

Implementation of Renewable Energy Resource Asset Accounts under the 2025 System of National Accounts: The Costa Rican Experience

Silvia Arguedas Villalobos
María José Sauma Chacón

Data Integration and Analysis Department
Data Analysis and Statistics Division

August 2026



Disclaimer

This paper forms part of an ongoing process to improve the compilation of Environmental Accounts. Therefore, it should not be considered a final version. The Central Bank of Costa Rica (BCCR) welcomes suggestions, comments, and the provision of complementary and updated information that may contribute to improving future versions of these accounts.

Contact information

For further information, please contact us through:

- Email: atencionalcliente@bccr.fi.cr
- Telephone: +506 2243-3333

Implementation of Renewable Energy Resource Asset Accounts under the 2025 System of National Accounts: The Costa Rican Experience

This document presents Costa Rica's experience in the experimental implementation of monetary asset accounts for renewable energy resources within the framework of the 2025 System of National Accounts (2025 SNA). The exercise, covering the period 2017–2024, estimates the net present value of future rents attributable to the natural resource. It presents the conceptual framework, the valuation methodology, and the adaptations made using national data. The results indicate that the value of these assets ranged from CRC 8.7 to 12.0 trillion and that their inclusion would increase the value of the country's non-financial assets by approximately 5%. The study demonstrates the technical feasibility of implementing the 2025 SNA recommendations and highlights the contribution of renewable natural capital to the measurement of wealth and economic sustainability.

Keywords: 2025 SNA, renewable energy resources, natural capital, resource rents, asset accounts, Costa Rica.

Contents

1. Introduction.....	5
2. Context of Costa Rica's Electricity System.....	5
3. Methodology	7
3.1 Methodological framework.....	7
3.2 Selection of included resources.....	7
3.3 Estimation of resource rents	8
3.4 Estimation of unit resource rents	8
3.5 Determination of asset life	9
3.6 Price deflators	9
3.7 Rate of return to capital	10
3.8 Discount rate	11
3.9 Valuation of assets	12
4. Results	12
5. Conclusions	15
References	17
Annex 1	19
Annex 2	20

Figures

Figure 1. Costa Rica: National electricity generation mix, 2015-2025.....	6
Figure 2. Impact of discounting on projected resource rents, 2025 prices, 2025-2065	14
Figure 3. Impact of discounting on asset value	14

Tables

Table 1. Rates of return by electricity generation technology	11
Table 2. Monetary asset account for Costa Rica's renewable energy resources, 2017-2024 (millions of CRC)	13
Table A1. Adjusted balance sheets, National Accounts, 2022.....	20

1. Introduction

In economic theory, natural capital is recognized as a fundamental asset for well-being and the sustainability of productive activity. Over recent decades, various international organizations have promoted the development of methodologies aimed at integrating environmental and economic information to improve the measurement of sustainability and the future availability of resources (United Nations *et al.*, 2025; OECD, 2025). Their statistical relevance lies in their ability to quantify and make visible crucial components of economic wealth that conventional indicators have traditionally failed to capture adequately.

The implementation of the recommendations set out in the 2025 System of National Accounts (2025 SNA) regarding the valuation of renewable energy assets poses significant methodological challenges related to the estimation of resource rents, the valuation of assets for which observable market prices are unavailable, and the availability of statistical information. In this context, Costa Rica's experience is particularly relevant given the predominant role that renewable energy sources play within its electricity mix. The exercise focuses on the valuation of hydroelectric, geothermal, wind and solar energy resources, which constitute the country's main sources of renewable electricity generation.

This paper presents Costa Rica's experience implementing the recommendations of the 2025 SNA, including the methodology, the main assumptions and adaptations made to accommodate the available national data, and the results obtained. It also demonstrates the technical feasibility of implementing these recommendations, identifies challenges related to data availability, the selection of valuation parameters, and the dependence of certain electricity generation technologies on climate, and highlights the importance of incorporating renewable natural capital to improve the measurement of national wealth and assessment of economic sustainability.

