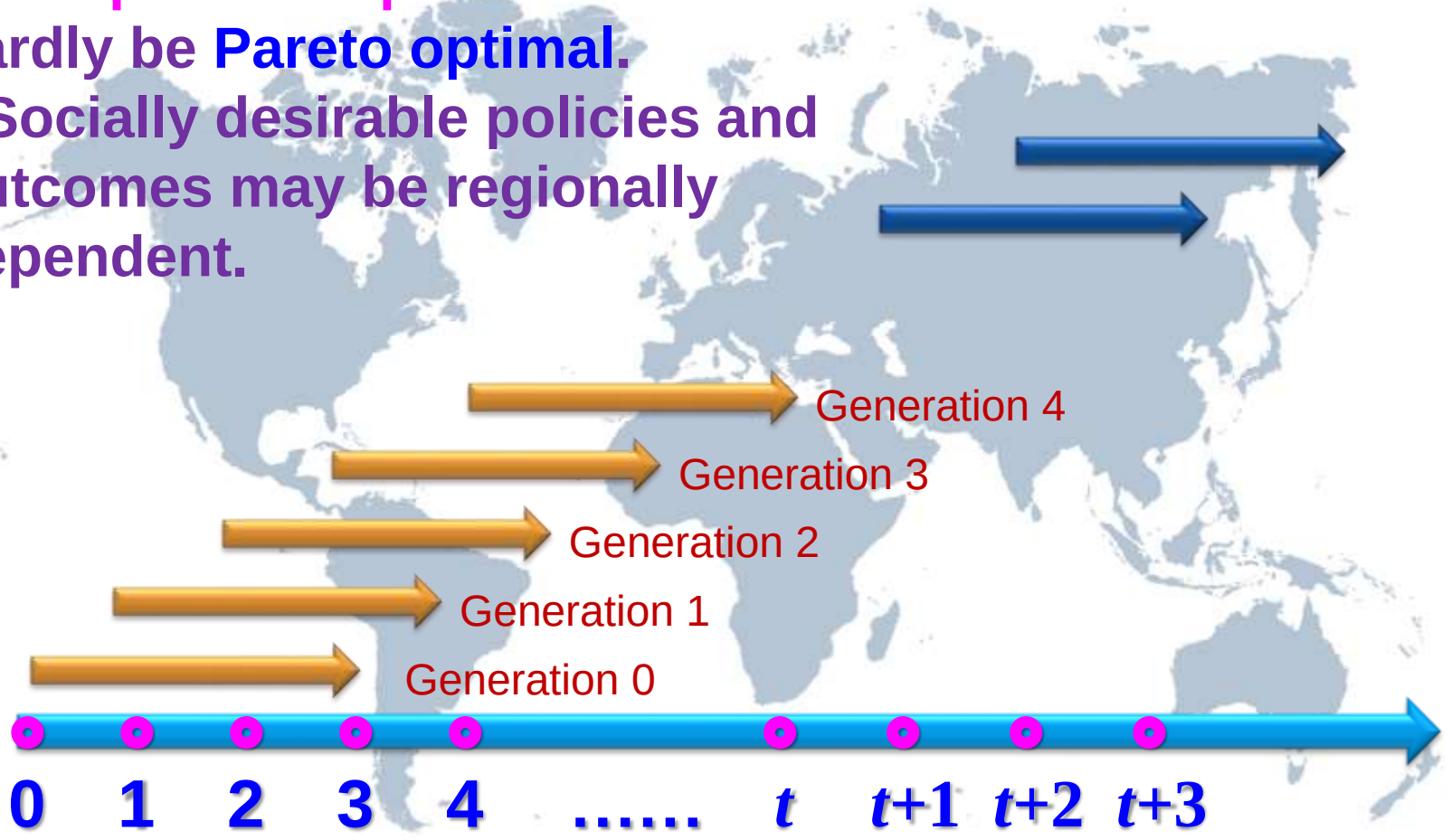
- **A bundle of**
  - natural resources (energy, water…)
  - ecological services
  - environmental quality
  - consumption commodities
  - Infrastructure and public services
  - welfare
  - better quality of life
  - All of them



$$W = CES(D_1, D_2, ..., D_N)$$

Generations of concern?

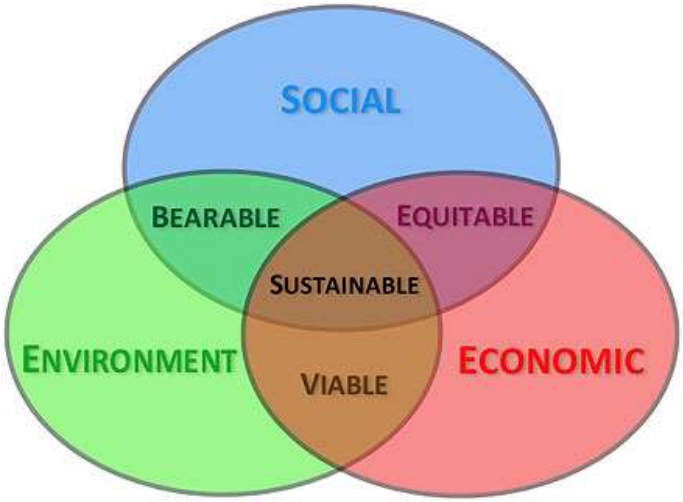
- Global vs. local perspectives
- Competitive equilibrium could hardly be Pareto optimal.
- Socially desirable policies and outcomes may be regionally dependent.



