Hertie School

The Evolution of Energy Aid Discourse: Insights from Structural Topic Modelling

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A thesis submitted in partial fulfillment
of the requirements for the degree of

Master of Science in Data Science for Public Policy
of
Hertie School.

April 28, 2025

Word Count: 7,392

Abstract

International aid (Official Development Assistance, ODA), plays a vital role in supporting countries as they transition to sustainable energy systems and strive to achieve universal energy access (Sustainable Development Goal 7), all while addressing global climate change. However, whether the priorities reflected in this aid consistently align with these multifaceted goals is often unclear. This thesis investigates the evolution of thematic focus within energy sector ODA discourse between 2014 and 2023. It examines how the thematic landscape represented in donor project descriptions evolved and what this reveals regarding articulated priorities and potential misalignments with sustainable development goals.

Using Structural Topic Modeling (STM), a computational text analysis method, project descriptions from the OECD's aid database were analyzed. This identified underlying themes and tracked how their prominence varied over time, across geographical regions, and in relation to climate mitigation and adaptation markers

Findings reveal a dominant discourse focused on climate mitigation via renewable energy and persistent attention to large-scale infrastructure. Climate adaptation is framed narrowly, primarily concerning grid resilience. Critically, the analysis provides empirical evidence that themes related to energy access and equity are systematically marginalized, indicating a significant disconnect with the universal access goals of SDG 7.

This research contributes a large-scale, data-driven analysis of donor narratives, highlighting crucial tensions and misalignments between the articulated priorities in energy ODA and the requirements of a just and sustainable energy transition.

Keywords : Official Development Assistance (ODA), Energy Finance, Climate Finance, SDG 7, Energy Access, Energy Transition, Structural Topic Modeling (STM), Text Analysis, Climate Change Mitigation, Climate Change Adaptation, Renewable Energy, Just Transition

Contents

List of Figures

Introduction

The international community is currently navigating a complex global landscape defined by shaped by the intertwined demands of climate change mitigation and sustainable development. Mitigating climate change requires a fundamental transformation of the global energy system, shifting away from the fossil fuels that have historically advanced economic growth but now pose significant environmental threats. Concurrently, achieving Sustainable Development Goal 7 (SDG7) involves addressing profound energy access deficits, as hundreds of millions globally still lack electricity and clean cooking facilities, which impedes socio-economic progress (United Nations 2023). Facilitating this dual transition necessitates not only technological advancements and robust national policies but also effective international cooperation, particularly through financial mechanisms like OECD's Official Development Assistance (ODA). This research is motivated by the critical need to examine whether the priorities articulated within energy ODA discourse correspond adequately to the multifaceted challenges of achieving a sustainable and equitable energy future.

The energy sector occupies a central position within this dynamic context. It is foundational to modern economies and human well-being, yet it remains the predominant source of greenhouse gas emissions (Ritchie, Rosado, and Roser 2023). The ongoing energy transition involves navigating away from fossil fuel-based systems towards renewable energy sources. While the costs of technologies like solar and wind have decreased substantially (IRENA 2024), their widespread integration encounters considerable infrastructural, institutional, and political challenges(Sen and Ganguly 2017). ODA aims to catalyze sustainable investments, support policy development, and bridge financing gaps in recipient countries. Furthermore, ODA must balance competing priorities like climate mitigation, adaptation, energy access, and economic development. Understanding how these potentially conflicting objectives are balanced and prioritized within aid discourse is essential.

This context allows for further enquiry on how has the thematic landscape of energy ODA within OECD's Creditor Reporting System (CRS) project descriptions evolved between the period of 2014 and 2023. This research also tries reveal articulated priorities and tensions and moves beyond financial aggregates to interrogate the language used by donors, understanding how narratives shape actions.

This research also provides a large-scale, empirical analysis of donor narratives using Structural Topic Modeling on project descriptions. It maps thematic content and its evolution over time, geography, and relation to climate markers (Mitigation/Adaptation). This data-driven approach highlights a significant discrepancy between the global SDG 7 commitment and the minimal representation of energy access/equity themes in donor narratives, offering a nuanced view of how energy aid is framed.

These findings are significant for policymakers, informing efforts towards better alignment, resource allocation and reporting practices. For researchers and practitioners, it provides context on funding narratives and highlights under-addressed areas. Evidence on the marginalization of access/equity themes supports civil society advocacy for more just energy development assistance. Understanding these patterns enhances the accountability and effectiveness of international energy cooperation.

Brief Methodological Summary: STM was applied to OECD CRS project descriptions (2014-2023) with metadata covariates. Key findings show a dominant focus on mitigation via renewables ('Wind & Solar', 'Climate Programs') and persistent emphasis on 'Infrastructure & Energy Systems'. Adaptation narratives appear narrow, focusing on grid resilience. Critically, 'Energy Access' and 'Equity' themes, alongside energy efficiency and just transition strategies, were underrepresented.

Literature Review

Energy sector ODA is vital for sustainable development, SDG 7, and Paris Agreement climate goals. Assessing its alignment requires understanding allocation patterns and thematic framings within complex debates on climate finance and development effectiveness.

A primary challenge lies in defining and tracking climate finance accurately. Shishlov and Censkowsky (2022) highlight the significant divergence and 'constructive ambiguity' surrounding definitions, particularly concerning the USD 100 billion annual commitment. This ambiguity complicates efforts to assess progress and ensure accountability. Much tracking relies on donor self-reporting through systems like the OECD's CRS, often using instruments like the Rio Markers. However, the reliability of this self-reported data is contested. Toetzke (2024), using ClimateFinanceBERT, trained on ODA project descriptions, found substantial discrepancies between automated classifications and official Rio Marker tags, suggesting official figures might overestimate actual climate finance. This aligns with critiques (Shishlov and Censkowsky 2022; Donner, Kandlikar, and Webber 2016; A. Michaelowa and K. Michaelowa 2011; Weikmans and J. T. Roberts 2017) regarding the potential for politically motivated reporting and inconsistent marker application. While financial tracking provides one essential perspective, other research explores different dynamics; Jain and Bardhan (2023), analyzed energy aid volatility, concluding that recipient country characteristics often outweigh donor factors in determining stability. The sheer volume and complexity of ODA data, encompassing millions of projects often described only in brief textual summaries, necessitates analytical approaches beyond traditional financial reporting and underscores the 'big literature' challenge identified by Minx et al. (2017) in the broader climate assessment context.

Responding to this challenge, researchers increasingly employ machine learning (ML) and natural language processing (NLP) techniques. These computational methods offer the potential to analyze vast amounts of text, identifying patterns and themes that might remain hidden with manual approaches. Topic modeling, in particular, has been applied to map large text corpora, including scientific literature on demand-side mitigation Creutzig et al. (2021), climate policies M. Callaghan, Banisch, et al. (2024), climate impacts M. Callaghan, Schleussner, et al. (2021), adaptation research Sietsma, Ford, M. W. Callaghan, et al. (2021), and adaptation policy Sietsma, Theokritoff, et al. (2024). Similar to this thesis, Wright et al. (2023) and Biesbroek et al. (2022) used structural topic modeling (STM) to analyze how

countries frame adaptation versus mitigation in their UNFCCC National Communications, finding persistent North-South differences and limited shifts post-Paris. Crucially, analyzing the language used in these documents offers a distinct analytical lens. Language is not merely descriptive; it constructs meaning and reflects priorities. Investigating donor-written texts allows this thesis to explore the narratives, framings, and articulated priorities embedded within aid practices, revealing potential biases and offering insights beyond quantitative financial data or simple classifications.

Sietsma, Ford, and Minx (2024) review the field, noting promises of scale but also pitfalls like the need for combined technical and domain expertise, the risk of models replicating biases in training data (observed North-South imbalances in research focus), and the challenges of validation and interpretation. ML is a powerful tool, but its outputs demand rigorous scrutiny.

This thesis carves a specific niche within this evolving research landscape. Despite the rich work on this topic, a significant gap remains in the systematic, large-scale analysis of the thematic content and evolution within donor-written energy ODA project descriptions. This research addresses this gap by applying STM to the OECD CRS database. Its core contribution is the multi-dimensional exploration (temporal, regional, climate marker association) of the language and narratives donors use when describing energy aid projects. By focusing on these articulated priorities within project texts, this research moves beyond aggregate finance or tag verification to reveal how energy aid is framed. It provides empirical evidence derived directly from donor narratives for critical issues, such as the marginalization of energy access and equity concerns. This approach complements financial analysis and classification efforts by offering a nuanced view of thematic content at scale, providing a unique, data-driven perspective that bridges the gap between high-level financial tracking, national policy framing, and broad literature mapping.