2. Context of Costa Rica's Electricity System

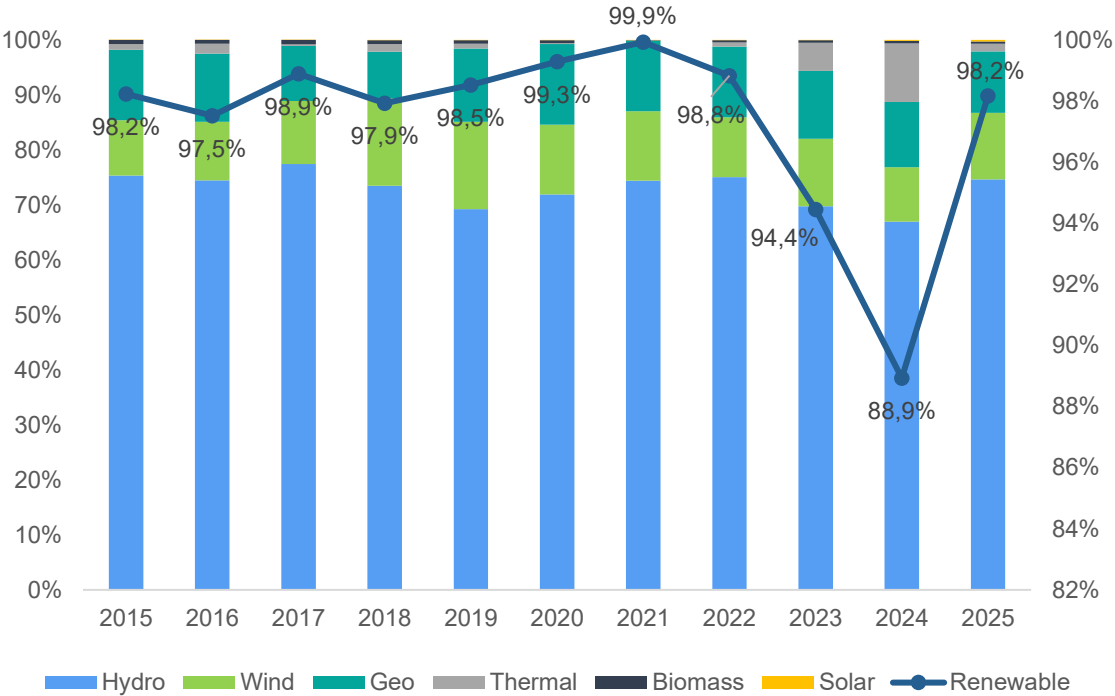
Costa Rica represents a relevant case for the experimental implementation of the 2025 SNA recommendations concerning the valuation of renewable energy resources as assets. Since the mid-twentieth century, the country has developed an electricity generation model based on the use of renewable natural resources, with an electricity generation mix supported primarily by hydroelectric, geothermal, wind, solar and biomass resources (ICE, 2020).

During 2015-2025, electricity generation from renewable sources consistently accounted for approximately 98% of Costa Rica's total electricity production, according to records from the National Energy Control Centre (CENCE) of the Costa Rican Electricity Institute (ICE). Specifically, ICE reported that in 2025, 98.2% of national electricity generation came from renewable sources,

supported by a diversified electricity generation mix comprising hydropower (74.6%), wind (12.1%), geothermal (11.2%) and solar (0.3%) (ICE, 2015-2025). These represent the country's main sources of electricity and provide the basis for the valuation exercise presented in this study.

As shown in Figure 1, the share of renewable sources remained consistently high throughout the entire period analysed. This characteristic implies that a significant proportion of electricity generation depends directly on natural assets capable of generating future economic benefits.

Figure 1. Costa Rica: National electricity generation mix, 2015-2025



Source: Central Bank of Costa Rica, based on the Annual Reports of the National Electricity System published by the National Energy Control Center, 2015–2025.

In addition, Costa Rica’s electricity market is predominantly regulated, which facilitates the availability of information. In particular, although there is private electricity generation in the country, provided by private companies (15%), cooperatives (7%) and municipal utilities (4%) (ARESEP, 2025), the operation of the National Electric System (SEN) is overseen by ICE, which coordinates the balance between electricity generation and consumption, ensuring system stability (ICE, 2025). Furthermore, electricity prices are determined by the Public Services Regulatory Authority (ARESEP), which approves and applies tariff-setting methodologies (Academia de Centroamérica, 2017), thereby providing a degree of price stability.