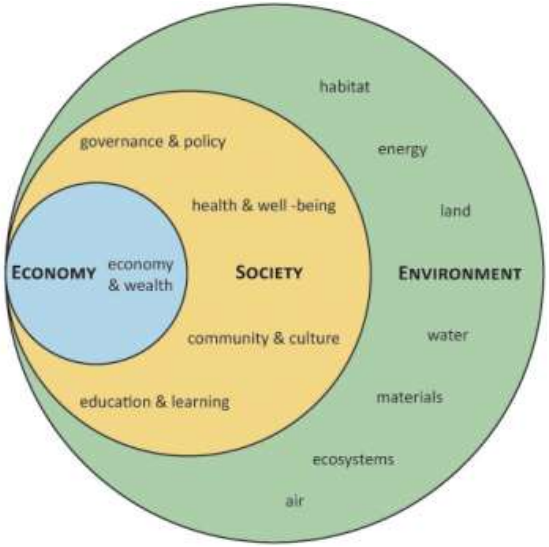
Development models to choose?

3-Legged Model

Intersection Model

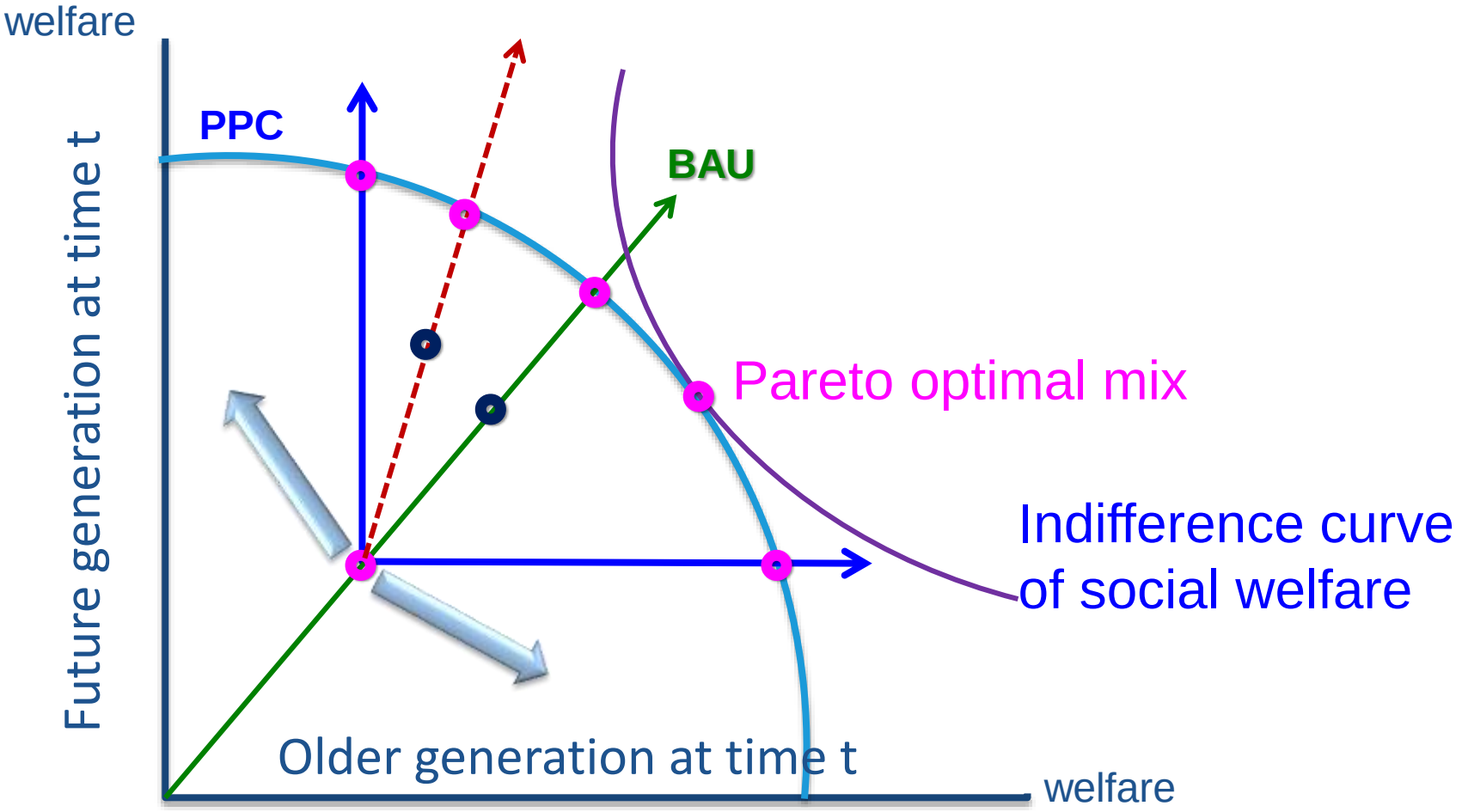


Nested Model

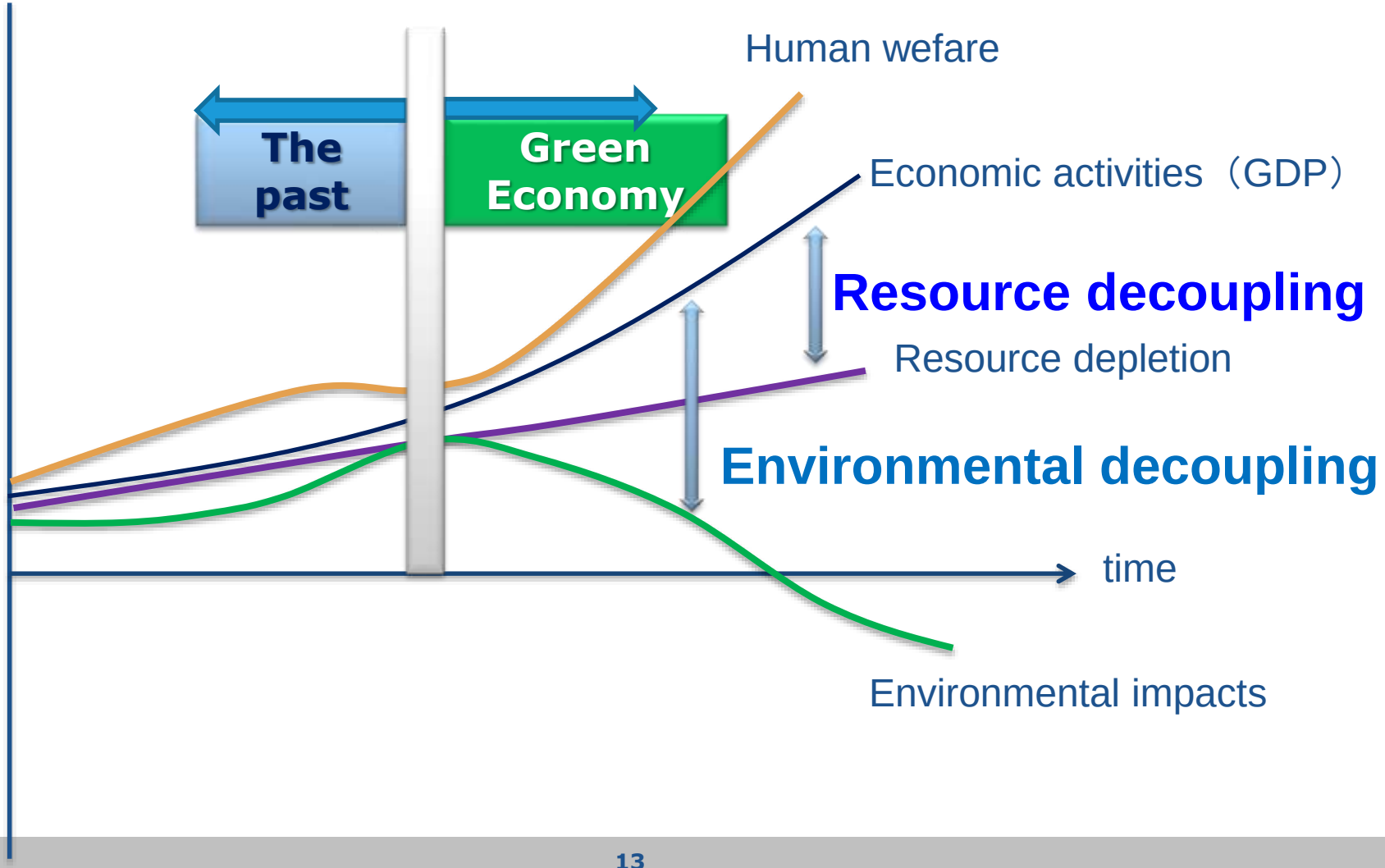