Data and Methodology

Data

This study utilizes project-level data on Official Development Assistance (ODA) from the Organisation for Economic Co-operation and Development's (OECD) Creditor Reporting System, covering the period from 2014 to 2023. The CRS database (OCED 2014-2023) was selected because it is the most comprehensive and standardized repository of ODA. It is maintained by the OECD Development Assistance Committee (DAC), and all DAC member countries and major multilateral institutions are required to report project-level information annually. This ensures comparability across donors and years, making it the de facto source for quantitative analysis of ODA flows worldwide. Another key advantage of the CRS is its inclusion of rich metadata (e.g., donor, recipient, sector, commitment amounts, ODA type etc) and unstructured text fields, which enable both quantitative and qualitative analysis.

The dataset was initially filtered to retain only energy-sector projects, defined by sector codes (see Appendix Table 2). These codes collectively define the energy sector in the DAC classification. The decision to focus on a 10-year time window (2014–2023) reflects a balance between data availability and the goal of capturing recent trends in energy-related development finance, particularly in relation to climate concerns and energy transition narratives in the post-Paris Agreement period.

Further filtering was applied to ensure the included projects represented actual financial flows. Only records with non-zero, positive values for financial variables were retained. Projects with zero disbursement or commitment may represent proposals, placeholders, or incomplete entries that were never implemented. Excluding these focuses the analysis on actual financial activity and reduces noise.

For textual analysis, the primary variable of interest was the "LongDescription" field. This unstructured text column provides detailed narratives about the nature, scope, and goals of individual projects.

The dataset includes instances where the same project description appears multiple times, often linked to different financial entries or specific regions within a larger project. Distinct records were distinguished based on a combination of description, year, project ID, region, and climate markers. This retained important links be-

tween potentially identical descriptions and their varying regional or climate-related contexts for subsequent analysis. One-word long descriptions were also removed.

After filtering, the dataset included approximately 64,200 energy-related project descriptions across 10 years.

Given the global scope of the CRS and its reliance on self-reporting by donor entities, the project descriptions were present in multiple languages. To create a homogenous corpus for analysis, language detection was performed using the facebook/fasttext library, a lightweight yet accurate tool for identifying text language at scale (Joulin et al. 2016; Meta AI Research 2023). Descriptions identified as non-English were translated into English using the Google Translate API (Han 2020). In cases where descriptions were repeated in multiple languages, the non-English portions were identified and removed to avoid redundancy and maintain consistency.

Subsequent text pre-processing involved standard natural language processing (NLP) techniques to clean the LongDescription column further. This included converting all text to lowercase, removing special characters and punctuation, removing single-letter words, and eliminating common English stop words.

Further, N-grams were generated. initial exploration revealed that unigrams (e.g., "energy", "support") were often too general or random. Bigrams (e.g., "solar installation", "grid expansion") on the other hand, provided richer thematic insight while reducing ambiguity and therefore were selected as the core features for modeling. Several refinement steps were applied to the bigram generation process. Redundant or nonsensical bigrams (e.g., energy_energy) were removed. Canonicalization was enforced, meaning that order variants such as technical_assistance and assistance_technical were treated as the same feature, preventing redundancy. Finally, the resulting set of bigrams was trimmed based on frequency. Bigrams occurring fewer than 50 times across the entire corpus were removed to filter out noise and overly specific terms. Conversely, bigrams appearing in more than 90% of all documents were also removed; this step eliminates extremely common phrases that do not help differentiate between nuanced themes.

This rigorous text-cleaning process ensured a compact but semantically rich representation of each project, suitable for topic modeling.

Methodology

To analyze the thematic structure and trends within the energy sector ODA, this study employs the Structural Topic Model (STM) (M. E. Roberts et al. 2013). STM was chosen as the primary analytical framework because it extends traditional topic models (like Latent Dirichlet Allocation) by allowing the incorporation of document-level metadata as covariates. STM is an extension of Latent Dirichlet Allocation (LDA), a probabilistic model of text that identifies latent topics as distributions over words and infers the distribution of topics within documents. Unlike LDA, STM allows the inclusion of document-level covariates to influence topic prevalence (how much specific themes are discussed) and content (how themes are discussed), enabling more nuanced interpretation of how external factors shape thematic discourse. By integrating covariates, STM can provide richer insights and more interpretable results compared to models that analyze text in isolation.

This study focuses on the prevalence dimension of STM i.e., how frequently each topic appears across projects, conditioned on metadata such as year, geography, climate objectives etc. Content covariates (which influence the words associated with each topic) were deliberately excluded. First, the primary research aim is to understand how thematic priorities vary across geography, time periods, and climate objectives. This aligns directly with the prevalence framework of STM, which models how document-level metadata shapes the distribution of topics across documents. Second, the project descriptions in CRS are often short or inconsistently structured, which limits the effectiveness of content covariates. In such cases, topic prevalence tends to be more stable and interpretable, while content-based differences may reflect noise rather than meaningful variation. Therefore, to maintain conceptual clarity and analytical focus, this study adopts a prevalence-only STM approach, using document metadata to explore when, where, and how different energy-related themes are emphasized.

The analysis incorporated several document-level covariates into the STM to model variations in topical prevalence. Temporal dynamics were explored using the "Year" variable to model trends over the study period. To understand geographical dimensions, "Recipient Region" was included to identify patterns linked to aid destinations, Additionally, the influence of stated climate objectives was investigated by including the "ClimateMitigation" and "ClimateAdaptation" Rio Markers (see Appendix 6.2) as covariates, enabling analysis of how these climate tags relate to the discussion of different energy themes.

The selection of the optimal number of topics (K) is a critical step in topic modeling. A systematic approach was taken, involving the fitting of multiple STM models with K ranging from 10 to 35 topics (see Appendix Table 5). The final selection of K=20 was based on a combination of quantitative metrics like semantic coherence (how often the top words of a topic co-occur) and exclusivity (how uniquely words belong to one topic) and qualitative assessment like interpretability and distinctiveness (whether the topics made conceptual sense when reviewing the keywords and exemplar documents) (see Appendix Table 6) . This process aimed to balance model fit with the ability to derive meaningful thematic insights.

Model hyperparameters were set to alpha = 0.5 (the prior on document-topic distributions) and eta = 0.1 (the prior on topic-word distributions). An alpha value of 0.5 allows documents to be represented by a mixture of topics, suitable for project descriptions that often cover multiple aspects. An eta value of 0.1 encourages topics to be represented by a more distinct set of words, enhancing topic interpretability. The model was run for 25 iterations.

To further validate the distinctiveness of the identified topics, the correlation matrix between the 20 topics was examined (see Figure 1) . Low correlations between topics suggested that the model successfully identified largely distinct thematic clusters within the data.

Topic interpretation and labeling relied primarily on examining the highest probability words and the FREX (Frequency and Exclusivity) words associated with each topic (see Appendix 6.2). FREX words are particularly useful as they balance term frequency within a topic with its exclusivity to that topic, highlighting terms that are both common and distinctive identifiers of a theme.

Following the identification and labeling of the 20 topics, they were further grouped into 6 broader thematic clusters. This clustering provides a higher-level overview of the main areas of focus within energy sector ODA.