Consequently, Costa Rica provides a particularly suitable context for assessing the conceptual and methodological implications arising from the explicit inclusion of these resources within the asset boundary established by the 2025 SNA.

3. Methodology

3.1 Methodological framework

The valuation of renewable energy resources was conducted in accordance with the guidelines set out in *Measuring Natural Resources in the National Accounts: A Compilation Guide* (OECD, 2025), developed to support the implementation of the 2025 SNA's recommendations on the treatment of natural resources.

The fundamental principle of this methodology is to estimate the economic value of the renewable energy resource as the net present value (NPV) of the future resource rents attributable to the natural resource. This approach is consistent with the 2025 SNA recommendations for the monetary valuation of natural assets when observable market prices for the assets themselves are not available.

The methodology proposed in the Guide comprises the following stages:

1. Calculate resource rents.
2. Project the physical asset account and physical output.
3. Calculate the unit resource rent.
4. Smooth unit resource rents.
5. Project future resource rents.
6. Calculate NPV for the opening and closing stocks.
7. Put together the monetary asset account.

While the exercise followed the general methodological framework proposed in the Guide, several adaptations were made to reflect the availability of national data and the specific economic, regulatory and operational characteristics of Costa Rica's electricity system.

3.2 Selection of included resources

The methodological guide recommends applying selection criteria to prioritize compilation efforts toward resources that account for a significant share of national energy generation. As an operational benchmark, the Guide suggests focusing initial efforts on resources whose contribution exceeds 5% of the country's total electricity generation (OECD, 2025).

In Costa Rica, hydroelectric, geothermal and wind resources meet this criterion and constitute the country's main sources of renewable electricity generation.

However, in addition to these resources, the exercise also included solar energy to assess the applicability of the methodology to different types of renewable energy resources recognized under the 2025 SNA.

Furthermore, it is important to note that the methodological guide recommends excluding biomass resources from renewable energy assets, as their value is already captured in other biological assets or they are treated as products of the economic system. For this reason, biomass was not included in the valuation exercise.

3.3 Estimation of resource rents

Resource rent represents the surplus value accruing to the extractor of an asset after all costs have been considered. That is, the portion of the economic surplus attributable to the natural asset after deducting the remuneration corresponding to the produced factors of production used in electricity generation.

The estimates were based on information from the national accounts and other sources related to electricity generation activities. The main components used were as follows:

- Output
- Intermediate consumption
- Remuneration of employees
- Depreciation
- Fixed assets used in electric power generation

One of the main limitations of the exercise is that Costa Rican national accounts record the economic activity of electricity supply on an aggregated basis, without explicitly distinguishing among different generation technologies. In addition, the national accounts are published with a certain time lag, therefore not all data is available for all years covered by the analysis. Consequently, allocation procedures were developed to distribute revenues, costs and assets across hydroelectric, geothermal, wind and solar generation technologies, and to estimate output, intermediate consumption and remuneration of employees for certain years. These allocations and estimates were based on supplementary information regarding the share of each technology in physical electricity generation, as detailed in Annex 1.

3.4 Estimation of unit resource rents

Unit resource rents were estimated by dividing the resource rents obtained for each technology by the corresponding electricity generation expressed in physical units.

In general terms:

$$\text{Unit resource rent}_i = \frac{\text{Resource rent}_i}{\text{Electricity generation}_i} \quad (1)$$

Where i represents the renewable energy technology.

This procedure makes it possible to express the rent generated per unit of electricity produced and provides the basis for projecting future resource rents used in the valuation of the assets.

To mitigate potential fluctuations arising from short-term variations in observed revenues and costs, smoothing procedures were applied to unit rents, consistent with the recommendations of the Guideline.

3.5 Determination of asset life

The methodological guideline recommends using the average or median licensed lifetime of projects as asset life of the resource, when such data is available (OECD, 2025). For Costa Rica, parameters from ARESEP and ICE were used to reflect the operating conditions of the generation technologies present in the country.

For hydroelectric power plants, both ARESEP and ICE consider a lifetime of 40 years; therefore, this value was adopted for the valuation of hydropower resources. For wind and solar energy, an asset life of 25 years was applied, in accordance with the parameters employed by ICE for wind and photovoltaic projects.

