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Waste, Power Generation and Non-Interconnected Zones: Analysis of Regulatory and Institutional Mechanisms Through a Case Study of San Andrés

Residuos, energía y zonas no interconectadas: análisis de los arreglos normativos e institucionales a partir del caso de San Andrés

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ABSTRACT

This article seeks to underscore some of the most significant regulatory and institutional challenges faced in generating electricity from solid urban waste in the Non-Interconnected Zones of Colombia. A review of the current regulations in Colombia reveals a manifest urgency for inter-institutional coordination between the entities responsible for energy generation and those tasked with waste collection and final disposal, revealing poor coordination between the regulations governing the generation, commercialization and distribution of energy with those concerning solid waste management. This article will address the limits and possibilities the regulatory and institutional framework provides to effectively implement energy projects from urban solid waste in Colombia.

To better grasp the practical implications of this normative breakdown, a case study was completed of the archipelago of San Andrés, Providencia and Santa Catalina (hereinafter SAI for its Spanish acronym), to identify the legal grounds and institutional capacities that have been determinants in that, despite completing in 2012 construction of a waste-to-energy plant that uses municipal solid waste (hereinafter RSU for its Spanish acronym), to date not even power has been generated.

KEYWORDS: Power Generation, Solid Urban Waste, Regulatory Environment, Institutional Capabilities.

RESUMEN

Este artículo busca comprender los retos normativos e institucionales que enfrenta la generación de energía a partir de residuos sólidos urbanos (en adelante RSU) en zonas no interconectadas en Colombia (en adelante ZNI). Así mismo, la urgencia de una coordinación interinstitucional entre los entes encargados de la producción de energía y los responsables de la recolección y disposición final de RSU, advirtiendo la desarticulación entre las normas reguladoras de energía y RSU. Pretende responder ¿cuáles son los límites y las posibilidades del marco normativo e institucional para la implementación de proyectos de energía a partir de RSU en Colombia?

Para entender las implicaciones prácticas de esta desarticulación normativa, se analizó el caso del Archipiélago de San Andrés, Providencia y Santa Catalina (en adelante SAI), a partir del cual, se determinó las razones jurídicas y de capacidad institucional por las que, a pesar de haberse concluido la construcción de una planta de generación de energía con RSU en el año 2012, a la fecha no se ha generado energía.

PALABRAS CLAVES: Generación Energía, Residuos Sólidos Urbanos, Arreglos Normativos, Arreglos Institucionales.

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Introduction

Energy, the final disposal of urban solid waste (RSU), and the Non-Interconnected Zones (ZNI) in Colombia are interrelated. The generation of energy from RSU, studied from an interdisciplinary perspective, provides indicators of quality of life and presents options for energy transition. It opens a possibility to understand specific territorial needs and explores the necessary institutional coordination to address the complexity of these issues. It also highlights the educational challenges for communities and all actors involved.

ZNI occupy 52% of Colombia[1], and several of its municipalities have been included in the list of ZOMAC[2] municipalities (Zones Most Affected by Conflict). In the ZNI, the provision of electrical energy relies mainly on diesel[3] generation plants; these areas have a high index of unsatisfied basic needs and a low capacity to pay. Their isolation leads to high interconnection and service provision costs[4]. As a result, energy generation in the ZNI —affected for years by armed conflict— is a fundamental right that the Colombian state has neglected.

In the context of sustainable development and efforts to reduce poverty, as envisioned in the Paris Agreement, emission reduction targets were set for the signatory countries to limit the temperature increase to 2%[5]. Therefore, the proper management of RSU contributes to achieving this goal (Kaza et al., 2018).

Although Colombia contributes 0.5% of global greenhouse gas emissions (GHG), this figure does not account for the impact of deforestation, and fossil fuels represent 55% of its exports (National Planning Department, 2022). Thus, in December 2020, the Intersectoral Commission on Climate Change approved the NDC Update, which defined the targets and measures for climate change management during the 2020-2030 period. Conpes Documents 3918, 3934, and 4075 established mechanisms and criteria for the energy transition and commitments in implementation, involving all sectors of society. Furthermore, the use of clean energy was included as one of the transformation pillars in the current National Development Plan[6].

The energy transition has highlighted global inequality in terms of access to safe and affordable services (Heldeweg & Séverine Saintier, 2020). Escobar (2019) cites studies showing increased access to public services, despite the persistence of rural poverty.

The World Bank (Komives et al., 2005) emphasizes the relevance of electrification for the provision of health services. Torres (2019) argues that processes focused on the productive use of electricity should prevail, as a connection alone does not guarantee economic development. García Ochoa (2014) understands the link between energy and poverty as a reality derived from its dependence on development. However, Jasanoff & Simmet (2021) argue that the structuring of generation projects with non-conventional sources must not deteriorate living conditions or ecosystems[7]. However, there are studies that find that the socioeconomic benefits of rural electrification have been overestimated (Samad & Zhang, 2017)[8].

