Limited Demand or Unreliable Supply? A Bibliometric Review and Computational Text Analysis of Research on Energy Policy in India

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Abstract: Although India has made significant progress towards the sustainable development goal on energy (SDG 7), further policy innovations are essential for closing the gap, addressing geographic disparities, and harnessing energy for transformative change. Research can support this process by creating policy-relevant knowledge regarding the energy transition, but there is no systematic account of the literature pertaining to energy policy in India to map the research area and suggest key avenues for future research. In this study, I conduct a bibliometric review and computational text analysis of over 2700 publications to identify the key themes, geographies, and public policy concepts (not) examined in the research on energy policy in India. I find that: (i) the literature is dominated by topics in energy supply and less attention is paid to demand-side management, energy efficiency, and electricity distribution; (ii) existing studies have hardly examined subnational policy (-making), especially in the case of eastern and north-eastern India; and (iii) research on both analysis for policy and analysis of policy is limited. I conclude that the current foci lack the breadth and depth necessary for supporting the Indian energy transition and urge scholars to diversify the thematic, geographic, and conceptual engagement in future research.

Keywords: bibliometric review; computational text analysis; energy policy; India; policy analysis; policy innovation; policy sciences; public policy; sustainable development goal on energy (SDG 7); sustainable energy transition

1. Introduction

India has made significant progress on the three pillars of the sustainable development goal on energy (SDG 7): energy access, energy efficiency, and renewable energy. Residential electricity consumption in the country has increased over 50-fold in half a century [1] and nearly every household has received a connection to liquified petroleum gas, or LPG [2]. To enhance energy efficiency, governments have adopted numerous measures on demand-side management [3], and energy intensity of the economy has witnessed a reduction of approximately 15 percent in the previous decade [4]. Further, the country has been successful in increasing the capacity of solar and wind energy in its electricity generation mix in a cost-effective manner [5–7]. However, access to modern energy remains uneven [2,8] and nearly 35 percent of the country is still energy poor [9]; significant energy savings in end use [10–14], transmission and distribution [15], and generation [16] remain untapped; the dependence on imported technologies for solar energy [17], the slow deployment of wind energy [18,19], and the limited contribution of other renewable energy sources [20] continue to pose a challenge. Policy innovations will, therefore, be important in accelerating the sustainable energy transition in India.

The situation in energy access, energy efficiency, and renewable energy varies significantly at the subnational level. For instance, both the cost and the quality of electricity supply differ from state to state and from rural to urban India [21–23]. In combination with differences in cultural, geographic, and socioeconomic characteristics, these result
in heterogeneities in demand and consumption [9,24–26]. Further, there are leaders and laggards at the sectoral- and state-level in the case of energy efficiency [3,10,13]. Even for renewable energy, resource availability, policy activity, and achievement differ widely within the country [27]. Moreover, energy governance in the country is multi-level; the union government and the state governments are concurrently responsible for decision-making, implementation, and monitoring and evaluation. Therefore, policy innovations will be necessary not only across policy areas, but also at various levels of government.

Policy-relevant research can create knowledge on understanding, explaining, and promoting policy innovation for the Indian energy transition. In fact, the field of policy analysis gained prominence in the Global North after the Second World War to provide governments with a systematic, domain-agnostic approach for identifying societal issues [28], formulating policy alternatives, and choosing the “best” course of action [29,30]. The idea of policy sciences—a normative, multi-disciplinary, and contextual orientation to public policy emphasizing both analysis for policy (i.e., traditional policy analysis) and analysis of policy (i.e., policy studies)—was also born [31]. While the field of policy analysis continued to develop, scholars also began to study the processes of policy formulation, policy adoption, and policy implementation to explain policy outputs and outcomes on the ground [32–35]. Further, since the 1990s, scholars dissatisfied with the positivist or post-positivist orientation in public policy have expressed increasing interest in using a constructivist lens and studying public policy as a discursive or narrative contest, in what is known as the “argumentative turn” in public policy [36–38]. Consequently, a variety of approaches, theories, and methods are available for creating policy-relevant knowledge in any policy area, including energy policy.

The body of research pertaining to the energy policy in India is large and growing rapidly. Illustratively, the Elsevier Scopus database alone has indexed over 2500 publications in this research area, over half of which have been published within the last decade. Within this literature, one can find reviews of various subjects, such as business models [39], characteristics influencing energy behavior [40], indicators [28], policies [41–43], status and progress [44,45], and technologies [46,47]. In addition, a few reviews of the literature on topics such as the Electricity Act, 2003 [48] and the effect of local content requirements on the development of renewable energy [49] also exist. However, no study has conducted a comprehensive review to provide a systematic account of the scholarship. As a result, knowledge of the trends in the literature, the topics covered, the gaps in existing work, and broad directions for future research remain unclear.

The objective of this study is to provide an overview of the literature on energy policy in India and shed light on its thematic focus, geographic focus, and policy focus. It addresses the following research question: what are the key themes, geographies, and public policy concepts that have been examined in this research area. To answer this question, I conduct a bibliometric review and computational text analysis of over 2700 publications pertaining to energy policy in India. In doing so, I contribute to the literature by: (i) providing the first systematic account of the scholarship; (ii) identifying (gaps in) the thematic, geographic, and public policy focus of existing studies; (iii) thereby, proposing directions for future research in this area; and, (iv) demonstrating one application of computational text analysis to the research on energy policy in India.

This article is structured as follows. After this introduction, Section 2 describes the methods of this study. Subsequently, an overview of research pertaining to energy policy in India is presented in Section 3. Section 4 examines the thematic focus of the research based on the clusters identified in the co-occurrence analysis. Then, the geographic focus (Section 5) and the policy focus (Section 6) of the research are analyzed. Finally, Section 7 discusses the implications of the findings, proposes directions for future research, and concludes the study.
2. Materials and Methods

This study is based primarily on bibliometric analysis. Bibliometrics is “the collection, the handling, and the analysis of quantitative bibliographic data, derived from scientific publications” [50]. Thus, the unit of analysis is the record of a scientific publication, which comprises information on author names, publication title, publication year, source title, abstract, keywords, number of citations, and cited references. This information is coded to obtain quantifiable data regarding the volume of scientific activity, the authorship network, the source network, and the most cited publications in the dataset [50,51].

Further, the structure of enquiry in the research area is mapped through computational text analysis, specifically automated (term) co-occurrence analysis. This involves extracting terms from publication titles and abstracts, creating a thesaurus to harmonize them, and creating a co-occurrence network of frequently occurring, relevant terms. In a co-occurrence network, the weight of an edge between two nodes (terms) indicates the number of publications in which the terms co-occur in the keyword list or the title and abstract. Following van Eck and Waltman [52], I used binary counting for the creation of the co-occurrence network, i.e., counted the presence of a term rather than the number of times it occurred within the title or abstract.

Subsequently, I examined occurrences of countries, states, and cities in the dataset to understand the geographic focus of the research. Finally, the context in which the term “policy” is used was examined by counting occurrences of noun phrases containing the term, as these are likely to indicate the sectoral (for example, climate policy, energy policy, or urban policy) as well as conceptual (for example, policy change, policy design, or policy implementation) focus of the publications in the dataset. I then searched for the frequently occurring phrases in the dataset and reviewed titles and abstracts of publications matching them to understand the research focus and its analytical engagement with public policy.

The data for the bibliometric analysis were obtained from the Elsevier SCOPUS database. They consisted of publications whose titles, abstracts, or keywords matched the following search query: India AND (electricity OR energy OR “power sector”) AND policy. This search was conducted on 25 July 2019 and returned over 3200 publications. Amongst these, about 450 publications were excluded based on relevance after two rounds of screening based on publication content and type. Those excluded were, for instance, business reports pertaining to electricity, gas, or oil; research on energy pertaining to other geographies in which India was mentioned only cursorily; works on foreign policy in which energy was merely mentioned; or publications on nutrition in which energy was described in the context of metabolism.

The analyses were conducted using Microsoft Excel and VOSViewer [53,54].

3. Overview of the Research on Energy Policy in India

This dataset contains 2771 publications pertaining to energy policy and India. The earliest publication in this dataset was by Henderson [55] on “India: The energy sector”. Subsequently, Parikh and Parikh [56] published on the “Mobilization and impacts of biogas technologies” and Parikh [57] published on the “Scope for energy substitution in India”. The number of publications on the topic has grown steadily since then. The 1980s witnessed over 80 publications in this research area, in comparison to the 10 publications during the 1970s. By the turn of the millennium, scientific activity had increased to approximately 30 publications per year. It has risen severalfold since and after 2015 Scopus has indexed more than 200 publications annually.

Over 4700 authors have contributed to the 2771 publications in this dataset, indicating a fairly high degree of collaboration in this research area. This is further corroborated by the co-authorship network analysis: the largest connected co-authorship network in this dataset links over 1700 authors. A majority of the authors have, however, been involved in only a single publication on the topic and fewer than 150 authors have five or more publications in this dataset. A co-authorship network of scholars with five or more publications is shown in Figure 1.
The authors with the most publications on the topic are: P. R. Shukla (n: 41), J. K. Parikh (n: 23), A. Singh (n: 17), and A. Garg, P. Purohit, and J. Urpelainen (n: 16 each). The results of this analysis also include A. Kumar and S. Kumar (n: 24 each). However, these names appear to match multiple authors who cannot be distinguished easily based on the bibliometric data. Among the prolific authors, while J. K. Parikh was actively involved in the early development of the research area (average publication year, y: 2000), P. R. Shukla, A. Singh, A. Garg, and P. Purohit have been more active since 2000 (y: 2010–12), and J. Urpelainen has been active more recently (y: 2016). As one might expect, a majority of the work on the topic (number of publications, n > 1600) has been published by scholars affiliated with an institution in India. In addition, scholars affiliated with institutions in the United States (n > 400) and the United Kingdom (n > 150) have also published frequently in this research area. Other countries with a substantial publication record on the topic (n > 50) include: Germany, China, Australia, France, the Netherlands, and Japan.