Finally, geothermal energy was assigned an asset life of 35 years, consistent with the parameters established by ICE for this technology. The asset life of resources applied in the analysis are intended to reflect the technical and operational characteristics of the electricity generation technologies operating in Costa Rica.

3.6 Price deflators

The Guide indicates that resource rents should be expressed in real terms and recommends the use of general price indices to adjust for nominal changes observed over time.

As this analysis is conducted *ex post* for the initial years, observed price information is available for the period under review. Accordingly, the estimates were based directly on published price indices, rather than on the chaining procedure recommended by the Guide. In addition, it was considered that the

specific characteristics of Costa Rica's electricity market warranted a methodological adaptation.

More specifically, the Guide recommends avoiding the use of resource prices because energy markets often exhibit substantial price volatility, particularly when production depends on climatic conditions. However, since electricity prices in Costa Rica are subject to tariff regulation, the observed price volatility is significantly reduced.

Consequently, the average annual electricity price was used as the deflator for estimating resource rents. This approach makes it possible to capture more accurately the evolution of revenues associated with electricity generation and to reflect more appropriately the observed changes in the economic value of the activity.

This methodological adaptation highlights the importance of considering the institutional characteristics of national electricity markets when implementing international recommendations, particularly where regulatory mechanisms alter the expected behaviour of prices.

3.7 Rate of return to capital

The estimation of resource rents requires deducting the remuneration attributable to the produced capital used in the electricity generation process. To this end, the Guide proposes a reference rate of return of 6%, while noting that countries may replace this parameter when more representative national estimates are available (OECD, 2025).

For Costa Rica, several sources were identified regarding the expected profitability of investments in electricity generation according to the technology employed. For example, ARESEP estimates a 14.9% rate of return for investments in hydroelectric generation projects (PGR, 2025).

Additionally, the Accelerating Renewable Energy Investments in Central America and Panama Project (ARECA; BCIE, 2009) estimates a return of approximately 13.8% for renewable energy projects and around 12% for geothermal power plants.

Furthermore, studies on the profitability of wind energy investments suggest that rates of return close to 5% would be insufficient to encourage projects of this nature (Matarrita-Chaves *et al.*, 2022).

Conjointly, these estimates are consistent with the average negotiated lending interest rate for the economic activity associated with electricity generation

during the period 2018-2025, which averaged approximately 12.9%¹. Therefore, these rates were adopted for the different generation plants (Table 1).

Table 1. Rates of return by electricity generation technology

Technology	Rate of return
Hydro	14,90%
Geothermal	12,00%
Wind	13,80%
Solar	13,80%

Source: Central Bank of Costa Rica, based on data from ARESEP and BCIE.

Relative to the 6% reference rate of return recommended in the Guide, the rates used for Costa Rica are more consistent with observed domestic market conditions and allow for a more realistic representation of the expected returns on investments in electricity generation infrastructure.

3.8 Discount rate

The discount rate is one of the parameters that exerts the greatest influence on the valuation of renewable energy resources. Because the net present value (NPV) method is based on the discounting of future flows of economic rents, relatively small changes in this parameter can cause significant variations in the estimated value of assets, particularly when long-term time horizons are considered (OECD, 2025).

The Guide recommends a 2% discount rate for international comparability exercises and sensitivity analyses, while allowing the use of national parameters when these are considered more appropriate to the objectives of the exercise (OECD, 2025).

A discount rate of 3% was adopted for the Costa Rican case. This rate was considered consistent with national macroeconomic conditions, as it coincides with the country's long-term inflation target². This assumption allows the estimates to be aligned with long-term macroeconomic expectations.

The use of a national discount rate seeks to reflect more appropriately the economic conditions observed in the country. Nevertheless, this decision

¹ Intuitively, for investment projects to be undertaken, the expected rates of return must exceed the negotiated interest rates on financing.

² Furthermore, this parameter is close to the average real growth rate of the Costa Rican economy, a result that would be consistent with an approach based on the social discount rate.

constitutes one of the main sources of sensitivity in the results and has important implications for the international comparability of the estimates.

Hence, a sensitivity analysis was undertaken using additional discount rates of 1%, 2% and 4%. This allows for an assessment of the robustness of the estimates with respect to variations in this key parameter and facilitates comparisons with results derived from assumptions used in other international applications. Moreover, the use of alternative scenarios helps capture the uncertainty associated with long-term projections and illustrates its effect on the estimated asset values.