1 UPME. Indicative Plan for the Expansion of Electric Energy Coverage 2016-2020

2 Law 1819, 2016. List of regions affected by the internal conflict.

3 CONPES 3855, 2016.

4 CONPES 3453

5 Paris Agreement. Article 2.
- Cop26.Together for the Planet. https://www.un.org/es/climatechange/cop26
- Cop27.Workinf for people and the planet. https://unfccc.int/cop27
- Cop28.Climate,Relief,Recovery,andPeacehttps://www.cop28.com/en/cop28-declaration-on-climate-relief-recovery-and-peace

6 Law 2295, 2023.

7 BADIA, Francesc, BERNAL SÁNCHEZ, Andrés. Wind fiver in La Guajira. December 16th, 2021. https://www.opendemocracy.net/es/fiebre-eolica-guajira-colombia/

8 Paris Accord. https://www.un.org/es/climatechange/paris-agreement

Regarding waste, only 15% is recovered through energy generation (International Environmental Technology Centre, n.d.), while 90% of solid urban waste (RSU) in Africa, Latin America, and the Caribbean is deposited in landfills. In Brazil, while the population grew at a rate of 0.8% between 2014 and 2015, RSU increased by 1.7% (Santos et al., 2019b). In the city of Dhaka (India), RSU increases annually in line with population growth and Gross Domestic Product (GDP) (Sufian & Bala, 2006).

Taking into account the International Solid Waste Association, in 2012, 130 million tons of RSU, representing only 10% of total RSU, were incinerated to produce energy. In the United States, China, Japan, Denmark, Switzerland, and Sweden, there are many incineration plants, but not all can produce energy. In Sweden, Switzerland, Denmark, Germany, Austria, and Belgium, most waste is diverted to recycling and composting facilities. In Singapore, 44% of waste is recycled, while in other countries (mainly developing ones), the RSU recycling rate usually ranges between 8% and 11% (Kumar & Samadder, 2017).

According to the World Bank, 2.59 and 3.40 billion tons of RSU will be generated annually by 2030 and 2050, respectively (Kaza et al., 2018). The rate of RSU generation is directly related to GDP; in developed countries, the rate ranges from 1.00 to 2.50 kilograms per day, while in developing countries, it is between 0.50 and 1 kilogram per day (Kumar & Samadder, 2017). In Colombia, 32,581 tons of waste were disposed daily in 2020 (Superservicios & DANE, 2021).

Even so, the transformation of RSU into energy has negative factors, such as potentially toxic emissions and high implementation costs (Kumar & Samadder, 2017). However, the properly controlled incineration of RSU generates a lower environmental impact than landfills (Santos et al., 2019a). RSU management becomes more important since it avoids prolonged storage of waste and requires less land than the installation of landfills (André & Cerdá, 2015).

A study conducted in São José dos Campos (Brazil) analyzed alternative RSU management methods: (i) landfills, (ii) anaerobic digestion, (iii) incineration, and (iv) combined use of incineration and anaerobic digestion. It concluded that incineration has the highest energy production capacity but comes with high costs; only the landfill alternative is financially viable—despite its negative environmental impacts (Santos et al., 2019b). Without entry tariffs or some form of subsidy, public policies for energy generation from RSU cannot be implemented (Medina Jimenez et al., 2019).

In Colombia, since 2005, the closure of unauthorized final disposal sites began. Through CONPES 3874 (2016), the circular economy was promoted without success. In 2022, 23.28% of the authorized sites (landfills and contingency cells) had a useful life of less than 3 years, highlighting the gravity of the situation (Superservicios & DANE, 2021).

One of Colombia's goals for 2030 is to increase research and technology related to clean energy, as well as to promote investment in this type of infrastructure (National Planning Department, 2022).

Although there are technical and specialized articles seeking to address the purely practical issues of energy generation, the attributes, pollutant effects, technologies, and efficiencies that can be achieved (Montiel Bohórquez & Pérez, 2019) (Poletto & Da Silva, 2009) (Kim, 2021) (Fatima et al., 2021) (Cardoso de Oliveira Neto et al., 2016), the literature has not focused on analyzing whether the existing legal framework is sufficient and adequate, nor which institutional arrangements are required.

Regarding institutional arrangements, as (Agarwal et al., 2012) stated: it is urgent to analyze the relationship between the different levels of strategic implementation. In terms of climate change, the different types of links between policies and decision-making levels must be understood. The authors analyzed the NAPAs (National Adaptation Programmes of Action) of 60 countries and conducted a literature review, determining that NAPAs did not involve local institutions, making it necessary to prioritize the search for information on local risks and capacities.

A bottom-up approach is essential to achieve a more democratic and inclusive energy transition, establishing rules and security that provide communities with an institutional environment and governance structures (Heldeweg & Séverine Saintier, 2020). In the same vein, (Lemaitre Ripoll, 2019)

explains how we must better understand the role of the State, as a project that belongs to us, not defined by international development experts' prescriptions or European theories, but in a way that ensures that community participation extends beyond mere survival needs to embrace the concept of the desired life.

(Agarwal et al., 2012) conclude that for greater coordination between local and national authorities, it is necessary to: (i) increase local capacity, (ii) empower communities and local authorities, (iii) develop mechanisms to share information between decision-makers, and (iv) increase the accountability of local decision-makers to their communities.

On the other hand, Hicks & Ison (2018) explore community renewable energy, highlighting that there is a variety of ownership structures and actors, which vary depending on political contexts and motivations, emphasizing that it is the voting rights that make a project community-based.

