



Background and overview of the project: building on UNDP and future Danida support

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Expressions of gratitude

The host:
NIEF/MOF

Royal Danish
Embassy in Viet
Nam

*"Promoting Green Reforms in
a Rapidly Industrializing
Country: Energy Transition and
Climate Smart Development in
Viet Nam"*

UNDP

*"Production of an Energy-
focused Social Accounting
Matrix (ESAM) for Viet Nam
and calibration of empirical
models of the distributional
impact of transition to
renewable energy"*

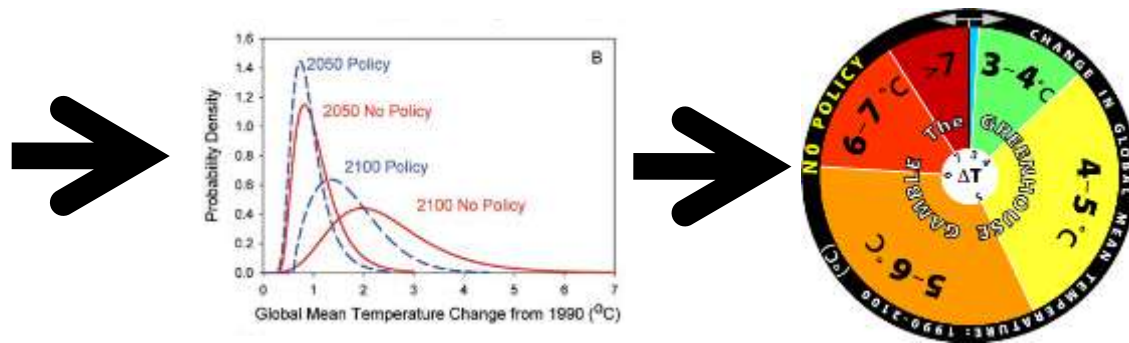
Collaborators in
CIEM/IPSS, ISPAE
and NIEF/MOF

I: Introduction – what's the issue from a global perspective?

Point of departure



Advances in climate science



- Fortunately, climate scientists leading the way in assigning probabilities to future climate change scenarios
- Means that while climate change will remain a **gamble**, at least we are getting to know the odds (at global, national and local levels)!

So much has happened – but dilemmas remain

- Achievement of SDG-1 (end poverty) a long standing and dominant development priority
- Now SDG-13 (climate action) has made its way to the top of the global agenda
- Providing access to energy is key for growth and development, but could hamper climate mitigation efforts
- Likewise, restricting the use of fossil fuels in energy transition could slow down growth and poverty reduction



II: Some basic questions and associated dilemmas

Three basic questions/topics

What does "low-carbon" mean for development?



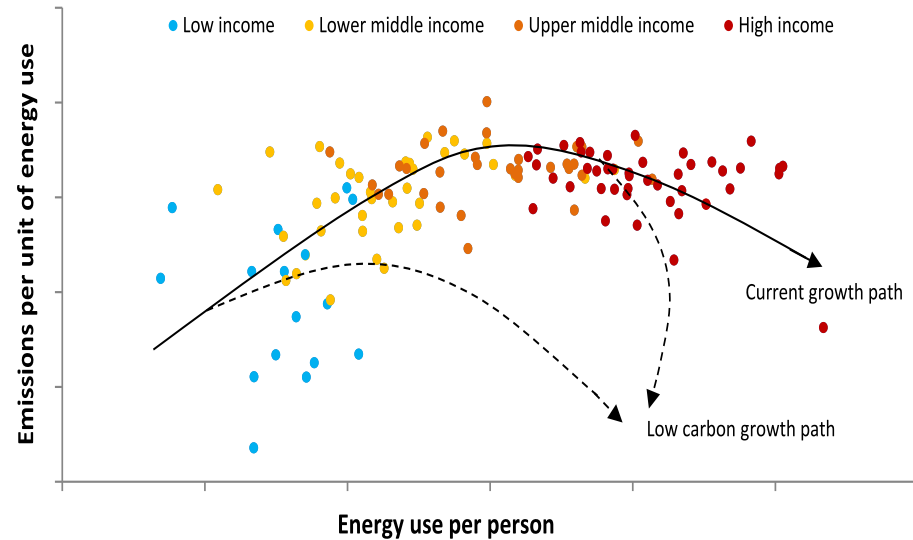
2. How should one approach new "green technologies" in developing/emerging economies?



3. What does green growth mean for existing development objectives?

II.1: What does “low-carbon” mean for development?

