FEDERALISM AND ITS IMPACT ON INDIA'S ENERGY TRANSITION: THE CASE OF THE ELECTRICITY SECTOR

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1. INTRODUCTION

The Indian federal structure is seen by scholars as being asymmetric in the distribution of powers. The structure is described as an "indestructible Union of destructible states" as power is concentrated in the Union Government.[234] In contrast, the United States, a federal country is seen as an "indestructible Union of indestructible States".[235]

The concentration of power has so far not helped the Union Government in India to consolidate power over energy policy.[236] The case of reform of the electricity distribution sector is illustrative of the same. Electricity is a subject in the concurrent list under the Indian Constitution and power over decision-making for the

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[234] Mahendra P. Singh, and Douglas V. Verney, 'Challenges to India's Centralized Parliamentary Federalism' (*Jstor*, 2003) 33 Publius 1 <http://www.jstor.org/stable/3331193> .

[235] Thomas Apolte, 'American Federalism and Emerging Federal Structures in Europe: A Comparative View' (1996) 47 ORDO — *Jahrbuch für die Ordnung von Wirtschaft und Gesellschaft* 279-292<http://www.jstor.org/stable/23743145>.

[236] International Energy Agency, *India 2020*, (IEA 2020), <https://www.iea.org/reports/india-2020>.

same is shared equally between the Union and State Governments.[237] Many policies initiated by the Union Government have not succeeded to the extent expected, on account of little or no State level ownership and dissonance with State interests, powers and capabilities.[238] Though several reform initiatives have been proposed by the Union Government over the last five decades, electricity distribution companies that are under State Governments have carried out reforms half-heartedly and often only to avoid financial penalties.[239] The draft Electricity Amendment Bill, 2022 initiated in 2014, continues to face stiff opposition from several State Governments over clauses that undermine State Government authority over electricity distribution.[240]

Oil & gas come under the Union Government as per the constitution but State Governments undermine federal

[237] Government of India, Legislative Department, The Constitution of India, Seventh Schedule, List III, Concurrent List (1950), <https://legislative.gov.in/sites/default/files/COI_English.pdf>.

[238] "Banerjee, Sudeshna Ghosh; Barnes, Douglas; Singh, Bipul; Mayer, Kristy; Samad, Hussain, *Power for All: Electricity Access Challenge in India*, (World Bank Study; Washington, DC: World Bank 2015), <https://openknowledge.worldbank.org/handle/10986/20525> License: CC BY 3.0 IGO."

[239] Mandhir Kumar Verma, V. Mukherjee, Vinod Kumar Yadav, and Santosh Ghosh, 'Indian Power Distribution Sector Reforms: A Critical Review'(2020)144*EnergyPolicy*1-12 <https://doi.org/10.1016/j.enpol.2020.111672> .

[240] Jasleen Bedi, Concerns over the Electricity (Amendment) Bill, 2022, *The Leaflet: Constitution First*, (17 October 2022), <https://theleaflet.in/concerns-over-the-electricity-amendment-bill-2022/>.

policy through State level taxes and subsidies.[241] Devolved federalism which puts authority in the State and Local Governments in the context of land use, slows down energy infrastructure projects in all such sectors, including nuclear and renewable energy sectors.

In the early years after independence, the Union Government played a large role in influencing the governance of the electricity sector as it was an important component in nation-building. This changed in the late 1960s when political power diffused to regional parties which in turn led to State Governments gaining control over electricity distribution.[242] In the 1990s the development funding agencies such as the World Bank strongly influenced the Union Government and advised it to take charge of the electricity sector, arrest the financial deterioration of State Electricity Boards (SEBs) and put it on a course of deregulation and liberalization.[243] In the 2000s the Union Government introduced radical legislation[244] that centralised electricity policy thus putting the sector on a course that will lead to market-oriented

[241] S Kalyanasundaram, Should Taxes on Petro-products be Reduced? *The Hindu*,(1 June, 2021),<https://www.thehindubusinessline.com/opinion/should-taxes-on-petro-products-be-reduced/article34701363.ece> .

[242]Navroz K. Dubash, and Sudhir Chella Rajan. "Power Politics: Process of Power Sector Reform in India." Economic and Political Weekly 36, no. 35 (2001): 3367–90. <http://www.jstor.org/stable/4411059> .

[243] Kale, Sunila S. "Current Reforms: The Politics of Policy Change in India's Electricity Sector." Pacific Affairs 77, no. 3 (2004): 467–91. < https://www.jstor.org/stable/4411059 > .

[244] Electricity Act 2003.

reform, a process that is currently making progress. Since 2010, the Union Government has been consolidating power over electricity sector governance partly driven by international climate-related obligations that require India to decarbonise the electricity sector and partly driven by private interests that dominate traditional fossil-fuel-based power generation and almost completely control renewable energy ("**RE**") based generation. Among the three most important segments of the electricity value chain i.e., generation, transmission and distribution: generation is now dominated by the private sector while transmission being a natural monopoly of the Union Government. The only segment over which States have some control is electricity distribution. This too is likely to change in the coming decade with a new legislation that is under discussion.

This article traces these developments in greater detail to gain insights into how wealthy private interests in today's India will influence electricity governance and shape its energy transition. Electricity is chosen because it is the vector or the main carrier of renewable energy and its share in final energy consumption is likely to grow in the future. Electricity is expected to replace oil in transportation including shipping which was once thought to be impossible. Even in heavy industries such

as cement and steel manufacture, electricity is expected to replace coal for generating high-temperature process heat.

The first section gives a brief overview of the Indian energy sector and the short and long-term goals for India's energy transition. This is followed by an outline of the constitutional mandate over governance of electricity. The chapter then proceeds to identify key historic influences that shifted authority over electricity governance from the State Governments to the Union Government in the generation of electricity and in the Distribution of electricity. The insights gained are used to make concluding observations on the course of the transition in the electricity sector towards low carbon fuels.