Intergenerational equity: an unsettled value judgment

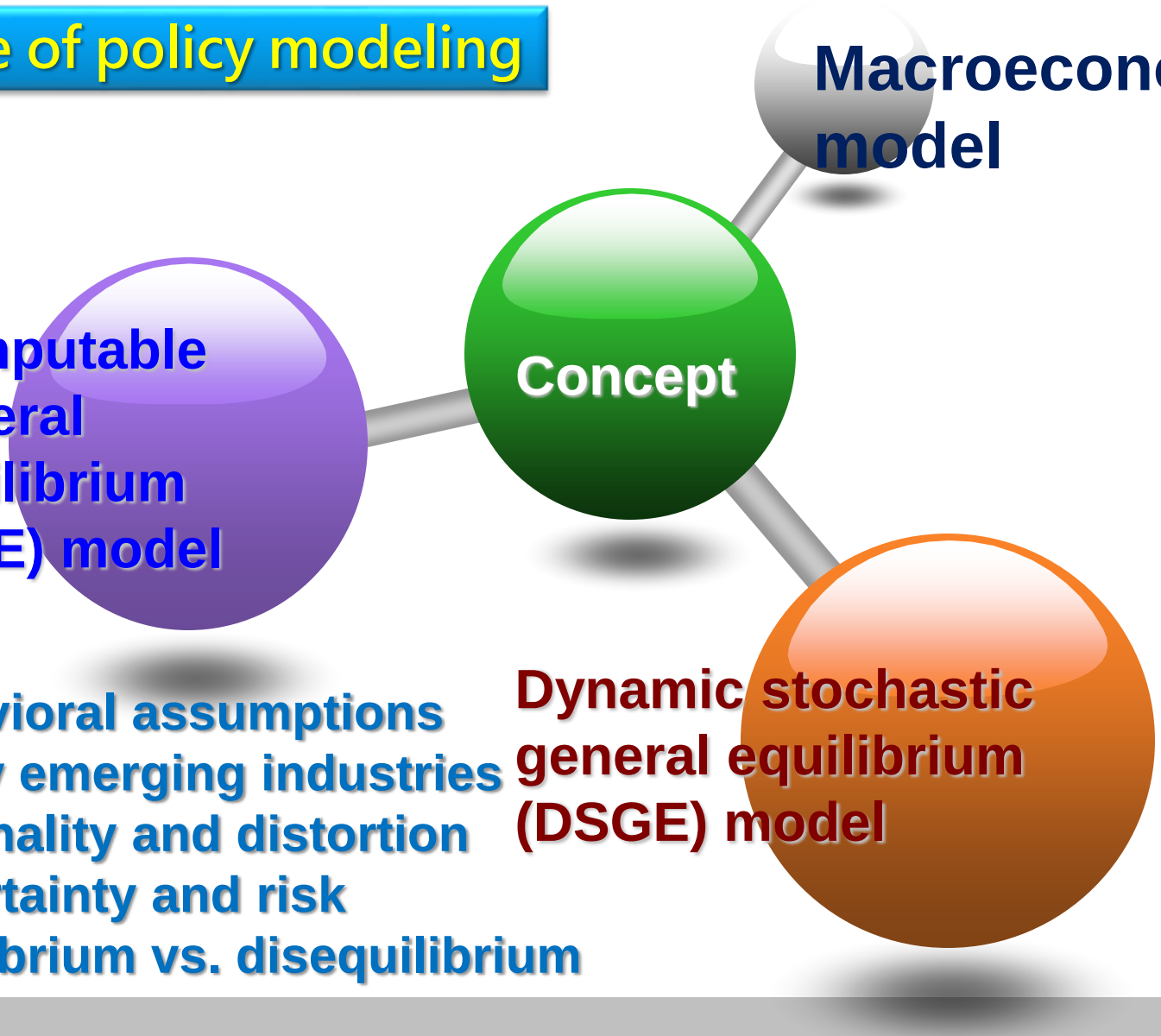
Is it warranted to sacrifice the current generation for the future generation?