Although research in this area has been published in over 1000 sources, only 92 sources have five or more publications and 33 sources have 10 or more publications in this dataset (Figure 2; Table 1). The sources with the most publications in this dataset are: Energy Policy, Renewable and Sustainable Energy Reviews, Energy, Energy Economics, and Energy for Sustainable Development. Other prominent sources in this research area include: Renewable Energy, The Journal of Cleaner Production, Energy Procedia, Economic and Political Weekly, and the International Journal of Global Energy Issues. While sources such as Energy Policy, Energy, Energy Economics, and Energy for Sustainable Development have demonstrated an interest in the topic for a while (y: 2008–11), sources such as Renewable and Sustainable Energy Reviews, The Journal of Cleaner Production, and Applied Energy have paid attention to the research area more recently (y: 2014–17).

The most cited publications in this dataset provide a preview of the themes discussed in the research area (Table 2). Illustratively, Masih and Masih [58] examine unidirectional and bidirectional Granger causality between total energy consumption and real income in six Asian countries, including India. Relatedly, Pao and Tsai [59] and Ghosh [60] analyze the relationship between energy consumption and economic growth in the BRIC countries and India, respectively. In another highly cited study, Jibaraj and Iniyan [61] review a plethora of energy modelling techniques to inform the policy-making and scholarly communities.
Meanwhile, Nejat, Jomehzadeh [62] review the trends in residential energy consumption, carbon dioxide emissions, and energy policies in the 10 highest carbon-dioxide-emitting countries worldwide. With a focus on biofuels, Sorda, Banse [63] examine the national strategies of the leading producers and De Fraiture, Giordano [64] assess the implications of production on land and water use. Meanwhile, in broader analyses that also touch upon energy policy, Drèze and Sen [65], Leach, Scoones [66], and Ackerman [67] delve into India’s development trajectory, the pathways approach to sustainability, and co-governance as a paradigm for effective public participation, respectively.

![Citation network of sources with 10 or more publications pertaining to energy policy in India.](image)

**Figure 2.** Citation network of sources with 10 or more publications pertaining to energy policy in India. A node depicts a source while a link between two nodes represents a citation relationship. The size of the node is indicative of the number of publications in the source in this dataset. The color of the node shows the average publication year for the source.

**Table 1.** Top sources publishing research pertaining to energy policy in India.

| Source                                      | Publications | Citations |
|---------------------------------------------|--------------|-----------|
| Energy Policy                               | 317          | 9448      |
| Renewable and Sustainable Energy Reviews    | 130          | 4479      |
| Energy                                      | 73           | 1888      |
| Energy Economics                            | 45           | 1446      |
| Energy for Sustainable Development          | 41           | 637       |
| Renewable Energy                            | 33           | 754       |
| The Journal of Cleaner Production           | 33           | 472       |
| Energy Procedia                             | 29           | 123       |
| Economic and Political Weekly               | 27           | 131       |
| International Journal of Global Energy Issues | 25           | 66       |
Table 2. The most cited publications pertaining to energy policy in India.

| Authors | Title | Year | Source | Cites |
|---------|-------|------|--------|-------|
| Masih A.M.M., Masih R. | Energy consumption, real income and temporal causality: Results from a multi-country study based on cointegration and error-correction modelling techniques | 1996 | Energy Economics | 419 |
| Dreze J., Sen A. | An uncertain glory: India and its contradictions | 2013 | - | 414 |
| Jebaraj S., Iniyan S. | A review of energy models | 2006 | Renewable and Sustainable Energy Reviews | 378 |
| Nejat P., Jomehzadeh F., Taheri M.M., Gohari M., Abd. Majid M.Z. | A global review of energy consumption, CO₂ emissions and policy in the residential sector (with an overview of the top ten CO₂ emitting countries) | 2015 | Renewable and Sustainable Energy Reviews | 347 |
| Leach M., Scoones I., Stirling A. | Dynamic sustainabilities: Technology, environment, social justice | 2010 | - | 335 |
| Pao H.-T., Tsai C.-M. | CO₂ emissions, energy consumption and economic growth in BRIC countries | 2010 | Energy Policy | 283 |
| Ghosh S. | Electricity consumption and economic growth in India | 2002 | Energy Policy | 281 |
| Sorda G., Banse M., Kemfert C. | An overview of biofuel policies across the world | 2010 | Energy Policy | 279 |
| De Fraiture C., Giordano M., Liao Y. | Biofuels and implications for agricultural water use: Blue impacts of green energy | 2008 | Water Policy | 265 |
| Ackerman J. | Co-governance for accountability: Beyond “exit” and “voice” | 2004 | World Development | 223 |

4. The Thematic Foci of the Research

The most commonly occurring terms in publication titles and abstracts in this dataset are: India (number of publications, n: 2565), policy (n: 1203), country (n: 1166), energy (n: 932), development (n: 720), technology (n: 614), China (n: 559), government (n: 531), system (n: 530), use (n: 477), and model (n: 475). However, many of these have little discriminating power in identifying specific themes within this literature. To increase coherence of the analysis, only 60 percent of the most relevant terms were used for clustering the research. Indicatively, the most frequently occurring relevant terms in this dataset are: China (n: 559), emission (n: 419), carbon emission (n: 346), security (n: 325), economic development (n: 313), generation (n: 287), energy consumption (n: 268), oil (n: 204), carbon (n: 201), and United States (n: 188). Based on co-occurrence of frequently occurring relevant terms, this literature can be classified broadly into eight clusters (Figure 3).

The first cluster focuses on various aspects of the electricity sector. This is indicated by the terms frequently occurring in this theme, such as (energy/power) generation, renewable energy source, solar/wind energy, (electricity) grid, transmission, electricity demand, customer, competition, trading, and policy framework. The themes covered here include electricity generation [68], renewable energy [69], transmission and distribution [70,71], electricity demand [72], and governance [73–75]. Illustratively, Umamaheswaran and Seth [76] identify characteristics that facilitate or hinder financing for utility-scale solar and wind energy while Sahoo and Shrimai [77] evaluate the effectiveness of a requirement to source technology domestically in strengthening the local solar photovoltaic manufacturing base in India. In the context of electricity reform, Srivastava and Shahidehpour [78] and Sharma, Nair [79] critique the initial progress and draw lessons for restructuring the sector.

The second cluster is on energy geopolitics. Studies in this cluster engage with themes pertaining to energy security [80,81], fuel supply [82,83], nuclear energy [84,85], international trade [86,87], and resource extraction [88,89]. Consequently, the terms appearing often in this cluster include: security, geopolitics, oil, (liquified) natural gas, pipeline, nuclear (energy/power), (non-) proliferation, trade, agreement, supplier, import, domestic
production, reserve, and mining. In addition, other countries such as China, the United States, Japan, Russia, and Pakistan are mentioned frequently in this theme. Illustratively, Grover [90] reviews the policy initiatives of the Government of India on nuclear energy to develop a likely scenario for electricity generation capacity while Roy [91] calls for closer cooperation between India and Central Asia, especially Turkmenistan, to secure natural gas supply. In a study at the interface of energy and foreign policy, Jörgensen and Wagner [92] identify opportunities for strengthening the bilateral relationship between the European Union and India on climate change and energy.

![Image](image_url)  

**Figure 3.** Co-occurrence network of terms in the titles and abstracts of at least 10 publications pertaining to energy policy in India. A node depicts a term in a publication title or abstract. A link between two nodes represents a frequent co-occurrence relationship. The size of the node is indicative of the number of occurrences of the node in this dataset. The color of the node shows the primary cluster of the node: the electricity sector (red), geopolitics (green), energy access (blue), climate change mitigation (yellow), the energy-food-water nexus (pink), the economy-energy nexus (aqua), oil and biofuel (orange), and the Kyoto protocol (brown).

The third cluster in this research area is on energy access. This literature covers themes spanning energy services, the choice of fuel, the availability and quality of electricity, the societal impact of energy access, and models for enhancing access. These are indicated by the terms used commonly in this cluster: energy access, energy requirement, cooking, lighting, biomass, liquified petroleum gas, kerosene, (rural) electrification, reliability, affordability, education, women, business model, microgrid, and public private partnership. Narula [93], for example, assesses sustainable energy security—in terms of availability, affordability, efficiency, and environmental acceptability—of several alternatives for households in India. Gupta and Ravindranath [94] conduct a financial analysis of household cooking energy alternatives, and Yap and Nixon [95] evaluate various waste-to-energy technologies based on a mix of qualitative and quantitative criteria. Focusing on the issue of energy access, Rao [96] examines the distributional benefit of the subsidy on kerosene in the state of Maharashtra while Jeuland, Bhoyvaid [97] estimate the willingness to pay for improved cook stoves in rural India. In a more recent study, Malakar [98] examines the effect of rural electrification in enhancing capabilities in two villages in the state of Andhra Pradesh. Meanwhile, Sudhakara Reddy and Nathan [99] highlight the impact of the lack of access to modern energy services on women.

The fourth cluster focuses on climate change mitigation. The most frequently occurring terms within this cluster include (carbon) emission, greenhouse gas, (climate change) mitigation, policy scenario, co-benefit, carbon capture (and storage), air (pollution/quality), nitrogen dioxide, sulfur dioxide, United Nations Framework Convention on
Climate Change (UNFCCC), Paris Agreement, and Nationally Determined Contribution (NDCs). These show that studies in this cluster delve into themes surrounding greenhouse gas emissions, climate policy, low carbon technologies, and air pollution. Illustratively, in a scenario modelling analysis, Shukla [100] constructs the emissions trajectory for India under alternative specifications of a carbon tax. Subsequently, Ghosh, Shukla [101] examine the mitigation potential of various renewable energy technologies in the electricity sector in India. Moreover, Cohen, Blanco [102] explore the use of multi-criteria decision analysis in operationalizing the co-benefit approach by guiding policymaking at the climate-development interface. Another strand within this theme examines the issue of local air pollution in relation to energy use [103–105]. In addition, this cluster comprises terms that refer to energy demand, including demand-side, energy efficiency, rebound effect, buildings, transport (system), and industries such as cement and iron and steel [106–108].