2. INDIA'S ENERGY BASKET: A BRIEF OVERVIEW

India's primary energy basket is dominated by fossil fuels (coal, oil and natural gas). About 47 percent of primary energy consumption in 2021 was derived from coal and about 22 percent from oil.[245] Biomass (burnt directly as

[245] Calculated from International Energy Agency, *World Energy Outlook 2022*, (2022) <https://www.iea.org/reports/world-energy-outlook-2022> & Statistical Review of World Energy, Energy Institute, <https://www.energyinst.org/statistical-review/resources-and-data-downloads> .

fuel for cooking) contributed about 18 percent and natural gas about 5 percent of primary energy consumption.[246] Among non-fossil fuels, nuclear energy contributed just under 1 percent, hydropower about 3 percent and renewable energy that includes solar, wind and other forms of new energies about 4 percent.[247] Overall fossil fuels and biomass accounted for over 91 percent of primary energy consumption and non-fossil fuels accounted for the remaining 9 percent of primary energy consumption in 2021.[248]

Unlike primary fuels whose relative shares are outlined above, electricity is a secondary source of energy. Electricity must be generated using primary fuels such as coal, natural gas, nuclear power and RE. As of 31 October 2022, installed electricity generation capacity was over 408 gigawatts (GW) with coal contributing 52 percent, hydropower contributing 11 percent, natural gas contributing just over 6 percent and nuclear energy accounting for 1.6 percent of total power generation capacity. RE accounted for over 29 percent of capacity making it the second largest after coal.[249] In terms of actual electricity generation, coal and natural gas lead with

[246] ibid.
[247] ibid.
[248] ibid.
[249] Calculated from Central Electricity Authority (CEA), Government of India, *Installed Capacity Report*, (October 2022) <https://cea.nic.in/installed-capacity-report/?lang=en> .

a share of 74 percent in 2021-22 followed by RE that contributed about 12 percent of power generation. Hydropower contributed about 10 percent of power generation while nuclear energy contributed 3 percent of power generation. [250] To make the transition towards net zero, India would have to replace coal and generate most of the electricity using RE.

3. CONSTITUTIONAL MANDATE OVER GOVERNANCE OF THE ENERGY SECTOR

The seventh schedule of the Indian Constitution read with Article 246 allocates responsibility for energy under Union, State and Concurrent lists. Atomic energy and minerals required for its production are unambiguously placed in the Union list (list I, entry 6).[251] Regulation and development of oil fields and mineral oil resources, petroleum and petroleum products, other liquids and substances declared by Parliament by law to be dangerously inflammable is also in the Union list (list I, entry 53). The provision under the Union list for the

[250] ibid.

[251] Government of India, Legislative Department, The Constitution of India, Seventh Schedule, List I, Union List (1950), <https://legislative.gov.in/sites/default/files/COI_English.pdf> The Indian Constitution (1950).

regulation of mines and minerals covers coal mining (list I, entry 54).[252]

The power to impose duties of excise on petroleum crude, high-speed diesel, motor spirit (commonly known as petrol), natural gas, aviation turbine fuel (list I, entry 84), substituted by the one hundred and first amendment act of 2016 [17 (a) (i)] has opened the opportunity to increase Central levies on petroleum products.[253] List II or the State list covers the power to tax the sale of petroleum crude, high-speed diesel, motor spirit, natural gas, and aviation turbine fuel but not including sale in the course of inter-state trade or commerce or sale in the course of International trade or commerce of such goods (list II, entry 54) substituted by the sixth amendment act of the constitution (1956) and further substituted by the one hundred and first amendment of the constitution in 2016 [17(b) (ii)].[254] List II also allows State Governments

[252] Government of India, Legislative Department, The Constitution of India, Seventh Schedule, List I, Union List (1950), <https://legislative.gov.in/sites/default/files/COI_English.pdf> The Indian Constitution (1950).
[253] Government of India, Legislative Department, The Constitution of India, Seventh Schedule, List I, Union List (1950), <https://legislative.gov.in/sites/default/files/COI_English.pdf> The Indian Constitution (1950).
[254] Government of India, Legislative Department, The Constitution of India, Seventh Schedule, List II, State List (1950), <https://legislative.gov.in/sites/default/files/COI_English.pdf> .

to tax the consumption or sale of electricity (list II, entry 53).[255]

List III or the concurrent list covers the items over which both the Union and State Governments can legislate and it also contains "electricity" (list III, entry 38).[256] The Union Government which had more or less left governance of electricity production, transmission and distribution to State Governments since independence, started intervening in the sector in the late 1990s following electricity sector reform initiatives promoted by development funding agencies such as the World Bank.[257] The entry of electricity in the concurrent list legitimised the involvement of the Union Government in the governance of the electricity sector.

Entry 56 under the Union list that provides for regulation and development of inter-state rivers and river valleys has proved to be contentious as it infringes on State authority to use water flow for generation of hydropower (list 1, entry 56).[258]

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[255] Government of India, Legislative Department, The Constitution of India, Seventh Schedule, List II, State List (1950), <https://legislative.gov.in/sites/default/files/COI_English.pdf> .

[256] Government of India, Legislative Department, The Constitution of India, Seventh Schedule, List III, Concurrent List (1950), <https://legislative.gov.in/sites/default/files/COI_English.pdf> .

[257] S. Karkia, M. D. Mannb, H. Salehfarc and R. Hill, *Electricity Sector Reform in India: Environmental and Technical Challenges* (Asian J. Energy Environ., Vol. 6, Issue 1, 2005): 71 – 102.

[258] Government of India, Legislative Department, The Constitution of India, Seventh Schedule, List I, Union List (1950),

4. GOALS FOR ENERGY TRANSITION

India has communicated obligatory near-term goals for its energy transition as well as long-term goals to achieve 'net-zero' emission of greenhouse gas ("**GHG**") emissions, to the multilateral climate platforms of the United Nations. Among key near-term goals are the nationally determined contributions ("**NDCs**") that are mandated by the Paris Agreement ("**PA**") on climate change. The energy-related quantitative targets in India's initial NDCs were to reduce the emission intensity of its gross domestic product ("**GDP"**) by 33 to 35 percent by 2030 from its 2005 level and to achieve about 40 percent cumulative installed capacity for electric power generation from non-fossil fuel-based energy resources by 2030 with the help of the transfer of technology and low-cost international finance including from green climate fund ("**GCF**"). GCF, the world's largest climate fund is a critical element of the Paris Agreement mandated to support developing countries raise and realize their NDC ambitions towards low-emissions, climate-resilient pathways. As required by the PA, India updated its NDCs in 2022 to reduce the emissions intensity of its GDP to 45 percent by 2030 from its 2005 level and to achieve 50 percent cumulative installed capacity for electric power

<https://legislative.gov.in/sites/default/files/COI_English.pdf> The Indian Constitution (1950).

generation from non-fossil fuel-based energy sources by 2030 under the same conditions.[259] These are not necessarily ambitious goals and India is on target to meet both goals even under the "business as usual" growth scenario.

In 2014, the new government that came to power increased the voluntary domestic target for RE power generation capacity to 175 GW with solar contributing 100 GW, wind 60 GW, biomass 10 GW small hydropower ("**SHP**") 5 GW.[260] At the Conference of Parties 26 ("**COP26**") at Glasgow in 2021, India also committed its long-term goal to achieve "net zero" by 2070.[261] "Net-zero" emissions refer to achieving an overall balance between GHG emissions produced and GHG emissions taken out of the atmosphere.[262] India's "net-zero" target by 2070 does not mean it will achieve "zero carbon" emissions, as that will require zero carbon

[259] Government of India, 'India's Updated First Nationally Determined Commitment under the Paris Agreement (2021-2030)' (2022, *UNFCC*) <https://unfccc.int/sites/default/files/NDC/2022-08/India%20Updated%20First%20Nationally%20Determined%20Contrib.pdf> .

