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Access, Technology, and Transition: Mapping the Themes of the Debate on Energy at the United Nations General Assembly (2000-2020)*,**

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How are the subjects of energy and energy justice discussed within multilateral forums? Given the significance of this subject and the disparities among nations, examining how energy-related matters are addressed in intergovernmental arenas reveals how governments manage the implications of inequalities in basic needs, such as energy. To investigate the phenomenon, we monitored how the seven categories identified in the literature – 'Efficiency', 'Access to Energy', 'Renewable Energies', 'Capacity Building', 'Research and Development', 'Technology Transfer', and 'Financing' – were evoked in multilateral discussions. Specifically, we used the 'UN General Assembly Sponsorship Dataset' to identify, through content analysis, 59 draft resolutions that mentioned these energy themes between 2000 and 2020. We analyzed this corpus and detailed the themes, their combination, and the most involved countries. Through cluster analysis and correspondence analysis, we identified three major groups of themes, 'Access to energy', 'Technology' and 'Energy Transition', while 'Capacity Building' appeared as a cross-cutting issue. We also identified that large multilateral groups were an important factor driving engagement with the topic, as G77 members, and specially those pertaining to Central and South Asia, were among the most active players.

Keywords: Energy; energy justice; UN; cluster analysis; correspondence analysis.

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How are the subjects of energy and energy justice discussed within multilateral forums? How do these themes address the challenge of a fair distribution of energy costs and benefits? These are guiding questions for research on how energy, which is crucial for societies to function properly, has been addressed in the main multilateral arena, the United Nations (UN).

In simple terms, 'energy justice' refers to the equitable allocation of both the benefits and costs of energy services in the global system. Additionally, it implies that decision-making regarding this issue should be representative and unbiased (SOVACOOL and DWORKIN, 2015). Energy poverty thus reflects either socio-demographic inequalities or spatial inequalities. The latter refers to the clear geographical patterns associated with energy poverty. In other words, the causes of energy poverty go beyond the socioeconomic, political, and legal issues typically associated with this phenomenon (BOUZAROVSKI and SIMCOCK, 2017). Overcoming energy poverty and achieving energy justice requires understanding the local conditions shaping energy services (BROTO, 2017).

Energy resources are recurrent on the agenda of neighboring states or states in the same region, because technical, geographical, economic, and legal issues hinder the globalization of energy relations (ANGULO, 2011). Nevertheless, certain attributes of global institutions might facilitate the study of this agenda beyond regional organizations. On the one hand, some of the items on the energy agenda are framed as global concerns. The UN agenda has both historical and contemporary examples[1] of energy issues being multilateralized because they are deemed too important or complex to be addressed by one single country or region. On the other hand, and more importantly for this 'Special Issue', organizations with broad memberships enable the examination of asymmetries. The discrepancy between actors in the international system is more patent in universal multilateral bodies, where countries in unequal positions discuss the challenges to which they are all exposed.

This study offers an original survey of the evolution of energy-related discussions at the multilateral level over the past two decades. We utilized the 'UN General Assembly

[1]Notably, the very first resolution adopted by the UN General Assembly in 1946 referred to the subject of atomic radiation. Currently, concerns about climate change and the perception that it is a global problem dominate the theme in global organizations.

Sponsorship Dataset' to identify the draft proposals introduced by UN member states that discussed energy topics since the year 2000. A keyword search led to the identification of 59 proposals. Content analysis was conducted to ascertain the prevalence of themes mentioned in the literature: 'Efficiency', 'Access to Energy', 'Renewable Energies', 'Capacity Building', 'Research and Development', 'Technology Transfer', and 'Financing'. Correspondence analysis and hierarchical clustering were then used to reduce the dimensionality of the data and find latent dimensions and clusters that would allow grouping the subjects and countries.

The remainder of this article is divided into four sections. The first section offers a literature review. In the second section, we describe the data and procedures used to obtain the results. The third section analyzes and discusses the results. The last section summarizes the findings, contributions, and limitations of the study.

Literature review

Through a literature review and an examination of official UN documents, we have identified seven recurrent and important themes in energy negotiations within the UN that pertain to energy justice: 01. Access to energy, 02. Energy efficiency, 03. Renewable energy, 04. Research and development, 05. Capacity building, 06. Financing, and 07. Technology transfer. In this section, we will elaborate on the methods used to identify these themes and demonstrate their connection to the energy justice agenda.

Although a prominent and contemporary topic, energy issues were initially of secondary importance in UN debates. The United Nations Conference on Environment and Development, commonly known as ECO-92, took place in 1992, leading to an important outcome, the Agenda 21. Despite the crucial role of energy in addressing climate concerns, it did not have a dedicated chapter in the final document. However, a review conducted by the United Nations General Assembly (UNGA) in 1997, assessing progress since ECO-92, suggested that energy should be a priority. As a result, it was included on the agenda of the ninth session of the Commission on Sustainable Development (CSD) (SPALDING-FECHER, WINKLER and MWAKASONDA, 2005).

As described by Spalding-Fecher, Winkler and Mwakasonda (2005), in the ninth CSD session, in 2001, energy was thus addressed in an 'integrated way' in the UN for the

first time. The commission then identified key energy-related challenges, among which: 01. Access to Energy; 02. Energy Efficiency; and 03. Renewable Energy[2].

The commission highlighted the critical role of access to energy resources in promoting social development and eradicating poverty, leading to the inclusion of ten recommendations to address this issue. As for energy efficiency, the commission argued that there was a positive-sum solution benefiting both developed and developing countries, but problems such as lack of access to technology, financial resources, and capacity building would hinder the optimization of this potential. The CSD provided governments with 13 recommendations. In what concerns renewable energies, the CSD emphasizes their significance for sustainable development while acknowledging the presence of barriers to their promotion. Consequently, it presented nine recommendations for overcoming these barriers (UNITED NATIONS, 2001).

In addition to these key challenges, the CSD also identified cross-cutting issues, among which we highlight: 04. Research and development; 05. Capacity building; 06. Technology transfer; and 07. Mobilization of financial resources[3].

According to the CSD, enhancing research and development is crucial to foster sustainable development for all. Energy research should be bolstered through public and private investments, whether individually or in combination, as well as through international and regional cooperation (UNITED NATIONS, 2001).

In terms of capacity building, the CSD emphasizes that the lack of local capacity is an obstacle to the expansion of energy services in developing countries. Therefore, it is important to enhance the institutions, infrastructures, and human resources in these countries, with critical support from developed countries, development banks, and the United Nations Development Programme (UNDP). Technology transfer was also seen as a means to promote energy for sustainable development, especially for developing countries. Also, the CSD considers financial resources as a key factor for implementing Agenda 21 (UNITED NATIONS, 2001).

[2]Although the CSD identified four additional key issues, they will not be addressed here because we prioritized the themes that most frequently appear in UN debates and are most related to energy justice.
[3]As with the key issues, the CSD identified other cross-cutting issues in addition to these four. However, we prioritized these four because they are relevant in UN debates and relate to energy justice.

The conclusions reached by the CSD played a significant role in the negotiations during the World Summit on Sustainable Development (Rio+10), when an action plan was proposed by the African Group to address the lack of access to modern energy and the need to move toward a cleaner energy system (SPALDING-FECHER, WINKLER and MWAKASONDA, 2005)[4].

Moreover, negotiations in the ninth session of the CSD revealed North-South divisions on energy-related matters, exemplified in disputes between the G77/China and the European Union (EU). While the EU advocated for prescriptive recommendations, the G77/China feared that such an approach could hinder its members' development, particularly their access to energy and use of local resources. Another disagreement was the terminology: the EU advocated for the use of the term 'sustainable energy', while the G77/China preferred 'energy for sustainable development'. The distinction is significant because the latter term refers to the provision of universal access to a cost-effective mix of energy resources compatible with the needs of different countries and regions (SPALDING-FECHER, WINKLER and MWAKASONDA, 2005). The preference for this second term highlights a concern for energy injustices, which are more prevalent in G77 countries and China.