The fifth cluster delves into the energy-food-water nexus. The key themes in this literature include water for energy [109,110], energy subsidies [111], agriculture [112], energy for water [113], and climate change adaptation [114]. This is reflected in the terms mentioned often in this cluster: hydroelectric power, energy subsidy, agriculture, farmer, food, groundwater, river, pricing, drought, livelihood, vulnerability, resilience, and adaptation. Illustratively, Devasenapathy, Senthilkumar [115] highlight the importance of a sustainable agricultural system in preventing the depletion of conventional energy sources, as agriculture consumes about 10 per cent of commercial energy in India. On the energy-water nexus, Bassi [116] argues that solar-powered irrigation is unviable in India from an economic and natural resources perspective, while Closas and Rap [117] also caution about the financial and economic cost of subsidizing solar photovoltaic technologies for groundwater pumping. Anand [118], in a focus on the energy-food nexus, emphasizes the dilemma in reducing energy subsidies in a low- or middle-income country, as a one-unit increase in the cost of input energy manifests as a multi-unit increase in the total cost of farming.

The sixth cluster concerns the economy-energy nexus. The most frequently mentioned terms in this cluster highlight its empirical foci and methodological preferences: economic development, gross domestic product, coal/electricity/energy consumption, foreign direct investment, price elasticity, environmental Kuznets curve, hypothesis, panel, time series data, co-integration, (Granger/unidirectional) causality, and vector error correction model. As these suggest, the prominent themes in this cluster are the relationship between energy consumption and economic growth, the influence of other economic variables—such as investment and trade—on the energy system, and price elasticities of energy demand. Illustratively, Ghosh [60] examines the presence and direction of causality between economic development and energy consumption in India (see also Paul and Bhattacharya [119]). In another example, Shahbaz, Mallick [120] study the effect of economic, social, and political globalization on energy consumption in India in the short-run as well as the long-run. Moreover, the mention of other countries—such as Brazil, Malaysia, South Africa, and Thailand—hints at cross-country analyses with a possible focus on BRICS and Asia. For instance, Abdouli, Kamoun [121] estimate the relationship of economic growth, foreign direct investment, and population density to carbon dioxide emissions in the BRICS economies.

The seventh cluster delves into issues related to oil and biofuel. This is indicated by the key terms in this cluster: crude oil, gasoline, petroleum, refinery, oil import/price, engine, transport fuel, alternative fuel, substitution, blending, biofuel, bioenergy, ethanol, lifecycle assessment, and wasteland. van Moerkerk and Crijns-Graus [122], for instance, analyze oil supply risk under different scenarios in large economies around the world and Li and Xiaowen Lin [123] estimate the effect of demand from emerging countries, such as China and India, on global oil prices. In another strand, Murali and Hari [124] examine the trends in demand and supply of biofuels in India, while Kumar Biswas and Pohit [125] identify the characteristics that hinder progress on the policy target of 20 percent bioethanol
and biodiesel blending in petrol and diesel, respectively. Meanwhile, Gmünder, Zah [126] conduct a lifecycle assessment of an electricity generation plant running on Jatropha oil.

The final cluster, closely related to the cluster on climate change mitigation, focuses on the Kyoto protocol and related topics. This is reflected in the terms associated with this cluster: clean development mechanism (project), Kyoto protocol, annex, host/industrialized country, certified emissions reduction, Latin America, tonne, and transparency. Illustratively, den Elzen, Lucas [127] identify geographic regions with similar mitigation costs in the post-Kyoto world. Meanwhile, Rahman and Kirkman [128] analyze variation in the cost structure of certified emissions reduction based on project and geographic characteristics. With an interest in the impact of the Kyoto protocol on low- and middle-income countries, Pathak, Gupta [129] model the effect of carbon tax in the United States on its trade with India.

This analysis shows that electricity generation has received far more attention than transmission and distribution in the literature. Even without counting variations such as (renewable) energy generation, the terms “generation” and “power generation” occur in over 275 publications and 150 publications, respectively. In contrast, the terms “distribution”, “transmission”, and “DISCOM” (or “distribution utility”) feature in about 125, 70, and 30 publications, respectively. In addition, although the term energy efficiency or its variants occurs in approximately 260 publications, energy efficiency does not feature as a separate cluster and is often discussed as one umbrella of measures in the context of climate change mitigation. Further, terms associated with energy conservation and demand side management also appear in only about 110 and 30 publications, respectively.

5. The Geographies in the Research

Apart from India, several other countries are mentioned often in publication titles and abstracts in the dataset. Most prominent amongst these are: China (n > 500), the United States (n > 200), Brazil (n > 150), Japan (n > 130), and Russia (n: 116). Other countries mentioned in a significant number of publications (n > 50) include South Africa, Pakistan, Australia, Bangladesh, and Mexico. The literature spans large-n econometric analyses [130], studies on countries prominent from an energy consumption or greenhouse gas emissions perspective [131–133], regional analyses on Asia [134] or the Indian subcontinent [135], research on emerging economies such as the BRICS countries [136], small-n comparative work, for example, on China and India [137], and investigation of issues involving geopolitically strategic countries for India, such as Iran [138].

The states in India are not mentioned often in this dataset. The ones mentioned most frequently are: Gujarat, Tamil Nadu, Maharashtra, Karnataka, Uttar Pradesh, Andhra Pradesh, Rajasthan, Odisha, and Kerala (Table 3). Numerous state-level studies focus on various aspects of renewable energy, such as solar energy resource potential [139,140], public acceptance of small hydroelectric power [141], diffusion of renewable energy [142–144], policy implementation [145], or the management of biomass energy [146]. Research has also delved into the energy-food or the energy-water nexus, for example, in the case of Gujarat [147], Karnataka [148], Tamil Nadu [149], or West Bengal [150]. The issue of energy pricing is another key challenge that has received attention in state-level analysis, illustratively, in the case of kerosene subsidy in Maharashtra [96] or cross-subsidization and residential pricing of electricity in Uttar Pradesh [151,152].

Research at the city level is even more limited. As one might expect, Delhi (or New Delhi) is the most frequently mentioned among the cities. The other cities featuring in the literature are: Mumbai, Bengaluru, Chennai, Hyderabad, Ahmedabad, Vishakhapatnam, Pune, and Kolkata (Table 4). A key topic at the city level is that of local air pollution. Illustratively, Gurjar, Ravindra [104] examine local air pollution in Indian megacities; Garg, Kapshe [153] focus on point sources of pollution; and Guttikunda, Goel [154] zoom in on particulate emissions in coastal cities such as Chennai and Vishakhapatnam. Carbon footprint and greenhouse gas emissions of the city or for specific categories of consumers (such as residential buildings) have also received attention, both in the international context.
and the domestic one [155–157]. Other issues studied at the city level include cooking fuel use [158], community microgrids [159], slum electrification [160], decentralized renewable energy [161], transportation scenarios [162], and energy conservation/optimization in industries [163].

Table 3. The states mentioned in research on energy policy in India.

| State            | Occurrences |
|------------------|-------------|
| Gujarat          | 44          |
| Tamil Nadu       | 37          |
| Maharashtra      | 30          |
| Karnataka        | 28          |
| Uttar Pradesh    | 27          |
| Andhra Pradesh   | 25          |
| Rajasthan        | 25          |
| Odisha           | 22          |
| Kerala           | 20          |

Table 4. The cities mentioned in research on energy policy in India.

| City                | Occurrences |
|---------------------|-------------|
| (New) Delhi         | 90          |
| Mumbai              | 31          |
| Bengaluru           | 18          |
| Chennai             | 9           |
| Hyderabad           | 9           |
| Ahmedabad           | 7           |
| Vishakhapatnam      | 6           |
| Pune                | 5           |
| Kolkata             | 5           |

This analysis indicates that a majority of the research pertaining to energy policy in India has focused on the international or national level. The fact that terms such as state, district, city, or village do not occur commonly in the dataset further corroborates this inference. Moreover, studies that conduct state-level analysis often delve into themes such as resource availability or techno-economic assessment. Energy governance, in which Indian states play a key role, has been relatively under-studied at the subnational level. Further, the literature also demonstrates a bias towards western and southern states, which benefit from higher (renewable) resource potential and a better standard of living. North-eastern, eastern, and northern states have received far less attention. Finally, city-level analyses have been mainly limited to large or metropolitan cities with a preference for themes such as air pollution and energy access or supply; end-use in buildings and transportation are hardly examined at this level.

6. The Locus of Public Policy

An examination of the terms mentioning policy provides a glimpse into the policy areas covered in this literature (Table 5). As one might expect, energy policy is the most commonly discussed domain in this dataset. The terms associated with it include energy policy, bioenergy/biofuel policy, energy conservation/efficiency policy, electricity policy, new (gas) exploration licensing policy, solar power policy, and oil policy. Climate policy is
another area receiving much attention in the literature, as corroborated by the presence of terms such as climate (change) policy, climate change mitigation policy, emissions reduction policy, and low carbon policy. Numerous studies also refer to energy in the context of economic policy as seen by the mention of the following: economic policy, development policy, fiscal policy, industrial policy, and trade policy. Other policy areas discussed in the literature include environmental policy, foreign policy, science, technology, and innovation policy, social policy, urban policy, and agricultural policy.