[260] Press Information Bureau, Government of India, Ministry of New and Renewable Energy, *A target of installing 175 GW of renewable energy capacity by the year 2022 has been set* (19 July 2018) <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1539238> .

[261] Ministry of Environment, Forest and Climate Change, *India's Stand atCOP-26*,(3February2022) <https://pib.gov.in/PressReleasePage.aspx?PRID=1795071> .

[262] Oxford University, Energy & Climate Intelligence Unit, *Taking Stock, A Global Assessment of Net Zero Targets*, (March 2021) <https://ca1-eci.edcdn.com/reports/ECIU-Oxford_Taking_Stock.pdf?mtime=20210323005817&focal=none> .

emissions by 2070. India (as well as other countries) should achieve "net-zero" through a rapid reduction in carbon emissions, but where zero carbon cannot be achieved, offset emissions through carbon credits or sequester emissions through rewilding (increasing tree cover to absorb carbon) or through the use of technologies such as carbon capture utilization and storage (CCUS).

In 2021, the Prime Minister articulated five goals that would potentially contribute to India's energy transition in his speech at COP26.[263] One of these ambitious goals is to achieve 500 GW of RE capacity by 2030 and this has been adopted as a voluntary domestic target by the draft National Electricity Plan (NEP) released for consultation in 2022.[264]

5. ELECTRICITY GENERATION

Erosion of State Government Control

Electricity is an energy carrier or secondary source of

[263] Down to Earth, *CoP26: Modi Offers 'Panchamrita' Concoction for Climate Conundrum at Glasgow*(2 November, 2021)<https://www.downtoearth.org.in/news/climate-change/cop26-modi-offers-panchamrita-concoction-for-climate-conundrum-at-glasgow-80001> .

[264] Central Electricity Authority, Ministry of Power, Government of India, *Draft National Electricity Plan 2021* (2021) <https://cea.nic.in/wp-content/uploads/irp/2022/09/DRAFT_NATIONAL_ELECTRICITY_PLAN_9_SEP_2022_2-1.pdf > .

energy that needs to be generated from primary sources of energy such as coal, natural gas, oil, nuclear energy, hydropower, solar energy, wind energy and other forms of renewable energy. In coal, natural gas, oil and nuclear power generation, heat energy is converted to electricity. In solar photovoltaic generation, light energy is converted to electricity and in hydro and wind-based generators, the kinetic energy of water and wind is converted into electricity. The Electricity (Supply) Act of 1948 ("**EA 1948**")[265] provided for generation and distribution by the State and Union Governments and also the private sector but the Union Government's 1956 policy resolution promoted a system whereby SEBs built power stations and produced, priced, and distributed electricity.[266] The Central Electricity Authority ("**CEA**") set up under EA 1948, served as the central planner promoting electricity generation and providing financial and technical resources to the State Governments.[267] SEBs did not quite meet expectations in addressing the growing electricity demand partly because the more electricity they supplied the more money they lost. Electricity tariff in rupees per kilowatt hour (unit) was set below the rate

[265] Government of India, Central Electricity Regulatory Commission, ElectricitySupplyAct1948,<https://cercind.gov.in/electsupplyact1948.pdf> .

[266] Navroz K. Dubash, Sudhir Chella Rajan, *Power Politics: Process of Power Sector Reform in India*(Economic and Political Weekly, Vol. 36, No. 35,Sep.1-7,2001): 3367-3390 <https://www.jstor.org/stable/4411059>.

[267] Central Electricity Authority (CEA), Government of India, *Functions*, (2022) <https://cea.nic.in/functions/?lang=en> .

required for full cost recovery for political and social reasons. This meant that SEBs lost money for each unit of electricity supplied reducing the incentive to supply electricity. The plant load factor (PLF, or the ratio of average power generated by the plant to the maximum power that could have been generated for a given time period) of existing plants was as low as 40-45 percent and power supply met only 65 percent of demand.[268] To address the challenge, the Ministry of Energy was created in 1974 to centrally plan and execute the setting up of large coal and hydropower-based power generating plants and improve SEB finances.[269] Until then the power sector was administered by the Ministry of Irrigation & Power, as hydropower generation that dominated power generation had the twin objectives of irrigation and meeting energy needs.[270]

In 1975, the newly set up Ministry of Energy and the CEA decided that the Union Government must step into power generation and initiated the idea of setting up the National Thermal Power Corporation ("**NTPC**") and National Hydro Power Corporation ("**NHPC**") to establish large power generating stations that would

[268] Government of India, Planning Commission, *Fourth Five Year Plan-1969-74* (1968).
[269] D.V. Kapur, *The Bloom in the Desert: The Making of NTPC* (Harper Collins India 2015).
[270] Planning Commission, Government of India, *Sixth Five Year Plan - 1979-84* (1978).

supply to SEBs.[271] The idea was resisted by both the PC and the Ministry of Finance which eventually yielded on condition that the World Bank should fund the projects.[272] World Bank funding was secured and NTPC was set up in 1976 and administratively located in the Ministry of Power. As political interference continued, the founding Chairman of NTPC observed that he was forced to use the WB as a shield.[273] As the planned NTPC plants were completed, the share of the Central sector in power generation grew to about a third of total power generation capacity by the 2000s.[274]

In 2001-02, the States dominated ownership of generating assets (62 percent) and electricity generation (56 percent). In 2020-21, the private sector dominated ownership of generating assets (56 percent) with State Government ownership falling to 27 percent.[275] Though the Central sector (Union Government) dominated electricity generation, the private sector was a close second (33 percent) with the State sector accounting for only 28 percent.[276] Factors that influenced the change are the

[271] ibid, 269.
[272] ibid.
[273] ibid.
[274] Central Electricity Authority, Ministry of Power, Government of India, *Growth of Electricity Sector in India from 1947-2021* (April 2021) <https://cea.nic.in/wpcontent/uploads/pdm/2021/12/Growth_Book_2021.pdf> .
[275] ibid.
[276] ibid.

legislation namely the Electricity Act 2003[277] which in turn was motivated by the dominant global economic narrative conveyed by development funding institutions such as the WB that emphasised the role of markets and private initiative in improving efficiency in electricity generation, transmission and distribution and the Union Government's decision to offer a key role to private players in the sector.

Though the share of power generation capacity under Central control was only about 25 percent in 2020-21, compared to 47 percent for the private sector, Central sector plants contribute over 38 percent of total power generation, the largest share, indicating technical and economic efficiency of centrally owned plants.[278] Many of the centrally owned plants are pit head plants (located near coal mines) which substantially reduces the cost of power generation.[279] State Government-controlled power plants were located in the State often far away from the coal mines which substantially increased the

[277] Government of India, Legislative Department, The Electricity Act, 2003, <https://legislative.gov.in/actsofparliamentfromtheyear/electricity-act-2003>.