3.9 Valuation of assets

The monetary value of renewable energy resources was estimated using the net present value (NPV) method based on expected future resource rents.

In general:

$$NPV = \sum_{t=1}^n \frac{RR_t}{(1+r)^t} \quad (2)$$

where:

- RR_t : projected resource rent for period t ;
- r : discount rate;
- n : asset life of resource.

The projections were extended over the full estimated asset life for each technology, under the assumption of the continued availability of the electricity generation capacity observed during the period analysed.

4. Results

Estimates for the period 2017-2024 were compiled based on the available information. The valuation of the monetary asset accounts, in particular, the opening and closing stocks of renewable energy resources during this period, ranged between CRC 8.7 and 12.0 trillion (Table 2).

In addition, revaluations ranged from approximately CRC 100 million to 2 trillion. During the period under review, four years recorded negative revaluations, while four years recorded positive revaluations.

Table 2. Monetary asset account for Costa Rica's renewable energy resources, 2017-2024 (millions of CRC)

Items	2017	2018	2019	2020
Opening stock	9 352 102	8 925 692	8 712 720	9 585 687
Additions				
Upward reappraisals	644 317	301 010	494 632	603 429
Reclassifications	-	-	-	-
Reductions				
Catastrophic losses	-	-	-	-
Downward reappraisals	195 079	421 019	460 111	210 307
Reclassifications	-	-	-	-
Revaluation	- 1 111 546	- 93 583	910 279	1 095 368
Closing stock	8 689 794	8 712 100	9 657 520	11 074 179

Items	2021	2022	2023	2024
Opening stock	11 086 056	10 541 252	11 011 957	12 028 612
Additions				
Upward reappraisals	1 040 967	160 543	73 141	113 708
Reclassifications	-	-	-	-
Reductions				
Catastrophic losses	-	-	-	-
Downward reappraisals	66 855	145 800	1 271 102	174 800
Reclassifications	-	-	-	-
Revaluation	- 1 501 272	425 070	2 249 821	- 360 696
Closing stock	10 558 896	10 981 065	12 063 816	11 606 823

Note: Discoveries and depletion are not applicable for renewable energy. For 2023 and 2024, production accounts were estimated using the available data.

Source: Central Bank of Costa Rica

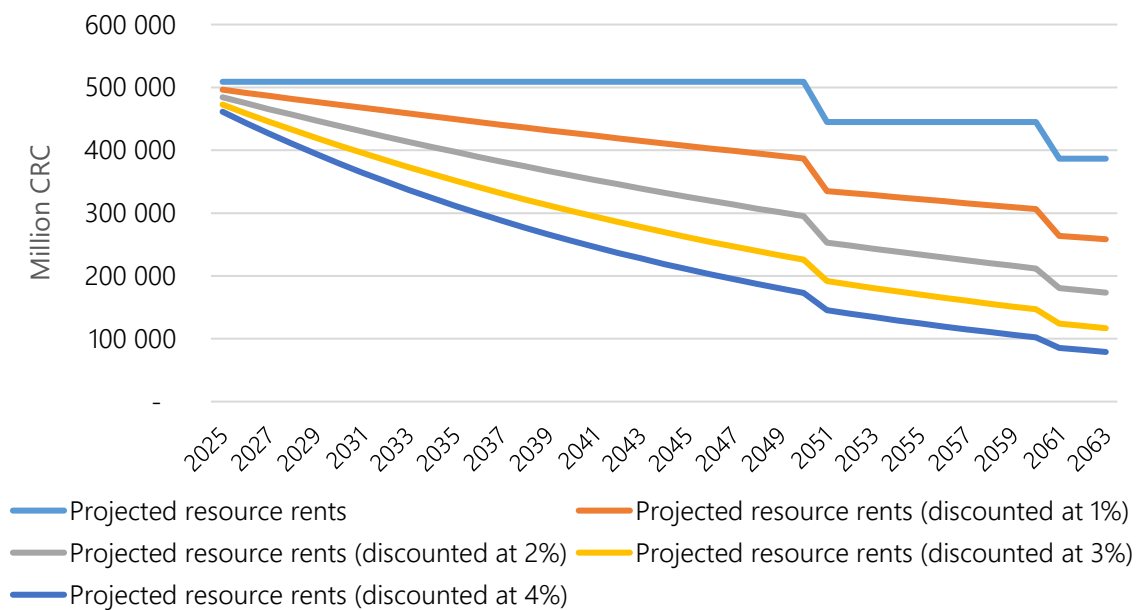
Compared with the 2022 national balance sheets, the opening stock of renewable energy assets for that year was equivalent to 5.1% of the opening stock of non-financial assets and 4.8% of their closing stock³. Moreover, the revaluation of renewable energy assets was equivalent to 1.9% of the change between the opening and closing stocks of non-financial assets recorded in the balance sheet. Further details on the changes to the balance sheets are provided in Annex 2.