Table 5. Policy areas mentioned in the research on energy policy in India.

| Policy Area                                      | Occurrences |
|--------------------------------------------------|-------------|
| Energy policy                                    | 217         |
| Bioenergy/biofuel policy                         | 37          |
| Energy conservation/efficiency policy            | 28          |
| Electricity policy                               | 17          |
| New (gas) exploration licensing policy           | 10          |
| Solar power policy                               | 3           |
| Oil policy                                       | 3           |
| Climate (change) policy                          | 96          |
| Climate change mitigation policy                 | 26          |
| Emissions reduction policy                       | 7           |
| Low carbon policy                                | 4           |
| Economic policy                                  | 22          |
| Development policy                               | 18          |
| Fiscal policy                                    | 8           |
| Industrial policy                                | 7           |
| Trade policy                                     | 5           |
| Environmental policy                             | 36          |
| Foreign policy                                   | 24          |
| Science, technology, and innovation policy       | 5           |
| Social policy                                    | 5           |
| Urban policy                                     | 5           |
| Agricultural policy                              | 4           |

Apart from policy areas, terms mentioning policy also reveal how the literature engages with concepts in public policy (Figure 4; Table 6). Several publications in the dataset use terms that indicate policy relevance. For instance, terms such as policy implication, policy recommendation, policy relevance, policy prescription, policy perspective, and policy suggestion are used in several publications. In addition, policy analysis has received attention in the scholarship, demonstrated by terms such as policy option, policy analysis, policy scenario, policy choice, policy alternative, and policy modelling.

A large number of studies refer to policy instruments in some form. This is indicated by the use of the following terms: policy measure, policy initiative, policy intervention, policy instrument, policy mechanism, policy tool, and policy action. These are frequently mentioned cursorily or descriptively, for instance, in the context of the need for policy measures [164], an acknowledgement of their adoption [165,166], or a reference to state-level variation [167]. Some studies focus more explicitly on creating knowledge regarding policy instruments. Illustratively, Dulal and Akbar [168] propose policy instruments for cities to address local priorities while also reducing greenhouse gas emissions. The research
examining whether and how policy instruments work in practice is, however, limited. In an example of this type of work, Kathuria [103] assesses the impact of the mandate for the use of compressed natural gas as the fuel for public transport on air pollution in Delhi. In another example, Quitzow [169] proposes an analytical framework of policy strategy to account for the presence of multiple policy instruments in a typical policy package and applies it to study the performance of the national solar mission in India.

Figure 4. A word cloud representing public policy concepts occurring in three or more publications. The figure is created using WordArt. Available online: https://wordart.com (accessed on 20 September 2021).

Table 6. Public policy concepts mentioned in the research on energy policy in India.

| Term                                | Occurrences |
|-------------------------------------|-------------|
| **Pertaining to policy relevance**  |             |
| Policy implication                  | 83          |
| Policy recommendation               | 38          |
| Policy relevance                    | 9           |
| Policy prescription                 | 8           |
| Policy perspective                  | 12          |
| Policy suggestion                   | 7           |
| **Pertaining to policy analysis**   |             |
| Policy option                       | 39          |
| Policy analysis                     | 23          |
| Policy scenario                     | 20          |
| Policy choice                       | 7           |
| Policy alternative                  | 6           |
| Policy modelling                    | 3           |
| **Pertaining to policy instruments**|             |
| Policy measure                      | 49          |
| Policy initiative                   | 41          |
Closely related to the topic of policy instruments is that of policy objectives and the match (or mismatch) between the two. Some terms indicate the possibility of such engagement in policy analysis: policy issue, policy challenge, policy formulation, policy goal, policy objective, policy priority, policy framework, policy approach, policy strategy, and policy design. Thakur, Deshmukh [170], for example, highlight the issue of inefficiency in the performance of state electricity utilities in India based on a country-wide comparative assessment. Meanwhile, Halsnæs and Garg [171] propose the integration of various policy goals pertaining to energy access, sustainable development, and climate
change in the case of emerging low- and middle-income countries such as India. Karma-charya and De Vries [172] evaluate the viability of several supply-side and demand-side alternatives in meeting the policy objectives of the energy system in India. Moreover, Rohankar, Jain [173] assess the policy framework for solar energy in India, comprising multiple policy instruments such as feed-in tariff, renewable purchase obligation, and accelerated depreciation.

Another set of terms refers to the policy process: policy-making, policy change, policy decision, policy reform, and policy process. Numerous scholars use the terms policy-making or policy change while highlighting the evidentiary value of their study for policy design [174–176]. For instance, Khosla, Dukkipati [177] propose multi-criteria decision analysis as a procedural tool for analytically rigorous, participative, and transparent policymaking. Some research has, however, examined these concepts empirically. Kale [178], for example, highlights how the interplay of domestic interests and prevailing global economic ideologies resulted in two historical policy changes in the electricity sector. Chaliganti and Müller [179] employ a critical discourse approach to explain the emergence of the national biofuel policy in India despite significant opposition from civil society, while Pradhan and Ruysenaar [180] delve into the role of specific actors and (global and local) narratives in the legitimizing of the adoption of the same policy. Further, Gupta [181] and Olofsson, Katz [182] apply the advocacy coalition framework to the case of nuclear energy and shale gas in India, respectively.

While the term policy implementation has not been used often in the literature, the concept as a whole has received attention: implementation, implementation strategy, and project implementation. This attention does not necessarily translate into systematic investigation of policy implementation itself though. Several studies that mention the term conduct policy analysis to make a case for policy implementation [183–185]. For instance, Balachandra [186] emphasizes implementation in proposing an integrated strategy for provision of universal energy access in rural India. Few scholars have studied the policy implementation phase analytically. Illustratively, Sindhu, Nehra [187] identify barriers to the implementation of solar energy in India and examine their interdependencies. In another example, Raha, Mahanta [188] analyze the implementation of the national biogas and manure management program in the state of Assam.

Concepts one might associate with policy evaluation—such as policy effectiveness, policy evaluation, policy outcome, policy performance, or policy success—find almost no mention in the dataset (policy failure being a limited exception). However, the mention of several other terms—such as evaluation, outcome, effectiveness, efficacy, and impact assessment—suggests that some studies have focused on ex-post evaluation. While many of these studies focus on technical or technological evaluation, a small number have conducted evaluations of policy. Schmid [74], for example, evaluates the effectiveness of major legislations and policies in increasing the penetration of renewable energy in nine states in India during 2001–09. Similarly, Thapar, Sharma [189] assess the economic and environmental efficacy of innovative policy practices that have contributed to the deployment of renewable energy in India. In another instance, Ghosh and Kathuria [190] examine the impact of independent state-level regulation on the efficiency of thermal-electricity-generating stations in India.

Thus, while policy-relevant research on energy policy in India is voluminous, policy analysis and policy studies constitute a small share of the research. Concepts from public policy—such as policy analysis, policy instruments, policy design—even when mentioned, are often used superficially or descriptively. Further, research examining the policy process empirically to shed light on agenda setting, decision-making, or policy implementation—through a (post-) positivist or an interpretive lens—is also limited. Finally, even the relationship between policy adoption (or design) and policy outcomes has been studied on few occasions, leading to paucity of evidence in the peer-reviewed literature on what works and why.
7. Discussion and Conclusions

In this study, I conducted a bibliometric review and computational text analysis of (the bibliographic data of) over 2700 publications pertaining to energy policy in India. The scholarship in this research area can be clustered broadly into the following themes, in descending order of prominence: (i) the electricity sector; (ii) geopolitics; (iii) energy access; (iv) climate change mitigation; (v) the energy-food-water nexus; (vi) the economy-energy nexus; (vii) oil and biofuel; and (viii) the Kyoto protocol. While demand-side management or energy efficiency has been discussed, primarily in the context of climate change mitigation, it does not constitute a distinct cluster. Further, the scholarship has focused mainly on the international level—with a keen interest in China, the United States, Japan, the BRICS economies, and the Indian subcontinent—and the national level. States and cities, towns, or villages have received less attention. In addition, while much of the research has policy relevance, relatively few publications have engaged with the scholarship on policy analysis or policy studies. These findings suggest that the thematic, geographic, and conceptual depth and diversity—necessary for supporting policy innovations for the Indian energy transition—are currently lacking in the literature.

To the best of my knowledge, this is the first large bibliometric analysis of the research pertaining to energy policy in India. The findings are, however, comparable to other reviews of climate and energy research. Creutzig, Roy [191], for instance, rue the overemphasis on supply-side technologies in the research on climate change mitigation and propose a multidisciplinary demand-side assessment framework to address this gap. In an exploratory literature review of research on energy policy in the Netherlands, Hoppe, Coenen [192] find that policy studies’ concepts were used only in about a quarter of the publications in the sample and illustrate the different ways in which policy studies can inform energy research.

The analysis emphasizes several avenues for future research. First, scholars should pursue different types of policy analysis to shed light on the various aspects of the energy transition. These go beyond research on policy or technology alternatives and include studies that explore the design of new governance arrangements, clarify values of different stakeholders in the system, promote democratization of policy-making, create knowledge or methodologies to mediate conflicts, and offer strategic advice to specific actors [193]. The field of policy studies, in particular, provides frameworks, theories, and models to do so by addressing questions on topics such as the framing of energy issues, the factors influencing policy-making, the role of advocacy coalitions, the structure and dynamics of policy networks, the prevalence of policy innovation and diffusion, and effectiveness of policy implementation [192]. It is especially important to create systematic knowledge on policy processes as these can inform the actions necessary for policy innovation in a given context [194] and influence policy success or failure [195]. Further, such an effort can also contribute to addressing “Western bias” in policy studies and spur the advancement of that field [196].