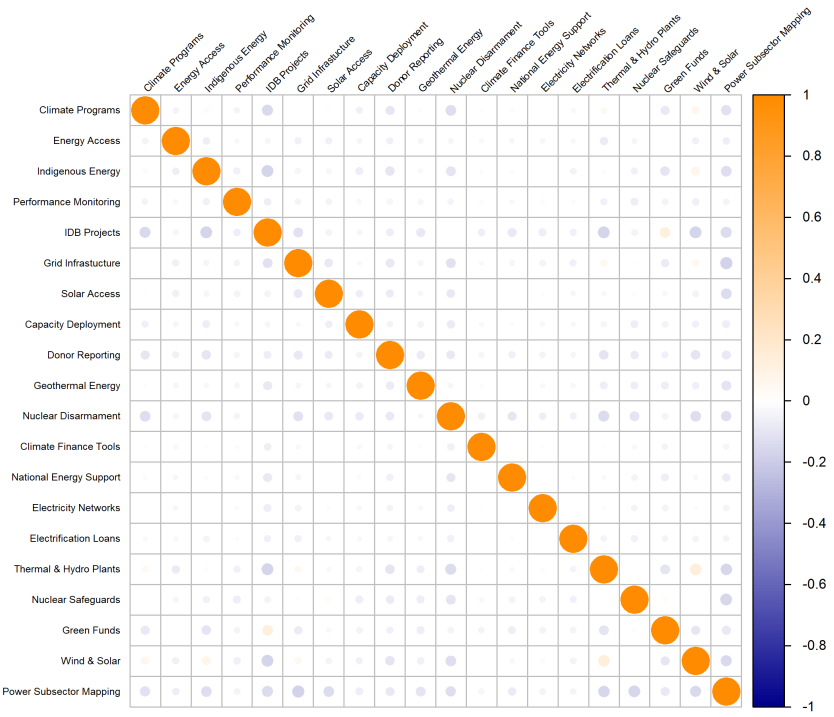

Figure 1: **Correlation Matrix**

Pairwise correlations between the 20 identified STM topics. Circle color indicates correlation direction and strength (orange=positive, blue=negative), while size represents the absolute magnitude (larger = stronger correlation). The predominance of small, pale circles indicates weak correlations between most topic pairs. This supports the distinctiveness of the topics identified by the model, suggesting they capture relatively separate thematic content.

The analysis of temporal trends in topic prevalence was conducted using the estimated effects from the full STM model, which accounts for the influence of all included covariates simultaneously. Subsequently, a more focused analysis was performed to understand the marginal impact of specific covariates (Recipient Region, ClimateMitigation, and ClimateAdaptation) on the prevalence of the identified topics. This allows for targeted insights into how geography and climate objectives relate to the specific themes emerging from the project descriptions.

Further details on the data processing, cleaning steps, and analysis are available on GitHub: https://github.com/Manjiri-Satam/MT_Energy_STM.

Results and Discussion

This section presents and critically discusses the findings from the STM analysis. The analysis identified 20 latent topics within this corpus, which were subsequently grouped into broader themes: Access & Equity, Finance & Institutions, Infrastructure & Energy Systems, Monitoring & Technical Assistance, Nuclear Disarmament, and Sustainable Transition. By integrating findings across temporal evolution (see Figure 2), regional variation (see Figure 3), and climate marker association (see Figure 4), this section aims to provide a critical interpretation of the priorities, framings, and potential misalignment characterising energy development finance during a pivotal decade shaped by the Paris Agreement, the Sustainable Development Goals (SDGs), and significant global crises. The STM, as an exploratory method based on textual patterns, reveals dominant narratives and discursive trends, offering valuable insights even though it does not measure causality or on-the-ground impact.

Sustainable Transition: A Dominant Narrative Under Scrutiny

The analysis unequivocally reveals the prominence of themes grouped under 'Sustainable Transition' in the energy-related ODA (see Figure 2). Topics such as 'Wind & Solar' and 'Climate Programs' are among the most consistently represented in the dataset. While the temporal trend for Wind & Solar remains largely stable from 2014 to 2023, rather than showing a marked increase, its consistently high prominence suggests that it has become an entrenched pillar of energy development discourse. Climate Programs shows some variation over time, with modest increases post-2016. These trends broadly reflect the policy momentum generated by the 2015 Paris Agreement and the push for countries to formulate Nationally Determined Contributions (NDCs), which placed mitigation at the center of donor strategies. The global decline in the cost of solar PV and wind technologies further bolstered their attractiveness as investment priorities in development cooperation (IRENA 2024).

This thematic alignment with climate policy is empirically validated in the climate marker analysis. Topics under the Sustainable Transition theme are significantly more likely to appear in projects tagged with a Rio Marker score of 2 for Mitigation (Principal) (see Figure 4). This empirically validates the intuitive link: donors frame renewable energy deployment and dedicated climate programs as core mitigation strategies in their project descriptions. Interestingly, however, the analysis also reveals

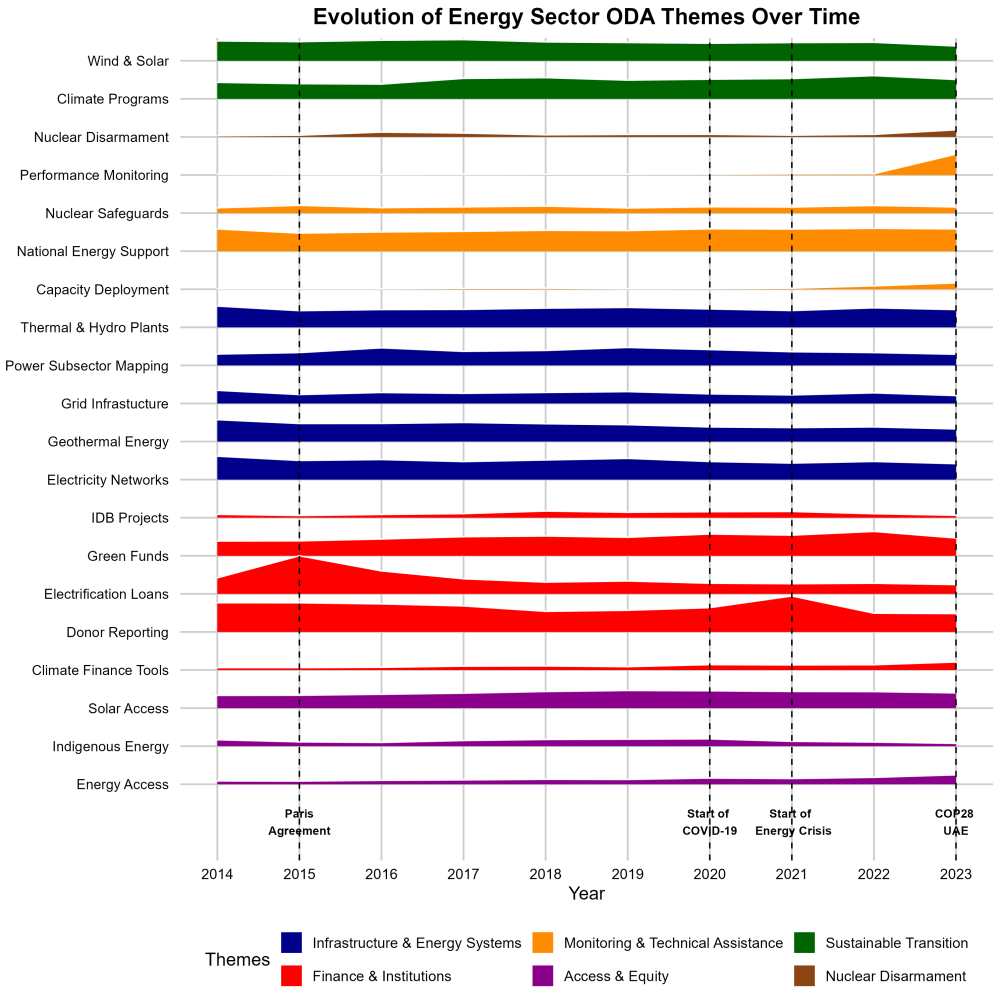

Figure 2: **Evolution of Topic Prevalence based on Structural Topic Model (STM)** This figure displays the estimated annual prevalence of topics from 2014 to 2023, calculated using an STM incorporating covariates. The height of each band represents the estimated proportion of a specific topic (y-axis) per year (x-axis). Topics are grouped into color-coded themes (see legend), illustrating temporal shifts in focus.

that 'Wind & Solar' shows a positive association with the Significant Adaptation marker (Score 1), suggesting that while not framed as a primary adaptation strategy, renewable energy projects are sometimes described with adaptation as an important secondary objective. This contrasts with 'Climate Programs', which shows little association with Adaptation markers overall.

At the regional level, Sustainable Transition themes are globally distributed, but their intensity varies.

Infrastructure's Enduring Shadow: Path Dependency, Resilience, and Adaptation's Limits

Despite the dominance of 'Sustainable Transition' discourse, themes grouped under 'Infrastructure & Energy Systems' maintain a significant and persistent presence across the decade (see Figure 2). These topics occupy a broad and stable portion of the corpus from 2014–2023, underscoring the perceived ongoing need for foundational infrastructure development and modernization. This reflects the capital-intensive, long-term nature of these investments and the powerful influence of path dependency in energy systems, where existing infrastructure shapes future development trajectories (Unruh 2000).

