

Integrating Climate Risk in Long-Term Planning

Pre-training Material

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Pre-Training Objectives

- ✓ Define Long Term Strategies (LTS)
- ✓ Understand linkages between LTS and NDCs
- ✓ Understand Transparency as it relates to LTS
- ✓ Link Climate Risk to long term planning

What is an LTS?

Long-term strategies (LTS) are a country strategy or plan that sets a vision and pathway towards sustainable, low-emission development to 2050.



LTS are economy wide, representing all major sectors of a country economy and **set specific targets and objectives**



LTS evolve over time to become more comprehensive and more ambitious in terms of GHG reductions and other sustainability goals.



LTS can **incorporate other policies**, such as those in NDCs, sector plans, or subnational activities.

Climate Change, LTS, and the Paris Agreement

Paris Agreement

- UN agreement signed by 195 countries at the 21st Conference of the Parties in 2015.
- **Focus:** decrease global CO₂ emissions to mitigate climate change.
- **Goal:** strengthen the global response to climate change by limiting global temperature rise to 1.5°C above pre-industrial levels.

Long-term Strategies Article IV, P. 19

“All Parties should strive to formulate and communicate long-term low greenhouse gas emission development strategies, mindful of Article 2, taking into account their common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.”

Long Term Strategies (LTS) and Nationally Determined Contributions (NDCs)

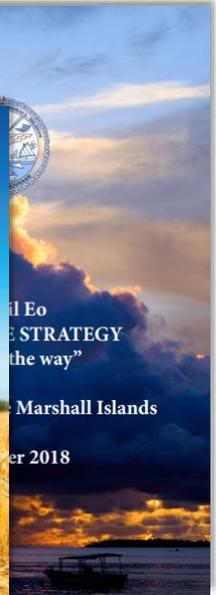
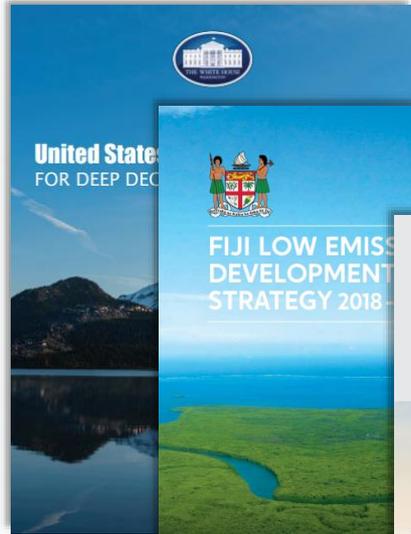
	LTS	NDCs
Scope	Defines the national vision and development priorities for a country, and links this to emissions pathway	Defines specific GHG emission reduction targets and detailed implementation plans
Timeframe	2050	2030
Requirement under the Paris Agreement	Voluntary (Article 4, paragraph 19)	Required (Article 4, paragraph 2)
Frequency of Update	Parties are invited to submit a LTS in 2020 with no requirement for revisions	Parties are required to communicate and update NDCs every five years
# of Countries with UNFCCC Submissions	17 (as of August 2020)	195 (as of April 2016)

<https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>

Elements of an LTS



LTS Examples



Transparency

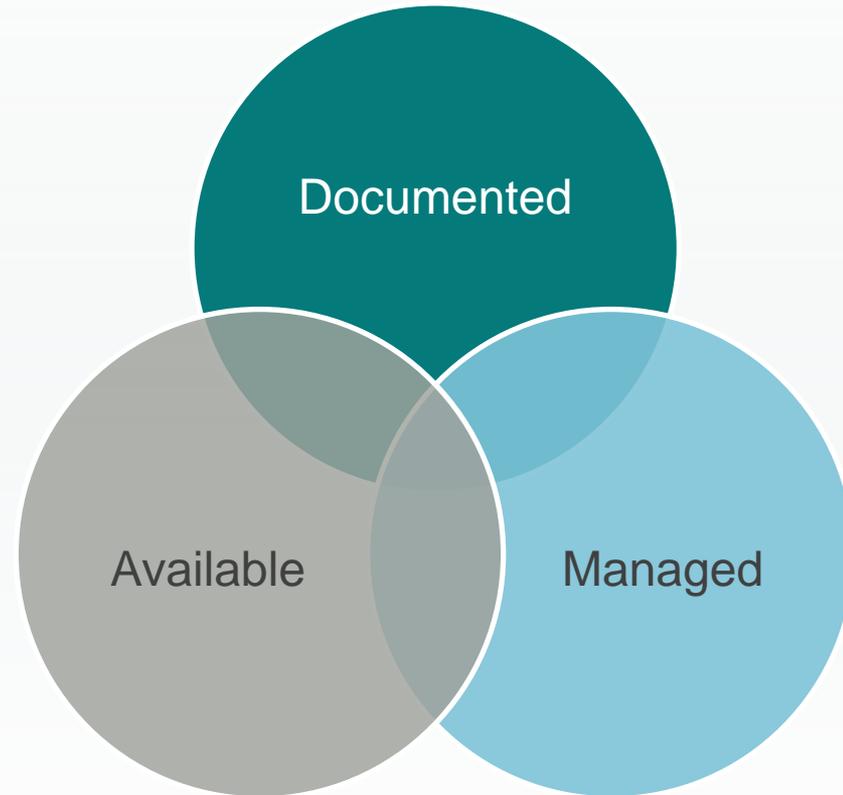


Transparency

Transparency includes documentation and reporting of information that underpins target setting, scenario planning, and monitoring. Transparency supports:

