Data-to-Deal (D2D): Open Data and Modelling of Long Term Strategies to Financial Resource Mobilization - the case of Costa Rica

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Abstract

Climate compatible and inclusive growth is needed to lift the vulnerable out of poverty and ensure we avoid climate impacts. A fundamental first step to delivering this objective is understanding the sectoral transformations required over time to transition to net zero emissions – such as penetration of electric vehicles, electricity generation from renewable sources, and reforestation - and how these interact with other socio-economic development priorities – such as poverty eradication, technological leadership in green tech, job creation, air quality, etc.-. This knowledge can inform a roadmap encompassing sectorial goals, conducive institutional, policy, and regulatory measures, and a project pipeline. This comprehensive roadmap can be explored by formulating long-term low GHG emission development strategies (LT-LEDS or LTSs) – as defined under the Paris Agreement.

Long Term Scenarios (LTSs) can be developed through an iterative process of codesigning with stakeholders and experts to form a joint vision of a development path. Once a roadmap is defined, governments can match financing sources and instruments to deliver the measures and projects defined in the LTS, providing signals to align broader finance flows towards the lower carbon economy. This exercise can increase access to and effectiveness of international climate finance. This is illustrated with a case example of Costa Rica. Its data-driven and stakeholder-codesigned National Decarbonization Plan (the country's LTS) was launched in 2019. It has been the foundation on which at least **US$2.4 billion** had been mobilised from international concessional finance sources by the end of 2022. An essential effort underpinning this was a carefully crafted and nationally owned LTS study – which leveraged 'public-good' advanced-schools[3], open-models[4], communities[5], principles[6] and goals[2]. As a result, the LTS study's direct cost was less than **US$200k**.

Introduction

An appropriate climate-compatible growth trajectory is required to contain the climate crisis[7]. These are increasingly technically feasible and can come with net economic growth benefits that support socio-economic development objectives[8]. This will require the reduction of carbon emissions by producing low-carbon electricity (e.g. through a large-scale rollout of energy from renewable sources); undertaking massive electrification (e.g. deployment of electric vehicles and electric cooking stoves), and switching to other carbon-free fuels (e.g. green hydrogen for the heavy industry); increasing the share of public and non-motorised transportation; improving efficiency and reducing waste across all sectors, particularly from energy and food consumption; switch to less carbon-intensive industrial processes,

agriculture practices, building materials and diets; and halting deforestation and protecting and regenerating natural carbon-rich ecosystems to balance the remaining emissions[8].

A first step to delivering this low-carbon growth is understanding how such sectoral transformations will need to evolve over time to achieve emissions reductions -at the pace required- and how these interact with other socio-economic development priorities given specific country context. This can be achieved by formulating a long-term low greenhouse gas emission development strategy (LT-LEDS or LTS). Under the Paris Agreement article 4.19, governments are invited to formulate and communicate their LTS [9]. This invitation was reinforced in the Glasgow Climate Pact (1/CMA.3) agreed upon at COP26, which urges countries to communicate their LTS and to update these strategies regularly as appropriate, in line with the best available science[10].

LTS help transform a broad idea of transitioning to a net zero[i] economy into specific sectoral targets across the sectors and, thereafter, sequences of measures – including institutional policy and regulatory roadmaps- whilst considering socio-economic priorities - such as poverty eradication, job creation, affordable energy access and improved air quality-, and anticipating potential challenges – such as lack of technological know-how, lack of societal buy-in, fiscal impacts and debt levels-. These considerations are delineated by short, medium, and long-term milestones to achieve those targets and manage tradeoffs tailored to local socio-economic context and development priorities.

However, moving from LTS to implementation raises concerns about the finance required and available to deliver the objectives. This is particularly the case for developing countries. Estimates indicate that climate-related investments globally should range between USD 4.5 - 5 trillion annually to achieve the transition to a sustainable, net zero emissions, and resilient world this decade. This implies a sixfold increase from current flows, redirecting investment from high carbon sectors, such as fossil fuel investments, which exceed USD 850 billion annually[11]. In addition, around two-thirds of infrastructure investment globally will be required in emerging and developing economies – as rapid rates of urbanisation and population growth call for an expansion of transport, electricity and other infrastructure [12]. This scale of action requires a decisive effort to redirect public and private financial flows away from high-carbon technologies into zero-carbon solutions.