Regionally, Grid Infrastructure and Electricity Networks are overrepresented in donor discourse on Africa, the Caribbean & Central America, and America (see Figure 3). This suggests a targeted regional focus on grid expansion or reinforcement, potentially in response to infrastructure gaps or electrification targets. However, this pattern may also reflect preferences for large-scale, technically mature investments.

The climate marker analysis adds further nuance. Electricity Networks shows a strong association with the Principal Adaptation marker, suggesting that within energy ODA discourse, adaptation is primarily framed as climate-proofing centralized grid infrastructure against physical risks like extreme weather events (see Figure 4). This aligns with a broader trend in global adaptation finance toward infrastructure 'climate-proofing' (European Commission 2021). Similarly, 'Power Subsector Mapping', which likely involves planning and assessment activities for the power sector, also shows a significant association with the Principal Adaptation marker, reinforcing the idea that adaptation efforts described in ODA are heavily focused on systemic resilience planning for existing or future infrastructure. However, such framing risks

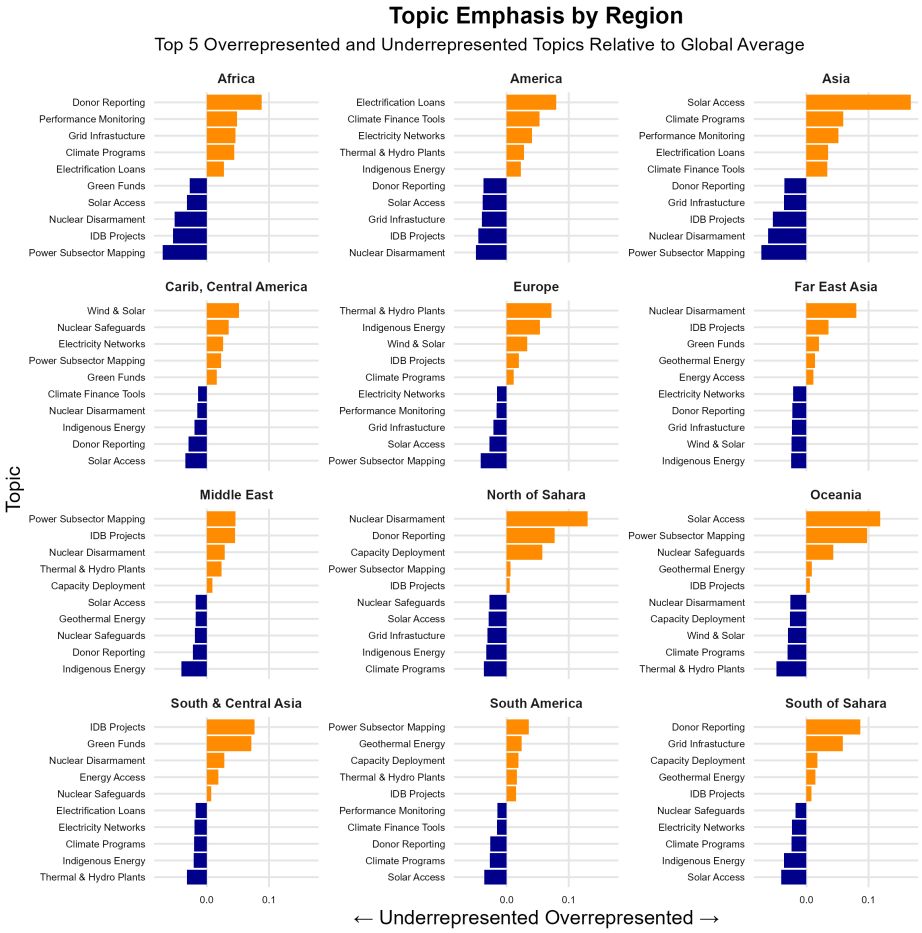

Figure 3: **Regional Emphasis of Topics Relative to Global Average**
This figure illustrates the differential emphasis on specific topics across various geographic recipient regions (where aid projects are implemented), compared to the global average prevalence estimated from the STM. Within each region, the horizontal bar chart displays the top five topics most overrepresented (orange bars, indicating a positive relative difference from the global average) and the top five topics most underrepresented (blue bars, indicating a negative relative difference). The length of the bar quantifies the magnitude of this deviation, highlighting specific regional priorities and areas of lesser focus in energy-sector aid discussions or projects compared to the overall global pattern.

being too narrow, potentially overlooking other crucial adaptation interventions conspicuously underrepresented in both topic prevalence and marker associations.

Interestingly, Thermal & Hydro Plants shows a positive association with the Significant Mitigation marker, implying that projects under this topic are sometimes framed as partially contributing to emissions reductions. Likewise, 'Power Subsector Mapping' is also significantly more associated with the Significant Mitigation marker than the Principal one. This pattern across both physical assets and planning activities suggests that mitigation is often integrated as a secondary objective or co-benefit within broader energy system development or rehabilitation projects, rather than always being the primary driver. However, this 'Significant' framing, particularly for 'Thermal & Hydro Plants', deserves closer scrutiny. The dataset does not provide sufficient granularity to distinguish between small-scale, low-impact projects and large-scale dams or fossil fuel plant upgrades. As such, this pattern may risk providing a cover for continued investments in controversial infrastructure, including hydro projects with known social and ecological consequences (Ndayiragije and Nkunzimana 2024) , or thermal plants whose lifespan extensions delay deeper decarbonization.

More broadly, the persistence of these infrastructure themes raises critical questions about flexibility and justice in energy transitions. Centralized systems may offer efficiency and scale, but they can also entrench control, exclude marginalized users, and fail to address the energy needs of remote or vulnerable communities. The dominance of infrastructure in adaptation discourse suggests that donor conceptualizations of climate risk remain focused on protecting existing energy assets, rather than enabling systemic transformation or community-level resilience.

The Starkest Misalignment: Energy Access and Equity Left Behind

Perhaps the most concerning finding, consistent across all analytical dimensions, is the critical marginalization of topics related to 'Access & Equity'. Temporally, 'Energy Access' and 'Indigenous Energy' represent a consistently minimal fraction of the discourse from 2014-2023 (see Figure 2). Their lack of prominence stands in stark contrast to the global community's explicit commitment to SDG 7 – ensuring universal access to affordable, reliable, sustainable, and modern energy by 2030 – and the overarching principle of "leaving no one behind."

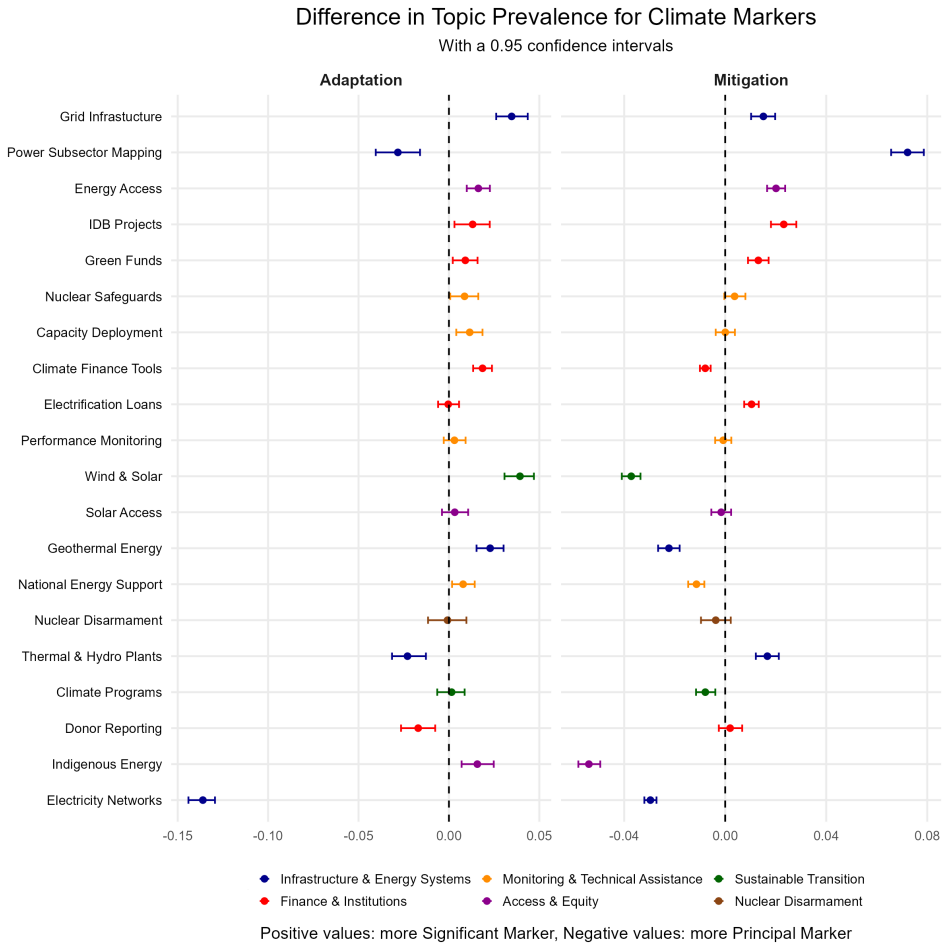

Figure 4: **Differences in Topic Prevalence Between Principal and Significant Climate Markers**