Although the ninth CSD session was crucial to the UN energy agenda, the latter was still being addressed in a fragmented manner. In response to this problem, UN-Energy was established in 2004 to coordinate UN strategies. UN-Energy operates in three core clusters: access to energy, energy efficiency, and renewable energies, reaffirming once again the significance of these three themes within the organization. These themes began to attract more attention, resulting in a rapid increase in investments and policies involving various stakeholders (YUMKELLA, 2012). The activities carried out within these three clusters were divided into sub-themes, encompassing subjects such as financing, capacity building, research anddevelopment, and technology transfer (UNITED NATIONS, 2010).

Subsequently, in 2011, the UN launched the 'Sustainable Energy for All' initiative, which defines that universal access to clean energy is indispensable for development (BECKER and NAUMANN, 2017). With this initiative, it was expected that developing countries would have greater access to energy services (UNITED NATIONS, 2012). For

[4]Ensuring access to energy is a priority for these countries, a means to achieve a prosperous future – the transition to cleaner forms of energy being a complementary priority (PISTELLI, 2020).

this to happen, three objectives should be achieved: 01. ensuring universal access to energy services; 02. doubling the rate of improvement in energy efficiency; 03. doubling the share of renewable energy in the global energy mix (UNITED NATIONS, 2011a).

Another noteworthy energy-related UN initiative was the declaration that 2012 was the 'International Year for Renewable Energy for All'. The objective was to engage governments, businesses, and civil society to achieve universal access to modern energy, reduce global energy intensity, and increase renewable energy use (SOVACOOL, 2012). The implementation of this initiative would help address the challenges linked to energy justice – the preamble of resolution A/RES/65/151 emphasizes how crucial it is that developing countries have access to energy in order to reduce poverty and enhance living standards, not to mention the importance of developed countries transferring technology (UNITED NATIONS, 2011b).

An especially important UN energy initiative in the context of universal access to energy was the introduction of the Sustainable Development Goals (SDGs). In contrast to the Millennium Development Goals, which did not directly address energy, SDG7 was established in Draft Resolution A/70/L.1 and later became Resolution A/RES/70/1. The goal of SDG7 is to ensure universal access to cheap, reliable, sustainable, and modern energy.

This primary objective is followed by five targets, three of which align with the goals of the 'Sustainable Energy for All' initiative: Ensuring universal access to energy by 2030 (target 7.1); increasing the share of renewables in the global energy mix (7.2); doubling the global rate of improvement in energy efficiency (7.3). Additionally, target 7.a addresses the need for increased international cooperation to facilitate access to research and technologies related to renewables, advanced fossil fuel, and energy efficiency, while also promoting investment in energy infrastructure and technologies. Finally, target 7.b complements target 7.a by emphasizing the expansion and modernization of energy services in developing countries.

Therefore, we see in SDG 7 again the centrality of the themes 'access to energy', 'energy efficiency', and 'renewable energies' within the UN. Additionally, we recognize the importance of 'research and development', investments facilitated through 'financing', 'technology transfer', and 'capacity building', which are addressed in targets 7.a and 7.b. We can thus identify seven themes with which the UN has engaged when

addressing the energy issue. The first three themes are central to the UN, while the last four are cross-cutting themes, relevant in more than one area.

After identifying the main energy topics addressed by the UN, we should now observe how they engage with the issue of energy justice. Firstly, lack of access to quality and sustainable energy is a serious environmental and social problem. According to data from the World Bank et al. (2018), about one billion people live without electricity and more than three billion still use firewood, coal, and kerosene for cooking and lighting. Lack of access to clean and renewable energy resources poses a risk to the environment and people's health. Indoor air pollution due to the burning of solid energy resources causes various types of diseases and death in developing countries (EZZATI, 2004). These data indicate the existence of spatial inequalities in the extraction, circulation, and use of energy resources (BECKER and NAUMANN, 2017).

The use of energy resources is linked to the increase in social productivity and living standards, given that energy is “an essential commodity for a well-functioning society” (JOHANSSON, 2013, p. 199). Energy contributed to the evolution of civilizations and helped create large urban centers and improve transportation and trade (SANTOS, ALBUQUERQUE and SANTOS, 2013).

Therefore, the lack of access to energy hinders economic and social development. Recent data reveals that over 90% of the global population suffering from energy poverty lives in Africa and Asia. Countries such as Bangladesh, China, India, Indonesia, and Pakistan collectively account for 80% of the Asian population without access to electricity or modern cooking fuels (REHMAN et al,, 2012; RITCHIE, ROSER and ROSADO, 2022).

Since energy justice involves providing universal access to energy according to local needs, it is a form of social justice. Nevertheless, energy justice has to go hand in hand with policies aimed at facilitating the transition to renewable energy. In the current context, renewable energies can help address climate change, enabling access to energy and, thus, mitigating energy poverty (BHATTACHARYA et al., 2016). Developing countries will play a central role, since about 70% of the world's energy demand in 2040 will come from non-OECD countries, according to data from the International Energy Agency (GOLDTHAU, EICKE and WEKO, 2020).

The shift towards a renewable energy model, however, must not exacerbate pre-existing inequalities, as pointed out by Carley and Konisky (2020). In regions such as sub-Saharan Africa, the transition to cleaner energy production has unique features when

compared to the rest of the world. Despite having countries with significant energy potential, this region has one of the lowest energy access rates in the world due to structural issues such as inefficiency and lack of investment (PISTELLI, 2020).

We should thus acknowledge that energy efficiency is crucial for enabling energy justice. Inefficiency increases the amount of energy that needs to be consumed and consequently the expenses necessary to meet all needs (WALKER and DAY, 2012). One can say, for example, that "poorer and more vulnerable households typically live in worse quality housing, and have least resource or opportunity to invest in improvements" (WALKER and DAY, 2012, p. 70). These factors show that current energy systems are inherently unequal (BROTO et al., 2018). Moreover, for peripheral regions of the world to overcome energy poverty, developed countries must contribute to capacity building, whether through financing, technology transfer, or knowledge dissemination.

To conclude this section, we divide the themes discussed into core themes (access to energy, energy efficiency, and renewable energies) and cross-cutting themes (research and development, capacity building, financing, and technology transfer). The core themes are connected to energy justice because they allow energy access to be fair, responsible, and sustainable. Cross-cutting themes, as they appear in the energy field, refer to the costs of overcoming energy poverty – that is particularly true for the themes of financing and technology transfer from more developed regions to those with lower capacity.

Data

For this article, we used the 'UN General Assembly Sponsorship Dataset' (SEABRA and MESQUITA, 2022). This dataset encompasses the sponsorship behavior of all 193 UNGA member states and Palestine as they worked on draft resolutions from 2000 to 2020 (sessions 55 to 74). Unlike data on roll-call votes, which only include non-unanimous proposals brought to a vote (usually around 1/3 of the proposals), the sponsorship records cover all submitted drafts, regardless of their result (whether adopted by consensus, voted on, rejected, or withdrawn). This dataset is therefore a less

restrictive and more comprehensive record, allowing us to capture the interests of countries and observe the shifts in the UNGA agenda[5].

Of all the information provided by the 'UN General Assembly Sponsorship Dataset', we highlight the 'priority' and 'ownership' indices. As defined by Seabra and Mesquita (2022), the priority index refers to the timing of each country's endorsement for each proposal. The ownership index, in turn, refers to whether the final text is signed by a large number of members or only by a few partners. Engaging at an early stage (e.g., as an original author, rather than only co-sponsoring the last revision of the text) reveals the country's higher level of engagement with the theme. Conversely, a theme supported only by a few like-minded stakeholders will be more indicative of their specific interests than a broadly supported initiative, which indicates universal interest.

During the two-decade period covered by the dataset, approximately 5,000 draft resolutions were submitted by UNGA members. To identify those addressing the theme of energy, we conducted a keyword search in the metadata of the drafts. Each draft resolution is registered with at least six fields containing metadata about the themes[6]. We searched for the words 'energy' and 'power' in these fields. We found 94 proposals mentioning at least one of the two terms[7]. A complementary search was made for the term 'sustainab*', anticipating that documents addressing the topic of energy might have this term in their titles. This additional search generated 195 results, totaling 289 documents.