The role of public finance is critical to building confidence in the broader economy in the direction of travel. However, COVID-19, compounded by the war in Ukraine, has created extremely challenging fiscal and debt situations for low-income developing countries. Very limited fiscal space to enable recovery and unsustainable external debt burdens have put a rising number of countries on the verge of a debt crisis[13]. Even before the pandemic, public investment globally has been in a downward trend; rates in most developing countries are significantly below 6-8% of GDP, exacerbating infrastructure gaps and highlighting the need to improve the quality and efficiency of investments[12].

International climate finance will therefore play a critical role in helping developing countries, including by relieving public finance constraints and making finance available to invest in the measures to achieve the objectives of the Paris Agreement and Sustainable Development Goals (SDGs). Climate finance from developed to developing countries amounted to USD 45.4 billion in 2017 and USD 51.8 billion in 2018.

[i] LTS can also integrate elements of climate resilience and adaptation, in this paper we will focus on the mitigation elements of an LTS.

And although climate finance flows are increasing, they remain considerably below what would be expected given the investment opportunities and needs that have been identified[14].

In this paper, we argue that formulating an appropriate LTS can help governments plan financial resources for delivery, clarify the role of public resources, and increase access to and effectiveness of international climate finance. Once specific targets and sequences of measures for sectoral transformation towards the net zero objective have been agreed upon in an LTS[ii], governments can clarify investment priorities and financing approaches to deliver the targets. With the type, scale and timing of measures, projects can be defined, and financing sources can be matched, informing, for example, the role of public finance, fiscal policy and debt. In addition, it can signal to international finance providers the country's priorities under an integral portfolio of actions aligned with its commitments under the Paris Agreement.

By the end of 2022, 57 LTSs have been submitted under the UNFCCC[11]. Costa Rica was one of the first developing countries to present such a plan in 2019, which has been recognised as a high-quality, ambitious plan internationally[12], offering an opportunity to explore how this LTS mobilised international climate finance towards its implementation.

The rest of the paper is structured as follows. In section 1, we explore the process of developing an LTS using open-data and open-model driven and stakeholder codesign to inform a consensus on a pathway towards net zero and sustainable development pathway. Section 2 explores how an LTS can enable financial resource mobilisation and address challenges for international climate finance access. Both sections include specific examples from Costa Rica's case, sharing characteristics of its LTS formulation process and finance resources mobilised up to date for its implementation. Finally, Section 3 presents lessons learnt from the Costa Rica case that can be relevant in the international context.

1. From data-driven analysis to a Long Term Decarbonization Strategy

Under the Paris Agreement, countries agreed to pursue efforts to limit the increase in global average temperature to 1.5°C. The 2018 IPCC Special Report on Global Warming of 1.5°C underscores that to have a likely chance of limiting warming to 1.5°C, global greenhouse gas emissions must be cut by 45% by 2030 and reach net-zero soon after 2050[7]. LTS typically describe what is required to achieve a transition in line with the 1.5°C temperature rise limit of the Agreement while also reaching desired societal outcomes[15].

Several examples of LTS processes exist – for energy, many are well documented by the International Renewables Energy Agency (IRENA)[16]. Costa Rica's LTS communicated in 2019 to the United Nations Framework Convention on Climate Change (UNFCCC)[17], defines a roadmap of technological transformation across all sectors of the economy, with a vision to achieve net-zero GHG emissions by 2050 while ensuring economic growth and compliance with the SDGs.

Creating narratives describing possible futures, analysing and modelling scenarios based on those narratives, and communicating and discussing assumptions and results with stakeholders have been identified as core building blocks to designing an LTS[15]. Models can be used as a framework to test strategies and facilitate a policy debate around decarbonisation, quantifying possible pathway options to define the LTS[8,18]. Most LTSs presented up-to-date include modelled scenarios, illustrating pathways to achieve the parties' long-term vision, varying in type and scope[19]. While some parties (Austria, Canada, Finland, Slovakia, Sweden, and the United States) design their own models to produce or contribute to the mitigation scenarios deployed within their LTSs, others, such as Costa Rica, Cyprus, Finland, Portugal, Spain, Sweden, and Ukraine have opted to tailor generic models to fit their specific national circumstances, such the TIMES or OSeMOSYS partial equilibrium model, the LEAP integrated assessment model, the EPPA computable general equilibrium model, and the GCAM integrated assessment model[20].