The desirable roadmap of decoupling?

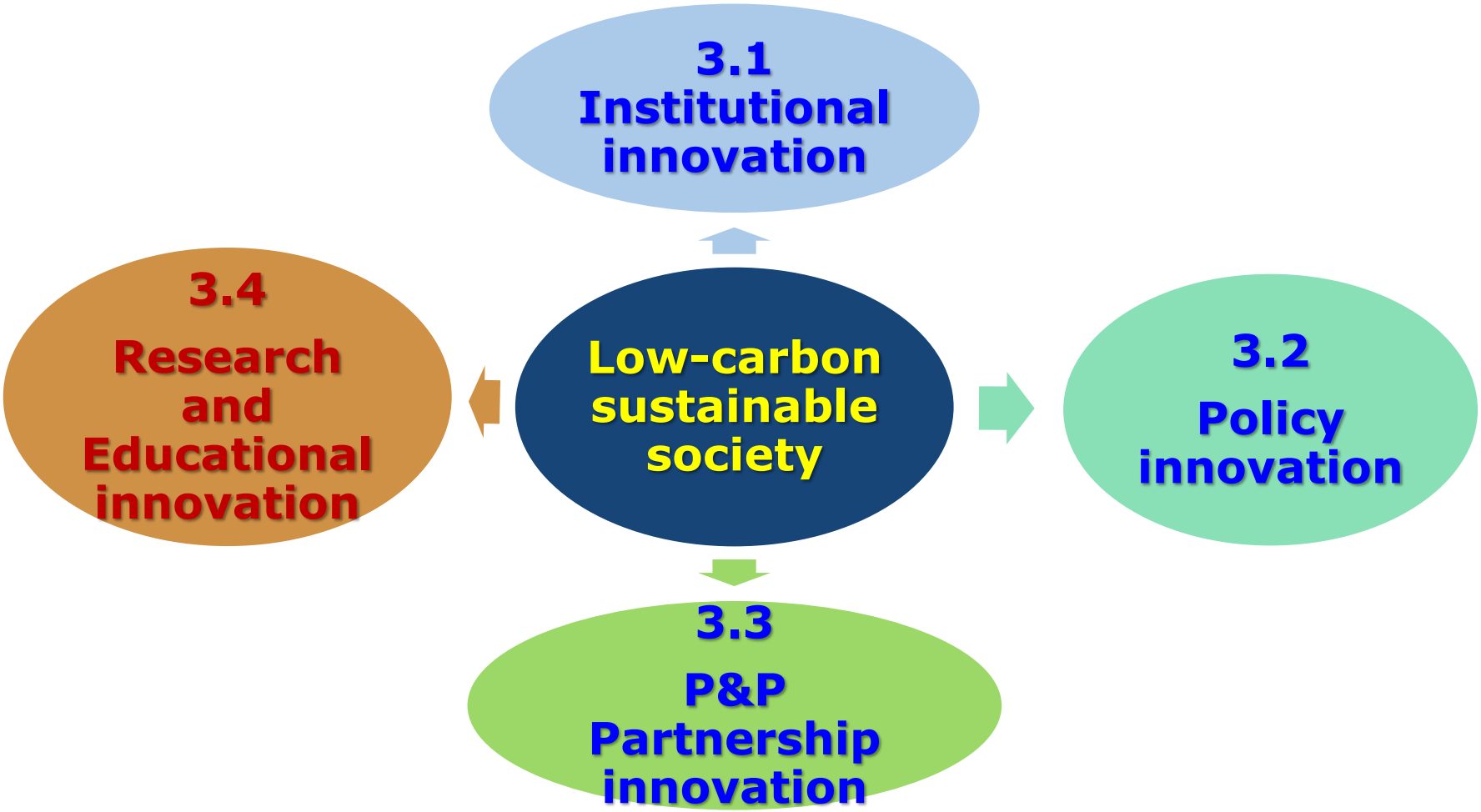


Failure of policy modeling



- Behavioral assumptions
- Newly emerging industries
- Externality and distortion
- Uncertainty and risk
- Equilibrium vs. disequilibrium