This figure shows the estimated differences in topic prevalence for energy-sector aid projects marked for climate adaptation and mitigation, with 95% confidence intervals. Positive values indicate stronger association with a Significant climate marker, while negative values indicate stronger association with a Principal climate marker. Topics are coloured by thematic areas. Points whose confidence intervals cross zero are not statistically distinguishable between Principal and Significant markers. The farther a topic lies from zero, the stronger the difference in prevalence between the two marker types. It is important to note that overall, only 38% of projects in the dataset were marked for Mitigation and 10% for Adaptation as Principal or Significant Objective (See Table 1)

This marginalization is further underscored by the climate marker analysis. These access-oriented topics display either very weak or statistically insignificant associations with both Mitigation and Adaptation markers (see Figure 4). 'Solar Access', a topic associated with household-level interventions, shows no statistically significant alignment with either Mitigation or Adaptation markers (see Figure 4). This suggests that such off-grid projects, despite their established climate co-benefits, are not systematically framed as climate-relevant within donor discourse.

Regionally, the 'Solar Access' is notably overrepresented in Asia, suggesting some focus on decentralized energy access in that region. However, this same topic is systematically underrepresented across numerous developing regions with some of the world's largest energy access deficits (see Figure 3). 'Indigenous Energy' is also underrepresented in most global regions, further indicating that donor narratives have not substantially engaged with energy justice principles or the energy needs of indigenous communities.

This disconnect empirically validates long-standing critiques that international development finance, including climate-focused ODA, often fails to adequately prioritize the needs of the poorest and most vulnerable (Carley and Konisky 2020). Topics like clean cooking, poverty receive minimal attention, despite being linked to profound development, health, and gender equity challenges.

Critically, this lack of focus raises developmental justice concerns. The minimal discussion of decentralized energy, clean cooking, and indigenous involvement contradicts effective energy access approaches, which prioritize community ownership, affordability, and local needs over top-down infrastructure(Singh and Ru 2022). The absence of these principles in ODA discourse suggests aid priorities remained fundamentally misaligned with the needs of the energy-poor throughout this decade.

This situation raises fundamental concerns about ODA priorities and mechanisms. There is a potential risk that the intense focus on large-scale mitigation and grid projects diverts resources and attention from the complex, often smaller-scale interventions necessary for last-mile energy access. Furthermore, ODA approval and reporting systems may inherently favor large, easily quantifiable infrastructure projects over community-focused initiatives. Reinforcing these concerns, the STM results strongly suggest that the dominant narrative within energy ODA discourse systematically underemphasized energy access and equity, representing a critical gap between stated global goals and documented aid priorities during this period.

Finance, Institutions, Monitoring, and Oversight: Enabling Structures or Bureaucratic Layers?

Themes related to the procedural, financial, and institutional aspects of energy aid, grouped under 'Finance & Institutions' and 'Monitoring & Technical Assistance' exhibit varied temporal trajectories and carry important implications for how energy transitions are designed, managed, and evaluated.

Temporally, financial topics such as 'Green Funds', 'Electrification Loans', and 'Climate Finance Tools' fluctuating patterns over the 2014–2023 period (see Figure 2). While no sustained upward trend is visible, some peaks appear to loosely correspond with major climate summits (COP21 in 2015, COP26 in 2021), suggesting donor signaling behaviour or responses to funding cycles .

In contrast to the fluctuating financial tools, 'Capacity Deployment' under 'Monitoring & Technical Assistance' is almost non-existent throughout the decade, indicating a consistent, ongoing perceived need for technical assistance and institutional strengthening activities. Whereas, 'Performance Monitoring' shows a notable uptick post-2022, potentially signaling an increasing emphasis on results-based management and evaluation frameworks in the wake of intensified scrutiny around climate finance effectiveness. This increase may also reflect the broader context of post-COVID-19 recovery efforts and volatility in global energy markets, which could have prompted greater demands for oversight, metrics, and transparency.

Regionally, administrative and procedural topics, especially 'Donor Reporting' and 'Performance Monitoring', are disproportionately prevalent in Africa (multi-country and regional programs) (see Figure 3). This pattern suggests that broad programmatic initiatives often carry heavier reporting and coordination requirements, possibly due to their scale or their alignment with multilateral financing platforms. However, this could also point to a tendency to privilege standardization and bureaucratic control in lieu of localized, context-specific evaluation systems.

The climate marker analysis reveals that several of these topics are associated with both Mitigation and Adaptation markers (see Figure 4). This cross-cutting alignment underscores their dual role in supporting a range of climate-relevant interventions. These themes often act as enablers rather than endpoints, facilitating the implementation of both technological solutions and institutional reforms.

While such support functions are vital to energy transitions, their effectiveness remains a subject of debate. The importance of institutional and technical support is widely acknowledged (Susskind and Kim 2021) but the development literature has consistently noted that capacity-building efforts often suffer from limited local ownership, low absorption, or donor-driven frameworks (Kuhl and Shinn 2022). Similarly, the rise of 'Performance Monitoring' could indicate either an emerging culture of accountability or the bureaucratic thickening of aid delivery.

The Nuclear Question: Disarmament, Safeguards, and Energy ODA

One of the more unexpected patterns to emerge from the STM analysis is the consistent, though minor, presence of topics associated with nuclear-related activities within the energy ODA discourse. The thematic grouping distinguishes 'Nuclear Disarmament' as a distinct topic, while nuclear-related safety and oversight themes are captured under 'Nuclear Safeguards' within 'Monitoring & Technical Assistance'.

Temporally, Nuclear Disarmament remains a low but persistent feature across the 2014–2023 period (see Figure 2). Though occupying a relatively small share of the corpus, its consistent appearance suggests a recurrent role in donor framing, particularly within specific geopolitical or security-focused aid contexts. The keywords associated with these topics indicate that these projects likely relate to the management, oversight, decommissioning, or security of nuclear materials and infrastructure, rather than the promotion of nuclear energy per se.

Regionally, these topics are concentrated in specific areas, most notably the Middle East, Far East Asia and South & Central Asia (see Figure 3), which aligns with regions that have historically been focal points for non-proliferation and nuclear security concerns. This pattern raises questions about whether energy-related ODA might sometimes serve as a channel for strategic or security-related objectives, potentially alongside or distinct from traditional energy development goals.

Critically, the climate marker analysis shows either weak or no associations between these nuclear topics and both Mitigation and Adaptation markers (see Figure 4). This indicates that nuclear-related projects are not framed as climate-relevant within donor reporting, which raises a crucial point: despite being listed under energy-related aid,

these projects may serve objectives that are only tangentially linked to sustainable energy or climate action.

This raises concerns about transparency and the potential inclusion of activities driven primarily by security, non-proliferation, or specific commercial interests under the umbrella of energy ODA.

Critical Gaps: Missing Themes

Bringing together these multi-faceted findings reveals several key tensions characterizing energy ODA discourse between 2014-2023. The analysis underscores significant thematic gaps in the dominant discourse. The lack of prominent, distinct themes dedicated to Energy Efficiency, Demand-Side Management (DSM) and Just Transition principles suggests these critical dimensions of a comprehensive and equitable energy transition were systematically underemphasized in the framing of energy ODA during this period. While aspects might be embedded within other topics, their failure to emerge as central narratives points to potential blind spots in donor priorities or, at least, in how those priorities are articulated.