- Credibility
- Accountability
- Reporting
- Enhanced public trust
- Tangible benchmarks
- Good governance

Are your data sources, assumptions, and methodologies:



Paris Agreement Provisions:

- *Article 13*: Calls for an Enhanced Transparency Framework (ETF)
- ETF creates a uniform system for countries to report progress on mitigation and adaptation measures defined in each country's NDC
- ETF supports more robust, clear, and effective data collection and reporting to inform future climate action



LTS & Transparency

Transparency Documentation: U.S. LTS

Appendix A – The GCAM-USA Advanced Technology Scenario

Note: Along with the “Advanced Technology” assumptions developed for use in this report, GCAM-USA also has “Reference Technology” assumptions, described below. The Reference Technology assumptions were not used in this report but are presented to provide a reference point for the magnitude of technological advancement envisioned in the U.S. Mid-Century Strategy scenarios. The assumptions in this document were informed by U.S. Department of Energy data, but changes were made as the data were translated into GCAM model inputs.

I. Electricity Sector Assumptions

Both the Reference and Advanced Technology scenarios use capital cost assumptions that were developed for selected electricity technologies. All other technologies used default GCAM values (Table 1). The updated technology assumptions were developed specifically for 2010 to 2040 and were assumed to be constant after 2040.

The Advanced Technology scenario uses a set of updated capital and O&M cost assumptions for the following technologies: coal (IGCC CCS), gas (CC CCS), Gen III nuclear, CSP, PV, and wind. Relative to the Reference scenario, costs were higher in 2020 for coal (IGCC CCS) and CSP technologies and lower for all other technologies. In subsequent years, the advanced capital cost assumptions were uniformly lower for all technologies relative to the reference (Table 1).

In the Reference scenario, default GCAM fixed and variable operating and maintenance (O&M) costs are used. These costs are given for 2005 to 2015 and assumed to decrease by a constant percentage from 2015 until they reach a maximum improvement threshold. In the Advanced Technology scenario, data for fixed O&M costs was developed for this report for 2010 to 2040. Values after 2040 were assumed to equal those in 2040. With the exception of gas (CC CCS), fixed O&M costs declined under the Advanced Technology scenario relative to the reference. In addition, variable O&M costs were provided for coal (IGCC CCS) and gas (CC CCS) technologies. These cost assumptions are higher than in the Reference scenario (Table 2).

Efficiency and capacity factors assumptions did not change between the Reference and Advanced Technology scenarios, but are presented in Table 3 for reference. For intermittent wind and solar technologies without storage, capacity factors are assumed to be dependent on renewable supply curves.

Table A.1: Capital Cost Assumptions for Reference and Advanced Technology scenarios (2010\$/kW)

	Reference Technology				Advanced Technology			
	2005	2020	2035	2050	2005	2020	2035	2050
Biomass (conv) ¹	3999	3951	3818	3702	Same as reference			
Biomass (IGCC) ¹	6000	5745	5180	4819	Same as reference			

Table A.4: Technology Cost Assumptions under Reference and Advanced Technology Scenarios, Residential Buildings Sector (2010\$/GJ)

Service	Technology	Reference Technology				Advanced Technology			
		2005	2020	2035	2050	2005	2020	2035	2050
Heating	Wood furnace	4.4	4.2	4.2	4.1	Same as reference			
	Coal furnace	4.4	4.2	4.2	4.1	Same as reference			
	Gas furnace	7.3	7.3	7.3	7.3	7.3	9.8	11.4	11.4
	Gas furnace hi-eff	11.3	11.3	11.3	11.3	Same as reference			
	Electric furnace	4.2	4.2	4.2	4.2	Same as reference			
	Electric heat pump	6.3	6.5	7.0	7.2	6.1	6.1	7.0	7.2
	Fuel furnace	11.2	12.7	12.7	12.7	11.2	15.0	15.0	15.0
	Fuel furnace hi-eff	18.7	18.7	18.7	18.7	Same as reference			
	Cooling	Air conditioning	17.8	17.8	17.8	17.8	17.8	22.0	24.5
Air conditioning hi-eff		43.3	43.3	43.3	43.3	Same as reference			
Water Heating	Gas	31.8	32.0	32.0	32.0	31.8	32.0	53.6	53.6
	Gas hi-eff	53.6	53.6	53.6	53.6	87.0	49.9	49.9	49.9
	Electric resistance	17.8	17.8	17.8	17.8	17.8	18.5	18.5	18.5
	Electric resistance hi-eff	21.1	21.1	21.1	21.1	Same as reference			
	Electric heat pump	56.9	54.0	54.0	54.0	Same as reference			
	Fuel	31.8	32.0	32.0	32.0	31.9	42.2	53.6	53.6
	Fuel hi-eff	53.6	53.6	53.6	53.6	87.0	88.2	83.2	81.5
Lighting	Incandescent	0.5	2.4	2.4	2.4	Same as reference			
	Fluorescent	0.79	0.59	0.57	0.56	Same as reference			
	Solid state	13.8	0.81	0.49	0.49	Same as reference			
Kitchen appliances	Refrigerator	29.2	32.1	32.1	32.1	29.2	37.8	41.1	41.1
	Refrigerator hi-eff	29.2	39.4	39.4	39.4	29.2	45.2	45.2	45.2
	Freezer	51.4	58.0	58.0	58.0	51.4	61.2	63.2	63.2
	Freezer hi-eff	58.0	61.2	61.2	61.2	58.0	94.2	94.2	94.2