3. Strategic innovations



3.1 Institutional Innovation

From NSC to MST, and CEPD to CND

Implementation Commission for SD, **National Science Council**

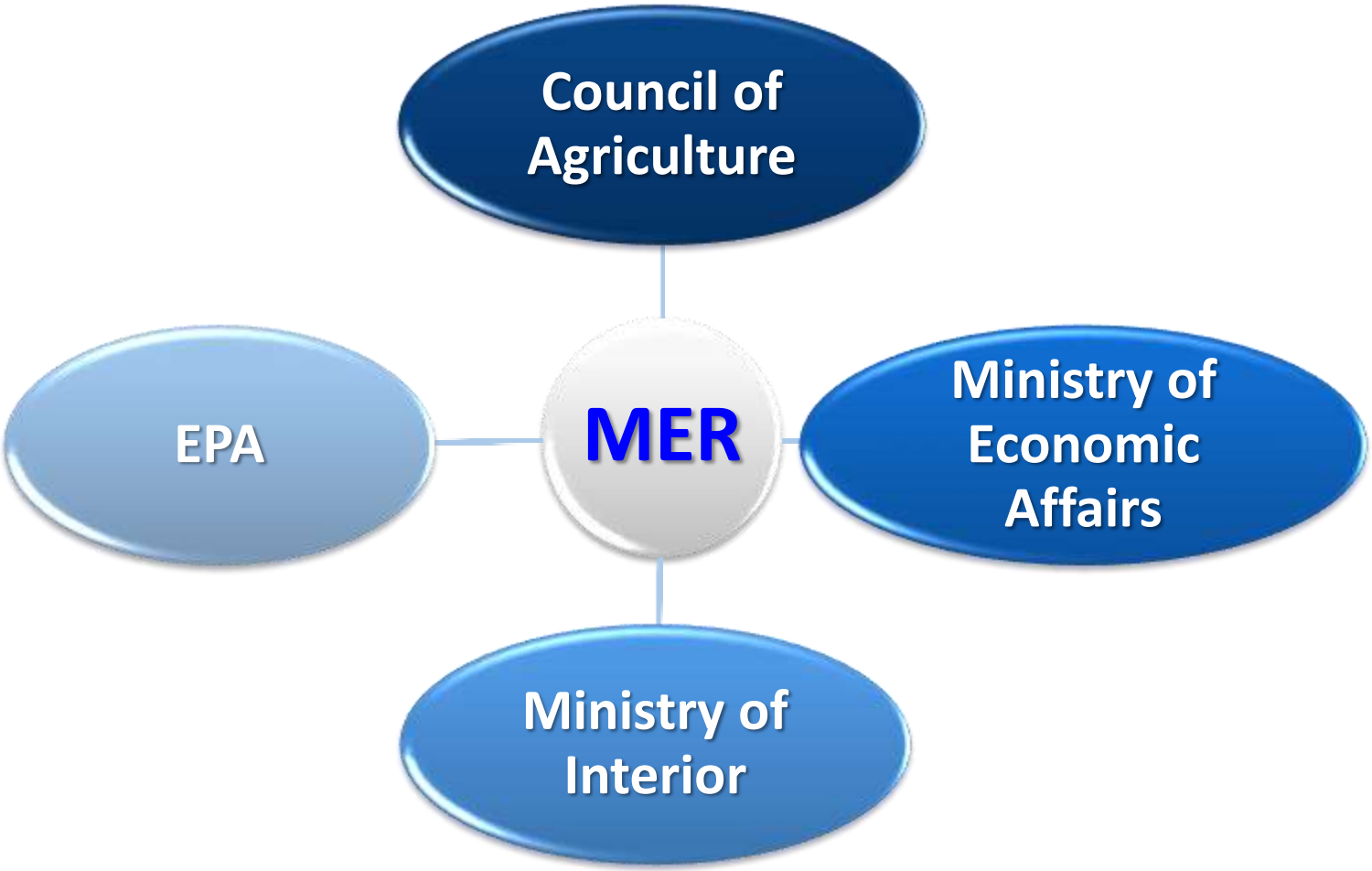
Department of Natural Sciences and Sustainable Research Development, **Ministry of Science and Technology**

Council of Economic Planning and Development

Council for National Development

3.1 Institutional Innovation

Ministry of Environment and Resources



3.2 Policy Innovation

National Programs and projects implemented

4 National Energy Conferences since 1998

Low carbon sustainable community (50), city (6), and living circle (4)

National Projects on Energy Saving & Carbon Reduction

10 Benchmark Programs

The Golden Decade-National Vision

Vision Projects for the Golden Decade (2011-2020)

3.2 Policy Innovation

Initiatives and national laws

Renewable Energy Act
- Energy structural change
- Subsidy for renewable energy
- FIT with bidding scheme and exemptions

Energy Tax Act
- Externality internalization
- Energy saving and efficiency
- Green fiscal reform