Considering that the generation of urban solid waste (RSU) is on the rise, the final disposal of this waste must be resolved comprehensively, combining source reduction, recycling, and incineration (André & Cerdá, 2015). While incineration is the most efficient mechanism and has the greatest impact on the energy matrix, it requires mechanisms for selective waste collection, as well as technologies to utilize biogas generated in landfills (Santos et al., 2019a). In general terms, as has occurred in Chile and Argentina, energy generation from non-conventional sources is not attractive to investors; thus, state intervention is necessary to establish subsidies (Cisterna Arellano et al., 2020).

For projects to have a climate impact, they require co-management models (Agrawal, 2008) and should include the concepts, knowledge, practices, and territorial relationships of Indigenous, Afrodescendant, and raizal communities settled in the Non-Interconnected Zones (ZNI) (Ulloa, 2021).

Given that any project can generate negative impacts, it should include long-term benefits, such as Payments for Environmental Services[9]. The effectiveness of such payments will depend not only on the transparency of their allocation but also on their impact on improving the quality of life of beneficiaries (Moros et al., 2023). However, there are still no systemic explorations to determine the effectiveness of these payments in reducing the carbon footprint (Perevochtchikova, 2014).

Finally, understanding the urgency of proper RSU disposal and the social dimensions of the energy service, the guiding question of this article is: **what are the limits and possibilities of the regulatory and institutional framework for the implementation of energy generation projects from RSU in Colombia?**

Methodology

The framework of Institutional Analysis and Development (IAD) that was adopted, focuses on interactions and outcomes. This framework allows for the description, analysis, prediction, and explanation of behavior within institutional arrangements and decision-making processes (Ostrom, 2011). Therefore, starting from the IAD, the analysis of the regulatory framework was emphasized, and it was verified that—at least in legal provisions—the actors are endowed with capacity and governance to generate expected outcomes and benefits for the community.

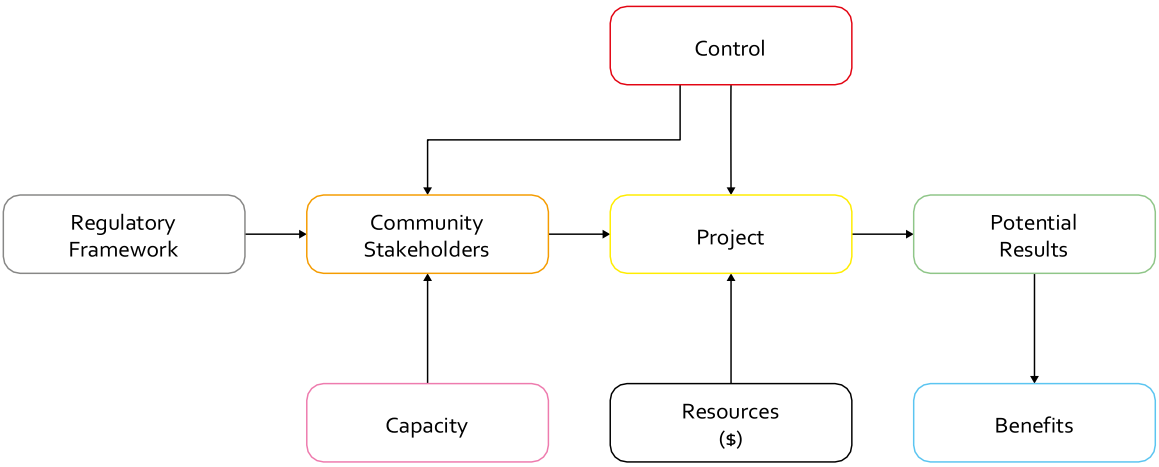
The regulatory framework was analyzed, starting from the Political Constitution of Colombia, Laws 142 and 143 of 1994, Law 1715 of 2014, as well as all current provisions related to energy generation from non-conventional sources and the disposal of urban solid waste (RSU).

On the other hand, the applicability of the concept and the specific public issues that could be resolved were determined. Capacities are not the same for all problems (Rosas Huerta, 2019), which became evident in the case of SAI.

Responsibility, transparency, accountability, participation, and efficiency of public actions are pillars of institutional capacity. The State and its dependencies must be analyzed in their dual nature as both an institutional apparatus and a social relationship (Rosas Huerta, 2019). However,

9 Law 870, 2017.Regulated the Final Agreement of the Conflict and created Payments for Environmental Services.

Figure 1. Regulatory and Institutional Arrangements as a Conceptual Framework.



territorial entities do not always have the information and capacity, so it is necessary to determine the set of actors, the role each will occupy, the set of permitted actions, and the link with results, potential outcomes, level of control, available information, and the costs and benefits assigned to actions and results (Ostrom, 2011). The implementation of public policies related to climate issues requires cooperation and coordination among levels of government, sectors, and public and private actors, all of which strengthens institutional capacity (Rosas Huerta, 2019).

The rules and requirements form a distinct legal space that guides actors to interact in accordance with the desired characteristic pattern of relationships and activities of interest. Regulations can create a resilient institutional environment, thereby contributing to a fair energy transition (Heldeweg & Séverine Saintier, 2020).