Regarding the sensitivity analysis of the discount rate, the results show that even relatively small variations of only one percentage point generate significant variance in the present value of the projected resource rents. Although the trajectory of resource rents exhibits a similar pattern across the alternative

³ With the inclusion of energy resources in the accounting of non-financial assets, renewable energy resources would account for 4.8% of the opening stock and 4.6% of the closing stock of non-financial assets.

scenarios considered⁴ (Figure 2), substantial differences emerge in the aggregate valuation when expressed in present-value terms.

Figure 2. Impact of discounting on projected resource rents, 2025 prices, 2025-2065



Source: Central Bank of Costa Rica

Figure 3. Impact of discounting on asset value



Source: Central Bank of Costa Rica

⁴ The breaks in the projected resource rent trajectories reflect differences in the asset lives of the renewable energy technologies included in the valuation.

In particular, using a discount rate of 2% instead of 3% increases the valuation by approximately CRC 2.0 trillion. By contrast, applying a discount rate of 4% reduces the valuation by around CRC 1.6 trillion relative to the baseline scenario (Figure 3). These differences are equivalent to 4.1% and 3.2% of GDP in 2024, respectively, highlighting the high sensitivity of the estimates to changes in the discount rate applied.

5. Conclusions

The valuation of renewable energy resources as assets represents an important step forward in integrating the environmental dimension into the traditional accounting framework. Their estimation and incorporation make it possible to explicitly recognize the contribution of natural resources to the generation of economic well-being and national wealth. In particular, the valuation of hydroelectric, geothermal, wind and solar assets provide strategic information on the economic value associated with the renewable resources that underpin, almost completely, Costa Rica's electricity generation mix.

Nevertheless, the exercise is subject to several important limitations. First, one of the main methodological constraints relates to the availability of economic information disaggregated by type of energy source. Specifically, Costa Rica's national accounts record the economic activity of electricity supply on an aggregated basis, which means that the results depend on allocation assumptions that introduce a degree of uncertainty. Although the procedures developed make it possible to produce estimates consistent with the conceptual framework of the 2025 SNA, this situation underscores the need to strengthen the availability of economic information disaggregated by generation technology for future applications.

Second, it is important to recognize that the estimated values depend on a degree of climate stability, particularly in the case of hydroelectric generation, which accounts for a significant share of the country's renewable generation capacity⁵. This high dependence on hydrological resources represents an important source of risk, as climate variability and the effects of climate change may alter hydrological patterns and thereby affect the future availability of the resource. This, in turn, poses a significant methodological challenge for the measurement of the stock in physical terms.

Third, the sensitivity analysis confirms that the discount rate is one of the most influential parameters in the valuation exercise. Although the trajectory of projected resource rents remains relatively stable, small changes in the discount rate result in substantial variations in the estimated present value. For this

⁵ During the period 2015-2025, hydropower accounted, on average, for 73% of the country's total electricity generation and 75% of renewable electricity generation.

reason, identifying discount rates that appropriately reflect the specific characteristics of each economy is of considerable importance.

Regarding the allocation of asset values among different owners, this initial estimate for Costa Rica assigns the entirety of the assets to Public Non-Financial Corporations (S11001), given that electricity generation is carried out primarily by ICE, a public sector institution. In future exercises, efforts will be made to link the estimates to electricity generation by technology type, with the aim of achieving a more accurate allocation across institutional sectors, including private generation attributable to Private Non-Financial Corporations (S11002).