The content of these 289 texts was analyzed to determine whether they included any of the seven themes identified in the literature review. This classification was not exclusive, meaning that a single document could be assigned to one or more of the themes. After the content analysis, 230 out of the 289 documents were identified as false positives and excluded. The remaining 59 documents were retained for further analysis. Among these, 43 were classified under one or more of the categories that were extracted from the literature; the remaining 16 documents were classified under the label 'others'

[5]This dataset does not include draft resolutions external to the UNGA or its committees (e.g., the Human Rights Council in Geneva or UN-sponsored conferences) or those submitted by an actor not associated with a member state delegation (e.g., Chairman of the Assembly).

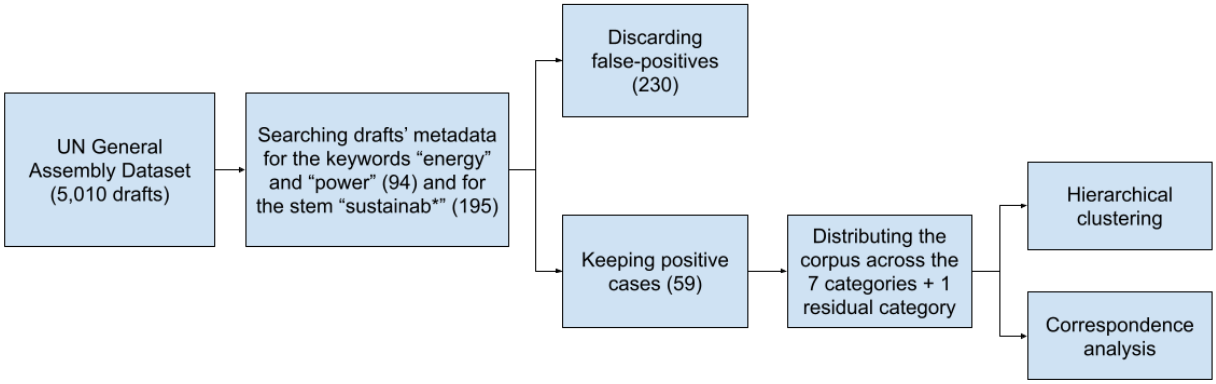
[6]These fields included the title, related organizations, two fields for related initiatives, the concerned country (if any), and two fields for subject matter (by keywords and by item in the work agenda).

[7]To avoid an overly strict query, we searched for other terms. However, expressions such as 'electricity' did not generate results. Others like 'oil' or 'fuel' led to false positives (e.g., 'oil slick off the Lebanese shore', 'the role of diamonds in fueling conflicts'). Moreover, expressions like 'renewable' generated the same findings as 'energy', since the former was used to modify the latter.

because, although they referred to energy, they used terms different from the initial seven categories.

The retained cases thus constitute the corpus of this study. This corpus was submitted to hierarchical clustering and correspondence analysis to detect underlying dimensions. The research design is summarized in Figure 01.

Figure 01. Research design flowchart



Source: Elaborated by the authors.

Analysis and discussion

Overview

The 59 draft resolutions were introduced from the first to the last year included in the dataset. On average, there were three proposals per session from 2000 to 2020, with the period between 2005 and 2011 being the most active in the series. However, these drafts should not be considered 59 different proposals, as UNGA texts are typically reintroduced annually with minor changes (PETERSON, 2018). This applies to our case, with initiatives being reintroduced every two or three years (e.g., 'Cooperation between the United Nations and the Black Sea Economic Cooperation Organization') or repeated every year ('Ensuring access to affordable, reliable, sustainable and modern energy for all').

Regarding their origin within the UN, most proposals were first drafted in the Second Committee (Economic and Financial), accounting for 39 drafts or 66% of the total. Plenary also played a significant role, with 17 drafts or 29%. This concentration in the Second Committee also explains the engagement of multilateral groups with the

theme. The G77, primarily focused on economic and development issues within the UNGA, was involved in 26 (44%) of the draft resolutions in the sample. Meanwhile, 30 (51%) drafts did not indicate formal group participation. The remaining drafts were divided between the EU and the Arab League[8].

As for their outcome, 27 draft resolutions (46%) were adopted without a vote, while the same number was withdrawn. The high number of withdrawals is explained by the working methods of the G77, which tends to withdraw drafts rather than revise them in the UNGA. The versions of the texts after their withdrawal are not included in the dataset because they are typically presented by a vice-chair of the Second Committee (see footnote Nº 05). We complemented the original dataset by searching the texts that succeeded those that were withdrawn in the UN Digital Library. We found that the 27 proposals introduced and later removed by the G77 were succeeded by 27 other drafts, which were in most cases accepted without a vote – the only exception was A/C.2/72/L.55, 'Ensuring access to affordable, reliable, sustainable and modern energy for all: draft resolution / submitted by the Vice-Chair of the Committee, Kimberly Louis (Saint Lucia), on the basis of informal consultations on draft resolution A/C.2/72/L.3', with two votes against (United States and Israel). Out of the 59 proposals from the original dataset, three were put to a vote: 'Commodities' (A/C.2/72/L.9/Rev. 01) and 'Entrepreneurship for sustainable development' (A/C.2/71/L.20 and A/C.2/73/L.35)[9].

These numbers are summarized in Table 01.

[8]The 'UN General Assembly Sponsorship Dataset' only registers as groups those who were explicitly named among the authors of the proposals.

[9]The document 'Ensuring access to affordable, reliable, sustainable and modern energy for all: amendment to draft resolution A/C.2/73/L.40/Rev.01' (A/C.2/73/L.60) proposed by Austria on behalf of the EU was rejected after a vote in the Second Committee, without proceeding to the Plenary.

Table 01. Total number of draft resolutions, by group and original committee

Session (year)	Total number of drafts	Groups			Original Committee			
		G77 Drafts	Other groups	No group	C.1	C.2	C.6	Plenary
S. 55 (2000)	02	01	01	-	-	01	-	01
S. 56 (2001)	01	01	-	-	-	01	-	-
S. 57 (2002)	02	-	-	02	-		-	02
S. 58 (2003)	03	01	01*	01	-	03	-	-
S. 59 (2004)	01	-	-	01	-		-	01
S. 60 (2005)	04	03	-	01	-	04	-	-
S. 61 (2006)	05	02	-	03	01	02	-	02
S. 62 (2007)	03	01	-	02	-	02	01	-
S. 63 (2008)	06	01	-	05	-	02	-	04
S. 64 (2009)	02	01	-	01	-	02	-	-
S. 65 (2010)	05	02	-	03	-	02	-	03
S. 66 (2011)	03	01	-	02	-	02	01	-
S. 67 (2012)	02	01	-	01	-	01	-	01
S. 68 (2013)	02	01	-	01	-	01	-	01
S. 69 (2014)	02	02	-	-	-	02	-	-
S. 70 (2015)	01	01	-	-	-	01	-	-
S. 71 (2016)	03	01	-	02	-	03	-	-
S. 72 (2017)	04	02	-	02	-	03	-	01
S. 73 (2018)	04	01	01	02	-	03	-	01
S. 74 (2019)	04	03	-	01	-	04	-	-
Total	59	26	03	30	01	39	02	17

Source: Made by the authors (*) Draft A/C.2/58/L.26, 'Promotion of new and renewable sources of energy, including the implementation of the Word Solar Programme 1996-2005' involved the participation of the EU and G77.

Themes

After selecting proposals that included mentions of the terms 'energy', 'power', or 'sustainab*', a content analysis was conducted on the documents to identify words, phrases, or contexts that indicated the presence of the seven pre-established themes. By

determining the presence or absence of these themes, we classified the documents so that more than one theme could be present in the same document. Context plays an important role in content analysis because it is crucial to identify false positives. In instances of false positives, even when the terms 'energy', 'power', or 'sustainab*' were found in the documents, they were used in a context unrelated to energy. Examples include reports from the International Atomic Energy Agency, which are more associated with the field of Disarmament and International Security, and cases related to the 'Oil slick on Lebanese shores' initiative that occurs annually and mentions the word 'power' in reference to the destruction of oil storage tanks near a power plant. After removing the false positives, a total of 59 documents were left to be classified in the predefined categories.

Twenty-three proposals were classified under the theme 'Access to Energy'. A search was conducted on mentions of 'access to energy' and related terms such as 'energy for all' and 'wider use of energy'. In general, these proposals aimed to increase access to energy in a reliable, sustainable, and affordable manner.