While regulations do not form part of a public policy, their implementation requires prior inclusion in some legal provision. Certainly, the regulatory framework generally limits itself to technical and regulatory aspects but omits social justice, equality, or democracy (Jasanoff & Simmet, 2021). Therefore, the regulatory framework should be analyzed with an interdisciplinary, systemic, and inter-institutional approach, which addresses the overlap of actors, authorities, and competencies and combats inter-institutional disintegration and the fragility of environmental regulation, as well as the limited adaptability of regulations to different contexts (Council of State, 2014).

In addition to the purely normative analysis, complementary information was collected and the case of SAI was analyzed. The methodology proposed by Eisenhardt (1989) was used, which combines different methods, such as semi-structured interviews (which ceased when data saturation was detected), field visits, on-site observations, and the collection of photographic material. The content of relevant news published in various media over the past ten years was reviewed, clarifying the context of the case. Qualitative data were combined, acknowledging that there may be an overlap of data (Eisenhardt, 1989). The triangulation of information allowed for the analysis and classification of regulatory and institutional pressures.

SAI Case

The issue of final disposal of urban solid waste (RSU) and the deficient and costly generation of energy in SAI is well-known[10]. SAI is a Non-Interconnected Zone (ZNI) with the unique characteristic of being an insular territory that meets its energy demand with diesel[11], which poses challenges to environmental and financial sustainability due to gas emissions and the fiscal burdens on the central government, resulting from the subsidies granted for energy generation and to ZNI users (Ramón Gomez, 2016). The RSU is deposited in the open-air landfill called Magic Garden, where 25,000 tons[12] arrive annually.

In SAI, the management of RSU is carried out by two operators. The first is responsible for street sweeping, cleaning public spaces, and collection (Trash Busters). The second is in charge of the final disposal of RSU in the landfill (InterAseo).

In 2009, the National Government and the Government of SAI determined the need to address the problem of RSU and the lack of low-cost electricity. Therefore, a public bidding process was initiated to build and operate a plant for generating electricity from RSU, using resources from FAZNI ($50,000,000,000 CONPES 3453, 2006)[13].

Concession Contract 067 of 2009[14] was signed with Sopesa S.A. E.S.P. (a company that was already generating, distributing, and selling energy in SAI). EEDAS S.A. E.S.P. (a mixed public service company responsible for providing energy services) was designated as the contract supervisor, which raises concerns about the logic of having the supervisor be the company that, due to its role, has a conflict of interest.

In February 2012, Sopesa completed the construction of the plant. However, operations could not begin as it required an update to the Environmental Management Plan for the Magic Garden and the signing of an operating contract (Council of State, First Section, 2017).

Additionally, the RSU must not exceed five centimeters in diameter and must have a moisture content of less than 20%, which implies a prior process of selection and shredding that none of the actors anticipated (Alianza GAIA, 2021).

Both the plant and the landfill were located in the *Schooner Bight*[15] community, a typically agricultural area, where residents had lived for several generations. They suffered the externality of the plant and landfill construction without receiving any compensation systems, as described by André

10 San Andrés: Health Emergency Due to Garbage Accumulation in the Streets. August 6, 2021. https://www.radionacional.co/regiones/insular/san-andres-emergencia-sanitaria-acumulacion-basuras

- Court Demands Progress on San Andrés' Waste Management System, June 22, 2021..https://www.lafm.com.co/colombia/corte-pide-avances-sobre-el-sistema-de-basuras-de-san-andres
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- San Andrés is Swimming in a Sea of Plastic: Representative Jack Housni. News from December 1, 2017, retrieved on May 26, 2022. https://www.camara.gov.co/san-andres-esta-nadando-en-un-mar-de-plastico-representante-jack-housni
- Magic Garden Landfill: Here We Go Again. http://www.xn--elisleo-9za.com/index.php?option=com_content&view=article&id=9121:relleno-sanitario-magic-garden-vuelve-y-juega&catid=41:ambiental&Itemid=83
- February 25, 2015. El Isleño. Retrieved on October 5, 2022.
- Ombudsman's Office Warns of Accumulation of Solid Waste, Debris, and Garbage Polluting the Islands of Providencia and Santa Catalina. https://defensoria.gov.co/-/defensor%C3%ADa-alerta-acumulaci%C3%B3n-de-residuos-s%C3%B3lidos-escombros-y-basuras-que-contaminan-las-islas-de-providencia-y-santa-catalina March 13, 2024. Retrieved on June 8, 2024

11 Article 2.2.5.1.3.3., Decree 1077, 2015 included the prohibition of disease for energy generation.

12 Isla de San Andrés, Summary of the Waste Problem in Colombia. El Tiempo. El Tiempo. https://www.eltiempo.com/vida/medio-ambiente/isla-de-san-andres-resumen-del-problema-con-la-basura-en-colombia-587952 May 13, 2021. Retrieved on May, 2022.

13 CONPES 3453, 2006 "Management Schemes for the Provision of Electric Power Service in Non-Interconnected Zones (ZNI)".

14 The contract and 5 amendments can be consulted on the Secop-I page..

15 In this area, there is also a prison, the RSU separation plant, and a scrapyard.

& Cerdá (2015). As agreed upon compensatory measures with the community, commitments were made to construct a sports facility, repair homes, build a recreational park, and implement fruit tree reforestation, among others. These commitments, despite being formalized in 2011, have not been fulfilled by Sopesa.

The government submitted the Environmental Management Plan (PMA) to Coralina in 2014, and only in 2018 did Coralina approve the PMA[16], which is currently not in effect[17].