Second, while the focus of current research on the international or national level is understandable, more studies at the state and local level are imperative [197]. This is the case as several challenges associated with the Indian energy transition, such as energy distribution, residential and commercial demand-side management, urban transport, and local air pollution require policy innovations from local and state governments as well. Moreover, with ongoing technological developments in renewable energy and energy storage, small “energy regions” can spur the transition by altering power dynamics and infrastructure ownership to facilitate economic development and promote energy justice [198,199]. In addition, such a decentralized setup has been conceived as a fertile ground for experimentation and learning; studies that examine diffusion and lesson-drawing at the subnational level can also help identify mechanisms through which policy innovations can scale up and catalyze the energy transition [200–202]. Importantly, an effort in this direction should cover states and cities, towns, or villages in eastern and north-eastern India too.
Third, the theme of demand-side management deserves more attention. The key questions in this context pertain to the social, economic, and environmental implications of various technology alternatives; the attitudes, norms, and values that shape energy behavior; the adoption and implementation of appropriate policy instruments; the impact of demand-side management on individual well-being; and the potential contribution of demand-side management to sustainable development [191]. A focused review of the literature on demand-side management and energy efficiency in India based on this framework can help elucidate the coverage of existing studies and facilitate the creation of a more specific research agenda on this aspect of energy policy.

Fourth, this study demonstrates one application of computational text analysis for research on energy policy in India. Computational text analysis is an emerging approach that allows the user to interact with unstructured text data through diverse techniques, such as frequency analysis, co-occurrence analysis, sentiment analysis, topic modelling, and those in natural language processing [203–208]. This approach has been used in research on public policy, for example, to study issue framing and agenda setting [209,210], map the relationship between policy discourse and public opinion [211], examine priorities of public agencies [212], “measure” policy design [213,214], and examine program evaluations [215]. In addition, it has been employed in research on energy and environment policy, illustratively, to understand stakeholder opinions regarding air pollution in Hong Kong [216], analyze 70 years of German parliamentary debate on coal [217], and identify various dimensions of electric vehicles’ adoption in the United States using Facebook posts [218]. The use of such an approach can tap into existing and new data sources for research on energy policy in India in a scalable and systematic manner.

As with any research, this study has numerous limitations that should be considered while interpreting its findings. First, the analysis is based on bibliographic data and did not take the complete text of the publications into account. Second, the search was conducted in 2019 and, as a result, recent literature is not covered by the bibliometric review and computational text analysis. Third, this analysis focused only on academic publications on the topic; future research should examine whether “gray” literature on energy policy in India addresses some of the shortcomings. These limitations notwithstanding, in this study, I reviewed over 2700 publications on energy policy in India to present the first systematic account of this research area, identify the key themes, geographies, and public policy concepts used in the literature, and recommend areas that deserve more attention in the future in order to foster policy innovations to accelerate the Indian energy transition.

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References

1. Chunekar, A.; Sreenivas, A. Towards an understanding of residential electricity consumption in India. Build. Res. Inf. 2019, 47, 75–90. [CrossRef]
2. Mani, S.; Jain, A.; Tripathi, S.; Gould, C.F. The drivers of sustained use of liquified petroleum gas in India. Nat. Energy 2020, 5, 450–457. [CrossRef]
3. AEEE and BEE. AEEE and BEE State Energy Efficiency Index; Alliance for an Energy Efficient Economy (AEEE) and the Bureau of Energy Efficiency (BEE): New Delhi, India, 2019.
4. Natarajan, B.; Kumar, S.; Rajah, V.; Cherail, K. State of Energy Efficiency in India: A Compilation of Policies, Priorities and Potential; Alliance for an Energy Efficient Economy: New Delhi, India, 2021.
5. Dawn, S.; Tiwari, P.K.; Goswami, A.K.; Singh, A.K.; Panda, R. Wind power: Existing status, achievements and government’s initiative towards renewable power dominating India. Energy Strategy Rev. 2019, 23, 178–199. [CrossRef]
6. Raina, G.; Sinha, S. Outlook on the Indian scenario of solar energy strategies: Policies and challenges. *Energy Strategy Rev.* 2019, 24, 331–341. [CrossRef]

7. Charles Rajesh Kumar, J.; Majid, M.A. Renewable energy for sustainable development in India: Current status, future prospects, challenges, employment, and investment opportunities. *Energy Sustain. Soc.* 2020, 10, 1–36.

8. Swain, S.S.; Mishra, P. Determinants of adoption of cleaner cooking energy: Experience of the Pradhan Mantri Ujjwala Yojana in rural Odisha, India. *J. Clean. Prod.* 2020, 248, 119223. [CrossRef]

9. Gupta, S.; Gupta, E.; Sarangi, G.K. Household Energy Poverty Index for India: An analysis of inter-state differences. *Energy Policy* 2020, 144, 111592. [CrossRef]

10. Singh, P.; Singh, G.; Sodhi, G.P.S. Energy auditing and optimization approach for improving energy efficiency of rice cultivation in south-western Punjab, India. *Energy* 2019, 174, 269–279. [CrossRef]

11. Singh, V.K.; Henriques, C.O.; Martins, A.G. Assessment of energy-efficient appliances: A review of the technologies and policies in India’s residential sector. *Wiley Interdiscip. Rev. Energy Environ.* 2019, 8, e330. [CrossRef]

12. Phadke, A.; Park, W.Y.; Abhyankar, N. Providing reliable and financially sustainable electricity access in India using super-efficient appliances. *Energy Policy* 2019, 132, 1163–1175. [CrossRef]

13. Haider, S.; Mishra, P.P. Benchmarking energy use of iron and steel industry: A data envelopment analysis. *Benchmarking* 2019, 26, 1314–1335. [CrossRef]

14. Haider, S.; Danish, M.S.; Sharma, R. Assessing energy efficiency of Indian paper industry and influencing factors: A slack-based firm-level analysis. *Energy Econ.* 2018, 81, 454–464. [CrossRef]

15. Bardhan, R.; Deb Nath, R.; Jana, A. Evolution of sustainable energy policies in India since 1947: A review. *Wiley Interdiscip. Rev. Energy Environ.* 2019, 8, e340. [CrossRef]

16. Graus, W.H.J.; Voogt, M.; Worrell, E. International comparison of energy efficiency of fossil power generation. *Energy Policy* 2007, 35, 3936–3951. [CrossRef]

17. Behuria, P. The politics of late late development in renewable energy sectors: Dependency and contradictory tensions in India’s National Solar Mission. *World Dev.* 2018, 126, 104726. [CrossRef]

18. Chaurasiya, P.K.; Warudkar, V.; Ahmed, S. Wind energy development and policy in India: A review. *Energy Strategy Rev.* 2019, 24, 342–357. [CrossRef]

19. Sharma, S.; Sinha, S. Indian wind energy & its development-policies-barriers: An overview. *Environ. Sustain. Indic.* 2019, 1, 10003.

20. Malav, L.C.; Yadav, K.K.; Gupta, N.; Kumar, S.; Sharma, G.K.; Krishnan, S.; Rezania, S.; Kamyab, H.; Pham, Q.B.; Yadav, S.; et al. A review on municipal solid waste as a renewable source for waste-to-energy project in India: Current practices, challenges, and future opportunities. *J. Clean. Prod.* 2020, 277, 123227. [CrossRef]

21. PFCL. *The Performance of State Power Utilities for the Years 2013-14 to 2015-16*; Power Finance Corporation Ltd., Government of India: New Delhi, India, 2016.

22. CEA. *Load Generation Balance Report 2016-17*; Central Electricity Authority, Ministry of Power, Government of India: New Delhi, India, 2017.

23. CEA. *Reliability Index of the Cities/Towns/Villages—DISCOM Wise*; Central Electricity Authority, Ministry of Power, Government of India: New Delhi, India, 2014.

24. Chunekar, A.; Varshney, S.; Dixit, S. *Residential Electricity Consumption in India: What do We Know?* Prayas (Energy Group): Pune, India, 2016.

25. National Sample Survey Office, Ministry of Statistics, National Sample Survey (NSS) Data (Unit Level). 2016, Harvard Dataverse. Available online: [https://doi.org/10.7910/DVN/K8BSDU](https://doi.org/10.7910/DVN/K8BSDU) (accessed on 1 November 2021).

26. Chindarkar, N.; Goyal, N. One price doesn’t fit all: An examination of heterogeneity in price elasticity of residential electricity in India. *Energy Econ.* 2019, 81, 765–778. [CrossRef]

27. Elavarasan, R.M.; Shafillah, G.M.; Padmanaban, S.; Kumar, N.M.; Annam, A.; Vetrivelvan, A.M.; Mihet-Popa, L.; Holm-Nielsen, J.B. A Comprehensive Review on Renewable Energy Development, Challenges, and Policies of Leading Indian States with an International Perspective. *IEEE Access* 2020, 8, 74432–74457. [CrossRef]

28. Kumar, A.; Yu, Z.G.; Klemes, J.J.; Bokhari, A. A state-of-the-art review of greenhouse gas emissions from Indian hydropower reservoirs. *J. Clean. Prod.* 2021, 320, 128806. [CrossRef]

29. Lasswell, H.D. *The Decision Process: Seven Categories of Functional Analysis*; University of Maryland Press: College Park, MD, USA, 1956.

30. Lindblom, C.E. The science of muddling through. *Public Adm. Rev.* 1959, 19, 79–88. [CrossRef]

31. Lasswell, H.D. The emerging conception of the policy sciences. *Policy Sci.* 1970, 1, 3–14. [CrossRef]

32. Pressman, J.L.; Wildavsky, A. *Implementation: How Great Expectations in Washington are Dashed in Oakland*; Or, Why It’s Amazing that Federal Programs Work at All, *This Being a Saga of the Economic Development Administration as Told by Two Sympathetic Observers Who Seek to Build Morals on A Foundation*; University of California Press: Berkeley, CA, USA, 1984; Volume 708.