[278] Central Electricity Authority, Ministry of Power, Government of India, Growth of Electricity Sector in India from 1947-2021 (April 2021) <https://cea.nic.in/wpcontent/uploads/pdm/2021/12/Growth_Book_2021.pdf>.

[279] PNS, NTPC Strives towards Being Cost Cognizant Organization, *TheDailyPioneer*(17March2022)<https://www.dailypioneer.com/2022/state-editions/ntpc-strives-towards-being-cost-cognizant-organization.html> .

cost of power generation as the cost of transport of coal by rail is often more than the cost of coal. [280] However, States preferred plants located in the State as it gave them control over the plant and control over pricing electricity generated by the plant and more importantly increased employment opportunities directly and indirectly.

6. THE CASE OF SEB FINANCES

Role of the Union Government

One of the key barriers to replacing fossil fuel-based electricity generation with that of RE is the poor financial health of electricity distribution companies, earlier state departments known as SEBs but now detached as independent commercial entities in most States and labelled "Discoms".[281] Though most of the analysis on the financial status of Discoms assigns blame on administrative inefficiency of SEBs and politicization of electricity tariff at the State level, the Union Government inadvertently initiated their financial deterioration.

[280] Rahul Tongia and Samantha Gross, *Coal in India: Adjusting to Transition*, (Brookings Institution, 8 March 2019).

[281] Prasanth Regy, Rakesh Sarwal, Clay Stranger, Garrett Fitzgerald, Jagabanta Ningthoujam, Arjun Gupta, Nuvodita Singh, *Turning Around the Power Distribution Sector: Learnings and Best Practices from Reforms* (NITI Aayog,RMI,andRMIIndia,2021)<https://www.niti.gov.in/sites/default/files/2021-08/Electricity-Distribution-Report_030821.pdf> .

At the time of independence (1947) electricity generation, transmission and distribution were primarily in the hands of the private sector.[282] Private companies and their franchisees focussed on urban and industrial electricity demand that offered a reasonable return on investment. Rural and agricultural sectors were ignored as they were unprofitable.[283] Following the enactment of the Electricity Act 1948, SEBs were set up as departments of State Governments that took over governance of their respective electricity sectors.[284] One of the key mandates of SEBs was to increase access to electricity. As per the original plan, SEBs were expected to earn a return of 3 percent on their net fixed assets in services after meeting other financial obligations and depreciation.[285] SEBs did manage to work under these conditions initially but they began to falter financially in the late 1960s. Under the Union mandate to "energize pump sets" (provide electricity connections) for agricultural irrigation to increase food production, SEBs were expected to focus

[282] S. Madan, S. Manimuthu and S. Thiruvengadam, *History of Electric Power in India (1890 – 1990)* (IEEE Conference on the History of Electric Power, Newark, NJ, USA, 2007): 152-165 <http://ieeexplore.ieee.org/document/4510263/> .

[283] Ronojoy Sen, 'India's Changing Political Fortunes' (2014) 113(762) *Current History* 131-136 <http://www.jstor.org/stable/45388182> .

[284] Anoop Singh, 'Power Sector Reform in India: Current Issues and Prospects' (2006) 34(16) *Energy Policy* 2480-2490 <https://www.sciencedirect.com/science/article/pii/S030142150400254X> .

[285] Thomas B. Smith, 'India's Electric Power Crisis: Why Do the Lights Go Out?' (1993) 33(4) *Asian Survey* 376-392 <http://www.jstor.org/stable/2645104> .

on increasing the number of pump sets "energised" rather than on financial performance.

The Planning Commission ("**PC**") , an extra-constitutional body set up in 1950 to ensure that the constitutional right to adequate means of livelihood and the right to a decent quality of life to all citizens strongly influenced governance of sectors such as electricity that were under State purview.[286] State Governments were required to send all proposals with economic or financial significance such as plans for electricity generation and distribution to the PC. Chief Ministers (CMs) of certain States resented this procedure as they were consulted only nominally at a late stage over the economic governance of their respective States.[287] The National Development Council ("**NDC**") set up in 1952 with State CMs as members and the PM as Chair to address the issue only strengthened the role of the PC as the most important arbiter of economic policy in India. The Central grants-in-aid were allocated to States through the PC which

[286] Medha Kudaisya, *A Mighty Adventure: Institutionalising the Idea of Planning in Post-Colonial India, 1947-60*(Modern Asian Studies, Vol. 43, No. 4, Cambridge University Press, July 2009): 939-978 <http://www.jstor.org/stable/40284916> .
[287] ibid.

increased the power of the Union Government over key subjects such as electricity.[288]

The famine in the 1960s led the Union Government and the PC to direct SEBs to focus on the national strategic goal of providing access to electricity for irrigation to promote agriculture.[289] As cost recovery for the supply of electricity was not emphasised as strongly as energising pump sets were emphasised for irrigation to boost food production, the financial status of SEBs started deteriorating.[290] At that time SEBs were departments of the State Government whose nature was influenced by the PC to pursue national objectives such as attaining self-sufficiency in food production and increasing access to electricity for poor households that compromised the financial performance of SEBs. .[291] SEBs managed to achieve not only a reasonable level of village electrification driven by the electrification of groundwater pumping for irrigation but also facilitated development in agriculture through the green revolution.[292] The upside of this strategic outcome, the achievement of self-sufficiency

[288] V Bhaskar Rao, 'Planning and Centre-State Relations in India' (1986) 47(2) *The Indian Journal of Political Science* 214-228 <http://www.jstor.org/stable/41855846> .
[289] Government of India, Planning Commission, Second Plan Document 1956-61 (1955) & Third Plan Document 1961-66 (1960).
[290] Government of India, Planning Commission, Third Plan Document 1961-66 (1960) & Fourth Plan Document 1969-1974 (1968).
[291] Joel Ruet, *Privatising Power Cuts? Ownership and Reform of State Electricity Boards in India,* (India, Academic Foundation, 2005).
[292] ibid.

in food production was appropriated by the Union Government while the downside, the deterioration of SEB finances was left behind as a problem for State Governments. The gap between revenue and costs of SEBs persisted despite the amendment to the Electricity Act that mandated positive return from SEBs.[293] A number of analytical reports from national and global development funding agencies took it upon themselves to reform SEBs after India was forced to approach these agencies for financial assistance following a balance of payments crisis in 1991.[294] They framed the problem as one of administrative or managerial inefficiency of SEBs and proposed "reform" of SEBs through unbundling of generation, transmission and distribution segments that would push SEBs under the efficient "market" logic.[295] The PC adopted the narrative and instructed SEBs to "accept reforms" and "pay their dues" to generating

[293] Navroz K. Dubash & Sudhir Chella Rajan, *The Politics of Power Sector Reform in India* (World Resources Institute, April 2001) <https://r.search.yahoo.com/_ylt=AwrPpQd_579jfQsLS567HAx.;_ylu=Y29sbwNzZzMEcG9zAzEEdnRpZAMEc2VjA3Ny/RV=2/RE=1673549824/RO=10/RU=http%3a%2f%2fpdf.wri.org%2fpower_politics%2findia.pdf/RK=2/RS=avq8.QP5ctG2BeRBeA2F41rAkys-> .