Twenty-five proposals were classified under the theme 'Renewable Energies'. The analysis of documents considered whether the term 'renewable energy' itself was mentioned or terms related to specific renewable energies, such as solar energy and wind energy, among others. The central idea behind the proposals classified in this group was to promote energy sources for sustainable development, and renewable energies were essential for this process.

Twenty-six proposals were classified under the theme 'Energy Efficiency'. In addition to the documents mentioning energy efficiency, those addressing the effective, rational, and low-cost use of energy were also included in this classification. Proposals categorized under this theme proposed that energy efficiency be a driver for conservation and sustainability.

Fourteen proposals were classified under the theme 'Research and Development'. The content analysis involved searching for this term in the documents, a term whose core concept is centered on promoting research and development as instruments for sustainable development. These proposals requested financial support from governments and the private sector to expedite this process.

Twenty-five documents were categorized under the theme 'Capacity Building'. In content analysis, we searched not only for the term 'capacity building', which appears frequently, but also explored related subjects such as institutional strengthening, technological development, infrastructure development, and human resources development. The primary goal of these proposals is to allow these countries to develop their capacities based on these elements.

Fifteen proposals were classified within the theme 'Financing' because they mentioned issues such as providing financial resources or investments. The theme is mentioned to emphasize the need for countries in the Global North to provide support to countries in the Global South so they can develop their energy sector. The theme 'Technology Transfer', which also assumes that donor countries should provide assistance to receiving countries, was identified in 13 drafts.

Finally, the 'Others' category refers to 16 documents that are not false positives but did not fit into the other themes. The analysis has revealed that sometimes energy-related issues are discussed alongside other topics, resulting in a less focused approach. These documents address energy along with different concerns, including cooperation between international organizations, holding ministerial meetings to discuss energy, regional cooperation, extending invitations to the Energy Charter Conference to participate in the General Assembly as an observer, and discussions about energy prices.

Table 02 shows examples of the identified themes, the resolutions in which they were found, and excerpts exemplifying how they were mentioned.

Table 02. Themes, resolutions, and excerpts

Theme	Draft Resolution	Excerpt
Access to Energy	A/C.2/64/L.33 'Promotion of new and renewable sources of energy'	'Emphasizes the need to improve access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services and resources for sustainable development'
Renewable Energy	A/C.2/56/L.8 'Promotion of new and renewable sources of energy, including the implementation of the World Solar Programme 1996-2005'	'Reiterates its call upon the Secretary-General to continue his efforts to promote the mobilization of adequate technical assistance and funding and to enhance the effectiveness and the full utilization of existing international funds for the effective implementation of national and regional high-priority projects in the area of renewable sources of energy'
Energy Efficiency	A/63/L.39 'Cooperation between the United Nations and the Economic Cooperation Organization'	'Appreciates the efforts of the Economic Cooperation Organization to develop energy trade in the region in cooperation with international organizations (…) and requests their continued support for the preparation and efficient implementation of regional programmes on energy efficiency and conservation'
Research and Development	A/C.2/72/L.3 'Ensuring access to affordable, reliable, sustainable and modern energy for all'	'Encourages research and development that could result in further competitiveness and rapid reductions in the cost of sustainable energy'
Capacity building	A/C.2/69/L.20 'Promotion of new and renewable sources of energy'	'Calls upon Governments of developed countries to take further action to mobilize the provision of (…) capacity-building (…) to developing countries and countries with economies in transition'
Financing	A/C.2/67/L.26 'Promotion of new and renewable sources of energy'	'Emphasizing also the need to take further action to mobilize the provision of adequate financial resources (...) to developing countries and countries with economies in transition (...)'
Technology Transfer	A/C.2/60/L.28 'Promotion of new and renewable sources of energy, including the implementation of the World Solar Programme 2006-2015'	'Stresses that the wider use of available renewable sources of energy requires technology transfer and diffusion on a global scale, including through North-South and South-South cooperation'
Others	A/59/L.3 'Cooperation between the United Nations and the Economic Cooperation Organization'	'Takes note of decision to hold ministerial meetings in the areas of transport and communications, energy/petroleum, environment, agriculture and information technology in 2004 and 2005'

Source: Made by the authors.

Countries

The 'UN General Assembly Sponsorship Dataset' provides the priority and ownership indices. The ownership index helps determine whether the interest in the mapped themes was more dispersed or concentrated among a few sponsors. On average,

the 59 proposals had 82 sponsors each, ranging from a minimum of 05 sponsors (A/65/L.32: "Cooperation between the United Nations and the Eurasian Economic Community") to a maximum of 167 sponsors for A/C.2/58/L.26 "Promotion of new and renewable sources of energy, including the implementation of the World Solar Programme 1996-2005" – the only case in which the G77 and the EU were simultaneously engaged in a proposal.

Due to the dynamics of multilateral groups at the UNGA, the themes with a lower level of ownership (i.e., more widespread ownership) were those of the G77, with more than 130 sponsors. Proposals not prepared by the G77 had less than 100 supporters. Those with a higher level of ownership (a more restricted number of supporters) involved cooperation between the UN and regional groups (e.g.: A/67/L.13 "Cooperation between the United Nations and the Economic Cooperation Organization"). At an intermediate level, we find proposals addressing different subjects, such as energy corridors and cooperation programs for Africa.

The priority index, in turn, shows us which were the countries that first supported a draft. In the case of the G77, the initiative is typically taken by the chairs, which are tasked with presenting all drafts on behalf of the group during the sessions. Between 2000 and 2020, countries such as Jamaica, Yemen, Bolivia, and Ecuador were the original sponsors of up to two drafts each during their chairmanship. We should refrain, nonetheless, from automatically considering that such countries place high priority on energy. Their initiation of the drafts can result merely from their chairing office. Hence, it is informative to monitor sponsorship activities apart from group efforts.

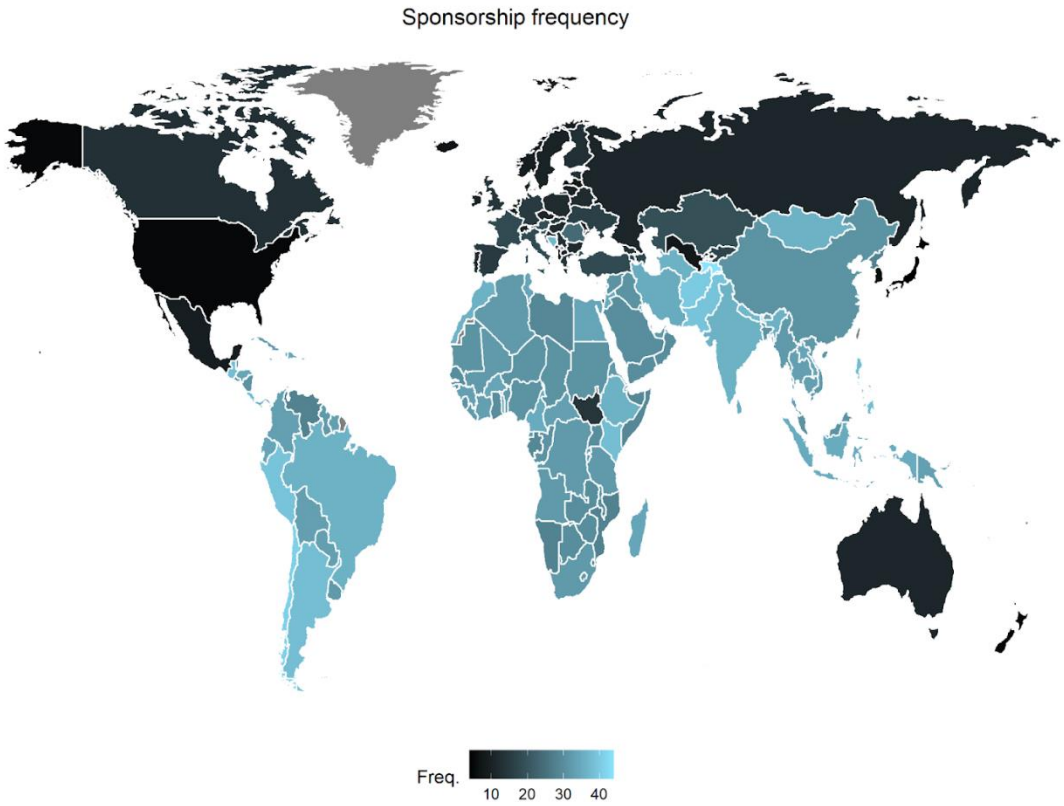
When considering sponsorship decisions taken outside the G77, we notice the distinct role of regional organizations. Members of organizations such as the Black Sea Economic Cooperation Organization (Albania, Greece, and Russia) and the Economic Cooperation Organization (Afghanistan and Turkey) have taken turns over the years presenting drafts on behalf of the other sponsors.

