Costa Rica: Developing a modeling framework for NDC Pathways

PMR Workshop – Paving the Way for NDC Implementation
San José, Costa Rica
December, 2016
Guiding questions

• How is the work relevant/useful to NDC?
• What are the specific policy/research/NDC-related questions of the exercise?
• What is the modeling/analytical framework and methodology used and why?
• What are the key outcomes and/or illustrative results of the exercise?
• What critical success factors have been identified?
CR Emissions Profile (2012)

• High ambition in our INDC, but support is required for transformational change to occur in the short-term, especially for agriculture and transport.

**Reported Emissions**

- **Energy**: 7,213.83 Gg CO2e
- **IPPU**: 980.7 Gg CO2e
- **AFOLU**: 1,191.36 Gg CO2e (net)
- **Waste**: 1,864.31 Gg CO2e
- **Total**: 11,250.20 Gg CO2e

**Gross emissions by source**

- **AFOLU (emissions)**: 40%
- **Transport**: 25%
- **Other Energy**: 22%
- **Waste**: 9%
- **IPPU**: 4%
NDC Trajectory

INDC trajectory

INDC goal @ 2030: 9.374 Mt CO2e

INDC period

$\text{t CO2e}$
# Reported mitigation actions (BUR)

* Pre-2021, pre-Paris Agreement and pre-INDC mitigation actions

<table>
<thead>
<tr>
<th>Action</th>
<th>GHGI Sector</th>
<th>Scale</th>
<th>Goal (Mt CO2e)</th>
<th>Goal period</th>
<th>MRVed outcomes (Mt CO2)</th>
<th>MRV period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic C-Market (C-brand)</td>
<td>All</td>
<td>Organization</td>
<td>TB Updated</td>
<td>2021</td>
<td>Implicit in GHGI</td>
<td>2009-2012</td>
</tr>
<tr>
<td>National Energy Plan</td>
<td>Energy</td>
<td>National</td>
<td>TB Updated</td>
<td>2021</td>
<td>Work in progress</td>
<td>TBD</td>
</tr>
<tr>
<td>National REDD+ Strategy</td>
<td>AFOLU</td>
<td>National</td>
<td>31.5</td>
<td>2010-2025</td>
<td>8.8</td>
<td>2010-2013</td>
</tr>
<tr>
<td>Coffee NAMA</td>
<td>AFOLU</td>
<td>National</td>
<td>TB Updated</td>
<td>2024</td>
<td>Work in progress</td>
<td>TBD</td>
</tr>
<tr>
<td>Livestock NAMA</td>
<td>AFOLU</td>
<td>National</td>
<td>12.9</td>
<td>2028</td>
<td>Work in progress</td>
<td>TBD</td>
</tr>
<tr>
<td>Waste water treatment</td>
<td>Waste</td>
<td>Sub-national</td>
<td>TBD</td>
<td>TBD</td>
<td>Work in progress</td>
<td>TBD</td>
</tr>
</tbody>
</table>

- Goals and MRV are emission reductions
- CDM projects excluded from table. Overall expected contribution to mitigation: 0.2 M tCO2 during 2006-2006.
Additional actions for *deep decarbonization*

- Costa Rica seeks to become a **national-scale laboratory for deep decarbonization** and has begun development and implementation of additional mitigation measures aligned with our NDC and key categories in GHGI:
  - Levy on mobile emissions sources
  - Levy on static emissions sources
  - Law for the Promotion of Electric Vehicles
  - Updating the Energy Efficiency Policy
  - Enabling conditions for distributed electrical generation project
• Costa Rica has been working on improving GHG emissions MRV and projection capacities
• For the BUR, this was done in an ad hoc basis with project developers, sectoral ministries and other stakeholders providing estimates
• Recognizing the importance of solid projections for long-term planning Costa Rica, through the support of the PMR-PAWP has started a national implementation of TIMES modelling platform
• TIMES is the most widely used, least-cost optimization methodology employed to inform energy (and water) policy and strategic planning, it was developed and is maintained by IEA-ETSAP
Project Objectives

• Identify the policies and measures politically, technically, and economically feasible for Costa Rica

• Develop a country-specific energy systems model with input parameters validated and the resulting Baseline scenario approved by local experts and key stakeholders

• Develop a Planned policy scenario to assess existing and proposed mitigation policies and actions

• Develop Enhanced policy scenarios for Costa Rica to achieve its NDC targets made up of plausible mitigation policies and actions

• Build the local capacity so that experts can use the TIMES-CR model to advise policy on an ongoing basis
Key requirements

• Sector coverage:
  • Primary modeling: bottom-up modeling of the energy and transport sectors
  • Secondary modeling: “external” inputs AFOLU, waste and IPPU sectors

• Modeling platform: transparent with user-friendly interface; flexible for changes of key assumptions, new scenarios, and allow soft-linking with other models, such as the Central Bank CGE Model and the SINAMECC

• The model and its interface will ideally be open-source and will not require licensing fees

• Time horizon: annual time steps up to 2050
What critical success factors have been identified?
DWG Keys for success

Successful development and ongoing use of the TIMES-Starter model for Costa Rica (TIMES-CR) is going depend on five fundamental components

1. **Strong commitment** by the appropriate Ministries and other government agencies responsible for the actually implementation of the policy recommendations arising from the undertaking

2. **Engagement** of the key stakeholders in the energy sector to foster buy-in of the approach and the results

3. Access to the **best available data** to underpin the analytical framework

4. Employment of **best TIMES practices**, tools and techniques, as embodied in the TIMES-Starter platform

5. An appropriately **skilled group of technically astute experts** to be trained in the principles, operation and application of the TIMES-CR model
Mind the Analysis Team

- Solid understanding of energy data
- Basic knowledge of energy technologies and how they are characterized, and associated units
- Very good understanding of working with (linked) Excel workbooks
- Familiarity with other energy system models (e.g., LEAP, MESSAGE, ENPEP, PLEXOS) a plus
- Background in operations research a plus
- Made up of transport, energy, economic, industrial and policy experts.
Key AT responsibilities

- Assist with identifying data sources and understanding the quality of the data
- Participate in the capacity building process
- Follow the model development process by periodically reviewing the evolving model
- Gain a solid understanding of TIMES-CR (see next slide)
- Take over long-term stewardship of TIMES-CR

- A successful AT requires sustained, long-term support
Integrate data-analysis broadly and deeply

- Conceiving TIMES as part of SINAMECC adds value to both
- Costa Rica’s overarching transparency framework has two main objectives:

  Monitoring, and accounting of public policies, including NDC goals

  Enabling data-driven policymaking
Systems-of-systems approach
Integrating multiple MRV schemes into one consolidated system
SINAMECC’s Structure

1. Core Capacities
   - Local and international reporting
   - Data visualization and open access
   - Data-driven policymaking tools (TIMES, CGE)

2. Facilitating Framework
   - Institutional agreements on data transfer
   - Sustainability of data flows
   - Interactions between institutions

3. Information flows
   - Data Quality Assessment and Control
   - Protocols and Methodologies
   - Strengthening Data Supply and Demand
It takes a village...

- Costa Rica is actively seeking ways to increase transparency, including approved projects with

  ![Logos of various organizations](image)

  to develop the:

  **National Climate Change Metrics System - SINAMECC**