1a. Low carbon development: *Finding a new growth path*



Source: WIDER "Green Growth in Development" (Davies et al., 2011) Note: Energy Use and Emissions are deviations from mean logged values.

- Economic development requires that global energy use will definitely have to rise
- So – given the dimension of the challenge faced - a **key** emphasis in lowering emissions is on clean energy options for low-income countries – and better do it earlier than later (avoiding the U-turn)

1b. Low carbon development: *Challenges*

- So, the “world” is asking developing and emerging economies...
 - To use cleaner energy early in their industrialisation process
 - BUT this has expensive start-up and opportunity costs
 - To rely on imported technology
 - BUT this raises cost of operations and maintenance
 - MORE leakages in the growth multiplier process
 - Not to use their natural resources (i.e. comparative advantage)
 - IF market mechanisms are to be relied on this involves carbon taxes and difficult distributional implications

II.2: How should one approach new “green technologies” in developing countries?

2a. Green technologies: *New opportunities*

- Green technologies are already supporting development efforts in many low-income countries



- There is scope to scale-up cost saving green technologies in ways that complement and support development

2b. Green technologies: *Some challenges*

- But green tech is not always the cheapest ("best") investment option
- Green investments must be subjected to the same criteria as other investments in low-income countries:
 - Foreign technology
 - Imported materials
 - Knowledge transfer
 - Foreign ownership
 - Subsidies and public investments to support green sector
 - Distributional consequences
 - And different green technologies must be compared ("scored") not just based on impact on emissions!

II.3. What does green growth mean for existing development objectives?

3. Trade-offs with development: *Food security vs. Green Growth*

Food security strategy	Advantages for food security	Disadvantages for Green Growth
Using fertilizers to enhance soil fertility	Raises crop yields (e.g., “Green Revolution”).	Accounts for a third of agriculture’s GHG emissions
Using irrigation to manage water resources	Doubles crop yield relative to rain-fed agriculture.	Worsens water scarcity if water is used beyond replenishment.
Promote high-value exports (e.g. horticultural and floricultural products)	Higher incomes for smallholder farmers.	Requires refrigeration and irrigation, and produces large emissions when exported to developed countries by plane.

3. Trade-offs with development: *Achieving food security without compromising Green Growth*

- Policymakers can try to address these trade-offs through technology and incentive-based mechanisms (prices)
- But these may create additional trade-offs...
- E.g., Genetically Modified crops (GMOs) may reduce the need for pesticides and irrigation, BUT...
 - They may limit developing countries' sovereignty over their seed stocks
 - Developing countries may lack bio-safety legislation and regulation capacity

III. Viet Nam: Background and Context

Changing policy context

Vietnam
achieved high
economic
growth over past
4 decades

- GDP averaged 6.5% per annum since 1990; exports averaged 15% per annum since 1990
- “Successful” economic transformation as traditionally perceived
- Improved living standards for most and poverty significantly reduced

However: High
growth has
brought new
challenges

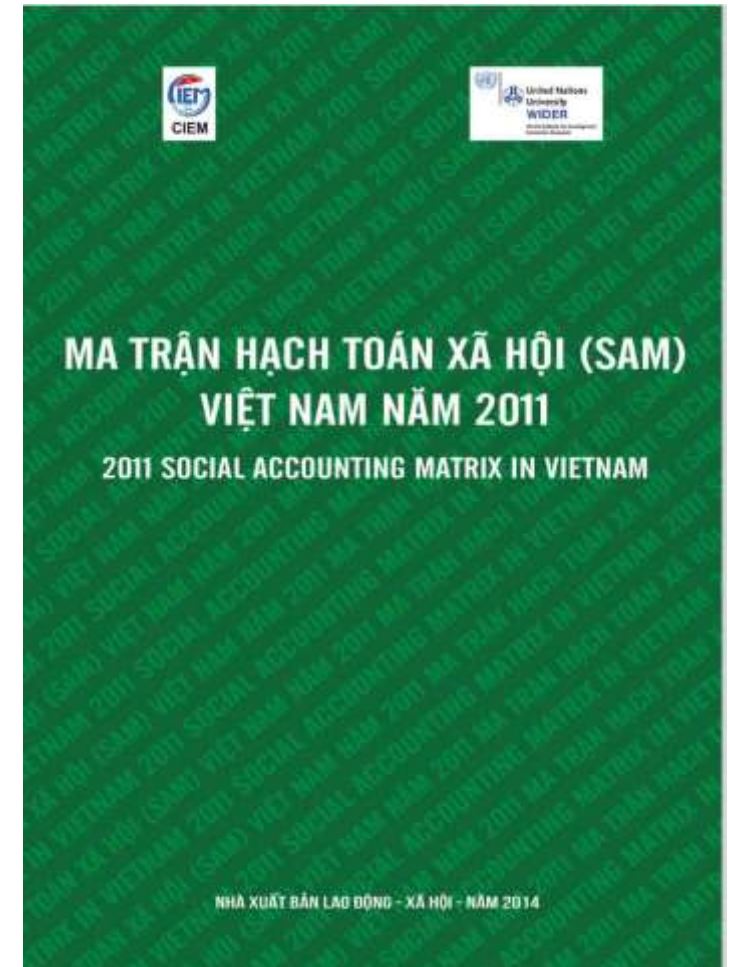
In particular:
high growth →
increased energy
intensity of
production