Furthermore, regionalization appears not only in drafts concerning formal cooperation between the UN and regional groups but also in other proposals. Examples include the initiatives 'Maintenance of international security – good neighbourliness, stability and development in South-Eastern Europe' (originally sponsored by North Macedonia) and 'New Partnership for Africa's Development:

progress in implementation and international support' (Sudan). These examples suggest that the energy agenda, when dissociated from large multilateral groups, is important in the regions.

The map in Figure 02 confirms this expectation, showing that some regions stand out from the average sponsorship frequency of their neighbors. G77 countries hold a more prominent position compared to the others, and, within the group, Central and South Asia states (Afghanistan, Tajikistan, Turkmenistan, Pakistan, and Iran) stand out from the rest. Some Latin American countries (Chile, Peru) and African countries (Kenya) have also participated more frequently.

Figure 02. Frequency of sponsorship for drafts

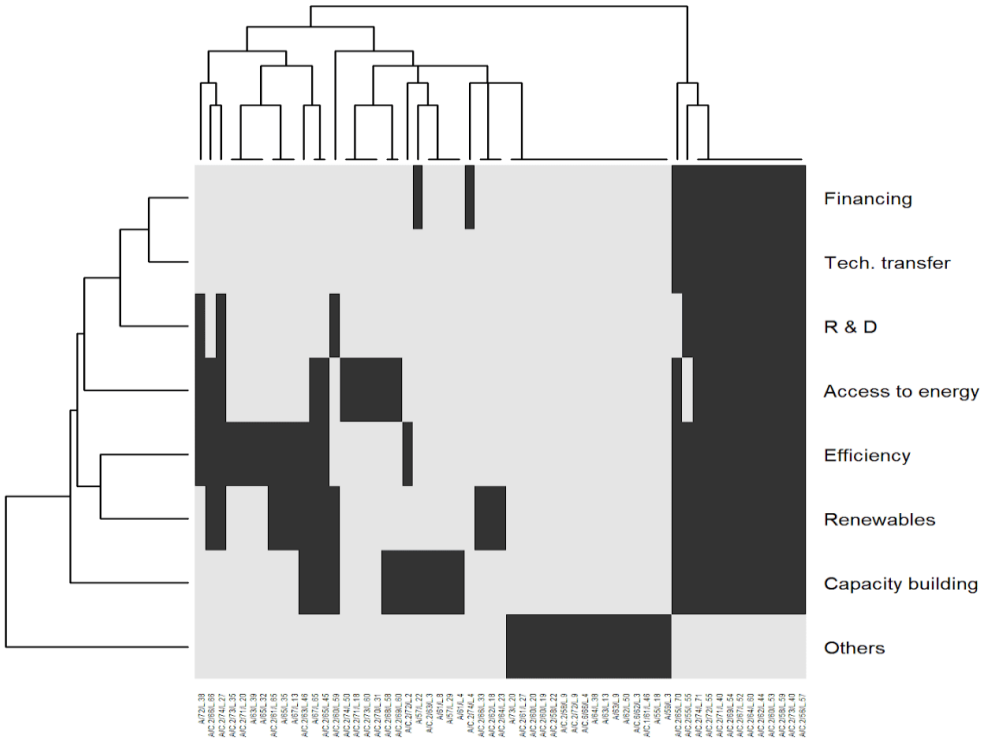


Source: Made by the authors.

Clusters

We applied two dimensionality reduction techniques to the document-theme matrix obtained from the content analysis: hierarchical clustering and correspondence analysis. We initially explored clustering through the heat map in Figure 03, where themes are shown in rows and proposals in columns.

Figure 03. Heat map with hierarchical clustering



Source: Made by the authors. Method for agglomeration used: 'complete linkage'.

The dark cells in the heat map indicate which themes were contemplated by which documents. The dendrograms above and to the left indicate which clusters can be formed. The eight themes can be grouped into four or five different clusters.

The categories 'Financing', 'Technology Transfer', and 'Research and Development' can be considered a single cluster, as the three of them have co-occurred almost identically in a set of texts.

'Access to energy' was placed in a different cluster because, although this theme appears in a similar way as in the set of drafts in the previous cluster, it appears more frequently in other documents.

'Efficiency' and 'Renewables', in turn, can be easily grouped in one set. Meanwhile, 'Capacity Building' can be considered a distinct cluster since it is applied differently in recurring drafts about UN cooperation with regional organizations and about the follow-up to conferences (e.g.: A/57/L.22 "Cooperation between the United Nations and the Economic Cooperation Organization", A/C.2/68/L.9 "Follow-up to the 4th United Nations Conference on the Least Developed Countries"). One can see the distance between 'Capacity Building' and the other themes in the dendrogram on the left.

The residual category 'Others' is the farthest from the other themes.

Focusing now on the proposals, displayed along the horizontal axis of the heat map, one can see they can be divided into approximately three groups. At the more central columns of the map, we have drafts that tended to be monothematic, dealing with only one of the topics. This is more evident for the 'Others' category, which, being a residual class, does not, by definition, co-occur with any of the others. Nonetheless, drafts in other topics appearing in these central columns of the map also tended to focus on just one theme.

The most evident group is the one in which the drafts mentioned all categories simultaneously. As seen on the far right of the graph, 11 proposals contained all the themes. For the most part, these drafts were the successors of the G77 proposals, especially two recurring proposals: 'Promotion of new and renewable sources of energy' and 'Ensuring access to affordable, reliable, sustainable and modern energy for all'.

The remaining proposals seem to be of two types. One group, located on the left margin of the graph, referred mainly to the themes of the thematic cluster on 'Efficiency' and 'Renewables' and more rarely to the clusters on 'Access to Energy' or on 'Research and Development' clusters. Some of the texts included in this group are A/67/L.65 'Reliable and stable transit of energy and its role in ensuring sustainable development and international cooperation' and A/C.2/65/L.45 'Industrial development cooperation'. Another group is primarily characterized by the mention of 'Capacity Building', often accompanied by at least one theme from another distinct cluster. This is the case, for example, of A/57/L.22 'Cooperation between the United Nations and the Economic Cooperation Organization', which addressed 'Capacity Building' and 'Financing'.

In summary, UNGA's repertoire of energy-related themes can be grouped into three large clusters (four, if we consider 'Others'). The first brings together the categories

'Financing', 'Technology Transfer', and 'Research and Development' and can be summarized under the label 'Technology'. The second set comprises 'Efficiency' and 'Renewables', with a common thread that can be summarized with the concept of 'Energy Transition'. Finally, the 'Access to Energy' category created its own set. 'Capacity Building', as will be shown, proved to be a cross-cutting category and therefore spans across all three groups. The corpus of documents indicates that some omnibus resolutions in the UNGA cover the entire repertoire while others emphasize only a specific set of themes.

A more detailed description can be derived using the second dimensionality reduction technique: correspondence analysis. As summarized by Figueiredo Filho et al. (2021), this technique aims to synthesize the matrix of observations X variables into more parsimonious dimensions that can explain the observed variance. Graphically, it demonstrates this association in a n-dimensional space by placing correlated variables/observations close to each other.

For this analysis, we omitted the residual category 'Others' and its 16 drafts. The correspondence analysis of the remaining 43 drafts shows that three latent dimensions cumulatively explain 73% of the variance in the data, as shown in Table 03. The rows that contribute the most to these three dimensions correspond to the previously identified thematic clusters, which gives us more confidence in the validity of our categorization into three groups of themes. Table 03 indicates the distinctive nature of the 'Capacity Building' theme, which contributes significantly to all dimensions.