A key objective of these mathematical tools is to quantify transformations over time in physical terms (e.g., per cent of renewable electricity; share of mobility fulfilled by electric public transport, walking or biking; hectares of forest to reforest) and their impact on GHG emissions. Along with quantifying related socio-economic indicators, highlighting positive impacts that can bring sectors on board (e.g. reduced energy prices leveraging cheap renewable power; improved quality of public transport and associated reduction in accidents; increased productivity in agriculture, ecosystem services provided by forests or creation of green jobs) and negative impacts that need to be acknowledged and addressed to ensure a just transition (e.g. brown jobs lost, stranded assets, fiscal impacts).

Analytical work to investigate the technical, economic, and social dimensions of decarbonisation scenarios, using sectoral and macro-economic modelling tools, can be useful to inform the LTS design process. However, there are complexities and political sensitivities in designing LTSs, given the transformations they entail. Therefore, to be effective, any analytical simulation should be developed to produce inputs for the policy discussions and can be understood, discussed and accepted by a working majority of stakeholders[2,8].

In Costa Rica, the LTS design process was led by the Directorate of Climate Change of the Ministry of Environment and Energy. It recognised the need to inform the technological pathway using an approach that combined qualitative and quantitative methods. The former was addressed through a stakeholder-driven back-casting participatory approach. This established the policy packages required in the ideal decarbonised future and defined strategies and actions around the decarbonisation pathway. The quantitative analysis was executed by a rapidly empowered[iii] local modelling team established at the University of Costa Rica; they built a basic data-set[iv]; and translated that info into long-term scenarios by incorporating updates and stakeholder engagement to model scenarios and a representation of the policy instruments available to (feasibly) achieve the desired output. The data used was publicly available[23] and the modelling framework used is based on the Open-Source Energy Modelling System (OSeMOSYS)[4] tool. The combination of open-data, (peer-reviewed) open-tools[4], and transparent

[iii] The upskilling activities included regional meetings and participation in the annual ICTP Joint Summer School[3]. This has since resulted in the launch of the Energy Modelling Platform School for Latin America[21]. (Now in its second year

[iv] The structure and basic data form the basis of 69 starter data-kits recently released to accelerate similar processes[22].

wrokflows allowed for a level of principle-based[24] community-focused accountability[v]. The workflow that defined the participatory stakeholder engagement was specifically developed to provide policy support. The results included the identification of measures to promote public transport and active mobility via a modal shift from private transport (Accompanied by an increase in concurrent generation from low-carbon sources).

Costa Rica's Ministry of Environment and Energy used these and other inputs to discuss with line ministries, civil society, and the private sector. The pathway agreed upon was reflected in the National Decarbonization Plan (NDP) launched by the President of the Republic in February 2019 and submitted before the UNFCCC as it LTS. This LTS defined sectoral targets over time, as well as a policy roadmap with assigned responsibility across government agencies and line ministries, including immediate actions to be delivered by the administration in office at the time of the launch of the LTS; for example, by 2022 the plans point to updating the design of public transportation markets to enable profitable business models for bus drivers acquiring electric buses, updating the payment for the ecosystem services scheme to finance large-scale reforestation, and investigating options to manage the fiscal impact of phasing out fossil fuel consumption[17].

From Decarbonization Plan to Mobilization of financial resources

International literature suggests that governments can play three primary roles in mobilising the required investments to achieve their climate objectives and SDGs: (i) create an enabling environment (policies and regulation) for long-term climate-aligned investment; (ii) make effective use of public budgets and investments, including through dedicated funds and/or financial intermediaries to encourage a shift towards climate aligned sustainable development; and (iii) mobilise private climate investments through tailored application of financial risk-mitigation instruments[25].

This broad set of levers can be assessed against measures defined in the LTS, matching needs with the more suitable tools and resources. For example, early action on decarbonisation is likely to require significant efforts to redirect public investments, which in turn is likely to require aligning sectoral plans with the objectives of the LTS. To make sure those plans are binding, governments can require that agencies in charge of implementing public investments justify within national public investment systems how the projects they execute are aligned with the decarbonisation goals. In addition, having a government-backed LTS, assigning ownership of projects and activities within the government, can enable the trust to facilitate resources from international finance institutions and the private sector.