On the other hand, since the resources analysed are renewable resources, no depletion is identified in the traditional sense. As a result, changes in the estimated asset values are driven primarily by changes in expectations regarding future generation and prices. Moreover, for this reason, these resources do not give rise to depletion as a cost of production, implying that their inclusion would not affect gross domestic product (GDP) or net domestic product (NDP). However, their inclusion does have important implications for other dimensions of the SNA, particularly in relation to national wealth and the balance sheet accounts.

In this regard, incorporation these estimates into the national balance sheets represents a fundamental step towards a more comprehensive measurement of the country's economic wealth. Recognizing the value of assets associated with renewable energy sources expands the coverage of national wealth is expanded beyond traditional produced assets, providing a complete representation of the contribution of natural capital to the country's economic development and wealth. Integrating these assets into official statistics strengthens the capacity to assess Costa Rica's economic and environmental sustainability, facilitating the formulation of public policies aimed at the efficient management of natural resources and the transition towards a sustainable growth model.

References

Academia de Centroamérica. (2017). El sector eléctrico en Costa Rica. Serie Visión Costa Rica, PV-01-17, febrero 2017.

Autoridad Reguladora de los Servicios Públicos [ARESEP]. (2025). ARESEP aprobó 6 nuevos proyectos para generar con energías renovables. Bol. 61-2025. <https://aresep.go.cr/noticias/aresep-aprobo-6-nuevos-proyectos-para-generar-con-energias-renovables/>

Banco Central de Costa Rica [BCCR]. (2025). *Valuing Nature's Energy: A Monetary Account of Costa Rica's Renewable Energy Resources*. Banco Central de Costa Rica.

Banco Centroamericano de Integración Económica [BCIE]. (2009). Análisis del Mercado Costarricense de Energía Renovable. Proyecto Acelerando las Inversiones en Energía Renovable en Centroamérica y Panamá (ARECA), Tegucigalpa.

Instituto Costarricense de Electricidad [ICE], Centro Nacional de Control de Energía [CENCE]. (2015-2025). Informes anuales del Sistema Eléctrico Nacional [Serie de informes]. Instituto Costarricense de Electricidad. <https://apps.grupoice.com/CenceWeb/CenceDescargaArchivos.jsf>

Instituto Costarricense de Electricidad [ICE]. (2020). Costa Rica: modelo sostenible, único en el mundo. Matriz eléctrica. Dirección de Comunicación, Instituto Costarricense de Electricidad. https://www.grupoice.com/wps/wcm/connect/8823524c-7cc7-4cef-abde-a1f06e14da0e/matriz_folleto_web2.pdf

Instituto Costarricense de Electricidad [ICE]. (2025). Plan de expansión de la generación eléctrica 2024-2040. Gerencia de Electricidad, Dirección de Planificación y Sostenibilidad. <https://www.grupoice.com/wps/wcm/connect/20b300e4-c4df-4994-b1b1-372726fa4f3b/PLAN+DE+EXPANSION+DE+LA+GENERACION+ELECTRICA+2024-2040.pdf?MOD=AJPERES&CVID=pFal9fj>

Matarrita-Chaves, R; Richmond-Navarro, G; Murillo-Zumbado, G; Jiménez-Ceciliano, M. (2022). Estimación de la rentabilidad de una turbina eólica comercial de pequeña escala en Costa Rica. *Tecnología en Marcha*, 35 (especial Programa de Investigación en Energías Limpias), 5-18. <https://doi.org/10.18845/tm.v35i7.6329>

Organisation for Economic Co-operation and Development [OECD]. (2025). *Measuring Natural Resources in the National Accounts: A Compilation Guide*, OECD Publishing, Paris, <https://doi.org/10.1787/420c7c2a-en>.

Procuraduría General de la República [PGR]. (2024). Resolución RE-0021-JD-2022 y su reforma Metodología de fijación de tarifas para generadores privados amparados al Capítulo I de la Ley 7200 que hayan renovado y que renueven contrato de compra-venta de electricidad con el Instituto Costarricense de Electricidad (ICE). OBS: Modificación realizada mediante resolución RE-0005-JD-2024 del 29 de febrero de 2024.

Procuraduría General de la República [PGR]. (2025). RE-0042-IE-2025 Aplicación anula de oficio de la “Metodología tarifaria de referencia para plantas de generación privada hidroeléctricas nuevas” según la metodología RJD-152-2011 y sus reformas. ET-036-2025, del 14 de agosto de 2025.