[294] N.K. Singh & Jessica S. Wallack, *Some Light at the End of the Tunnel: Ingredients of Power Sector Reforms in India* (Working Paper Number 235, Stanford Centre for International Development, December 2004) <https://kingcenter.stanford.edu/sites/g/files/sbiybj16611/files/media/file/235wp_0.pdf> .

[295] Banerjee,Sudeshna Ghosh; Pargal, Sheoli, *More power to India: The Challenge of Electricity Distribution* (Directions in development, Energy and Mining,WorldBankGroup2014) <http://documents.worldbank.org/curated/en/815021468042283537/More-power-to-India-the-challenge-of-electricity-distribution> .

companies failing which "they will face graded reduction in power supply".[296] The threat did not stop State Governments from exploiting electricity tariffs as a political tool to further erode SEB finances.

Role of State Governments

Federalism in India was designed to diffuse potential conflicts arising out of heterogeneity and more importantly to manage the pace and direction of social change in the interests of regional elites and caste-based voting blocks that they controlled. Electricity in the hands of State Governments played a significant role in appealing to these groups. Though electricity was a concurrent subject as per the Constitution, the establishment of SEBs as vertically integrated monopolies gave State Governments greater control of electricity generation, transmission, and distribution.[297] Amendments to the Electricity Act in 1949 and 1951 allowed State Governments to influence the appointment of senior staff in SEBs and required SEBs to accept 'policy directives' from State Governments.[298] In the

[296] Government of India, Planning Commission, *Tenth Plan Document 2002-2007* (2001).
[297] Kelli L. Joseph, 'The Politics of Power: Electricity Reform in India' (2010)38(1)*EnergyPolicy*503-511 <https://www.sciencedirect.com/science/article/pii/S0301421509007241> .
[298] Santosh Ghosh, Vinod Kumar Yadav, Vivekananda Mukherjee, and Shubham Gupta, 'Three Decades of Indian Power-Sector Reform: A CriticalAssessment'(2021)68*UtilitiesPolicy*1-12

1960s and 70s, external political developments allowed State Governments to further consolidate their power over SEBs.[299]

Electoral loss of the dominant congress party in certain key States in 1967 allowed regional parties to become major actors in political and economic negotiations.[300] Though facilitating the accumulation of physical capital by land owning castes and groups remained the central model for political intermediation at the Federal and State level, compromises in the form of social capital had to be offered to emerging interest groups such as a sizeable middle class in urban areas and farmers empowered by the green revolution in rural areas.[301] The best way to appease both groups was to continue provision of subsidised electricity to farmers and extend similar subsidies to households in urban areas. The offer of clean and convenient lighting replacing smoky oil lamps in households and pumped water for irrigating agricultural land guaranteed political returns from the two

<https://www.sciencedirect.com/science/article/pii/S0957178720301508> .

[299] Brian Min, Miriam Golden, *Electoral Cycles in Electricity Losses in India* (EnergyPolicy,Volume65,2014):619-625, <https://www.sciencedirect.com/science/article/pii/S0301421513009841> .

[300] Mridula Mukherjee, Aditya Mukherjee and Bipan Chandra, *India Since Independence* (Penguin Books India, 2008).

[301] Shashank Kela, *Federalism and its Discontents: The Doctrine of States' RightsinIndia*(TheCaravan,February,2019)<https://caravanmagazine.in/literature/doctrine-state-rights-india> .

large groups.[302] The electoral success of this model led many States to replicate subsidising electricity tariff for households and farmers. The widespread use of electricity as a tool to control resource allocation for political gains by State Governments accelerated the financial deterioration of SEBs.[303] A number of reform initiatives by the Union Government designed to improve the finances of SEBs in the 1990s and 2000s have not had a significant impact. In 2021-22, the consolidated financial debt of State Discoms was estimated at ₹6 trillion.[304]

The dire financial status of Discoms hinders their ability to accommodate electricity generated by RE. Though the electricity from RE sources may be cheaper than fossil fuel-based electricity at the plant level (for example when electricity is being generated by a solar plant when the sun is shining and is used as it is generated), it is costlier at the

[302] Reena Badiani-Magnusson &Katrina Jessoe, *Electricity Prices, Groundwater, and Agriculture: The Environmental and Agricultural Impacts of Electricity Subsidies in India* in Wolfram Schlenker (ed) Agricultural Productivity and Producer Behaviour (November 2019, University of Chicago Press): 157-183 <https://www.nber.org/books-and-chapters/agricultural-productivity-and-producer-behavior/electricity-prices-groundwater-and-agriculture-environmental-and-agricultural-impacts-electricity> .

[303]Rahul Tongia, *Delhi's Household Electricity Subsidies: Highly Generous but Inefficient?* (Brookings India IMPACT Series No. 042017, April 2017) <https://www.brookings.edu/articles/delhis-household-electricity-subsidies-highly-generous-but-inefficient/> .

[304] ICRA, *Reforms implementation critical for state-owned Discoms amid rising debt levels and dues towards Gencos/IPPs* (8 March, 2021) <https://www.icra.in/Rating/DownloadResearchSummaryReport?id=4475 > .

system level (that is providing electricity to the grid day and night across summer, winter and monsoon) as it requires investment in expensive storage batteries or in backup generation.

7. REFORMS IN ELECTRICITY SECTOR GOVERNANCE: ELECTRICITY ACT 2003

The poor financial health of SEBs and perennial power outages led to the passing of the Electricity Regulatory Commissions Act 1998 Act under which the Central Electricity Regulatory Commission ("**CERC**") and State Electricity Regulatory Commissions (SERCs).[305] CERC and SERCs proved that the Union Government can create apolitical regulatory spheres simply by legislating one. But these institutions have so far had only moderate success in restricting political interventions in investment and tariff-setting decisions in the electricity sector at both the Federal and State levels. Retired bureaucrats who have served under the Union Government and State Governments are appointed to lead CERC and SERCs

[305] Nair, S. K. N. *Electricity Regulation in India: Recent Reforms and their Impact* (Margin, The Journal of Applied Economic Research, 2(1), 2008): 87–144, <https://journals.sagepub.com/doi/pdf/10.1177/097381007002001003> .

thereby allowing for informal political influence in shaping key decisions.