On the other hand, the Council of State's Civil Service and Consultation Chamber mistakenly determined that the concession was limited exclusively to the public electricity service and did not include the services for the utilization of RSU or final disposal[18]. However, the Contract defined RSU as that which is generated in SAI and disposed of in the Magic Garden, and included the treatment of RSU deposited in the landfill as a source of input.

Regardless of all interests, the (Council of State, First Section, 2017) determined that the final disposal of solid waste conditions citizens' enjoyment of the collective right to a healthy environment and ecological balance.

In 2019, the National Government co-financed the construction of a RSU Separation Plant to put the energy generation plant[19] into operation, which is currently operated by InterAseo. However, the generating plant has not yet been started.

In 2023, Coralina requested information regarding the existing quotas at the landfill and demanded the acceleration of interaction between Trash Buster, InterAseo, and Sopesa, in order to ensure the proper functioning of the RSU[20] plant without imposing sanctions for non-compliance[21].

Given the absence of industry in SAI, recycling is economically unviable (Alianza GAIA, 2021), which presents advantages such as saving scarce natural resources, reducing landfill space, and allowing reversibility since it does not involve the destruction of materials, as occurs with incineration (André & Cerdá, 2015). Resolution 6217 of 2015[22] adopted the Comprehensive Solid Waste Management Plan in SAI, transferring the implementation of this plan to the Secretariat of Public Services and the Environment (which has not yet been adopted).

Finally, it is worth mentioning that SAI was declared a Biosphere Reserve in 2000, so what happens in SAI not only concerns its raizal communities but is also a borderless issue[23].

Findings

Normative Analysis

Below, some graphs summarize the regulations applicable to the case of SAI. See Figures 2 and 3 in the next page.

In conclusion, the extensively analyzed regulatory framework does present possibilities for the structuring of energy generation projects from urban solid waste (RSU) in the Non-Interconnected Zones (ZNI), such as tax benefits, energy communities, and organizational capacities of the communities. However, the regulatory framework must be adjusted in terms of tariffs, so that there is no conflict between those responsible for the final disposal of RSU and the energy generators.

16 Article 23 of Law 99, 1993 establishes that Coralina is the Environmental Authority in SAI.

17 Resolution 490, 2018.

18 Council of State, Consultation and Civil Service Chamber. Presiding Counselor: Álvaro Namén Vargas. Bogotá D.C., February 4, 2015. File No.: 11001-03-06-000-2014-00230-00 (2230)..

19 https://minvivienda.gov.co/sala-de-prensa/san-andres-operara-la-primera-planta-generadora-de-energia-partir-de-residuos-solidos-en-el-pais.

20 March 3, 2023, responds to petition 20231100409 dated February 23, 2023.

21 Official Letter 20232100207, March 3, 2023, Coralina.

22 Resolution 6217, December 17, 2015, SAI Governorship. https://www.sanandres.gov.co/index.php/gobernacion/normatividad/resoluciones/2740-resolucion-6217-de-2015/file