Limitations of the Study

While the STM offers valuable insights into the patterns across a large corpus of ODA project descriptions, several limitations must be acknowledged to contextualize and qualify the findings.

Data-Related Limitations

Donor Self-Reporting and Data Inconsistencies: The CRS data is compiled from reports submitted by individual donor countries and organizations. The reliance on self-reporting introduces significant challenges for data comparability and reliability. Variations in topic prevalence may stem from inconsistent reporting practices (differing guideline interpretations, capacities, strategic framing), not just genuine focus shifts. This inherent variability introduces "noise" (missing data, inaccuracies, incomplete or vague project descriptions), impacting analytical precision.

Lack of Outcome Indicators: Crucially, the CRS data lacks outcome/impact indicators, restricting analysis to stated intentions in administrative texts. Findings cannot link discourse prevalence to real-world results, financial weight, or developmental significance. The analysis maps intentions, not results.

Specific Data Ambiguities: Use of the criticized Rio Markers, with their inconsistent application and simplistic classification, means observed topic-climate associations may result from reporting practices rather than authentic integration into the mainstream discourse. Additionally, Broad or inconsistently applied "energy sector" coding may include only tangential projects, potentially skewing topic distribution.

Methodological Limitations of STM

Subjectivity and Sensitivity: Although STM algorithmically identifies, the process of labeling and grouping topics remains subjective. Further, the resulting topic structure is contingent upon specific modeling choices (number of topics, model priors (alpha and eta)). Alternative specifications could yield a different set conclusions.

Correlation, Not Causation: A fundamental limitation is that STM only reveals correlations between metadata (like region, or donor type) and topic prevalence. It

cannot establish causality. A topic becoming more prominent does not imply an increase in actual disbursements.

Limited Analytical Scope: This analysis focused on topic prevalence and its relation to covariates. Deeper exploration of topic content, co-occurrence patterns within documents or constructing topic networks could offer deeper insights.

Limitations of Applying STM to CRS Data

Analyzing Discourse, Not Reality: The study analyzes administrative project descriptions written for reporting and compliance, not field reports reflecting ground-level activities. These texts likely involve strategic framing and performative elements, potentially exaggerating alignment with policy goals. STM captures how donors describe projects, which may diverge significantly from implementation realities.

Constraints of Input Text: The dataset comprises of relatively short, formalized project descriptions, many of which use standardized language and acronyms. Sparse and repetitive language may reduce topic distinctiveness and inflate generic topics.

Level of Temporal and Spatial Aggregation: While the analysis incorporates time and region as covariates, much of the interpretation relies on patterns aggregated over the ten-year period and broad geographical regions. This necessary aggregation might conceal significant short-term fluctuations, mask variability within regions, or overlook critical interactions between the two.

In light of these limitations, it should be noted that this study provides evidence of how donor narratives are structured, which themes are under/over represented, and how climate priorities are expressed, but it cannot assess implementation or effectiveness.

Conclusion

This analysis reveals a significant divergence between the articulated priorities in donor narratives and the holistic requirements of sustainable development. While the discourse prominently reflects the global push for climate mitigation, evidenced by the focus on renewable energy topics like 'Wind & Solar' following the Paris Agreement, this dominant theme overshadows other critical dimensions. The research highlights the persistent influence of traditional, large-scale infrastructure paradigms, particularly pronounced in regions like Africa and America, and a concerningly narrow framing of climate adaptation, largely confined to climate-proofing existing grids.

Most consequentially, the findings demonstrate a profound and systematic marginalization of energy access and equity within the ODA discourse. Topics directly addressing access and indigenous energy rights constitute a minimal fraction of the narrative globally and are notably underrepresented even in regions with significant access deficits, indicating a stark misalignment with SDG 7 and the principle of "leaving no one behind". This marginalization, coupled with the underemphasis on crucial areas like energy efficiency, just transition strategies, suggests that the prevailing ODA discourse, despite its climate focus, fails to capture an equitable approach to energy development. The study underscores a potential disconnect between the language guiding international energy finance and the achievement of sustainable and just energy futures for all, signaling the need for a significant rebalancing of ODA priorities and reporting practices to better reflect and support development alongside climate action across diverse regional contexts.

Policy Recommendations:

The current state of energy ODA necessitates critical reforms in monitoring, target-setting, and priority alignment to address profound shortcomings in global aid tracking and equity considerations. Merely continuing current trajectories risks perpetuating a system where stated global goals, particularly around equity and access, remain secondary to established frameworks focused on large-scale mitigation and infrastructure. The significant under-application of Rio Markers, with over 30% of projects lacking climate classification (See Table 1, is not just a data gap; it represents a fundamental failure in transparency and accountability that hinders

tracking climate finance flows, its policy effectiveness, and hold donors accountable to their commitments. Donors must invest in improving the quality and consistency of marker application and develop other complementary qualitative indicators beyond simple categorisation.

Furthermore, to address the stark marginalization of energy access and equity concerns,donors must develop robust, mandatory frameworks that integrate specific targets and metrics for energy access and just transition outcomes. This involves actively shifting funding priorities to the marginalized areas, recognizing that interventions like off-grid solutions and community-focused energy programs are not niche alternatives but essential components of equitable development. Similarly, the narrow, infrastructure-centric framing of adaptation must be challenged; donors should explicitly broaden funding criteria to support diverse adaptation strategies.

Explicit requirements should be introduced for ODA projects to systematically consider and report on energy efficiency improvements and just transition implications (including impacts on workers and communities). Concurrently, recipient countries must be supported to strengthen national monitoring systems beyond tracking financial inputs to assess the equity dimensions and localized impacts of ODA projects. Including these justice and access principles within national energy transition plans can also empower recipient countries to negotiate aid packages that better reflect national priorities rather than donor preferences.

Reforming marker frameworks, diversifying funding portfolios, demanding comprehensive reporting, and ensuring equity-focused monitoring are not just technical adjustments but essential steps to redirect energy ODA towards genuinely supporting sustainable and equitable energy futures globally.

Future Work and Expansion:

This research highlights several avenues for future investigation. Methodologically, refining STM by incorporating sentiment analysis or network analysis exploring topic co-occurrence could move beyond simple thematic prevalence to capture the tone and intersectionality of donor framings. This may reveal subtle shifts and interconnected priorities within the aid landscape. Combining this with qualitative case studies could provide much richer insights into the gap between discourse and reality. Expanding the dataset temporally or integrating other sources (e.g., evaluation reports, recipient documentation, media reports) could offer a more comprehensive picture.

Thematically, deeper analysis of underrepresented topics is critically needed. Investigating how and why these essential components of equitable energy transitions are marginalized in discourse can inform strategies to elevate their importance in policy and practice. Comparative analyses across donor types and more granular spatio-temporal analyses could reveal institutional variations and context-specific challenges. Perhaps most importantly, future work must strive to link thematic prevalence more directly to financial commitments and assessed project impacts. Finally, tracking how the discourse evolves in response to recent global shocks (energy price crises, escalating climate impacts) and policy developments post-2023 would be highly valuable.

In conclusion, this thesis demonstrates the power of large-scale text analysis to reveal critical patterns and persistent misalignments within energy ODA discourse. The documented gap between the prominent climate mitigation narrative and the marginalization of energy access and equity underscores the urgent need for donors and policymakers to re-evaluate priorities and reporting frameworks. Ultimately, achieving a truly just and sustainable global energy transition requires a fundamental shift towards integrating climate action with foundational development needs, ensuring that ODA effectively supports equitable outcomes for all.

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Appendix

Rio Markers Description

The Rio Markers system was established in 1998 by the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development (OECD). Its core purpose is to monitor development finance flows and track how aid activities target the objectives of the key environmental agreements. These markers serve as a standardized tool to indicate the extent to which environmental objectives are integrated into international development co-operation.

Climate Change Markers:

- Mitigation Marker: Identifies activities aimed at reducing or limiting greenhouse gas emissions or enhancing the absorption of greenhouse gases (e.g., protecting forests).
- Adaptation Marker: Introduced later (applied from 2010 onwards), this marker identifies activities intended to reduce the vulnerability of human or natural systems to the current and expected impacts of climate change by increasing resilience and adaptive capacity.

Projects are scored based on the significance of the environmental objective:

- Principal (Score 2): The objective is fundamental to the activity.
- Significant (Score 1): The objective is important but not the primary driver for the activity.
- Not Targeted (Score 0): The activity does not target the objective.