33. Kingdon, J.W. *Agendas, Alternatives, and Public Policies*; Little, Brown: Boston, MA, USA, 1984.

34. Sabatier, P.A. An Advocacy Coalition Framework of Policy Change and the Role of Policy-Oriented Learning Therein. *Policy Sci.* 1988, 21, 129–168. [CrossRef]
35. Hall, P.A. Policy Paradigms, Social Learning, and the State: The Case of Economic Policymaking in Britain. Comp. Politics 1993, 25, 275–296. [CrossRef]
36. Fischer, F. Reframing Public Policy: Discursive Politics and Deliberative Practices; Oxford University Press: Oxford, UK, 2003.
37. Hager, M. Discourse analysis and the study of policy making. Eur. Political Sci. 2002, 2, 61–65. [CrossRef]
38. Stone, D.A. Policy Paradox: The Art of Political Decision Making; WW Norton: New York, NY, USA, 1997; Volume 13.
39. Tyagi, V.; Dwivedi, P.; Gupta, A. Critical review of business models for grid connected rooftop solar PV systems in India. Water Energy Int. 2021, 63r, 29–35.
40. Kumar, R.; Mathew, N.; Varaprasad, G. A review on factors affecting adoption of electric vehicles. In Proceedings of the 12th International Conference on Advances in Computing, Control, and Telecommunication Technologies, Hyderabad, India, 8–15 August 2021.
41. Verma, M.K.; Mukherjee, V.; Yadav, V.K.; Ghosh, S. Indian power distribution sector reforms: A critical review. Energy Policy 2020, 144, 111672. [CrossRef]
42. Kumar, A.; Ghosal, A.; Rabbi, M.T. Proposed amendment of electricity distribution in India: A review. Water Energy Int. 2021, 63r, 28–34.
43. Smirnova, E.; Kot, S.; Kolpak, E.; Shestak, V. Governmental support and renewable energy production: A cross-country review. Energy 2021, 230, 120903. [CrossRef]
44. Mishra, S.; Verma, S.; Chowdhury, S.; Gaur, A.; Mohapatra, S.; Dwivedi, G.; Verma, P. A comprehensive review on developments in electric vehicle charging station infrastructure and present scenario of India. Sustainability 2021, 13, 2396. [CrossRef]
45. Gautam, R.; Sabharwal, S.P. A conceptual review of green buildings in India: Importance and need. Nat. Environ. Pollut. Technol. 2016, 15, 799–804.
46. Sharma, P.; Janwal, A.; Sharma, N.; Agrawal, R. Opportunities and Issues with Clean Renewable Energy Development in India: A Review. In Advances in Fluid and Thermal Engineering. Lecture Notes in Mechanical Engineering; Sikarwar, B.S., Sundén, B., Wang, Q., Eds.; Springer: Singapore, 2021. [CrossRef]
47. Vyshnavi, P.; Venkatesan, N.; Samad, A.; Avital, E.J. Tidal current energy for Indian Coastal lines—A state art of review. In Proceedings of the 2020 National Science, Engineering and Technology Conference, NCSET 2020, Chennai, India, 11–12 May 2020; IOP Publishing Ltd.: Chennai, India, 2020.
48. Mukherjee, S.; Dhangra, T.; Sengupta, A. Status of Electricity Act, 2003: A systematic review of literature. Energy Policy 2017, 102, 237–248. [CrossRef]
49. Hansen, U.E.; Nygaard, I.; Morris, M.; Robbins, G. The effects of local content requirements in acquisition schemes for renewable energy in developing countries: A literature review. Renew. Sustain. Energy Rev. 2020, 127, 109843. [CrossRef]
50. Verbeeck, A.; Debackere, K.; Luwel, M.; Zimmermann, E. Measuring progress and evolution in science and technology—I: The multiple uses of bibliometric indicators. Int. J. Manag. Rev. 2002, 4, 179–211. [CrossRef]
51. Tijssen, R.J. Cartography of Science: Scientometric Mapping with Multidimensional Scaling Methods. Ph.D. Thesis, Leiden University, Leiden, The Netherlands, 1992. Available online: https://philpapers.org/rec/TIJCOS (accessed on 1 November 2021).
52. van Eck, N.J.; Waltman, L. Visualizing bibliometric networks. In Measuring Scholarly Impact; Ding, Y., Rousseau, R., Wolfram, D., Eds.; Springer: Berlin, Germany, 2014; pp. 285–320. Available online: https://doi.org/10.1007/978-3-319-10377-8_13 (accessed on 1 November 2021).
53. van Eck, N.J.; Waltman, L. VOS: A New Method for Visualizing Similarities Between Objects. In Advances in Data Analysis: Proceedings of the 30th Annual Conference of the Gesellschaft für Klassifikation e.V., Freie Universität Berlin, Berlin, Germany, 8–10 March 2006; Decker, R., Lenz, H.J., Eds.; Springer: Berlin/Heidelberg, Germany, 2007; pp. 299–306.
54. van Eck, N.J.; Waltman, L. Software survey: VOSviewer, a computer program for bibliometric mapping. Scientometrics 2010, 84, 523–538. [CrossRef] [PubMed]
55. Henderson, P.D. India: The Energy Sector; World Bank: Washington, DC, USA, 1975.
56. Parikh, J.K.; Parikh, K.S. Mobilization and impacts of bio-gas technologies. Energy 1977, 2, 441–455. [CrossRef]
57. Parikh, K.S. Scope for Energy Substitution Policy in India. Rev. De L’énergie 1977, 28, 50–57.
58. Masih, A.M.M.; Masih, R. Energy consumption, real income and temporal causality: Results from a multi-country study based on cointegration and error-correction modelling techniques. Energy Econ. 1996, 18, 165–183. [CrossRef]
59. Pao, H.T.; Tsai, C.M. CO2 emissions, energy consumption and economic growth in BRIC countries. Energy Policy 2010, 38, 7850–7860. [CrossRef]
60. Ghosh, S. Electricity consumption and economic growth in India. Energy Policy 2002, 30, 125–129. [CrossRef]
61. Jeharaj, S.; Iniyan, S. A review of energy models. Renew. Sustain. Energy Rev. 2006, 10, 281–311. [CrossRef]
62. Nejat, P.; Jamezadeh, F.; Taheri, M.M.; Gohari, M.; Majid, M.Z. A global review of energy consumption, CO2 emissions and policy in the residential sector (with an overview of the top ten CO2 emitting countries). Renew. Sustain. Energy Rev. 2015, 43, 843–862. [CrossRef]
63. Sorda, G.; Banse, M.; Kemfert, C. An overview of biofuel policies across the world. Energy Policy 2010, 38, 6977–6988. [CrossRef]
64. de Fraiture, C.; Giordano, M.; Liao, Y. Biofuels and implications for agricultural water use: Blue impacts of green energy. Water Policy 2008, 10 (Suppl. 1), 67–81. [CrossRef]
65. Dréze, J.; Sen, A. An Uncertain Glory: India and its Contradictions; Princeton University Press: Princeton, NY, USA, 2013; pp. 1–434.
66. Leach, M.; Scoones, I.; Stirling, A. *Dynamic Sustainabilities: Technology, Environment, Social Justice*; Routledge: London, UK, 2010; pp. 1–212.

67. Ackerman, J. Co-governance for accountability: Beyond “exit” and “voice”. *World Dev.* 2004, 32, 447–463. [CrossRef]

68. Shanmugam, K.R.; Kulshreshtha, P. Efficiency analysis of coal-based thermal power generation in India during post-reform era. *Int. J. Glob. Energy Issues* 2005, 23, 15–28. [CrossRef]

69. Sharma, N.K.; Tiwari, P.K.; Sood, Y.R. Solar energy in India: Strategies, policies, perspectives and future potential. *Renew. Sustain. Energy Rev.* 2012, 16, 933–941. [CrossRef]

70. Srivastava, G.; Kathuria, V. Utility reforms in developing countries: Learning from the experiences of Delhi. *Util. Policy* 2014, 29, 1–16. [CrossRef]

71. Dossani, R. Reorganization of the power distribution sector in India. *Energy Policy* 2004, 320, 1277–1289. [CrossRef]

72. Parikh, J.K.; Reddy, B.S.; Banerjee, R.; Koundinya, S. DSM survey in India: Awareness, barriers and implementability. *Energy* 1996, 21, 955–966. [CrossRef]

73. Malakar, Y. Evaluating the role of rural electrification in expanding people’s capabilities in India. *Energy Policy* 2018, 114, 492–498. [CrossRef]

74. Yap, H.Y.; Nixon, J.D. A multi-criteria analysis of options for energy recovery from municipal solid waste in India and the UK. *Waste Manag.* 2015, 46, 265–277. [CrossRef] [PubMed]

75. Dalla Valle, A.; Furlan, C. Diffusion of nuclear energy in some developing countries. *Technol. Forecast. Soc. Chang.* 2014, 81, 143–153. [CrossRef]

76. Meier, O. The US-India nuclear deal: The end of universal non-proliferation efforts? *Int. Polit. Und Ges.* 2011, 27, 35–43. [CrossRef]

77. Roy, M.S. Strategic Importance of Turkmenistan for India. *Strateg. Anal.* 2011, 35, 661–682. [CrossRef]

78. Jørgensen, K.; Wagner, C. Low Carbon Governance in Multi-level Structures: EU–India relations on energy and climate. *Environ. Policy Gov.* 2017, 27, 137–148. [CrossRef]

79. Narula, K. Comparative assessment of energy sources for attaining sustainable energy security (SES): The case of India’s residential sector. *Int. J. Sustain. Energy Plan. Manag.* 2015, 5, 27–40. [CrossRef]

80. Grover, R.B. Policy initiatives by the Government of India to accelerate the growth of installed nuclear power capacity in the coming years. *Energy Procedia* 2011, 7, 74–78. [CrossRef]

81. Gupta, S.; Ravindranath, N.H. Financial analysis of cooking energy options for India. *Energy Convers. Manag.* 1997, 38, 1869–1876. [CrossRef]

82. Malakar, Y. Evaluating the role of rural electrification in expanding people’s capabilities in India. *Energy Policy* 2018, 114, 492–498. [CrossRef]
99. Sudhakara Reddy, B.; Nathan, H.S.K. Energy in the development strategy of Indian households—The missing half. *Renew. Sustain. Energy Rev.* **2013**, *18*, 203–210. [CrossRef]

100. Shukla, P.R. The modelling of policy options for greenhouse gas mitigation in India. *AMBIO* **1996**, *25*, 240–248.