Costa Rica´s LTS defined a framework with more than 70 targets from 35 different government agencies and line ministries to be immediately implemented (by 2023) before the end of the term of the government in office at the time of the launch of the LTS and served as a basis for the national development plan[26] of the Ministry of National Planning and Economic Policy (MIDEPLAN). Defining concrete actions to align public finances across government agencies, including regulatory actions (e.g., establishing the rules on how the electricity price for electric vehicle charging stations can be set), investments (notably to enable public transit), studies (e.g., assess options to fund an updated payment for ecosystem services scheme), and policy and institutional reform (e.g., evaluating fiscal policy given the decarbonisation the transport sector).

[v] Consistent with U4RIA goals[2]

This exercise can help remove barriers to accessing international climate finance. Challenging aspects of mobilising and delivering climate finance from public sources include matchmaking actors at the international and national levels. Once matched, they need to: design and implement climate projects; determine intervention specifics that meet country needs, regulations and policies; ensure climate mitigation; and overcome high fragmentation of climate plans and programs at the country level[27]. Country ownership and country-driven strategies have also been highlighted as important elements for ensuring that developing countries are taking the lead in developing and implementing funding proposals. In addition, limited availability of disaggregated data at the sector and subsector level, as supposed to overall needs estimates, constitutes one of the major gaps identified by developing countries to clarify finance needs[28].

Barriers to climate finance	How an LTS can help address barriers
Matchmaking actors at the international and national level to design and implement climate projects	An LTS allows the ministry of finance and the rest of the government to coordinate funding received from international donors, as it establishes a list of priorities for which the government is requesting support. It also facilitates matching resources with funders looking for transformational investments, as the LTS can clarify a whole government effort to align national public budgets or to identify possible public-private financing schemes. This can increase the effectiveness of access to international climate finance.
identifying and designing interventions that meet country needs aligned with national regulation, policies and planning	By ensuring that stakeholder engagement includes those knowledgeable multi-sector experts and appropriate political economy analysis insights can be tailored to needs.
demonstrating the benefits of climate actions for development	The LTS modelling can be developed such that it quantifies, translates and communicates appropriate development information.
high fragmentation of climate plans and programs at the country level	In quantifying scenarios in the LTS via stakeholder engagement, an LTS allows for inconsistent fragmentation to be identified and discussed. Further, if the LTS helps unlock funding for implementation (discussed below) this can create strong incentives for defragmentation.
Country ownership and country-driven strategies	The LTS should be undertaken by nationals, and if needed with assistance. This can require rapid and deep capacity building of local institutions that are self-sustaining. This can be achieved by taking advantage of technical assistance programs such as the initiatives such as the DDP-LAC program[29] of the IADB and the SDSummerSchool[3].
Limited availability of disaggregated data at the sector and subsector level	Having a government backed LTS, assigning ownership of projects and activities within the government including responsibility for open data development, can enable trust and facilitate resources from international finance institutions and the private sector

Leveraging international climate finance

Investments to deliver a pipeline of projects resulting from an LTS may require different financial solutions. According to the latest Global Landscape of Climate by the Climate Policy Initiative, in 2019/2020 the public sector accounted for 51% (USD 321 billion) of tracked climate finance, with development Finance Institutions (DFIs) continuing to provide the majority of public finance at almost 70%. Private actors accounted for the remaining USD 310 billion, representing 13%, with commercial,

financial institutions and corporations contributing almost 80% of the total. The financial instruments most used to channel climate finance are debt and equity. In 2019/2020, debt accounted for 61% of climate finance flows, of which 88% was market-rate debt and almost 100% of concessional loans provided by public institutions; equity investments accounted for 33%. On the other hand, grants accounted for 6% (USD 36 billion) of 2019/2020 climate finance, with governments as the main source of grant funding [11].

In Costa Rica, the formulation of the NDP/LTS itself attracted international assistance (grants) from multiple bilateral and multilateral development agencies. In particular, in 2018, the Interamerican Development Bank (IDB) started an academic collaboration with the University of Costa Rica, using analytical tools to assess technical roadmaps to net-zero emissions in the energy, transport and buildings sectors [12] through the DDPLAC project [1]. In addition, at the request of the Government, IDB financed local and international experts to compile existing knowledge and policy plans in energy, transport, building environment, waste management, agriculture, livestock and forestry. The aim was to understand better the aggregate impact of existing policies on GHG emissions and how sectoral plans could be extended over time to reach the net-zero goal collectively.