Table 1: Distribution of Rio Marker Variables in the Data

	Screened			**Not Screened**
	Not Targeted	Significant	Principal	
Climate Mitigation	30.17%	13.39%	24.47%	31.96%
Climate Adaptation	56.96%	7.39%	2.60%	33.05%

Sector Codes for Energy Projects

Table 2: Energy sector codes based on DAC classification.

Code	Description
230	Energy
231	Energy Policy
232	Energy generation, renewable sources
233	Energy generation, non-renewable sources
234	Hybrid energy plants
235	Nuclear energy plants
236	Energy distribution

Semantic Coherence and Exclusivity

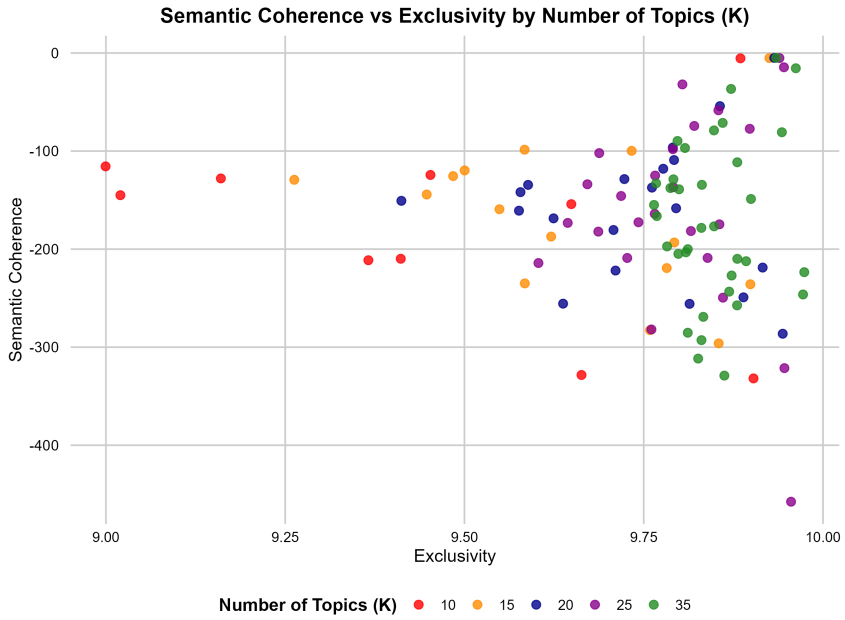

Figure 5: **Model Selection**
This plot compares semantic coherence and exclusivity across different numbers of topics (K). Higher semantic coherence and exclusivity indicate better topic quality. Colors represent different topic model sizes.

Topic Quality for Final Model K=20

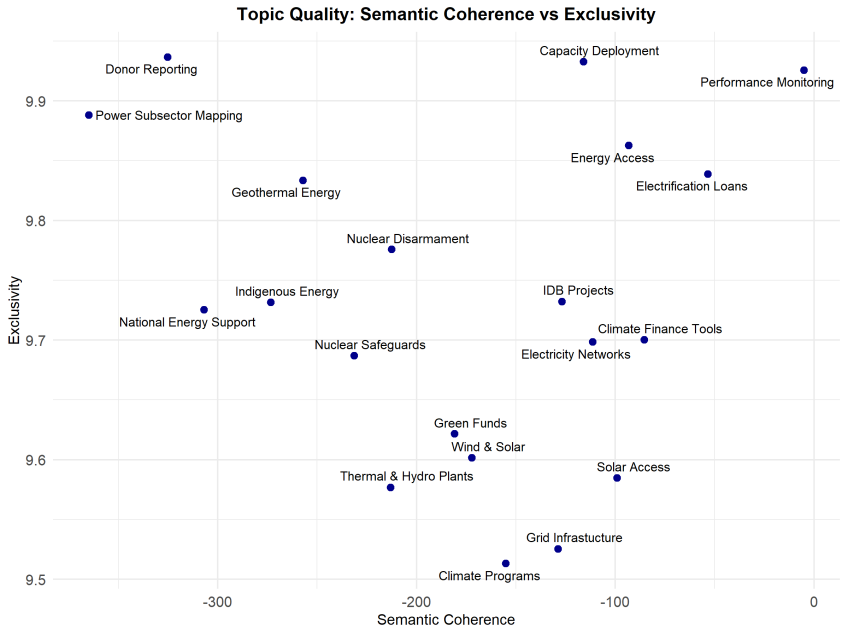

Figure 6: **Topic Quality**
This figure displays the semantic coherence and exclusivity of the final 20 topics selected. Higher exclusivity and coherence values suggest well-differentiated and meaningful topics.

Topic Keywords and Thematic Mapping

This table presents the most representative keywords associated with each topic generated through the Structural Topic Modeling (STM) of project descriptions. Topics are grouped under broader thematic areas based on shared content and semantic similarity. Both probability-weighted (prob) and FREX-weighted (frex) keyword lists are shown to provide insights into topic interpretation. Probability-weighted keywords (prob) are the most frequent words within a topic, emphasizing overall word occurrence. FREX-weighted keywords (frex) balance frequency and exclusivity, highlighting words that are not only common within a topic but also distinctive compared to other topics.

Topic	Topic Name	Theme	Metric	Words
1	Climate Programs	Sustainable Transition	prob	change_climate, aim_project, clean_energy, development_sustainable, energy_transition, carbon_low, build_capacity, climate_programme, country_partner, chain_value, good_practice, climate_description, energy_water, civil_society, change_mitigation
			frex	climate_programme, climate_description, description_support, environment_programme, medium_small, country_partner, africa_west, african_union, promote_sustainable, description_solution, objective_technical, development_lowcarbon, man_woman, climate_environment, power_programme
2	Energy Access	Access & Equity	prob	bank_world, eur_million, natural_resource, energy_transition, development_international, area_program, assistance_technical, clean_cook, aim_improve, clean_energy, fund_trust, investment_private, economic_growth, fund_use, achieve_contribute
			frex	area_program, boost_economic, clean_cook, eur_million, achieve_contribute, mobilise_pidg, provision_service, aim_pidg, alleviate_job, boost_poor, job_trade, poor_provision, poverty_world, consultative_group, increase_order
3	Indigenous Energy	Access & Equity	prob	country_develop, efficiency_increase, development_investment, fuel_import, energy_source, energy_service, investment_promote, area_energy, promote_service, efficiency_reliability, energy_indigenous, development_transport, import_source, process_transport, energy_transparency
			frex	energy_indigenous, development_transport, import_source, process_transport, energy_transparency, indigenous_utilization, process_utilization, reliability_transparency, area_country, enhance_order, energy_science, order_policy, develop_official, governmental_official, competency_comprehensive
4	Performance Monitoring	Monitoring & Technical Assistance	prob	assess_monitor, development_include, commercial_finance, finance_mobilize, monitor_project, individual_project, include_mobilize, performance_program, individual_performance, performance_risk, framework_monitor, additional_commercial, framework_measurement, measurement_performance, blend_finance
			frex	assess_monitor, individual_project, performance_program, individual_performance, performance_risk, framework_monitor, additional_commercial, framework_measurement, measurement_performance, portfolio_progress, iaip_program, assess_risk, blend_project, finance_outcome, iaip_portfolio
5	IDB Projects	Finance & Institutions	prob	private_sector, america_latin, change_climate, adaptation_mitigation, america_caribbean, adaptation_project, country_develop, efficiency_energy, climate_fund, climate_mitigation, project_support, energy_renewable, bank_development, catalyze_private, company_local
			frex	adaptation_project, company_local, fund_may, development_interamerican, group_idb, gas_utility, company_organisation, genderresponsive_promote, bank_idb, idb_invest, partnership_term, agreement_contract, subcontractor_venture, america_caribbean, contract_import