101. Ghosh, D.; Shukla, P.R.; Gang, A.; Ramana, P.V. Renewable energy technologies for the Indian power sector: Mitigation potential and operational strategies. *Renew. Sustain. Energy Rev.* **2002**, *6*, 481–512. [CrossRef]

102. Cohen, B.; Blanco, H.; Dubash, N.K.; Dukkipati, S.; Khosla, R.; Sreicicu, S.; Stewart, T.; Torres-Gunfauts, M. Multi-criteria decision analysis in policy-making for climate mitigation and development. * Clim. Dev.* **2019**, *11*, 212–222. [CrossRef]

103. Kathuria, V. Impact of CNG on vehicular pollution in Delhi: A note. *Transp. Res. Part D Transp. Environ.* **2004**, *9*, 409–417. [CrossRef]

104. Gurjar, B.R.; Ravindra, K.; Nagpure, A.S. Air pollution trends over Indian megacities and their local-to-global implications. *Atmos. Environ.* **2016**, *126*, 475–495. [CrossRef]

105. Panday, A.; Bansal, H.O. Green transportation in India: Need analysis and solution. In Proceedings of the 2013 International Conference on Control, Automation, Robotics and Embedded Systems (CARE), Jabalpur, India, 16–18 December 2013.

106. Anand, S.; Vrat, P.; Dahiya, R.P. Application of a system dynamics approach for assessment and mitigation of CO₂ emissions from the cement industry. *J. Environ. Manag.* **2006**, *79*, 383–398. [CrossRef]

107. Dasgupta, S.; Roy, J. Analysing energy intensity trends and decoupling of growth from energy use in Indian manufacturing industries during 1973–1974 to 2011–2012. *Energy Effic.* **2017**, *10*, 925–943. [CrossRef]

108. Morrow, W.R., III; Hasanbeigi, A.; Sathaye, J.; Xu, T. Assessment of energy efficiency improvement and CO₂ emission reduction potentials in India’s cement and iron & steel industries. *J. Clean. Prod.* **2014**, *65*, 131–141.

109. Jumani, S.; Rao, S.; Machado, S.; Prakash, A. Big concerns with small projects: Evaluating the socio-ecological impacts of small hydropower projects in India. *Ambio* **2017**, *46*, 500–511.

110. Yuskel, I. Hydroelectric power in developing countries. *Energy Sources Part B Econ. Plan. Policy* **2004**, *26*, 92–106. [CrossRef]

111. Anand, M.K. Reforming fossil fuel prices in India: Dilemma of a developing economy. *Energy Policy* **2009**, *37*, 139–150. [CrossRef]

112. Parikh, J.K.; Ramanathan, R. Linkages among energy, agriculture and environment in rural India. *Energy Econ.* **1999**, *21*, 561–585. [CrossRef]

113. Scott, C.A.; Shah, T. Groundwater overdraft reduction through agricultural energy policy: Insights from India and Mexico. *Int. J. Water Resour. Dev.* **2004**, *20*, 149–164. [CrossRef]

114. Halsnæs, K.; Verhagen, J. Development based climate change adaptation and mitigation—Conceptual issues and lessons learned in studies in developing countries. *Mitig. Adapt. Strateg. Glob. Chang.* **2007**, *12*, 665–684. [CrossRef]

115. Devasenapathy, P.; Senthilkumar, G.; Shannugam, P.M. Energy management in crop production. *Indian J. Agron.* **2009**, *54*, 80–89.

116. Bassi, N. Irrigation and energy nexus: Solar pumps are not viable. *Econ. Political Wkly.* **2015**, *50*, 63–66.

117. Closas, A.; Rap, E. Solar-based groundwater pumping for irrigation: Sustainability, policies, and limitations. *Energy Policy* **2017**, *104*, 33–37. [CrossRef]

118. Parikh, J.K.; Ramanathan, R. Linkages among energy, agriculture and environment in rural India. *Energy Econ.* **1999**, *21*, 561–585. [CrossRef]

119. Scott, C.A.; Shah, T. Groundwater overdraft reduction through agricultural energy policy: Insights from India and Mexico. *Int. J. Water Resour. Dev.* **2004**, *20*, 149–164. [CrossRef]

120. Halsnæs, K.; Verhagen, J. Development based climate change adaptation and mitigation—Conceptual issues and lessons learned in studies in developing countries. *Mitig. Adapt. Strateg. Glob. Chang.* **2007**, *12*, 665–684. [CrossRef]

121. Devasenapathy, P.; Senthilkumar, G.; Shannugam, P.M. Energy management in crop production. *Indian J. Agron.* **2009**, *54*, 80–89.

122. Bassi, N. Irrigation and energy nexus: Solar pumps are not viable. *Econ. Political Wkly.* **2015**, *50*, 63–66.

123. Closas, A.; Rap, E. Solar-based groundwater pumping for irrigation: Sustainability, policies, and limitations. *Energy Policy* **2017**, *104*, 33–37. [CrossRef]

124. Parikh, J.K.; Ramanathan, R. Linkages among energy, agriculture and environment in rural India. *Energy Econ.* **1999**, *21*, 561–585. [CrossRef]

125. Scott, C.A.; Shah, T. Groundwater overdraft reduction through agricultural energy policy: Insights from India and Mexico. *Int. J. Water Resour. Dev.* **2004**, *20*, 149–164. [CrossRef]

126. Halsnæs, K.; Verhagen, J. Development based climate change adaptation and mitigation—Conceptual issues and lessons learned in studies in developing countries. *Mitig. Adapt. Strateg. Glob. Chang.* **2007**, *12*, 665–684. [CrossRef]

127. Devasenapathy, P.; Senthilkumar, G.; Shannugam, P.M. Energy management in crop production. *Indian J. Agron.* **2009**, *54*, 80–89.

128. Bassi, N. Irrigation and energy nexus: Solar pumps are not viable. *Econ. Political Wkly.* **2015**, *50*, 63–66.

129. Closas, A.; Rap, E. Solar-based groundwater pumping for irrigation: Sustainability, policies, and limitations. *Energy Policy* **2017**, *104*, 33–37. [CrossRef]

130. Parikh, J.K.; Ramanathan, R. Linkages among energy, agriculture and environment in rural India. *Energy Econ.* **1999**, *21*, 561–585. [CrossRef]
Das, A.; Parikh, J. Transport scenarios in two metropolitan cities in India: Delhi and Mumbai. *Energy Convers. Manag.* 2004, 45, 2603–2625. [CrossRef]

Shibin, K.T.; Gunasekaran, A.; Papadopoulos, T.; Childe, S.J.; Dubey, R.; Singh, T. Energy sustainability in operations: An optimization study. *Int. J. Adv. Manuf. Technol.* 2016, 86, 2873–2884. [CrossRef]

Purohit, J.; Purohit, P.; Shekhar, S. Evaluating the potential of concentrating solar power generation in Northwestern India. *Energy Policy* 2013, 62, 157–175. [CrossRef]

Sindhu, S.; Nehra, V.; Luthra, S. Investigation of feasibility study of solar farms deployment using hybrid AHP-TOPSIS analysis: Case study of India. *Renew. Sustain. Energy Rev.* 2017, 73, 496–511. [CrossRef]

McNeil, M.A.; Iyer, M.; Meyers, S.; Letschert, V.E.; McMahon, J.E. Potential benefits from improved energy efficiency of key electrical products: The case of India. *Energy Policy* 2008, 36, 3467–3476. [CrossRef]

Usah Rao, K.; Kishore, V.V.N. Wind power technology diffusion analysis in selected states of India. *Renew. Energy* 2009, 34, 983–988. [CrossRef]

Dulal, H.B.; Akbar, S. Greenhouse gas emission reduction options for cities: Finding the “Coincidence of Agendas” between local priorities and climate change mitigation objectives. *Habitat Int.* 2013, 38, 100–105. [CrossRef]

Quitizow, R. Assessing policy strategies for the promotion of environmental technologies: A review of India’s National Solar Mission. *Res. Policy* 2015, 44, 233–243. [CrossRef]

Thakur, T.; Deshmukh, S.G.; Kaushik, S.C. Efficiency evaluation of the state owned electric utilities in India. *Energy Policy* 2006, 34, 2788–2804. [CrossRef]

Halsnaes, K.; Garg, A. Assessing the Role of Energy in Development and Climate Policies-Conceptual Approach and Key Indicators. *World Dev.* 2011, 39, 987–1001. [CrossRef]

Karmachary, S.B.; de Vries, L.J. Addressing the supply-demand gap in India’s electricity market: Long and short-term policy options. In Proceedings of the 2009 Second International Conference on Infrastructure Systems and Services: Developing 21st Century Infrastructure Networks (INFRA), SNN, Nager, India, 9–11 December 2009; IEEE: Tamil Nadu, India, 2009.

Rohankar, N.; Jain, A.K.; Nangia, O.P.; Dwivedi, P. A study of existing solar power policy framework in India for viability of the solar projects perspective. *Renew. Sustain. Energy Rev.* 2016, 56, 510–518. [CrossRef]

Tongia, R.; Banerjee, R. Price of power in India. *Energy Policy* 1998, 26, 557–575. [CrossRef]

Alam, M.; Sathaye, J.; Barnes, D. Urban household energy use in India: Efficiency and policy implications. *Energy Policy* 1998, 26, 885–891. [CrossRef]

Sishodia, R.P.; Shukla, S.; Wani, S.P.; Graham, W.D.; Jones, J.W. Future irrigation expansion outweigh groundwater recharge gains from climate change in semi-arid India. *Sci. Total Environ.* 2018, 635, 725–740. [CrossRef] [PubMed]

Khosla, R.; Dukkipati, S.; Dubash, N.K.; Sreenivas, A.; Cohen, B. Towards methodologies for multiple objective-based energy and climate policy. *Econ. Political Wkly.* 2015, 50, 49–59.