23 https://seaflowerfoundation.org/reserva-de-la-biosfera.html

Figure 2. Energy Framework

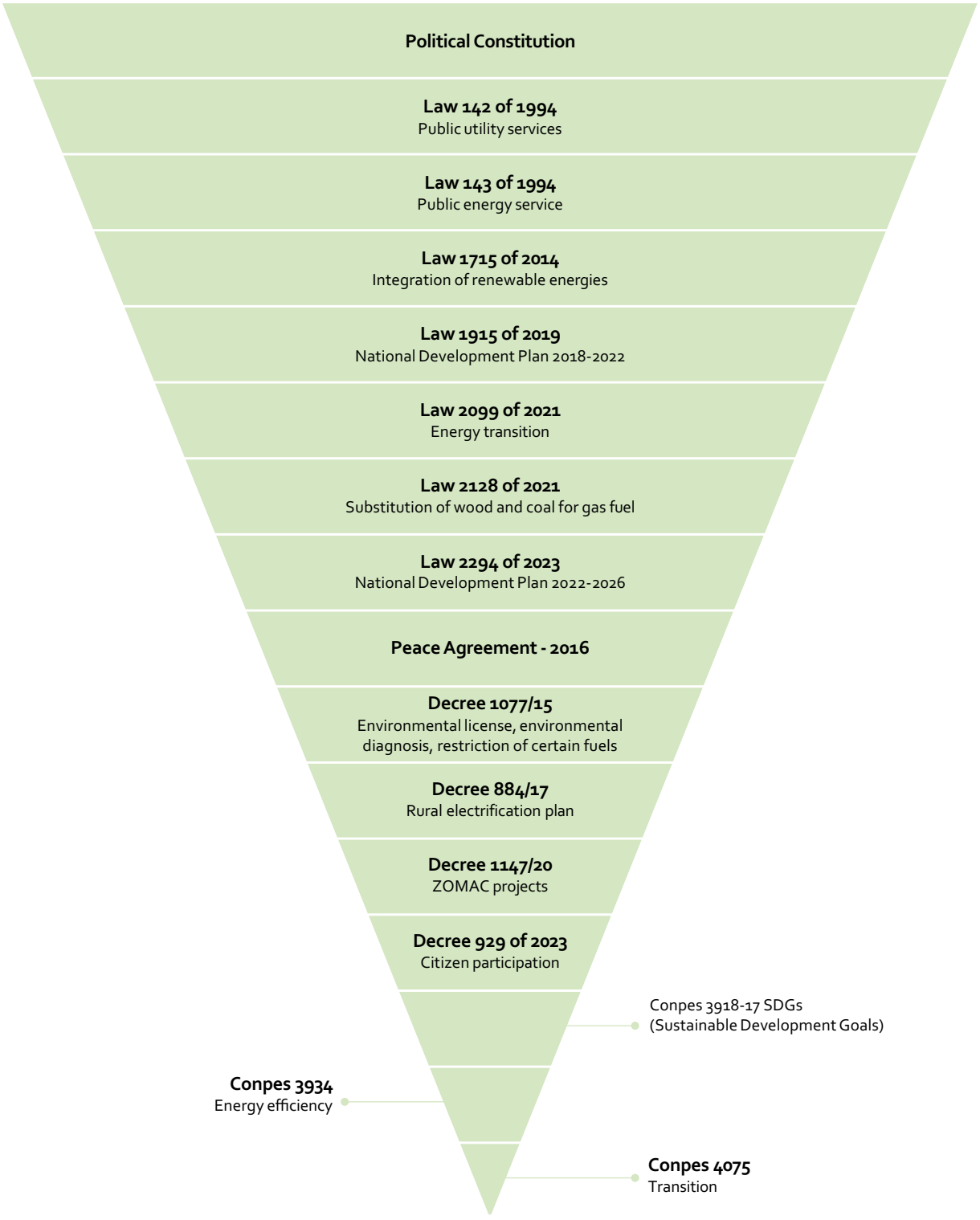


Figure 3. RSU Framework

Institutional Analysis of the SAI Case

The identified actors are presented as Figure 4, following the criteria of Mitchell et al. (1997).

As announced in the analytical framework, in the SAI case, if the analysis proposed in Figure 1 is applied, the following result is obtained:

Figure 4. Identified Stakeholders.

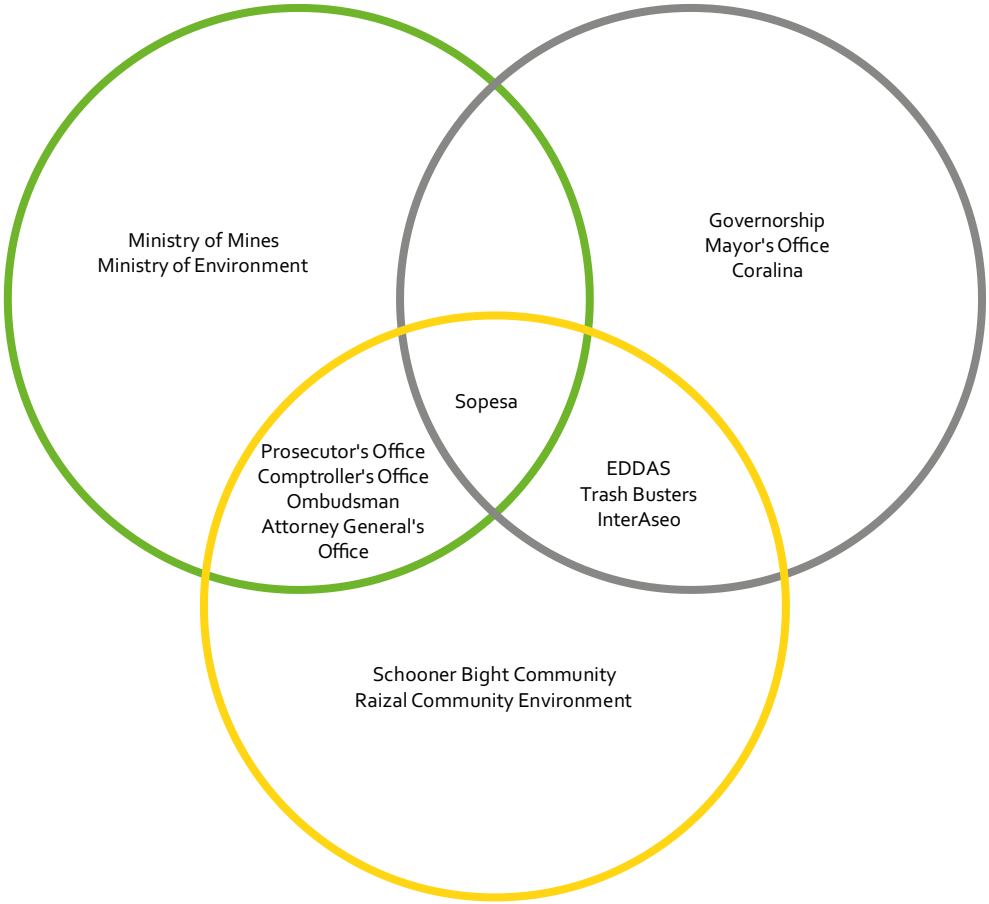
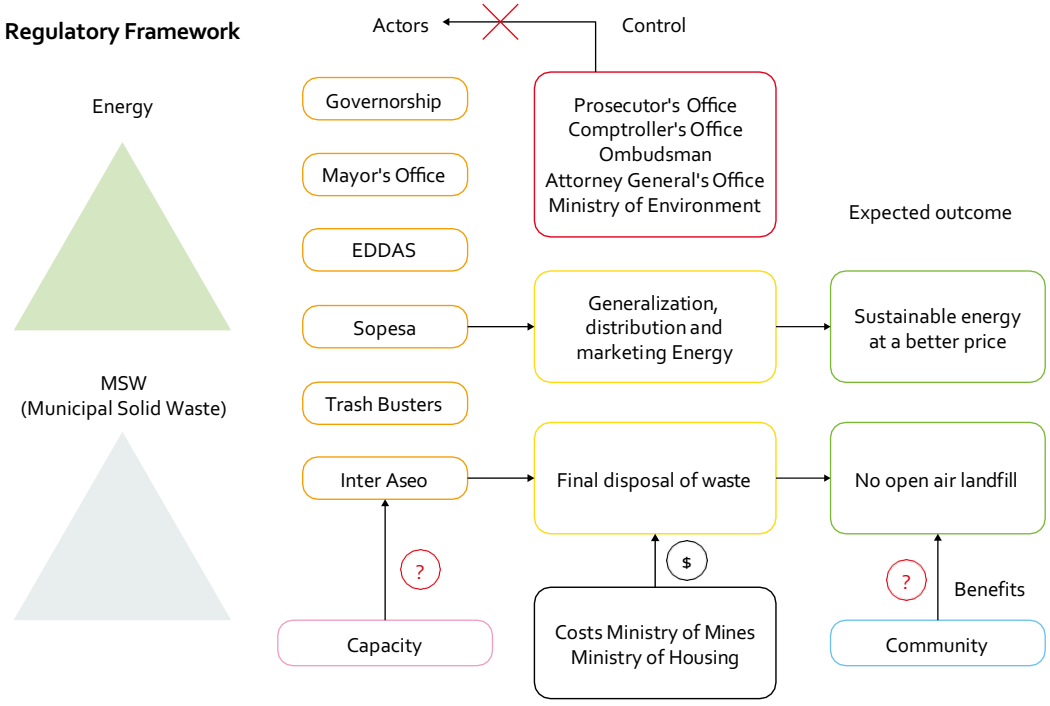