Once published, the LTS served as a backbone for mobilising financing from international public sources through the Ministry of Finance, which coordinates finance from multilateral and bilateral entities. As a result, between LTS´s publication in 2018 and the end of 2022, Costa Rica has secured at least US$2.4 billion of international finance directly linked to it.

96% of the total resources were concessional loans. This type of loan can lower overall capital costs and increases the profitability of infrastructure needed to decarbonise, such as the public transport system. 59% of the loans were policy-based (PBL) amounting to US$1.4 billion, this financial instrument that provides liquid (fungible) concessional funding disbursed upon evidence of the delivery of policy and regulatory reform programs [9]. PBLs can mobilise more significant amounts of funding than traditional technical assistance. In addition, their fungible concessional nature can attract more interest and ownership from the Ministry of Finance, for whom delivering the reforms agreed upon becomes a priority to secure the disbursement of funds. Programmatic PBLs with two sequential disbursements against the delivery of measures defined in the Decarbonization Plan, from the IDB, the French Development Agency (AFD) and World Bank (WB) enabled early stages of implementation of the strategy (See table 1).

Grants for around US$86 million, 4% of the total funding, can also be linked to the LTS. Grants represented only 4% of the resources estimated, amounting a total of US$86 million. Technical cooperation linked to the PBLs supported delivery of studies to inform the reforms required under the loans from IDB and AFD[30], for example to inform new climate change budget markers, guidelines to assess the alignment to the NDP of the projects submitted to the National Public Investment System, inputs to inform the National Strategic Plan to 2050, evaluate the reform of the Ministry of Public Works and Transportation (MOPT) given responsibilities linked to the NDP, and assess fiscal and macro-economic implications of decarbonising and options to manage the transition. Other grant funding was received from the International Climate Initiative (IKI)[31], GIZ, UNDP, UNWomen, FAO and ILO. (See table 1) Electric passenger trains, a flagship project within the plan, received grant funding from Central American Bank for Economic Integration (BCIE) and IDB to complete a business case.

Table 1 Resources mobilised for LTS design and implementation (in construction)

Source	Funds	Instrument	Objectives

	(US$)		
IDB	45,000	Grant - Technical Cooperation	LTS design – Modelling and policy analysis[32]
IDB	230 million	Programmatic Policy Base Loan	CR-L1142 : Towards a Green Economy: Support for Costa Rica's Decarbonization Plan I. Policy and regulatory reform in energy, transport, agriculture and ecosystem sectors. As well as within national economic planning processes and fiscal and budgetary policy [33]
IDB	500,000	Grant - Technical Cooperation	CR-T1217 : Strengthening the Management and Monitoring of Climate Action. To support achieving policy commitments related to climate management and monitoring defined under PBL CR-L1142 [34]
IDB	450,000	Grant - Technical Cooperation	CR-T1224 : Support for the Strategy of Strengthening Mass Public Transport of People by Bus. Including support for the implementation of the public transport electrification project and electronic payment system. To support achieving policy commitments under the PBL CR-L1142 and CR-L1139 [35]
IDB	850,000	Grant - Technical Cooperation	CR-T1218 Support for policy reforms and implementation of Nature-Based and Climate-Smart Agriculture Solutions that contribute to Costa Rica's National Decarbonization Plan [36]
IDB	220,000	Grant - Technical Cooperation	CR-T1219 : Support for the Transformation of the Energy Sector towards a Decarbonized Economy as per the NDP to support achieving policy commitments under the PBL CR-L1142[37]
IDB	400,000	Grant - Technical Cooperation	CR-T1240 : New Skills for the Agriculture of the Future. Develop a proof of concept of a "bootcamp" in agricultural technical high schools so that education in agriculture can adapt to the new demands of the labor market [38]
IDB	500,000	Grant - Technical Cooperation	CR-T1239 : Support for the Development of the National Hydrogen Strategy towards a Decarbonized Economy, in line with the Decarbonization Plan[39]
IDB	300 million	Programmatic Policy Base Loan	CR-L1147 : Towards a Green Economy: Support for Costa Rica-s Decarbonization Plan II. $250 million in ordinary capital from the IDB, plus $50 million from the Government of Korea. loan to continue to back Costa Rica's NDP. This loan is the second in a series of two programmatic policy-based lending operations [40,41]
IDB	400,000.00	Grant - Technical Cooperation	CR-T1259 Apoyo a la implementación del Programa Hacia una Economía Verde II (CR-L1147). Con el fin de complementar las acciones de reforma del PND en relación a Soluciones Basadas en Naturaleza y Agricultura[42]
IDB	350,000	Investment Grant BID Lab	(CR-G1010) circular economy from agroforestry residues for decarbonisation[43]
AFD	150 million	policy-based loan	Policy and regulatory reform in energy, transport, agriculture and ecosystem sectors. As well as within national economic planning processes and fiscal and budgetary policy.
AFD	2.79 million	Grant - Technical Cooperation	
AFD	€100	policy-based loan –	Policy and regulatory reform in energy, transport, agriculture and ecosystem