Table 03. Results of the correspondence analysis

		Dimension 01	Dimension 02	Dimension 03
% Variance	Individual	28	24	21
	Cumulative	28	52	73
Contribution of each row	Efficiency	**35**	0	08
	Renewables	**22**	01	0
	Capac. Build.	**27**	**21**	**34**
	Access to energy	11	**71**	01
	Tech. transfer	01	01	**14**
	Financing	04	07	**31**
	R & D	0	0	**11**

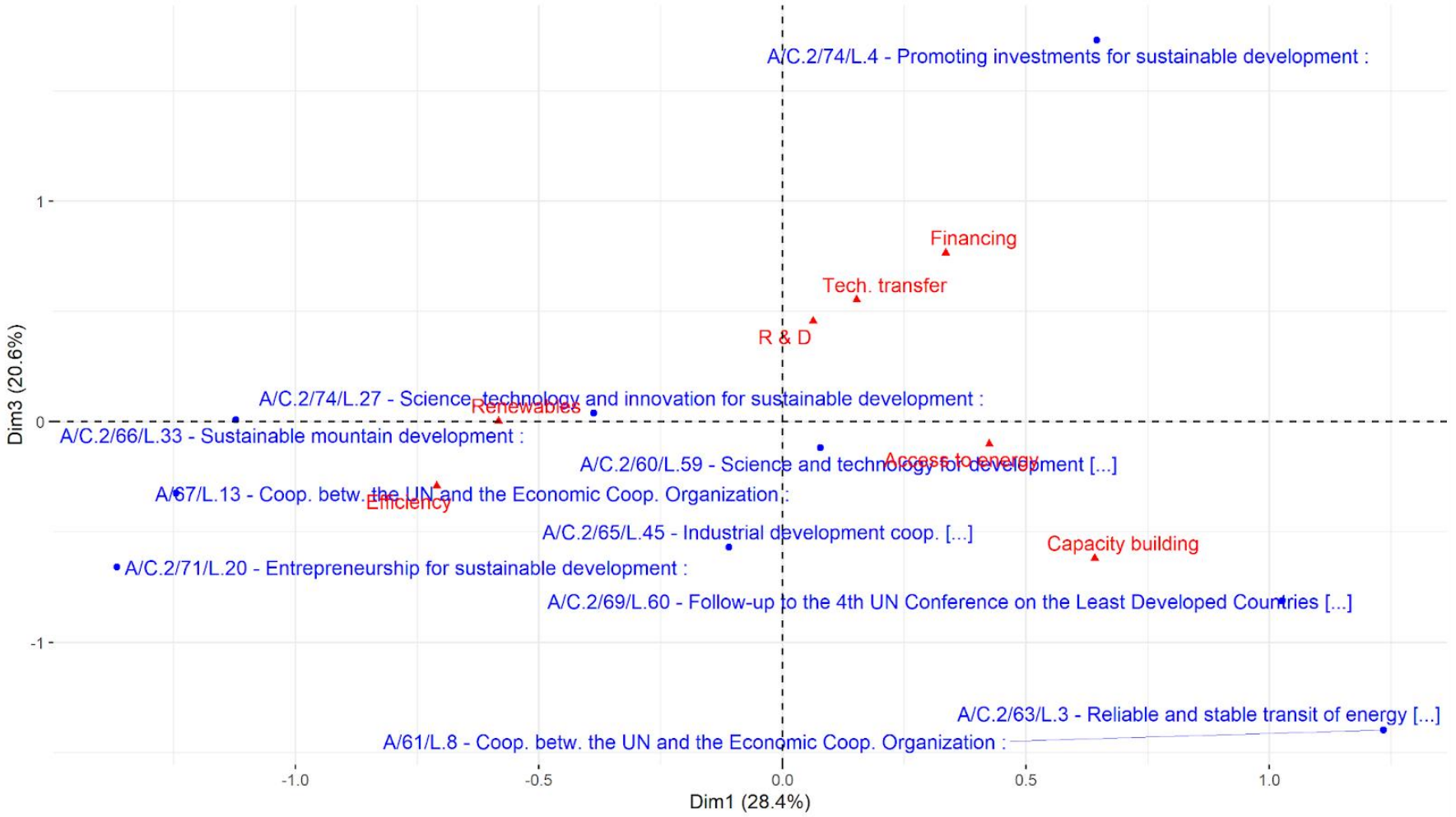
Source: Made by the authors. The table indicates in bold the rows' greatest contributions to the latent dimensions.

The distribution of the themes and drafts is spatially represented in Figure 04. The plot shows dimensions 01 and 03 of the correspondence analysis, following the indexing of Table 03. Dimension 01 occupies the horizontal axis and segregates the theme 'Capacity Building' at one end and the pair 'Renewables' and 'Efficiency' at the other. The spatial placement of drafts along this dimension demonstrates, for example, that the draft 'Sustainable mountain development' was more focused on 'Renewables' and 'Efficiency', while the draft 'Follow-up to the 4th United Nations Conference on the Least Developed Countries' was more focused on 'Capacity Building', and others such as 'Industrial development cooperation' addressed both themes.

The third dimension from Table 03 is projected on the vertical axis and mainly differentiates between the themes 'Financing', 'Research and Development', 'Technology Transfer', and all others. As seen in the heat map, these three themes occur practically in the same way, which is why they are positioned next to each other. The drafts located closest to this point are dedicated more exclusively to these topics. One of these is shown in the chart, 'Promoting investments for sustainable development'.

The second dimension from Table 03 is not displayed in the image. It is almost entirely determined by the theme 'Access to Energy'. One could imagine it as a Z-axis, projecting outward from the surface of the image. In this axis, drafts such as A/C.2/73/L.60 "Ensuring access to affordable, reliable, sustainable and modern energy for all" are distant from the rest of the corpus because they scored high only in this dimension.

Figure 04. Correspondence analysis



Source: Made by the authors. Ten of the 59 drafts are displayed in blue in the plot for visualization purposes.

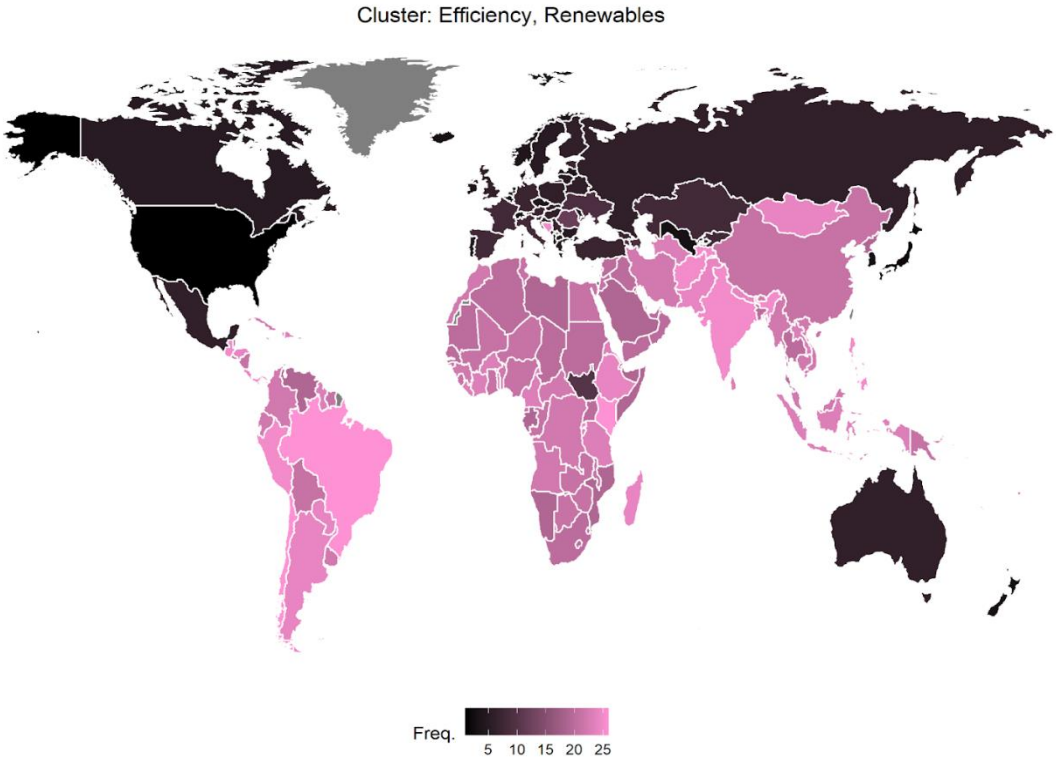
Another important finding refers to the thematic stability of the recurring draft. Some of the documents kept the same thematic configuration over the years. This is the case of the recurring drafts titled 'Ensuring access to affordable, reliable, sustainable and modern energy for all', which consistently mentioned all seven themes over the four years in which they were proposed[10]. On the other hand, the proposals about 'Cooperation between the United Nations and the Economic Cooperation Organization' highlighted different themes in each of the five years in which they were proposed.