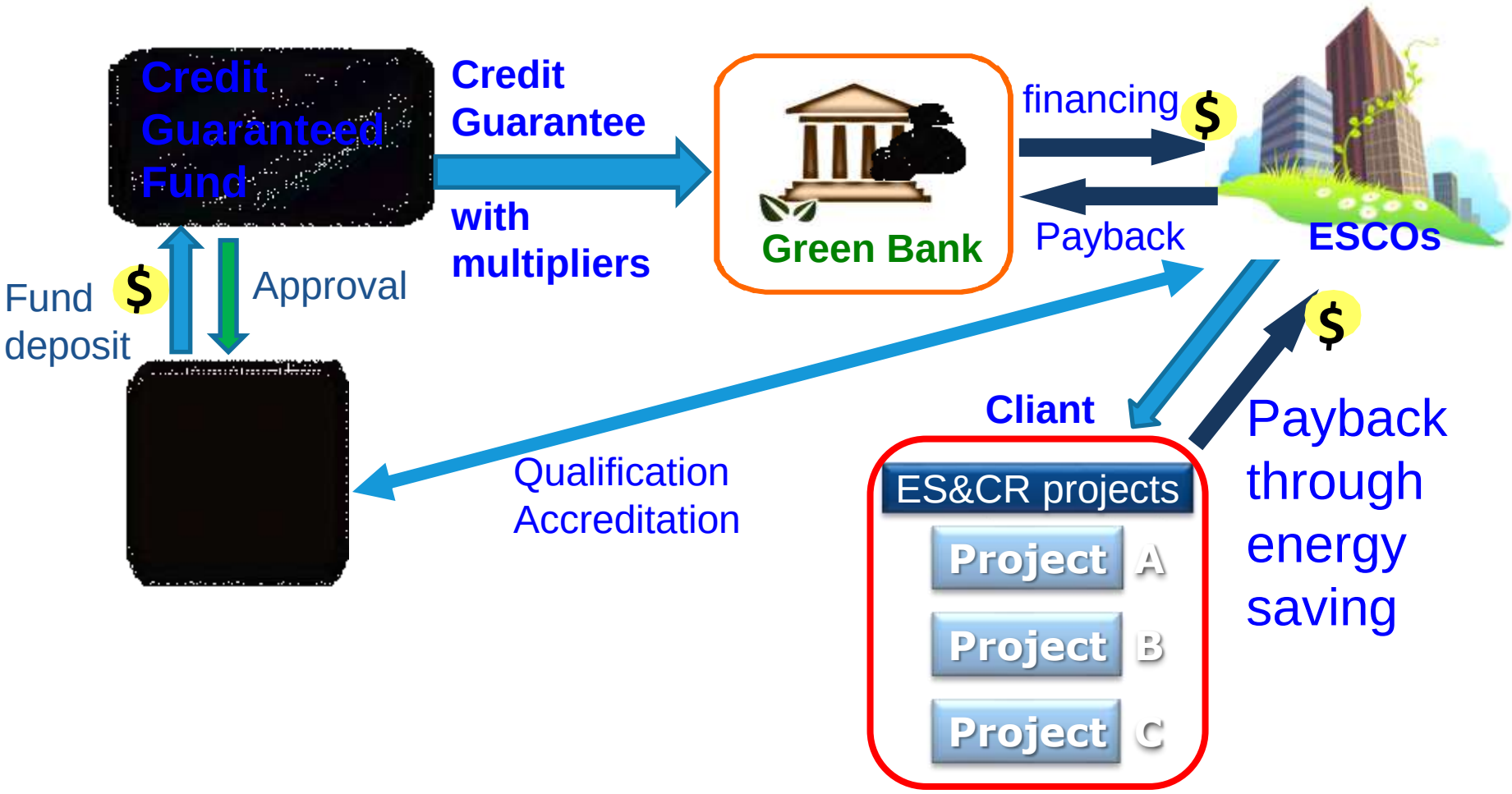
Air Pollution Control Act
- GHGs as one of the air pollutants
- Cap and trade
- Emission charge (carbon tax)

Energy Management Act
- Efficiency standards
- Energy cap management
- Energy R&D
- Promotion of energy-saving technologies

GHG Emission Reduction & Management Act
- Voluntary and early-action emission reduction
- Cap and trade
- Efficiency standards
- Green procurement