6	Grid Infrastucture	Infrastructure & Energy Systems	prob	line_transmission, power_transmission, investment_program, kv_transmission, energy_renewable, km_kv, kv_substation, network_transmission, kv_line, high_voltage, grid_power, infrastructure_transmission, construction_new, component_include, line_substation
			frex	kv_transmission, km_kv, kv_line, kv_new, construction_kv, associate_substation, exist_kv, circuit_double, efficiency_enhancement, grid_station, kv_mva, finance_multitranche, resource_time, line_substation, project_transmission
7	Solar Access	Access & Equity	prob	energy_solar, access_energy, energy_sector, aim_project, access_electricity, area_rural, access_improve, economic_growth, energy_source, development_economic, access_increase, contribute_project, renewable_source, energy_rural, energy_system
			frex	home_system, country_recipient, panel_solar, energy_offgrid, solar_system, centre_health, affordable_sustainable, emphasis_particular, cluster_develop, partnership_regulatory, solar_use, access_reliable, inclusive_increase, home_solar, creation_job
8	Capacity Deployment	Monitoring & Technical Assistance	prob	assistance_technical, deployment_expert, initiative_ta, contribute_sustainable, activity_aim, civil_society, civil_sector, development_goal, development_sustainable, advisory_support, activity_include, project_work, study_tour, support_technical, academia_private
			frex	deployment_expert, initiative_ta, civil_sector, seminar_train, total_year, expert_partnership, country_fragile, academia_private, advisory_support, activity_aim, academia_society, contribute_sustainable, region_various, contribute_people, deployment_mechanism
9	Donor Reporting	Finance & Institutions	prob	activity_aggregate, aggregate_tc, energy_resource, department_state, bureau_energy, bureau_state, information_redact, contractual_service, contractual_miscellaneous, classify_service, enr_resource, enr_infrastructure, fund_support, cover_miscellaneous, implement_partner
			frex	activity_aggregate, aggregate_tc, department_state, bureau_energy, bureau_state, information_redact, contractual_service, contractual_miscellaneous, classify_service, enr_resource, enr_infrastructure, cover_miscellaneous, education_research, accountability_act, aid_foreign
10	Geothermal Energy	Infrastructure & Energy Systems	prob	private_sector, district_heat, economic_growth, framework_regulatory, assistance_technical, supply_water, resource_water, build_capacity, investment_sector, energy_geothermal, infrastructure_project, participation_sector, heat_system, energy_infrastructure, heat_supply
			frex	energy_geothermal, heat_supply, district_heat, heat_system, participation_sector, heat_waste, million_year, mission_trade, live_standard, start_year, critical_infrastructure, development_geothermal, reverse_trade, energy_infrastructure, biomass_energy

11	Nuclear Disarmament	Sustainable Transition	prob	change_climate, action_climate, equality_gender, private_sector, high_impact, assistance_technical, grant_million, climate_partnership, gender_promote, impact_partnership, woman_young, concessional_finance, material_nuclear, climateresilient_lowcarbon, across_globe
			frex	impact_partnership, climateresilient_lowcarbon, across_globe, across_facility, civilian_facility, civilian_material, confirm_disposition, confirm_remove, disposition_excess, excess_weaponsuseable, nuclear_weaponsuseable, bank_reconstruction, bank_european, million_repayable, development_ebrd
12	Climate Finance Tools	Finance & Institutions	prob	energy_technology, climate_finance, country_develop, collaborative_project, asia_southeast, finance_solution, change_climate, knowledge_transfer, blend_finance, power_sector, adaptation_mitigation, fund_grant, assistance_technical, develop_solution, joint_project
			frex	finance_solution, develop_solution, client_collaborative, applicant_select, capital_mobilization, delhi_india, minister_prime, accelerate_assistance, collaborative_project, create_thus, climate_project, address_impact, capital_develop, finance_vehicle, actor_contribute
13	National Energy Support	Monitoring & Technical Assistance	prob	efficiency_energy, energy_sector, energy_renewable, energy_improve, assistance_technical, gas_greenhouse, energy_increase, energy_production, emission_gas, energy_security, build_capacity, bank_development, assistance_ta, energy_system, asian_development
			frex	country_member, facility_ta, knowledge_support, build_public, determine_nationally, develop_member, energy_increase, country_dmcs, balkan_western, efficiency_measure, energy_production, distribution_production, energy_implementation, support_ta, energy_management
14	Electricity Networks	Infrastructure & Energy Systems	prob	electricity_supply, power_supply, distribution_transmission, distribution_network, distribution_system, power_system, africa_power, distribution_electricity, demand_electricity, electricity_transmission, distribution_power, system_transmission, improve_reliability, access_electricity, improve_power
			frex	electricity_market, africa_power, electricity_increase, distribution_electricity, center_control, generation_transmission, reliable_supply, distribution_network, electricity_supply, electricity_transmission, electricity_network, order_task, electricity_regional, acquisition_datum, loss_reduce
15	Electrificatio n Loans	Finance & Institutions	prob	electrification_rural, objective_project, product_type, development_project, objective_specific, energy_renewable, objective_overall, project_support, description_product, electricity_sector, area_rural, nam_viet, main_objective, development_energy, general_objective
			frex	product_type, description_product, electrification_project, base_loan, base_libor, libor_type, general_objective, objective_specific, loan_project, build_design, electricity_sector, comfortable_thermally, efficient_thermally, adf_type, nam_viet

16	Thermal & Hydro Plants	Infrastructure & Energy Systems	prob	plant_power, power_station, power_thermal, gas_natural, generation_power, hydroelectric_power, aim_project, hydro_power, capacity_mw, combine_cycle, electric_power, construction_operation, power_project, consist_project, generate_power
			frex	power_thermal, combine_cycle, cycle_power, gas_turbine, manage_service, locally_manage, locally_provide, need_strategy, delivery_plan, hydroelectric_power, canada_monitor, delivery_monitor, policy_socioeconomic, generate_station, aim_satisfy
17	Nuclear Safeguards	Monitoring & Technical Assistance	prob	nuclear_regulatory, include_train, activity_include, agency_regulatory, collaboration_technical, activity_engagement, international_nuclear, fund_national, execute_prepare, laboratory_national, nuclear_safeguard, award_fund, agency_relate, agency_nuclear, organization_relate
			frex	nuclear_regulatory, collaboration_technical, international_nuclear, execute_prepare, laboratory_national, nuclear_safeguard, award_fund, agency_nuclear, organization_relate, agency_operator, consultation_technical, consultation_train, engagement_safeguard, nuclear_operator, collaboration_foreign
18	Green Funds	Finance & Institutions	prob	energy_renewable, energy_sustainable, clean_energy, energy_service, energy_project, efficiency_energy, access_energy, country_develop, private_sector, business_model, investment_private, energy_investment, energy_modern, energy_market, access_clean
			frex	energy_finance, energy_fund, early_stage, business_technology, promotion_renewable, energy_partnership, energy_market, africa_fund, fund_target, modern_sustainable, group_target, framework_loan, financial_institution, bond_green, energy_modern
19	Wind & Solar	Sustainable Transition	prob	feasibility_study, power_solar, energy_renewable, hydropower_plant, generation_power, power_wind, energy_generation, power_project, photovoltaic_solar, energy_storage, pv_solar, hydropower_project, implementation_project, pilot_project, feasibility_fund
			frex	pv_solar, feasibility_study, grant_ustda, contribution_shall, park_solar, photovoltaic_solar, energy_wind, storage_system, contribution_financial, power_wind, shall_use, battery_storage, project_would, grid_smart, plant_pv
20	Power Subsector Mapping	Infrastructure & Energy Systems	prob	power_sector, afdb_sector, afdb_subsector, afdb_power, electricity_subsector, power_subsector, demand_power, development_hydropower, improvement_project, electrification_rural, increase_power, financial_management, increase_meet, build_capacity, adb_venture
			frex	afdb_sector, afdb_subsector, afdb_power, electricity_subsector, power_subsector, province_uva, allocation_star, solar_subsector, adb_venture, development_hydropower, cc_star, hydropower_sustainability, demand_power, power_sector, meet_power

Statement of Authorship

I hereby certify that the present master's thesis is entirely my own work and that all sources have been appropriately acknowledged. Any ideas, data, figures, or text derived from the work of others have been clearly referenced and cited. Verbatim extracts are clearly indicated as such, and all other sources of information have been specifically and accurately acknowledged.

I also acknowledge that, in line with academic integrity policies, AI-based tools were utilized in a limited and responsible manner to assist with language editing, formatting improvements, and technical troubleshooting during the preparation of this thesis. All substantive research, analysis, writing, and critical thinking are my own work.

I further confirm that the digital copy of this thesis submitted on April 28, 2025 is identical to the printed version submitted to the Examination Office on April 29, 2025.

Manjiri Girish Satam
April 28, 2025