Lastly, the three dimensions identified through correspondence analysis can be applied to categorize the production of each country. By classifying the 59 drafts into the three clusters and the 'Capacity Building' cross-cutting category, along with the residual 'Others', it is possible to identify the thematic specialization of each member state according to the type of proposal they sponsored most frequently. The total number of sponsorships previously shown in Figure 02 is disaggregated into five maps. Figure 05 shows, for each country, the frequency of sponsorships for proposals classified into one of the two themes of the 'Energy Transition' cluster ('Efficiency' and 'Renewables'). Figure 06 does so for the 'Access to Energy' cluster, Figure 07 for the 'Technology' cluster ('Financing', 'Technology Transfer', and 'Research and Development'), Figure 08 for the 'Capacity Building' cross-cutting cluster, and, finally, Figure 09 for 'Others'.

Of the five groups, the 'Technology' cluster appears to have been embraced more homogeneously within the G77, with similar levels of engagement from all members, with members from Central and South Asia showing some prominence. Similarly, the emphasis on 'Capacity Building' is also notable in this geographic area. Quite differently, the 'Others' category involves participants from more varied groups and regions of the world. Latin American countries, along with certain states in the Horn of Africa, have played a more significant role in the themes 'Energy Transition' and 'Access to Energy' compared to their engagement in other clusters.

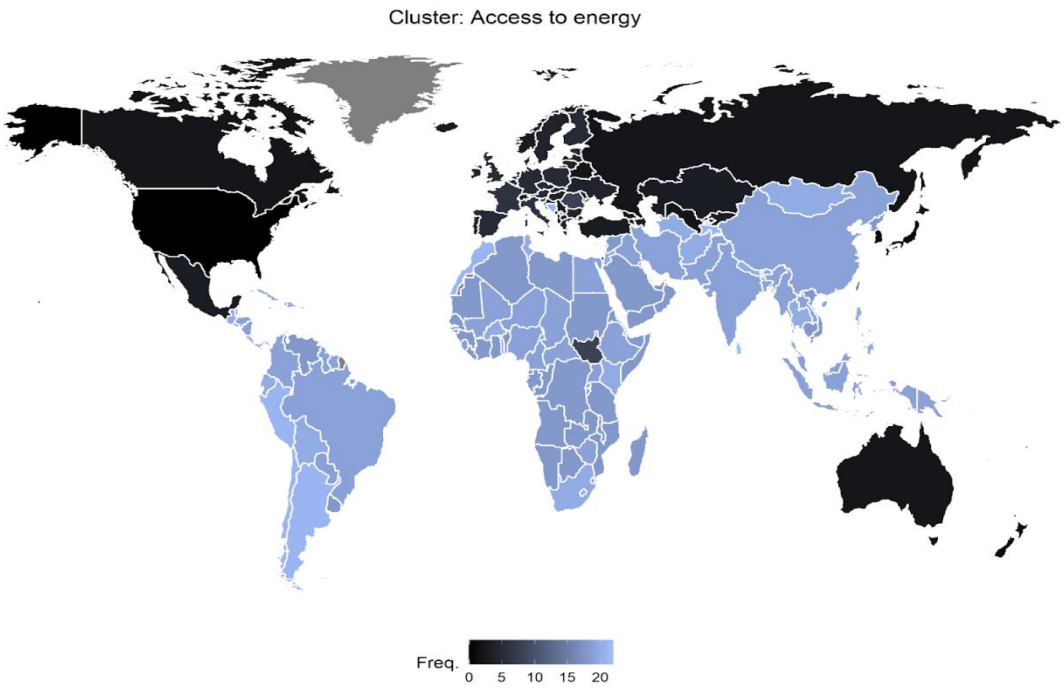
[10]A draft that does not follow this pattern is A/C.2/73/L.60, which goes by the same title but is actually an amendment proposed by the EU to the draft originally presented by the G77. The amendment requests that an operative paragraph of the original text exhorting that 'no country is left behind' be replaced by a more extensive version, also mentioning the 2030 Agenda, its 'people-centred' goals, and highlighting that 'the dignity of the human person is fundamental'. The amendment was rejected.

Figure 05. Frequency of sponsorship for proposals from the 'Energy Transition' cluster



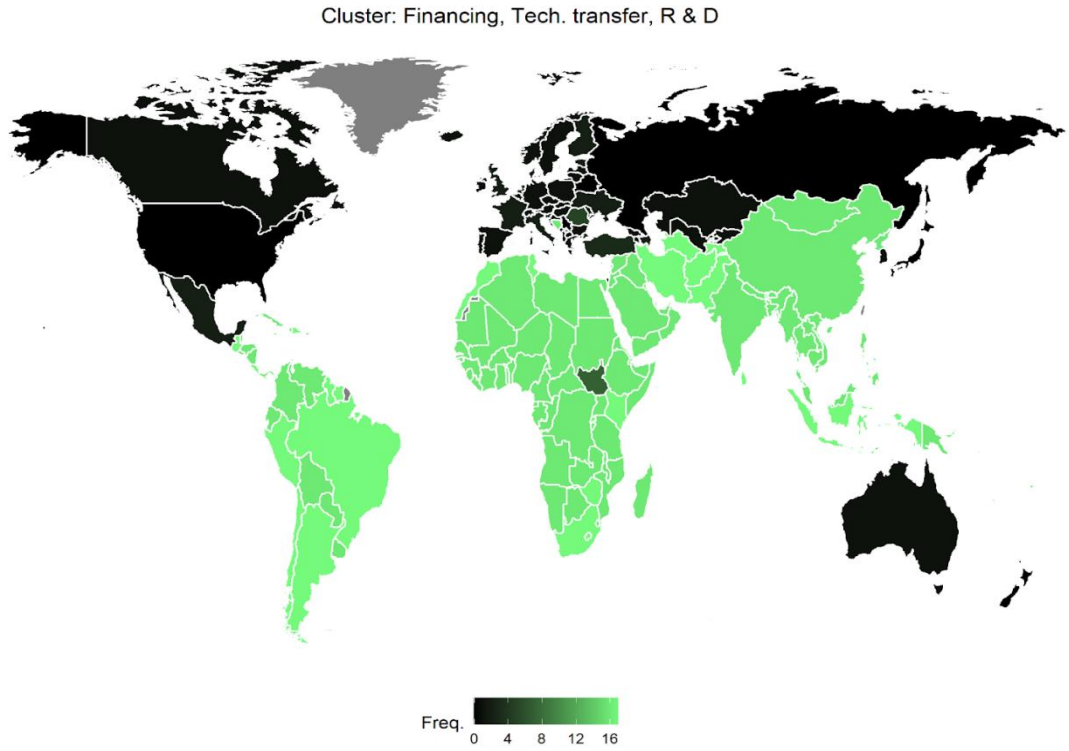
Source: Made by the authors.