Kale, S.S. Current reforms: The politics of policy change in India’s electricity sector. *Pac. Aff.* 2004, 77, 467–491.

Chaliganti, R.; Müller, U. Policy Discourses and Environmental Rationalities Underpinning India’s Biofuel Programme. *Environ. Policy Gov.* 2016, 26, 16–28. [CrossRef]

Pradhan, S.; Ruysenaar, S. Burning desires: Untangling and interpreting ‘pro-poor’ biofuel policy processes in India and South Africa. *Environ. Plan. A* 2014, 46, 299–317. [CrossRef]

Gupta, K. A Comparative Policy Analysis of Coalition Strategies: Case Studies of Nuclear Energy and Forest Management in India. *J. Comp. Polit. Anal. Res. Pract.* 2014, 16, 356–372. [CrossRef]

Olofsson, K.L.; Katz, J.; Costie, D.P.; Heikila, T.; Weible, C.M. A dominant coalition and policy change: An analysis of shale oil and gas politics in India. *J. Environ. Policy Plan.* 2018, 20, 645–660. [CrossRef]

Depuru, S.S.; Wang, L.; Devabhaktuni, V. Electricity theft: Overview, issues, prevention and a smart meter based approach to control theft. *Energy Policy* 2011, 39, 1007–1015. [CrossRef]

Giljum, S.; Behrens, A.; Hinterberger, F.; Lutz, C.; Meyer, B. Modelling scenarios towards a sustainable use of natural resources in Europe. *Environ. Sci. Policy* 2008, 11, 204–216. [CrossRef]

Xu, T.; Sathaye, J.; Akbari, H.; Garg, V.; Tetali, S. Quantifying the direct benefits of cool roofs in an urban setting: Reduced cooling energy use and lowered greenhouse gas emissions. *Build. Environ.* 2012, 48, 1–6. [CrossRef]

Balachandran, P. Modern energy access to all in rural India: An integrated implementation strategy. *Energy Policy* 2011, 39, 7803–7814. [CrossRef]

Sindhu, S.; Nehra, V.; Luthra, S. Identification and analysis of barriers in implementation of solar energy in Indian rural sector using integrated ISM and fuzzy MICMAC approach. *Renew. Sustain. Energy Rev.* 2016, 62, 70–88. [CrossRef]

Raha, D.; Mahanta, P.; Clarke, M.L. The implementation of decentralised biogas plants in Assam, NE India: The impact and effectiveness of the National Biogas and Manure Management Programme. *Energy Policy* 2014, 68, 80–91. [CrossRef]

Thapar, S.; Sharma, S.; Verma, A. Economic and environmental effectiveness of renewable energy policy instruments: Best practices from India. *Renew. Sustain. Energy Rev.* 2016, 66, 487–498. [CrossRef]

Ghosh, R.; Kathuria, V. The effect of regulatory governance on efficiency of thermal power generation in India: A stochastic frontier analysis. *Energy Policy* 2016, 89, 11–24. [CrossRef]

Creutzig, F.; Roy, J.; Lamb, W.F.; Azevedo, I.M.; De Bruin, W.B.; Dalkmann, H.; Edelenbosch, O.Y.; Geels, F.W.; Grubler, A.; Hepburn, C.; et al. Towards demand-side solutions for mitigating climate change. *Nat. Clim. Chang.* 2018, 8, 260–263. [CrossRef]
Sustainability 2021, 13, 13421

192. Hoppe, T.; Coenen, F.; van den Berg, M. Illustrating the use of concepts from the discipline of policy studies in energy research: An explorative literature review. *Energy Res. Soc. Sci.* 2016, 21, 12–32. [CrossRef]

193. Mayer, I.S.; van Daalen, C.E.; Bots, P.W.G. Perspectives on Policy Analysis: A Framework for Understanding and Design. In *Public Policy Analysis: New Developments*; Springer: Boston, MA, USA, 2013; pp. 41–64.

194. Goyal, N.; Howlett, M.; Chindarkar, N. Who coupled which stream(s)? Policy entrepreneurship and innovation in the energy–water nexus in Gujarat, India. *Public Adm. Dev.* 2020, 40, 49–64. [CrossRef]

195. Goyal, N. Explaining Policy Success Using the Multiple Streams Framework: Political Success Despite Programmatic Failure of the Solar Energy Policy in Gujarat, India. *Politics Policy* 2021, 49, 1021–1060. [CrossRef]

196. Goyal, N. A “review” of policy sciences: Bibliometric analysis of authors, references, and topics during 1970–2017. *Policy Sci.* 2017, 50, 527–537. [CrossRef]

197. Goyal, N. Promoting Policy Innovation for Sustainability: Leaders, Laggards and Learners in the Indian Electricity Transition; National University of Singapore: Singapore, 2019.

198. Moss, T.; Becker, S.; Naumann, M. Whose energy transition is it, anyway? Organisation and ownership of the Energiewende in villages, cities and regions. *Local Environ.* 2015, 20, 1547–1563. [CrossRef]

199. Spåth, P.; Rohracher, H. ‘Energy regions’: The transformative power of regional discourses on socio-technical futures. *Res. Policy* 2010, 39, 449–458. [CrossRef]

200. Walker, J.I. The Diffusion of Innovations among the American States. *Am. Political Sci. Rev.* 1969, 63, 880–899. [CrossRef]

201. Rose, R. What is lesson-drawing? *J. Public Policy* 1991, 11, 3–30. [CrossRef]

202. Goyal, N. Policy Diffusion Through Multiple Streams: The (Non-)Adoption of Energy Conservation Building Code in India. *Policy Stud.* J. 2021. [CrossRef]

203. Feldman, R.; Sanger, J. *The Text Mining Handbook: Advanced Approaches in Analyzing Unstructured Data*; Cambridge University Press: Cambridge, UK, 2006.

204. Montes-y-Gómez, M.; Gelbukh, A.; López-López, A. Discovering association rules in semi-structured data sets. In Proceedings of the Workshop on Knowledge Discovery from Distributed, Dynamic, Heterogeneous, Autonomous Data and Knowledge Source at 17th International Joint Conference on Artificial Intel-ligence (IJCAI’2001), Seattle, WA, USA, 4–10 August 2001; AAAI Press: Menlo Park, CA, USA, 2001.

205. Allahyari, M.; Pouriyeh, S.; Assefi, S.; Safaei, S.; Trippe, E.D.; Gutierrez, J.B.; Kochut, K. A brief survey of text mining: Classification, clustering and extraction techniques. *arXiv 2017*, arXiv:1707.02919.

206. Collobert, R.; Weston, J.; Bottou, L.; Karlen, M.; Kavukcuoglu, K.; Kuksa, P. Natural language processing (almost) from scratch. *J. Mach. Learn. Res.* 2011, 12, 2493–2537.

207. Blei, D.M.; Ng, A.Y.; Jordan, M.I. Latent dirichlet allocation. *J. Mach. Learn. Res.* 2003, 3, 993–1022.

208. Ravi, K.; Ravi, V. A survey on opinion mining and sentiment analysis: Tasks, approaches and applications. *Knowl.-Based Syst.* 2015, 89, 14–46. [CrossRef]

209. Nowlin, M.C. Modeling Issue Definitions Using Quantitative Text Analysis. *Policy Stud. J.* 2016, 44, 309–331. [CrossRef]

210. Fawcett, P.; Jensen, M.J.; Ransan-Cooper, H.; Duus, S. Explaining the “ebb and flow” of the problem stream: Frame conflicts over the future of coal seam gas (“fracking”) in Australia. *J. Public Policy* 2019, 39, 521–541. [CrossRef]

211. Bohr, J. Key events and challenges: A computational text analysis of the 115th house of representatives on Twitter. *Environ. Politics* 2021, 30, 399–422. [CrossRef]

212. Hollibaugh, G.E. The Use of Text as Data Methods in Public Administration: A Review and an Application to Agency Priorities. *J. Public Adm. Res. Theory* 2018, 29, 474–490. [CrossRef]

213. Dunlop, C.A.; Kamkhaji, J.C.; Radaelli, C.M.; Taffoni, G. Measuring design diversity: A new application of Ostrom’s rule types. *Policy Stud. J.* 2021. [CrossRef]

214. Goyal, N.; Howlett, M. “Measuring the Mix” of Policy Responses to COVID-19: Comparative Policy Analysis Using Topic Modelling. *J. Comp. Policy Anal. Res. Pract.* 2021, 23, 250–261. [CrossRef]

215. Goyal, N.; Howlett, M. Combining internal and external evaluations within a multilevel evaluation framework: Computational text analysis of lessons from the Asian Development Bank. *Evaluation* 2019, 25, 366–380. [CrossRef]

216. Lam, J.C.; Cheung, L.Y.; Wang, S.; Li, V.O. Stakeholder concerns of air pollution in Hong Kong and policy implications: A big-data computational text analysis approach. *Environ. Sci. Policy* 2019, 101, 374–382. [CrossRef]

217. Müller-Hansen, F.; Callaghan, M.W.; Lee, Y.T.; Leipprand, A.; Flachsland, C.; Minx, J.C. Who cares about coal? Analyzing 70 years of German parliamentary debates on coal with dynamic topic modeling. *Energy Res. Soc. Sci.* 2021, 72, 101869. [CrossRef]

218. Debnath, R.; Bardhan, R.; Reiner, D.M.; Miller, J.R. Political, economic, social, technological, legal and environmental dimensions of electric vehicle adoption in the United States: A social-media interaction analysis. *Renew. Sustain. Energy Rev.* 2021, 152, 111707. [CrossRef]