	million	Tranch II	sectors. As well as within national economic planning processes and fiscal and budgetary policy.
WB	300 million	policy-based loan	First Fiscal and Decarbonization Management DPL
WB	300 million	policy-based loan	Second Fiscal and Decarbonization Management DPL, in support of Costa Rica's efforts to protect ' 'people's income and jobs from the impact of COVID-19, strengthen small and medium enterprises (SMEs), reinforce fiscal sustainability, and lay out foundations for a strong post pandemic recovery based on green and low-carbon development [44]
IMF	700 million	Loan, IMF's Resilience and Sustainability Trust (RST)	See[45]
GCF	271 million	Loan 250 million, Grant 21,300	FP166 Light Rail Transit for the Greater Metropolitan Area (GAM). This project aims to install an 85 km double-track, electric light rail transit system in San ' 'José's Greater Metropolitan Area which will be powered by more than 98% renewable electricity[46]
Germany	13.475.000	Grant, IKI	Project "Low-carbon and climate-resilient transformative pathways (Transforma)". To shift production systems from relevant sectors towards low-carbon and climate-resilient pathways, in support of Costa Rica's Nationally Determined Contributions (NDCs) and the implementation of the NDP
GIZ NDC	€10,000,000	Grant, IKI	Project: ACCION Clima – NDC Implementation and Regional Knowledge Transfer - including in line with the NDP- [47]
GIZ		Grant	Project: Climate change mitigation in Costa Rica's transport sector[48]
GIZ			Green Economy Transformation and Decarbonization Pathways in the Context of Economic Recovery [49]
CABEI/ GIZ	10,000,000	Grant	NAMA Facility Coffee Support Program US $10 million in support of the decarbonisation process of the coffee sector in Costa Rica[50]
UNDP	210,800.00	Joint Fund	The Joint Collaborative Programme (JCP) to to strengthen the social protection system and accelerate SDG achievement through concrete changes in institutional arrangements and local initiatives in three specific cantons enhancing synergies and coordination between economic, social and environmental national policies [51]
FAO	210,800.00	Fund	The Joint Collaborative Programme (JCP) to strengthen the social protection system and accelerate SDG achievement through concrete changes in institutional arrangements and local initiatives in three specific cantons enhancing synergies and coordination between economic, social and environmental national policies [51]
ILO	210,800.00	Fund	The Joint Collaborative Programme (JCP) to strengthen the social protection system and accelerate SDG achievement through concrete changes in institutional arrangements and local initiatives in three specific cantons enhancing synergies and coordination between economic, social and environmental national policies [51]

UN WOMEN	210,800.00	Fund	The Joint Collaborative Programme (JCP) to strengthen the social protection system and accelerate SDG achievement through concrete changes in institutional arrangements and local initiatives in three specific cantons enhancing synergies and coordination between economic, social and environmental national policies[51]
UNDP GEF	7,471,945	Grants	Seventh Operational Phase of the GEF Small Grants Programme, aims to strengthen environmental management capacities of country partners at the community level and the engagement of these with national authorities, facilitating the introduction of improved management practices, landscape restoration and reforestation efforts, aligned with the 'country's development plans and decarbonisation process[51]
UNDP	250,000	Grant	Forging a common pathway to 2030. To develop material conditions, evidence and data for the strengthening of democratic governance in Costa Rica, building upon the NDP and the post- COVID-19 recovery plans, where transitioning to a green economy based on natural capital has become priority. [52]
UNDP	350,000	Grant	Project: Rapid Financing Facility. Development of a Green and Inclusive Economy Investor Map to detail investment opportunities for transforming the economy into one more inclusive and greener, as well as the conditions that would allow progress over different priority sectors with an intersectional gender approach. [53]
UNDP	4,386,210	Grant + Co financing	Project: International Waters SIXAOLA. To strengthen the transboundary multi-stakeholder integrated water resource management (IWRM) in the Sixaola River Basin shared by Costa Rica and Panama.
Total	US$2.4 bilion		