United Nations, European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, & World Bank. (2025). *System of National Accounts 2025*. United Nations.

United Nations, European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, & World Bank. (2009). *System of National Accounts 2008*. United Nations.

Annex 1

Resource rents are estimated using gross output, intermediate consumption, remuneration of employees, and taxes on production, obtained from the adjusted production account for the economic activity of electricity supply:

$$\begin{aligned} \text{Resource rent}_{i,t} \\ &= (\text{Gross operating surplus} + \text{gross mixed income} \\ &\quad - \text{depreciation} - \text{return to fixed capital})_t * WG_{i,t} \quad (A1) \end{aligned}$$

Where i denotes the renewable energy technology, t the year and WG represents the relative share of each technology in gross electricity generation measured in GWh. In addition, depreciation is derived from the gross fixed capital formation associated with the electricity supply activity, adjusted by the corresponding relative shares and asset lives:

$$\text{Depreciation}_i = \frac{\text{Fixed capital formation} * WI_i}{\text{Asset life}_i} \quad (A2)$$

Where WI represents the relative share of each renewable energy technology in total installed capacity, expressed in GW.

For years in which the production account for the electricity supply activity is not available, specifically 2023 and 2024, the following formula is applied to estimate output, intermediate consumption, remuneration of employees, and taxes on production (indicator of interest):

$$\text{Indicator}_{i,t} = \text{Indicator}_{i,t-1} * VG_{i,t} \quad (A3)$$

Where VG represents the annual variation in electricity generation for the specific generation technology.

Annex 2

After incorporating the corresponding adjustments, the balance sheets for 2022 would be presented as follows:

Table A3. Adjusted balance sheets, National Accounts, 2022

Account	Sub-account	Code	Order	STOCKS AND CHANGES IN ASSETS	S1 6 Total economy	
					Assets	Liabilities and net worth
IV. Opening balance	IV.1. Non-financial assets	AN	IV.1	Non-financial assets	217 384 476,62	
		AN1	IV.1.1	Produced non-financial assets	203 137 681,24	
		AN2	IV.1.2	Non-produced non-financial assets	3 148 686,61	
		AN3	IV.1.3	Natural resources	556 856,74	
		AN33	IV.1.3.1	Biological resources	402 784,98	
		AN35	IV.1.3.2	Costs of ownership transfer on non-produced natural resources	-	
		AN333	IV.1.3.3	Work-in-progress on cultivated biological resources	154 071,77	
		AN30	IV.1.3.4	Non-produced natural resources	-	
		AN31	IV.1.3.4.1	Land	-	
		AN32	IV.1.3.4.2	Mineral and energy reserves	10 541 252,02	
		AN34	IV.1.3.4.3	Water resources	-	
		AN39	IV.1.3.4.4	Other natural resources	-	
	IV.2. Financial assets/liabilities	AF	IV.2	Financial assets/liabilities	169 833 586,07	196 333 116,78
		B90	IV.3	Net worth	-	190 884 945,91
V. Closing balance	V.1. Non-financial assets	AN	IV.1	Non-financial assets	239 806 142,33	
		AN1	IV.1.1	Produced non-financial assets	224 806 179,15	
		AN2	IV.1.2	Non-produced non-financial assets	3 381 591,83	
		AN3	IV.1.3	Natural resources	637 306,67	
		AN33	IV.1.3.1	Biological resources	433 607,46	
		AN35	IV.1.3.2	Costs of ownership transfer on non-produced natural resources	-	
		AN333	IV.1.3.3	Work-in-progress on cultivated biological resources	203 699,21	
		AN30	IV.1.3.4	Non-produced natural resources	-	
		AN31	IV.1.3.4.1	Land	-	
		AN32	IV.1.3.4.2	Mineral and energy reserves	10 981 064,68	
		AN34	IV.1.3.4.3	Water resources	-	
		AN39	IV.1.3.4.4	Other natural resources	-	
	V.2. Financial assets/liabilities	AF	IV.2	Financial assets/liabilities	173 382 409,95	202 047 523,37
		B90	IV.3	Net worth	-	211 141 028,91

Source: Central Bank of Costa Rica