Long-Term Strategies and Climate Risk





Climate Risk and Resilience

Climate Threat / Hazard: A weather-related physical process or event (hydro-meteorological or oceanographic variables or phenomena) with the potential to damage, destroy, or disrupt human health, livelihoods, systems, assets, or natural resources.

Vulnerability: Weakness within infrastructure, processes, and/or systems that are susceptible to various threats.

Climate Risk: The potential for loss, damage, or destruction resulting from exposure of a vulnerability to a climate-related threat.

Resilience: The capacity of a community, business, system, or natural environment to prevent, withstand, respond to, and recover from a disruption.

Climate Risk Integration in LTS

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graph TD; A[Climate Risk Integration in LTS] --> B[Improves sector sustainability and resilience]; A --> C[Decreases vulnerabilities]; A --> D[Decreases disruptions and reduces adverse long-term impacts]; A --> E[Contributes to long-term climate goals];
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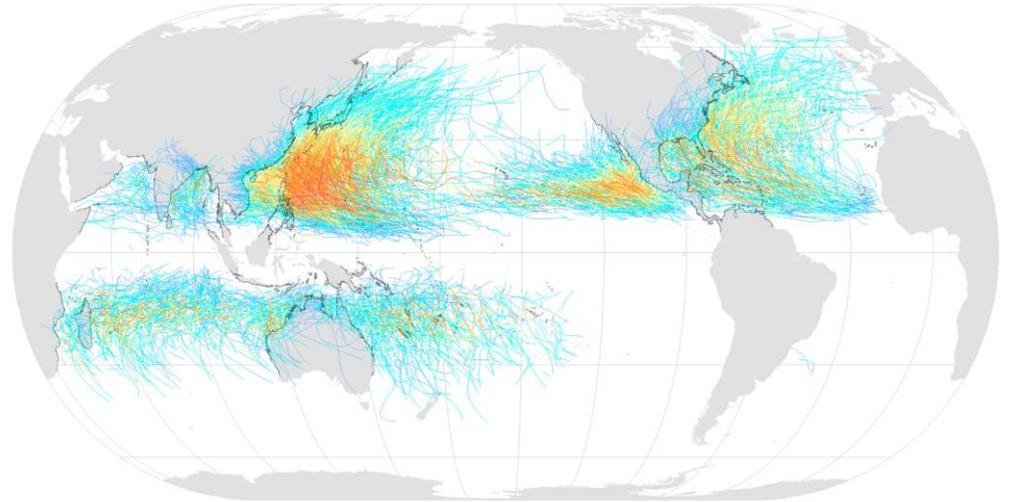
Contributes to
long-term
climate goals

Example Climate Threat: Tropical Cyclones

Climate Forecasts Vary

- Increases in frequency of the most intense cyclones
- Hurricane intensity increases of 2–11% by 2100
- Hurricane frequency decreases of 6–34% by 2100

Tropical Cyclones, 1945–2006



Saffir-Simpson Hurricane Scale:



Example Vulnerabilities



Vulnerabilities are sector specific...

Agriculture Sector

- Freshwater dependence
- Crop varieties need arid climate
- Low-lying crop areas
- Lack of protective natural infrastructure (e.g., mangroves or coral reefs)

Energy Sector

- Aging infrastructure
- Hydropower-dependent power production

Key Takeaways

1

LTS are a strategy or plan that sets a vision and pathway towards sustainable, low-emission development to 2050.

2

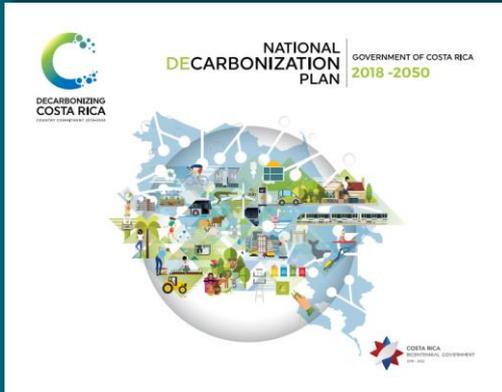
Transparency is a key part of LTS because it supports tangible benchmarks, reliable reporting, and accountability.

3

Considering climate risk will help ensure that an LTS is resilient, decreases sector vulnerabilities, and achieves long-term goals.

Do you have an LTS for your sector/country?

If so, please upload it to our shared [Google Drive](#)





Thank you!



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