Figure 06. Frequency of sponsorship for proposals from the 'Access to Energy' cluster



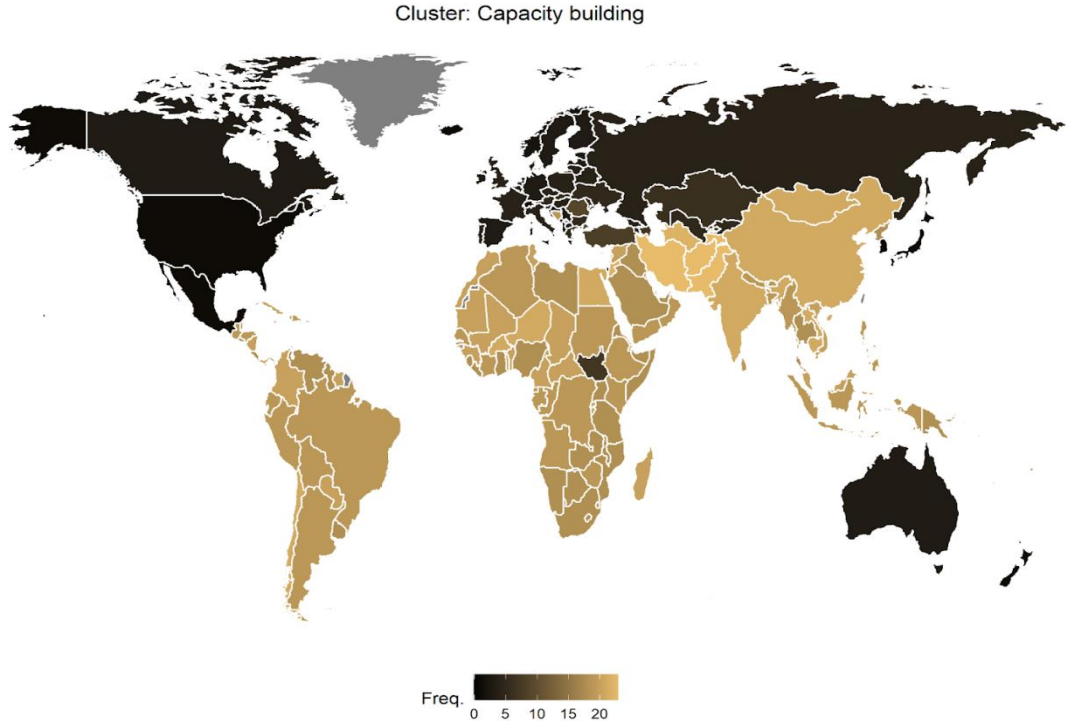
Source: Made by the authors.

Figure 07. Frequency of sponsorship for proposals from the 'Technology' cluster



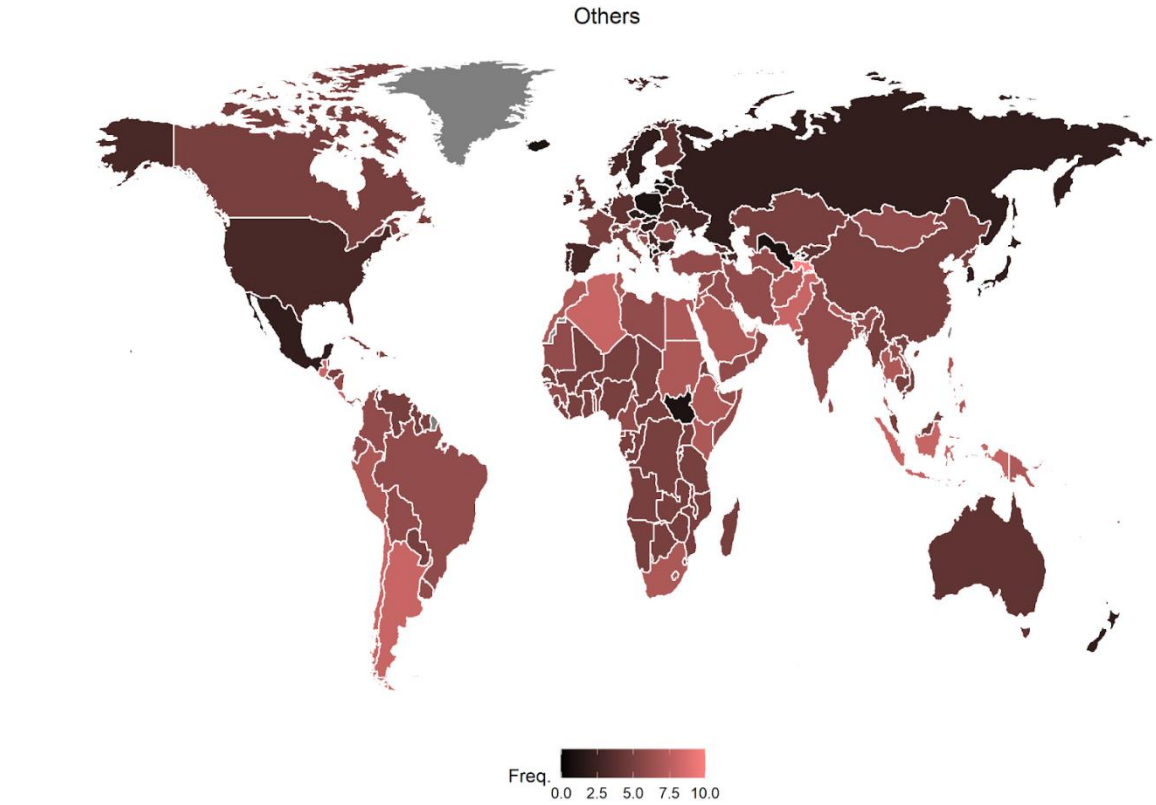
Source: Made by the authors.

Figure 08. Frequency of sponsorship for proposals from the 'Capacity Building' cluster



Source: Made by the authors.

Figure 09. Frequency of sponsorship for proposals from the 'Others' cluster



Source: Made by the authors.

Conclusion

This article explored how the topic of energy, particularly energy justice, is addressed in the world's foremost multilateral arena: the United Nations General Assembly (UNGA). Drawing on the categories proposed by the literature and UN documents, we analyzed a corpus of 59 draft resolutions. Guided by the seven categories identified in the literature review, we conducted a content analysis and identified the prominence of each theme in the production of UNGA member countries.

The results showed that energy is most often addressed through the theme of 'Energy Efficiency', closely followed by 'Capacity Building'. The 'Energy Efficiency' theme can be incorporated into a broader cluster, which addresses the issue of 'Energy Transition'. As a result, this macro-theme could be considered the most prominent in the UNGA. This finding suggests that, in the context of multilateralism, the concern with climate change and the development of countries goes hand in hand with the issue of energy justice. Jenkins et al. (2016) suggest that, to conduct a

normative assessment about the injustices of how costs and benefits are distributed, one must identify how these injustices could be addressed. Energy transition would be a solution to the distributional problem as it would expand the sustainable distribution of renewable resources, while also enabling individuals' access to energy services.

This study's main limitations refer to the construction of the sample. In limiting our sample to the UNGA, we exclude other relevant international bodies dedicated to the energy issue, such as the International Renewable Energy Agency (IRENA) and the International Energy Agency (IEA). It is also worth noting that data from the UNGA have its own limitations. As the case of the withdrawn drafts has shown, because the original dataset excludes some documents based on their authorship situation, we had to carry out complementary research. Since more drafts might have been left out, the number of relevant drafts – or each country's level of participation – could be higher than described here. Considering the limited size of our empirical dataset, our conclusions cannot be confidently extrapolated far beyond the present scope. However, the corpus used in this study allows us to conclude that countries belonging to the G77 and Asia are engaged with expanding access to energy, which is consistent with the literature on energy access. Energy poverty is mostly affecting countries in the Global South, which essentially make up the G77, especially developing Asian countries.

Future research could overcome these limitations and follow up on the findings of this exploratory study. A more comprehensive corpus – encompassing other UN bodies – or an energy-related dataset could be built. With broader datasets, scholars could verify whether our inductively created categorization in three clusters would also apply to these corpora or whether different multilateral bodies make different connections between the themes. In addition, a more in-depth analysis of our data could be conducted. For example, it was beyond the scope of this article to consider the fact that some omnibus resolutions addressed all themes while others were more specialized. This distinction calls for a closer examination of the two approaches to creating international standards. And scholars should question which is more effective: the comprehensive approach or the focused one. It is known that texts negotiated between several parties strike a delicate balance between their accuracy or ambition and the level of support they can

generate (MESQUITA and PIRES, 2023). A comparison between the two sets of draft resolutions could reveal which energy-related strategy has been most successful. Finally, another research avenue is to test causal research designs to explain the patterns mapped in this study. Patterns such as the activism of Asian countries demand explanations for what motivates certain actors to strongly prioritize the multilateralization of the energy issue.

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