Figure 5. Analysis AID applied to the case SAI



In this case, there was not poor management of stakeholders; rather, there was no management at all. As a result, there is no relationship among the actors. The central government was unaware of the complexities of energy generation on an island, did not conduct a genuine prior consultation process, and ignored the real community needs. Sopesa, having a perverse incentive represented by a subsidy for diesel-based generation, has no motivation to produce less polluting energy. The kilowatt generated in SAI is considerably more expensive than in non-island areas. InterAseo—despite having business ties with Sopesa—is unwilling to bear the costs of RSU mining. Trash Busters has no incentive to reduce the volume of collected RSU, as this would reduce their income. Local authorities lack the management capacity, or if they have it, they prefer to rely on incompetence. Judges and oversight entities issue peremptory orders with no real legal effects. Resources for inspection and monitoring are limited. Exemplary environmental sanctions are not imposed. Meanwhile, the community suffers the consequences of companies lacking compensation practices and receives costly services. The lack of transparency, lack of accountability, and lack of effective community involvement in decision-making highlight the institutions' lack of capacity. Likewise, the absence of educational tools in the community, which would enable them to effectively exercise civic oversight, minimizes the impact of their claims. As Ruiz Barbosa (2022) states, there is a need to build a culture of transparency, integrity, and civic ethics, which allows citizens in general and young people in particular to have the tools to fight against corruption.

The State has failed in its duty to ensure effective coordination among the actors.

Organizational and Actor Analysis

The results of the fieldwork consider the information collected during the visit to SAI, the surroundings of the facilities of Sopesa, InterAseo, Trash Busters, Magic Garden, and Coralina, as well as data obtained from semi-structured interviews.

Institutional Arrangements

The SAI case highlights failures in arrangements and the lack of experience in the construction and operation of a municipal plant. In the words of the community: "The Government has failed us by treating us like laboratory rats."

Regarding the prior consultation, the community stated that although Sopesa claims that it was conducted, this is not true, as commitments were made without the community's knowledge.

Notably, there is no material division between the properties of Sopesa and InterAseo, despite the lack of agreements on how and who will bear the costs of waste mining, which gives credence to rumors in the community that the owners of both companies are the same.

This is corroborated in Act 50, formalized through Public Deed 1,316 on December 22, 2022, from the Sole Notary of SAI, which states that InterAseo holds 4.37% of the shares of Sopesa. In Act 21 (May 14, 2012), the controlling shareholder of the SAI company—with 83% of the shares—is InterAseo[24].

Decision-Making

Regarding the best alternative for the disposal of RSU on the island, a raizal leader stated that a zero-waste program should be implemented, which requires strengthening environmental education. Furthermore, he emphasized that Colombia does not understand what it means to have an island; it equates it with a continental territory, whereas in SAI, realities exist that only occur in an insular territory.

Fundamental Rights

Different members of the Schooner Bight community expressed that the company is committing "a human rights abuse," fearing that the ashes from the RSU plant could be more polluting than the gases from the landfill itself.