- Greenhouse gas emissions increased 5% per annum since 2000

- Government of Viet Nam now more alert to climate change impacts
 - Both in general and vis-à-vis vulnerable groups
- Since mid 2010: adopting Green Growth principles
- Committing to net zero carbon emissions by 2050
- National Climate Change Strategy:
 - Transition away from coal-fired power generation plus focus on Just Energy Transition Partnership (JETP)
- Future transformations more challenging than those experienced in the past – need for up-to-date data (including energy and emissions accounts) and research-based policy evidence (economy-wide GreenReform impact modelling)

Expanding the Toolkit: up to 2023

- **2011 ESAM**: first effort to incorporate disaggregation of electricity generation
 - Proof of concept in collaboration with CIEM
 - On backburner for a decade
- Fast forward to 2023:
 - Development of energy accounts by GSO (supported by Stats Denmark)
 - **UNDP started** to mobilise homegrown effort
 - Capacity building
 - Review of homegrown GSO eSUT proposal: adjustments suggested
 - More industry detail in Energy Accounts
 - More electricity detail in GSO eSUT
 - Consistency between eSUT and Energy Accounts
 - Think about ways forward (2024-26 and beyond)



So, the UNDP acted

By early 2020s
need for support
identified

- High income countries have an obligation to assist in just energy transition
- In addition, several studies focusing on climate change **impacts** already in hand (UNU-WIDER, WB, ADF, GIZ)

But, economy-wide analysis constrained by old structural data and the lacking focus on energy transition and its economy-wide impacts

- Putting the basic institutional and data building blocks in place (aware of upcoming I/O-SUT data updates by GSO) so effort initiated to:
 - Update and expand existing data
 - Initiate capacity building targeting new generation of data and policy analysts (CIEM/GSO/Other)

IV. Analytical tools available

Analytical Tools

- Macro Economy-Wide Models **can** be used to examine impacts on
 - Macro GDP growth
 - Inflation
 - Interest rates
- Macro Economy-Wide Models **cannot** be used to examine impacts
 - Income distribution (equity)
 - Output and employment impacts in specific industries and occupations
- Required: multisector-multi household framework: → **SAM data needed**
 - Social Accounting Matrices (SAMs) have been used in View Nam
- But what has been **missing** (in addition to updating):
 - Incorporating **detailed set of energy accounts**
 - Links to **emissions accounts**
 - The need for an **ESAM!**

NOTE: A SAM contains monetary values. So, the physical energy and emissions dimensions are “satellite accounts” to the SAM. An ESAM is a SAM with energy industry and commodity detail, which matches up to energy and emission data so that the interplay between the economy and its social impacts such as income distribution, on the one hand, and the physical aspects of energy transition (and indeed climate change) can be examined in an economy-wide context.