In 2000, the Union Government conceived a radical new piece of legislation to completely change the paradigm for the electricity sector. Though the initial draft of the legislation was prepared by an Indian research institution, the WB was involved in shaping the final draft.[306] Passed in 2003, the Electricity Act 2003 ("**EA 2003**") provided a roadmap for initiating a market-based electricity sector through the progressive introduction of competition and choice with provisions for liberalization of captive generation, entry of the private sector in generation, introduction of open access in transmission and subsequently in distribution and issuing multiple distribution licenses in a given area. A critically important change that the Act sought to encourage was replacing the present single-buyer (i.e., SEBs) model with a multi-buyer model. This was expected to lead to a paradigm change in the sector where the monopoly of the SEBs for buying and selling power would cease, thus leading to a market determined tariff structure. Towards harmonization of regulation, the Act specified that the principles laid out by the CERC in generation and transmission should guide SERCs. The Act wrote the

[306] "World Bank, *Post-2003 Electricity Act, Power Sector Challenges and Options* (World Bank, India: Long-term Energy Issues, 2006) <https://openknowledge.worldbank.org/handle/10986/12998> .

code for the sector from a national perspective with regard to grid discipline and rationalised dispatch of power. It also contained provisions that would potentially favour the incorporation of RE in the electricity grid. Overall, the EA 2003 and amendments to it are likely to preside over not just the transition of the electricity sector to low-carbon fuels but also the transition of governance of the electricity distribution segment from State Governments to the Union Government.

Amendments to the Electricity Act 2003

There were two minor amendments to the EA 2003 in 2003 and 2007. The amendment proposing major changes, the Electricity (Amendment) Bill 2014 that amends the EA 2003 was introduced in the lower house of the Parliament in December 2014.[307] It was referred to the Parliamentary Standing Committee on Energy following which it was reintroduced several times but was not passed. Revised and labelled as the Electricity (Amendment) Bill, 2022 ("**EA 2022**") was introduced in lower house of the Parliament in August 2022. [308] EA

[307] PRS Legislative Research, *The Electricity (Amendment) Bill, 2022*, <https://prsindia.org/billtrack/the-electricity-amendment-bill-2022#:~:text='The%20Electricity%20(Amendment)%20Bill%2C%202022%20was%20introduced%20in%20Lok,the%20electricity%20sector%20in%20India> .

[308] Business Today, Electricity (Amendment) Bill, 2022 Sent to Standing Committee on Energy Examination, *Business Today* (8 August

2022 was once again referred to the Parliamentary Standing Committee on Energy after members of several opposition parties opposed its introduction on the grounds that it violated the Federal principles of the Constitution.[309] EA 2022 is also opposed by farmers[310] as they fear that it will eliminate subsidised access to electricity and by some trade unions who fear job losses after the take-over of Discoms by private enterprise with tacit support from the Union Government.[311]

The concern expressed by opposition parties is that EA 2022 seeks to amend the Constitution through a statute that will allow the Union Government to appropriate the powers of State Governments. EA 2022 seeks to amend Section 42 of EA 2003 to facilitate non-discriminatory open access to the distribution network of a distribution licensee. In theory, open access would allow the entry of multiple companies to supply electricity to consumers as

2022)<https://www.businesstoday.in/latest/economy/story/electricity-amendment-bill-2022-sent-to-standing-committee-on-energy-examination-344040-2022-08-08> .

[309] The Wire, Continuing Assault on India's Federal Structure': People's Commission on Electricity Bill, *The Wire* (29 July 2022) <https://thewire.in/government/continuing-assault-on-indias-federal-structure-peoples-commission-on-electricity-bill> .

[310] A M Jigneesh, Why is there uproar over the Electricity (Amendment) Bill, 2022, *The Hindu* (10 August 2022) <https://www.thehindu.com/news/national/explained-why-is-there-uproar-over-the-electricity-amendment-bill-2022/article65755167.ece> .

[311] Newsclick, Why is there Opposition to the Electricity Amendment Bill2022?*NewsClick*(15August2022)<https://www.newsclick.in/why-there-opposition-electricity-amendment-bill-2022> .

in the case of mobile telephone services.[312] This amendment is favoured by the middle and affluent classes eager to replace State Discoms with efficient private suppliers.[313] The concern over this provision from State Governments is that it will allow the Union Government to grant multi-state entry of favoured corporates into the electricity distribution segment.[314] The EA 2022 achieves this by blurring the distinction between the distribution licensee and distribution company.[315] This means that any company will only be required to register to trade in electricity to enter the distribution segment. In contrast, a distribution licensee will have to go through due diligence by the SERC to distribute electricity in a particular area. Multiple operators in areas where there are several categories of consumers with different tariff

[312] The Hindu, Business Line, Electricity (Amendment) Bill 2022 Would Lead to Healthy and Ethical Competition, *The Hindu Business Line* (18August2022)<https://www.thehindubusinessline.com/news/national/electricity-amendment-bill-2022-would-lead-to-healthy-and-ethical-competition/article65784324.ece> .

[313] Shreya Jai, Power Hurdles: Consumers Need to Wait Before They Can Choose Supplier, *Business Standard* (21 July 2022) <https://www.business-standard.com/article/economy-policy/long-way-to-go-before-consumers-can-get-to-choose-their-power-retailer-121072100801_1.html>.

[314] The Wire, After Opposition's Concerns, Electricity Amendment Bill Sent to Parliament Standing Committee, *The Wire* (8 August 2022) <https://thewire.in/government/electricity-amendment-bill-parliament-select-committee> .

[315] Gursimran Kaur Bakshi, Electricity (Amendment) Bill, 2022 is an Assault on The Federal Structure of The Constitution: People's Commission on Public Sector and Services, *The Leaflet, Constitution First* (5 July 2022) <https://theleaflet.in/electricity-amendment-bill-2022-is-an-assault-on-the-federal-structure-of-the-constitution-peoples-commission-on-public-sector-and-services/> .

slabs are likely to create complex administrative and economic challenges.[316]

EA 2022 offers open access at the low-tension consumer level. In theory, this could mean that a distribution company can choose to supply electricity to urban areas concentrated with affluent households marginalising rural areas with poor and low-income households. This would effectively create two different market segments, one, high-cost good quality commercial power for the cities supplied by private companies and another, low-cost, poor-quality social electricity for rural areas supplied by Discoms. This was the case in the early years after independence when the private sector dominated the electricity supply. Harsh penalties are imposed by the EA 2022 on Discoms for non-compliance with Renewable purchase obligations (RPOs) as prescribed by the Central Government.[317] EA 2022 provides for CERCs to effectively carry out policies of the Union Government which can compromise the autonomous functioning of the regulatory body. It can also effectively make SERCs redundant.[318]

[316] ibid.
[317] ibid.
[318] V K Gupta, Electricity (Amendment) Bill, 2022: Pitfalls of Power Privatisation,*Newsclik*(15July2022)<https://www.newsclick.in/Electricity-Amendment-Bill-2022-Pitfalls-Power-Privatisation> .