24 Documents available in the Commerce Chamber of SAI

Cultural Adaptation

One of the leaders reminisced about how Schooner Bight used to be. It was agricultural land with a stream that led to caves and then to the sea; all of this is now covered by the slopes of waste from the landfill and the leachate that emanates from it.

In the community's words, corruption has made us prisoners.

Financial Aspects

Regarding the tariff issue, the community stated that they pay very high electricity bills. According to the reviewed invoices, the cost per kilowatt-hour in February 2023 was $1,157.52, while the charge by Enel Codensa during the same period in La Calera (Cundinamarca) was $706.91, and by Enel X in Bogotá it was $758.32. On Sopesa's own website, the rate is $1,183.42[25].

Concerning the costs of RSU mining, a Sopesa worker indicated that the dispute lies in who will bear these costs since neither Sopesa nor InterAseo wants to assume them.

Corporate Responsibility – Environmental Compensation

Spokespeople from Schooner Bight claim they suffer negative health consequences, both during the fires at Magic Garden and for the workers at Sopesa. One woman stated that her husband, who worked there for over 20 years, has severe heart and lung ailments due to the diesel he inhaled.

The community emphasized the absence of compensation for receiving RSU in the neighborhood. They demand fair and transparent treatment. The community claims that Sopesa has not compensated for the damages caused and ignores their feelings, needs, and complaints.

Energy Transition

The contract signed with Sopesa included the RSU Utilization Plan. Sopesa cannot in good faith claim that the transition to non-conventional sources was not foreseen.

Regarding this issue, a woman from the community said: "...I want Petro to come and see. Sopesa gets a monthly check from the Ministry of Mines for the diesel; that company is not going to give up that cash cow."

Despite the contractual obligation to install and operate a wind farm, Sopesa is going to install solar panels right next to the only children's playground in the area.

Discussion and Conclusions

The analysis of the SAI case allowed for the testing of an interdisciplinary technical, legal, and institutional analysis methodology. It facilitated an understanding of the combination of analysis from these perspectives, the deficiencies in governance, and the challenges in providing real and effective capacities to institutions within a systemic model (energy and RSU).

As recognized by various authors, in advanced societies, institutions, the rule of law, contracts, social trust, and legitimacy determine political capacity (Bali & Ramesh, 2018). Polidano (2000), in developing an index to measure public sector capacity, distinguished between political capacity (which focuses on the decision-making process, coordination mechanisms, and information flows) and implementation authority (which involves the ability to execute decisions and enforce rules in the public sector and society in general) (Bali & Ramesh, 2018). According to these authors, the formulation of public policies requires analytical, operational, and political elements, in addition to the skills and dimensions essential for the successful execution of formulated projects.

Institutional capacity is improved through the development of personnel competencies, and the development and dissemination of better working methods, procedures, tools, and systems, along with better overall coordination and planning (Commission, 2014). Therefore, in SAI, competencies must be developed among public officials, businesspeople, and the community at large, promoting a culture of

25 https://sopesa.com/ This value is from 6 april, 2023. By 9/06/ 2024, the value is $1.193,70.

RSU reduction, source recycling, and rational and efficient energy use.

Furthermore, in response to the question that inspired this research, legislation must indeed be adjusted in determining compensation and mitigation mechanisms for RSU incineration. Similarly, the tariff regime should be unified so that companies responsible for the final disposal of RSU and energy generators do not enter into conflicts over rate allocation. The manner and responsibilities for decommissioning these plants once they reach the end of their useful life should also be anticipated. Additionally, beyond changing the rules of the game, a unification in legislation can be proposed to facilitate understanding and effective implementation. As stated by the (Council of State, 2014), new, more flexible interpretive frameworks should also be sought, where, without losing sight of the imperative nature of the regulations, a negotiated law and agreed restrictions are achieved.

To replicate a process that combines the final disposal of RSU and energy generation, it is necessary to strengthen local institutional capacities through effective education mechanisms, the negotiation of community needs, and the implementation of tariff schemes that allow investors to recover their investments and communities to receive quality services at fair rates. The presence of local authorities, the State, and oversight bodies is required to ensure the proper execution of projects; the community must be trained to be real overseers of environmental issues; and the needs and solutions for the community and by the community must be determined.

It is essential for the community to be involved in the structuring of projects, using, among other things, the recently created Energy Communities. Beyond prior consultation, which has become a bureaucratic process, projects must be structured with the community from the bottom up, in accordance with the provisions of directive P9_TA (2023) 0209[26].

Additionally, oversight bodies must be equipped with effective mechanisms for monitoring, control, and sanctions, as well as communities with effective oversight mechanisms. Citizens must be educated to prevent corruption practices and to make real commitments to socio-environmental issues.

It concludes with the hope that the State reaches where it has not yet arrived with a clear understanding of these places and their inhabitants (Lemaitre Ripoll, 2019), so that we can contribute to building a less unequal community, focused on the "*vivir sabroso*" (the Living joyfully and in harmony with community and nature) to which we must justly aspire, without this desire being attributed exclusively to Afro-descendant, Black, raizal, or palenquero people (Mena Lozano & Meneses Copete, 2019).

Declaration of Conflict

This research has been funded with personal resources and is not part of any consulting work contracted to the firm Leyva Abogados, of which the author is a partner. Therefore, the opinions, analyses, and conclusions do not compromise any institution.

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