Why SAMs are important



The SAM puts together all our data



SAMs form the basis for more advanced economy-wide multiplier and CGE modelling



SAMs are models in their own right

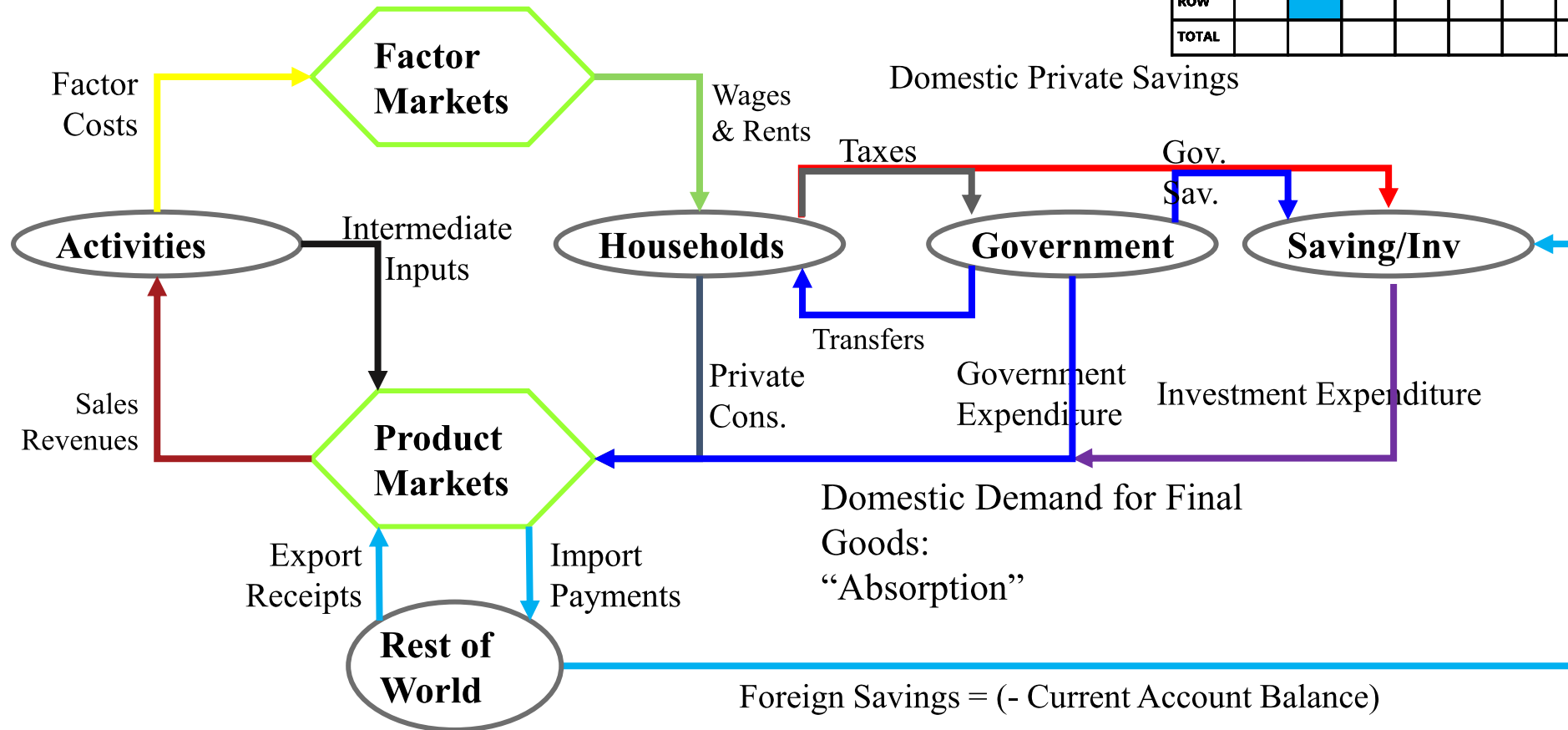
Stylized representation of the economy

SAM exploration

SAMs often used on their own for impact or multiplier analysis (matrix algebra)