In the table above each quanta of finance was linked directly, indirectly or inspired by Costa 'Rica's LTS (and subsequent Decarbonization and National Development Plan). As the foundation the integrity of the LTS and its interface with appropriate national and bilateral was critical. In the next section we discuss the IDB-AFD Policy-Based Loan (PBL) in illustrative granularity. Of particular significance is reference to lower-carbon transport identified in the LTS. This resulted in the sponsoring of subsequent more detailed studies and investment plans. These in turn are related to the release of larger loans.

IDB-AFD Policy-Based Loan

The plan enabled funding from an IDB Policy-based loan that combined IDB expertise in energy, transport, land-use and climate governance, and was co-funded with the French Development Agency, [15]. The two institutions lent money to the government at preferential rates to help implement the regulatory part of the Plan. The IDB loan of US$230 million has a repayment term of 20 years, a grace period of five and a half years, and an interest rate based on LIBOR. It also has parallel funding of US$150 million from the (AFD) [13]. The IDB and AFD also provided technical assistance attached to the PBL, to support the development of policy reforms for US8.7 million.

The loan aims to support the implementation of political reforms focused on strengthening the management and monitoring of climate action in Costa Rica in the planning, investment, and public

budget process; conserve and restore high-carbon ecosystems and integrate low carbon practices in agriculture; and encourage the use of electric energy, particularly moving towards electro-mobility and modern and efficient public transport [18]. This was the first loan of two consecutive single-tranche operations, a second loan for US$300 million was completed in 2022.

Activities supported include the study *The Benefits and Costs of Decarbonizing Costa Rica's Economy* [19], which finds that, well-executed, the plan will bring US$41 billion by 2050 in areas including economic productivity, competitiveness, quality of life, and ecosystem services, even after paying investment costs necessary to electrify transport, improve agricultural and livestock practices, and the restoration and protection of ecosystems, which account for US$37 billion; formulation of an Investment Plan, identifying type and scale of investments linked to each of the targets and activities defined in the plan, and the policy and institutional processes/tools and know-how required to deliver those investments; a study to understand fiscal impacts of decarbonising the transport sector and to identify possible fiscal strategies to manage it[20], considering distributional impacts, and development of guidelines to prioritise projects registered under the National System of Public Investment if they are aligned with the NDP.

Lessons learnt

To be effective in mobilising finance an LTS needs a solid data-driven, stakeholder engagement process that captures local socio-economic and development objectives to inform a consensus on a path to decarbonisation. Such a process can inform a government-backed LTS with a comprehensive vision for low carbon economic growth and broader sustainable development. In Costa Rica a net-zero emissions economy by 2050 was targeted and a policy and investment road map to deliver it was developed. Such 'LTS's can build trust on the seriousness and clarity of what investment will lead the country to its decarbonisation goal, i.e., what are Paris Aligned investments. Defining specific targets for the short, mid, and long term can open a space to identify financial needs and match suitable resources. Costa Rica's LTS, the National Decarbonization Plan was designed based on open data and model driven analysis with deep and appropriate stakeholder engagement. It provides an example of how to deliver a national policy, translated into a pipeline of projects that in-turn attracts financing from multilateral and bilateral resources. In particular, short-term targets included in the LTS can result in the mobilisation of financial resources relatively soon after the official publication of an LTS. These can include policy and regulatory reforms, which could attract policy-based lending, as well as studies, prefeasibility studies, pilots, and infrastructure investments that can capture grants and concessional loans. LTS can offer an umbrella to inform financing from multiple sources, reducing fragmentation of funding, facilitating matching of needs and funding, providing a programmatic government own approach to align public and private resources towards a decarbonised and sustainable development.

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