3.3 P&P Partnership Innovation

2.3 Credit Guarantee for ESCOs

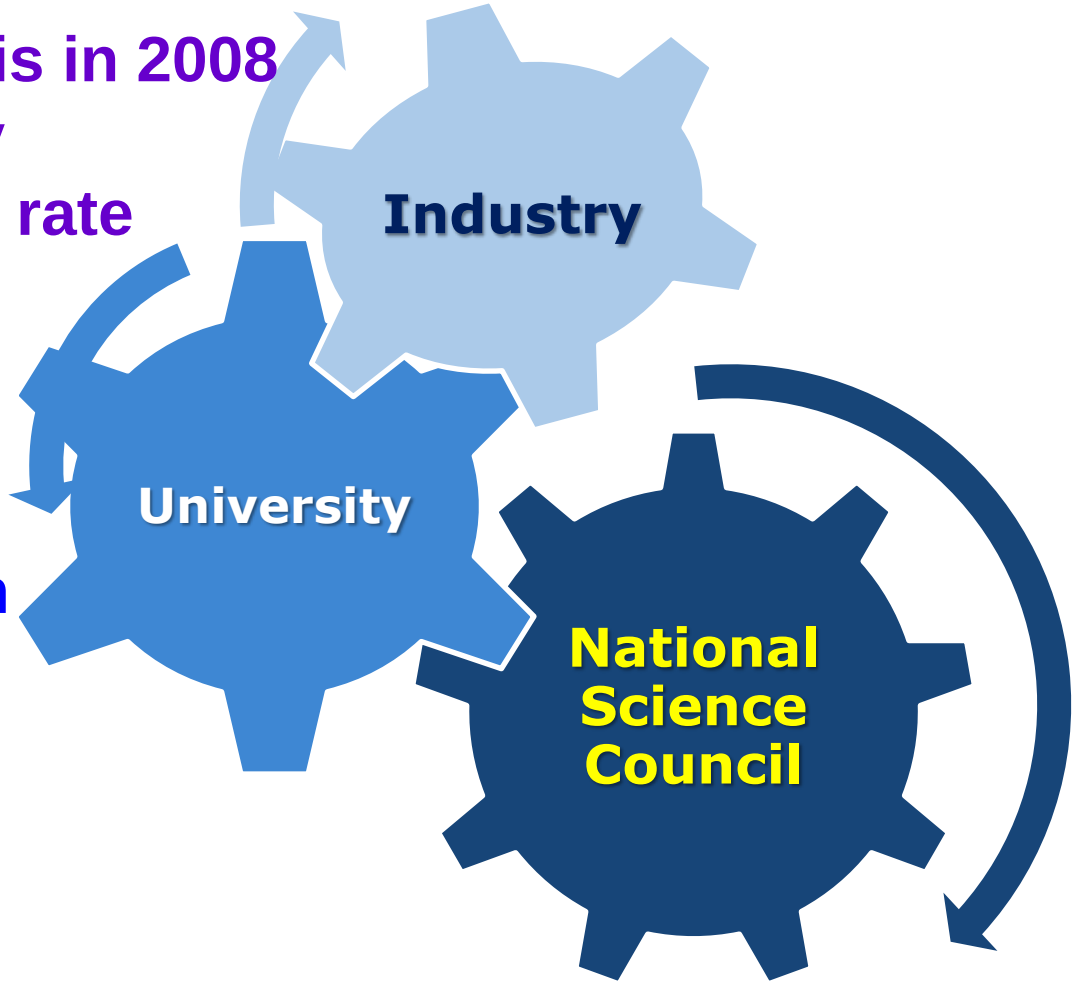


3.3 P&P Partnership Innovation

The Root-Consolidation Program

- Global financial crisis in 2008
- Off-duty without pay
- High unemployment rate

- NSC offers grants to support research cooperation between university and private company so as to retain skilled labor in work.



3.3 P&P Partnership Innovation

Sustainable Utilization Program of Wood Fuel in Central America

- Regional trade agreements
- Green financing
  - -- State aids
  - -- UNFCCC/ Green Climate Fund
  - -- ADB, AIIB, …

3.4 Research and Educational Innovation

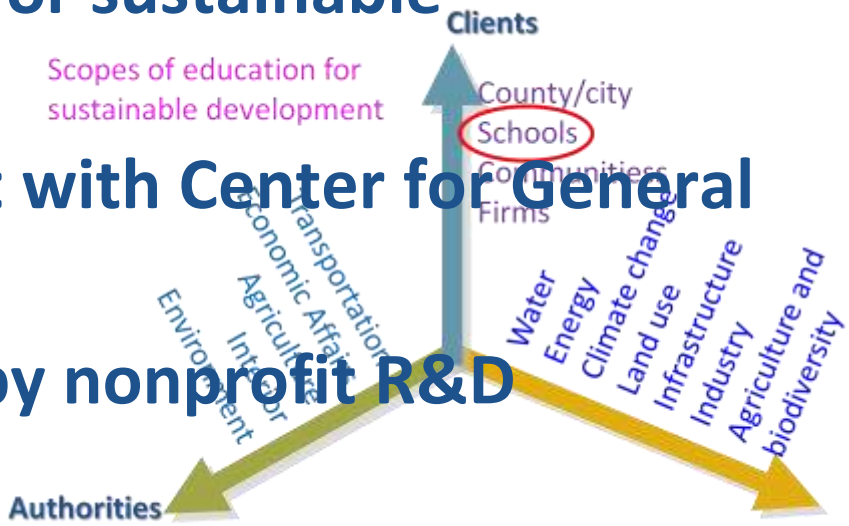
Environmental Education Act 2010

- **Objectives: Understanding the inter-dependence between individual, society and environment. Enhancing environmental ethics and responsibility. Maintain Environmental and ecological balance**
- **Measures:**
  - Initiate National Environmental Education Framework and Action Plan, and **National Reviewing Committee**
  - Establish **Environmental Education Fund**, donation from:
    - Environment Education Fund (5% of the expenditure)
    - revenues from recycling (10%)
    - the fines from violation against environmental laws and regulations (5%)
  - Accreditation of institutes and personals for environmental education
  - Assistance and rewards to qualified private institutes