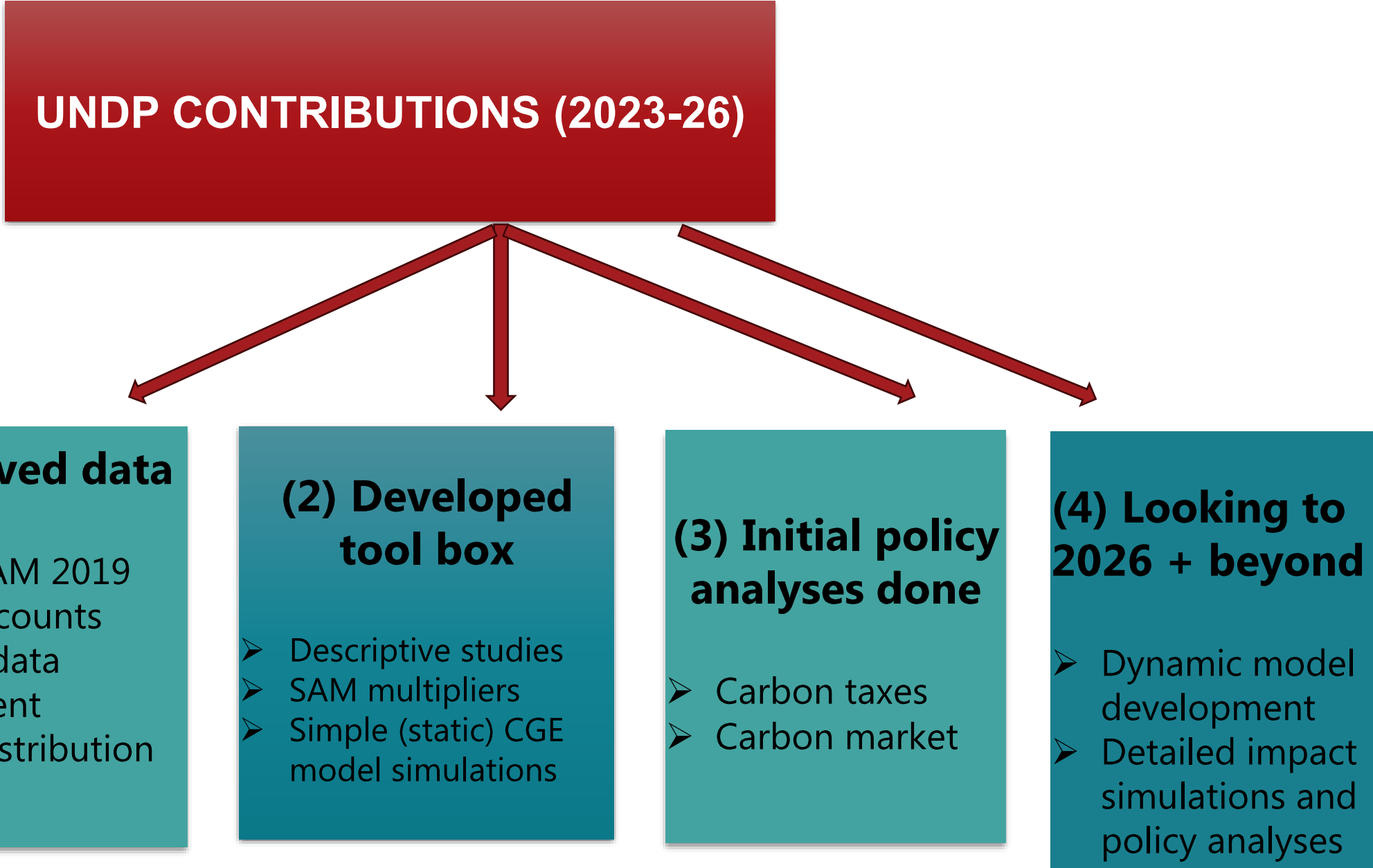
SAMs Capture the Circular Flow of Income in a Matrix

	ACT	COM	FAC	HHD	GOV	ACC	ROW	TOT
ACT								
COM								
FAC								
HHD								
GOV								
ACC								
ROW								
TOTAL								



V: Summing-up and the New Danida Supported Project

UNDP CONTRIBUTIONS (2023-26)



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graph TD; A[UNDP CONTRIBUTIONS (2023-26)] --> B["(1) Improved data"]; A --> C["(2) Developed tool box"]; A --> D["(3) Initial policy analyses done"]; A --> E["(4) Looking to 2026 + beyond"];
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(1) Improved data

- SUT + ESAM 2019
- Energy accounts
- Emission data
- Employment
- Income distribution

(2) Developed tool box

- Descriptive studies
- SAM multipliers
- Simple (static) CGE model simulations

(3) Initial policy analyses done

- Carbon taxes
- Carbon market

(4) Looking to 2026 + beyond

- Dynamic model development
- Detailed impact simulations and policy analyses

Assembling Economy Nature



91%

Industry Export Share

High Import Dependence

While Industry drives exports, it contributes only 40.25% to GDP versus 63.84% of gross output, reflecting an "assembling" economy. This heavily relies on imported energy to produce exports. In 2019, imported coal accounted for 48% of total supply, and crude oil imports reached 41%, exposing the economy to global price volatility.

Household Equity



Socioeconomic Divide: Urban rich consume the most electricity and gas, generating the highest per capita emissions. Rural poor heavily rely on low-quality, indoor-polluting solid fuels.



Methane Challenge: 61.3% of Methane (CH_4) emissions originate from the household sector, primarily due to rural cooking using solid biomass (firewood, charcoal).



Just Transition: Policy must extend beyond industrial CO_2 to actively support poor rural households transitioning to clean cooking energy.