In addition, the government passed the Energy Conservation (Amendment) Act, 2022 by the parliament in December 2022.[319] The Act is designed to amend the Energy Conservation Act, 2001 enabling the Union Government to impose the use of non-fossil fuels on energy consumers as an important provision that will help India meet its climate goals.[320] The Act also allows the Union Government to implement a carbon trading scheme but it empowers the SERCs to adjudge penalties and to make regulations for discharging their functions offering some comfort to the concern that the Union is appropriating powers of State Governments over regulations on electricity.[321] The governing council of the Bureau of Energy Efficiency (BEE) has been expanded under the Act to include members from six ministries, departments, regulatory institutions as well as members

[319] Maitreyi Karthik, All You Need to Know About the Energy Conservation Bill, *Down to Earth* (17 August 2022), <https://www.downtoearth.org.in/news/energy/all-you-need-to-know-about-the-energy-conservation-bill 84362#:~:text=The%20Lok%20Sabha%20passed%20Energy,energy%20sources%20and%20green%20hydrogen> .

[320] Sangita Shetty, Energy Conservation Bill Amendments to Help Usher in Energy Transition: ICRA, *Solar Quarter* (18 August 2022) <https://solarquarter.com/2022/08/18/energy-conservation-bill-amendments-to-help-usher-in-energy-transition-icra/> .

[321]Money Control, Energy Conservation (Amendment) Bill 2022 introduced in Lok Sabha, *Money Control* (3 August 2022) <https://www.moneycontrol.com/news/business/economy/energy-conservation-amendment-bill-2022-introduced-in-lok-sabha-8945861.html> .

from industries and consumer groups.[322] While the provisions of the new Amendments on the Electricity Act and the Energy Conservation Act may be welcome from the Climate perspective, these provisions are likely to orchestrate the slow erosion of State Government power over the governance of electricity distribution.

Decarbonising the Electricity Sector

The EA 2003, contained a number of provisions to promote RE which was probably premature in the early 2000s but very relevant after the Paris Agreement on climate change in 2015 and the declaration by India that it will achieve net zero by 2070 at COP 27 in Glasgow in 2021.[323] EA 2003 provided for adequate grid connectivity for RE project developers and mandated minimum purchase of RE power by Discoms through renewable purchase obligation (RPO) to be enforced by the SERCs. The National Electricity Policy 2005, emphasized the need for specific power purchase agreements and tariff mechanisms to promote RE.[324] The National Tariff Policy of 2006 introduced

[322] Rituraj Baruah, Lok Sabha Clears Amendments to EC Act, *LiveMint* (9 Aug 2022) <https://www.livemint.com/politics/policy/lok-sabha-passes-bill-to-mandate-use-of-clean-energy-11659966783012.html> .
[323] Ministry of Environment, Forest and Climate Change, Government of India, India's Stand at COP-26*Press Information Bureau* (3 February 2022) <https://pib.gov.in/PressReleasePage.aspx?PRID=1795071> .
[324] Ministry of Law & Justice, Government of India, *Electricity Act 2003*, (ActNo36of2003)<https://cercind.gov.in/Act-with-amendment.pdf> .

preferential feed-in tariffs to promote RE.[325] Without EA 2003 and policies that were derived from the Act, many of the financial incentives offered to RE project developers include but not limited to: access to low-cost finance, capital subsidies, viability gap funding, attractive generation-based incentives and "must-run" status that are behind the substantial RE capacity addition would not have been justified.[326]

Most of the provisions are centrally decided and implemented with little or no participation from State Governments.[327] This is not necessarily the case of federal countries around the World. In the United States, ideological differences in the desired level of climate protection (between Republican and Democrat governed States) and disagreements over where authority should lie underpin the divergence between the Union and Regional Governments over climate action.[328] For example, the

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[325] Ministry of Power, Government of India, *National Tariff Policy, 2006*,(2006)<https://cea.nic.in/wpcontent/uploads/legal_affairs/2020/09/Tariff%20policy.pdf> .

[326] Ministry of New & Renewable Energy, Government of India, Schemes,<https://www.bing.com/ck/a?!&&p=ed260d4dfdf94c13JmltdHM9MTY3MzY1NDQwMCZpZ3VpZD0yZGNkZWE0NS05MDgwLTYyMTItMWEwYS1mODI2OTFkMjYzNjYmaW5zaWQ9NTE4Nw&ptn=3&hsh=3&fclid=2dcdea45-9080-6212-1a0af82691d26366&psq=mnre+schemes&u=a1aHR0cHM6Ly93d3cubW5yZS5nb3YuaW4vc29sYXIvc2NoZW1lcy8&ntb=1> .

[327] IRENA, *Renewable Energy Prospects for India*, Working paper, The International Renewable Energy Agency (IRENA, 2017) < https://www.irena.org/Publications/2017/May/Renewable-Energy-Prospects-for-India > .

[328] Cary Funk, *Key Findings: How Americans' Attitudes About Climate Change Differ by Generation, Party and Other Factors,* (Pew Research Centre

State of California has set itself the target of producing all energy from carbon free sources by 2045 and has mandated phase out of fossil fuels in all segment especially electricity generation.[329] This has resulted in California having one of the highest electricity prices in the USA.[330] Other federal countries in the American continent and in Europe have constitutionally mandated diffusion of power over energy policy.[331] Even when the Federal Government sets climate targets as required by multilateral climate agreements, State consultation and cooperation are solicited.[332]

Role of state governments in decarbonising the electricity sector

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26,May,2021)<https://www.pewresearch.org/facttank/2021/05/26/key-findings-how-americans-attitudes-about-climate-change-differ-by-generation-party-and-other-factors/> .

[329] Hannah Findling, *A Regional Energy Market to Achieve California's Renewable Energy Goals*, (Consilience: The Journal of Sustainable Development,Iss.24,2021)<https://journals.library.columbia.edu/index.php/consilience/article/view/7411> .

[330] Kumar, R., Rachunok, B., Maia-Silva, D. et al. *Asymmetrical Response of California Electricity Demand to Summer-Time Temperature Variation* (Sci Rep 10, 10904, 2020) <https://doi.org/10.1038/s41598-020-67695-y> .

[331] International Energy Agency, *Germany 2020: Energy Policy Review*, (IEA,February2020)<https://www.bmwk.de/Redaktion/DE/Downloads/G/germany-2020-energy-policy review.pdf?__blob=publicationFile&v=4> .

[332] David L Schwartz (ed), *Energy Regulation and Markets Review* (Tenth Edition,LawReviews, Law Business Research Ltd, 2021) <https://scholar.google.co.in/scholar?q=David+L+Schwartz+(ed),+Energy+Regulation+and+Markets+Review&hl=en&as_sdt=0&as_vis=1&oi=scholart> .