3.4 Research and Educational Innovation

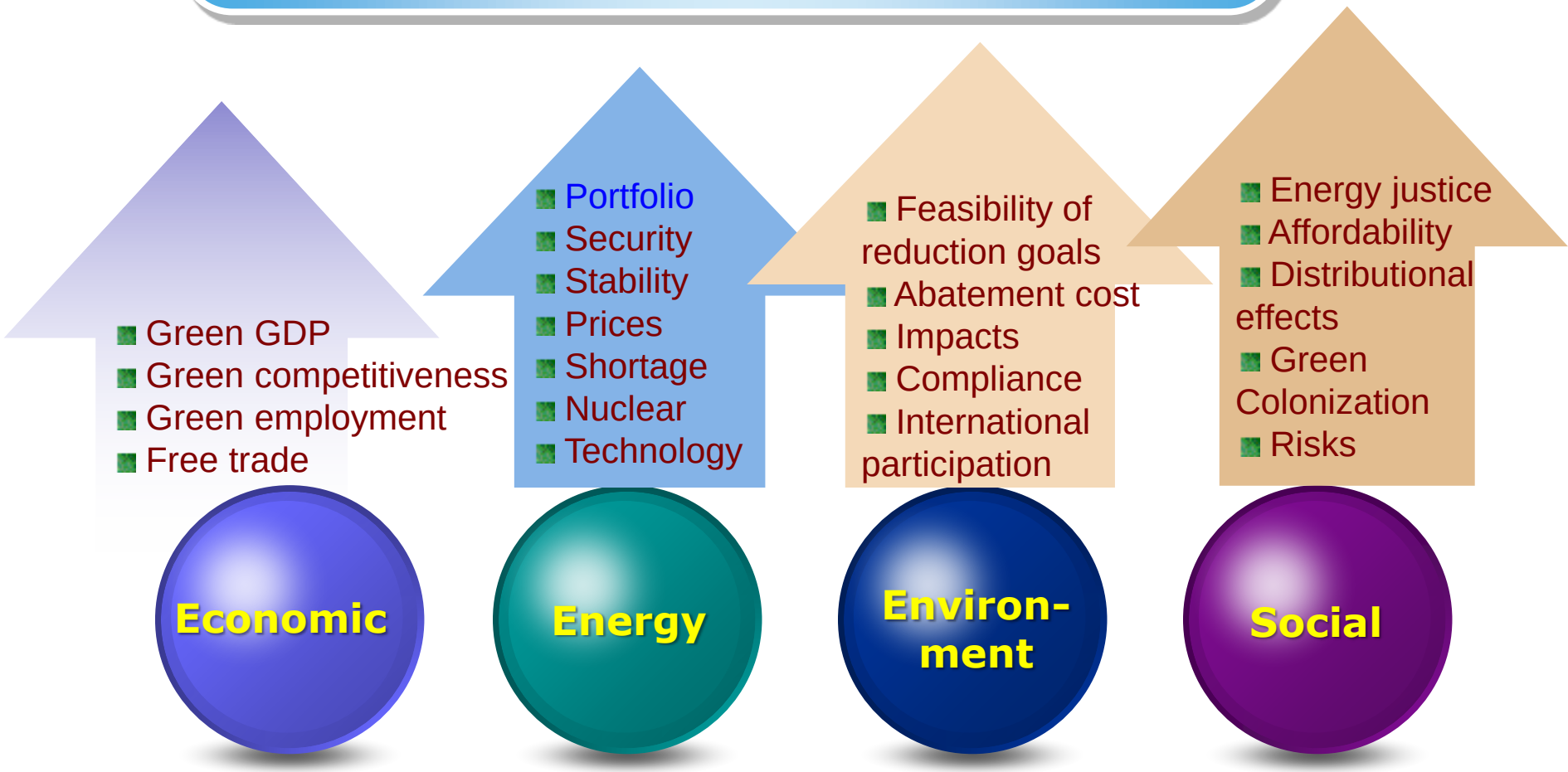
Grant support for newly established programs

- Research centers/school of SD/departments established at universities
- Related courses offered by Center for General Education at universities
- Degree-oriented programs for sustainable development
- Minimal credit requirement with Center for General Education
- Training programs offered by nonprofit R&D foundations



4. Challenges and obstacles

Industrial transformation and green growth



Barriers to green growth: a global survey

- **Top three obstacles by industry**

Obstacle	Manufacturing	Retail	Services
1st	Finance	Finance	Finance
2nd	Power	Informality	Tax rate
3rd	Informality		Informality

Source: Adapted from IFC (2013)

Top five major severe obstacles facing businesses by country income group

Obstacle	Low income	Lower-middle income	Upper-middle income	High income
1st	Power	Corruption	Tax rate	Tax rate
2nd	Finance	Power	Corruption	Worker skills
3rd	Tax rate	Political instability	Power	Power
4th	Corruption	Crime, theft, disorder	Worker skills	Political instability
5th	Political instability	Informality	Informality	Finance

Source: Adapted from IEG (2014)

Top five major severe obstacles facing businesses by region

	Sub-Saharan Africa	East Asia and Pacific	Europe and Central Asia	Latin and Central America	South Asia	Middle East and North Africa
1st	Power	Corruption	Tax rate	Corruption	Political instability	Corruption
2nd	Finance	Power	Political instability	Skills	Power	Political instability
3rd	Informality	Skills	Power	Power	Corruption	Land
4th	Corruption	Political instability	Corruption	Tax rate	Finance	Power
5th	Tax rate	Tax rate	Skills	Political instability	Land	Informality

Source: Adapted from IEG (2014)

Domestic core barriers

05 Concluding remarks

- **Reform the decision-making mechanism, e.g., from EIA Committee to Advisory Committee**
- **Strengthen capability of integrated skills**
- **Multiple policy instruments** are warranted to accomplish multiple policy goals.
- **Integration and harmonization** of policy instruments
- **Innovative design of strategic policy** for the development of renewable energy to reduce cost burden on consumer and government
- Facilitation of **green investment and financing**
- **Partnership and capacity building**