The Price Wedges

Different industries are paying very different average electricity prices, reflecting current cross-compensation mechanisms.

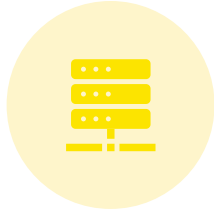
Removing these price wedges through a competitive electricity market will heavily impact energy-intensive industries, but is necessary to incentivize true energy efficiency and accurate economic modeling.

CGE model: Progressive Carbon Tax

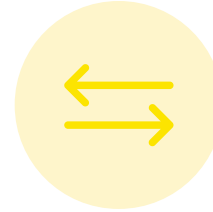
-  **Macroeconomic Cost:** Simulating a \$15/ton CO₂e tax increases production costs, resulting in a 0.78% decrease in real GDP and a 3.2% drop in total emissions.
-  **Fossil Fuel Decline:** Coal electricity generation drops by 5.4%, and emissions from crude oil decrease dramatically by 13.9%, showing the effectiveness of pricing tools.
-  **Equity via Redistribution:** When tax revenues are recycled to double social benefits, the disposable income of poor rural households actually increases, protecting vulnerable groups.
-  **Urban Impact:** Conversely, urban high-income households experience a net loss due to higher energy consumption (gasoline, A/C) and lower subsidy eligibility.

V.2: New Danida Supported Project

New Priorities, Data updating and Analytical Development



Two digit growth -> need for updated macro-economic modelling (the merged model)



Moving GreenReform modelling forward -> introduce dynamics (GreenReform)



Data requirements (update the SAM to 2024)



Policy studies



Additional Capacity training

The Merged Model

Merged Model combines

- World Bank's Revised Minimum Standards Model (real sector)
- IMF's Financial Programming Model (monetary sector)

Aggregate Framework which includes

- Material Balance
- Government Budget
- Balance of Payments
- Money Market

GreenREFORM EU Dynamic CGE

- [Adapt The GreenREFORM EU model | DREAM](#)
- A policy-ready **dynamic** modelling framework to assess the macroeconomic, employment, investment, distributional, and emissions impacts of green policies
- GreenReform-EU (a dynamic, small-open-economy CGE model) just launched (after considerable investment in model development to have **“workhorse”** version)
- First, in the tradition of CGE models, **optimisation is decentralised** to the respective agents of the model (in contrast with energy system models like TIMES, which feature centralized cost minimization)
- Model designed for **practical policy analysis**, operating on detailed input-output and energy accounts, as well as an energy system model and can be calibrated to national datasets (plus can solve simultaneously)
- We will adapt to **Viet Nam specific case** and apply

The modules in GreenREFORM EU

Section	Module	Section	Module
2.1 The input-output system	Input output	2.5 The public sector	Government
2.2 Financial accounts	Financial accounts		Energy and emission taxes
2.3 Corporate sector	Production inputs	2.6 Rest of the world	Imports
	Production outputs		Exports
	Factor demand		Energy exports
	Pricing	2.7 Energy and emissions	Energy market
	Non-energy markets		Energy demand from production
2.4 Household sector	Households		Disaggregated consumption (energy)
	Ramsey household	2.8 Abatement	Emissions
	Disaggregated consumption		Abatement
	Labour market		

Illustrative (CO₂e taxation)



Simulations without abatement model indicate (a priori) that a projected increase in CO₂e taxation of €100 is expected to reduce emissions by approximately 6%, primarily by encouraging a shift in production from emission-intensive to labour intensive industries



The tax revenue is recycled to households; however, there is still a decline in household welfare



The activation of the abatement model alters the model's predictions; emission reductions are greater as electrification technologies are adopted to mitigate the tax increase; wage rates, GDP, and household welfare improve



Overall, the GreenREFORM EU model empowers policymakers with the insights needed to identify efficient investments and evaluate the effectiveness of green policies, supporting a sustainable transition towards a low-carbon economy.



Findings underscore the model's relevance for future research and its potential for adaptation to include sector-specific sub-models and national regulations, enhancing its applicability across various contexts.

V: Conclusion

Concluding remarks



Finding greener growth paths for Viet Nam is clearly a necessity; but does create challenges



There will inevitably be difficult trade-offs between green reforms and existing development objectives (growth, poverty reduction and inequality) – achieving a just transition a key challenge



While green technologies may complement development investments, our profession must help appraise these investments – not always optimal



Green reforms must complement, not replace existing development strategies; economy-wide analysis and evidence-based advice critical; also in how to choose among different green technologies?