In India, there is no strong ideological difference over the need for Climate protection between the State and Union Governments. So far, most State Governments have been eager to implement policies that address climate change and also eager to attract investment in RE.[333] Investment in RE capacity has a significant upside in terms of employment generation and elevation in the rankings of States that are active in addressing climate change which in turn attracts more investment. However, there are downsides to climate action that accrue mostly to State Governments. Many State Governments whose Discoms are in dire straits financially are concerned with the consumption of RE mandated by centrally determined RPOs.[334] The Discoms on whom RPOs are imposed are financially constrained and RPOs increase their financial liabilities.

The increase in targets for RE in 2014 has meant a large degree of Centralization of the initiatives and programmes to increase RE capacity. Though many State Governments had their own incentive schemes for promoting solar and wind project development prior to

[333] Niti Aayog, Government of India, *State Renewable Energy Capacity Addition Roadmap, Action Plan 2022 and Vision 2030: Summary of findings*, <http://www.indiaenvironmentportal.org.in/content/446589/state-renewable-energy-capacity-addition-roadmap-action-plan-2022-and-vision-2030-summary-of-findings/> .

[334] Shakti Sustainable Energy Foundation, Analysis of Financial Health of DISCOMs and its Link with End-use Efficiency Implementation, July2018,<https://shaktifoundation.in/wpcontent/uploads/2018/10/Analysis-of-Financial-Health-of-DISCOMs-16Oct18.pdf> .

2014, the scale of targets and scope of incentives announced by the Centre substantially reduced interest in State schemes.[335] Centralization of policymaking and implementation on RE has produced mixed results. On the one hand, it has dramatically improved the visibility of India's effort to decarbonize the power sector. This has attracted large overseas players and foreign investment in the RE sector.[336] On the other hand, Centralization has oversimplified and generalized RE projects offered on an auction or tender basis which has affected their technical and economic viability. While the involvement of technologically competent international players in the RE sector has introduced advanced technology, it has also driven out small players with domestic roots promoted by State Government policies, especially in the wind sector. Most importantly the constant pressure to drive down tariffs of RE projects has favoured large international players with access to low-cost finance at the expense of smaller domestic players. In addition, the overemphasis on lower tariffs has meant that tariff caps set for centrally auctioned projects are often too low to make the projects bankable or

[335] Kumar. J, C.R., Majid, M.A. Renewable Energy for Sustainable Development in India: Current Status, Future Prospects, Challenges, Employment, And Investment Opportunities (Energ Sustain Soc 10, 2, 2020).<https://energsustainsoc.biomedcentral.com/articles/10.1186/s13705-019-0232-1> .

[336] International Energy Agency, *Renewables Integration in India* (IEA 2021), <https://www.iea.org/reports/renewables-integration-in-india>. .

economically viable.[337] While solar is generally location agnostic, wind favours specific locations and this has become a major problem when tariff caps are set at low levels. Under a 'one tariff fits all' approach that centralized efforts pursue, wind projects crowd around a few favourable locations around the country. This has limited capacity creation. Continued emphasis on low tariffs pushed projects towards cheaper components that compromised the efficiency and life of wind and solar energy systems.

Prior to the involvement of the Union Government, proactive State Government initiatives in the wind energy sector in the early 2000s not only facilitated the development of a competitive domestic wind energy manufacturing industry employing thousands of people but also put India ahead of China in wind energy generation.[338] Early State Government initiatives in the solar sector enabled India to briefly become a net exporter of solar modules.[339] Today aggressive targets set for RE electricity capacity development by the Union

[337] Ankita Chauhan, Low renewable auction prices in India – Aggressive bids or unrealistic expectations? (S&P Global, 30 August 2019),<https://www.spglobal.com/commodityinsights/en/ci/research-analysis/low-renewable-auction-prices-in-india.html> .

[338] Deepak Sangroya et al., *Development of Wind Energy in India* (International Journal of Renewable Energy Research, Vol.5, No.1, 2015),<https://www.ijrer.org/ijrer/index.php/ijrer/article/download/1626/pdf_7> .

[339] Reuters, Moser Baer Gets Export Orders Worth $500 Mn, *Livemint* (1October2008)<https://www.livemint.com/Industry/vsHAQbGExoScuT2MGZvkdO/Moser-Baer-gets-export-orders-worth-500-mn.html> .

Government along with the centrally decided low tariff for RE electricity has gained international prestige but necessitated the import of cheap solar panels from China inadvertently creating jobs in China.

The share of solar and wind in India's ten renewables-rich states (Tamil Nadu, Karnataka, Gujarat, Rajasthan, Andhra Pradesh, Maharashtra, Madhya Pradesh, Telangana, Punjab and Kerala) is significantly higher than the national average. This is partly because of natural factors such as the State being windy most of the time or having excellent solar insolation. States that are not favourable to solar and wind projects cannot install RE capacity on the same scale as the RE-rich States. Even if they do, they will not be able to accommodate the low tariff set by centrally administered auctions because of unfavourable terrain and other natural challenges. These States may be required to purchase RE from other RE-rich states to meet their RPO obligations even if they are self-sufficient in meeting their electricity requirement. This could be an additional burden on poorer States with Discoms that carry huge financial liabilities.

8. CONCLUSIONS

The key question in this context is whether Centralization is working for the energy transition or the energy

transition is working for Centralization. The answer is possibly the latter as electricity is only one of the many subjects that are placed under the State by the Constitution that the Centre is appropriating through legislation, policy promotion and through allocation and control of financial resources. The decision to Centralize electricity sector governance in India predates the commitment towards making an energy transition and is partly influenced by development funding agencies for whom Centralization and harmonization of electricity policies across nations and regions has been on the agenda for over four decades.

The fact that India's federal institutions place relatively weak checks on the power of a Union Government with a Parliamentary majority has accelerated the pace of Centralization.[340] 'Placing this kind of flexibility in the hands of the Central Government was deliberate and designed to enable decisive Central action to protect national integrity in the aftermath of Partition' according to Loise Tillin.[341] The architect of the Constitution, B.R. Ambedkar concurred with the view as he observed that the difference between the 'tight mould' of other federal

[340] Aswini K. Ray *India's Federal Polity: Some Questions*, (Economic and PoliticalWeekly14,no.34,1979):1471–75, <http://www.jstor.org/stable/4367879> .

[341] Louise Tillin, *The Fragility of India's Federalism*, The Hindu, (8 August 2019) <https://www.thehindu.com/opinion/lead/the-fragility-of-indias-federalism/article28872165.ece > .

systems and the flexibility hard-wired into India's which would enable it to be both 'unitary as well as federal' according to the requirements of time and circumstances.[342] Time and circumstances, in the form of the commitment to multilateral institutions to decarbonize the energy sector has provided the Union Government the opportunity and justification to take back control of the electricity sector.

[342]ibid .