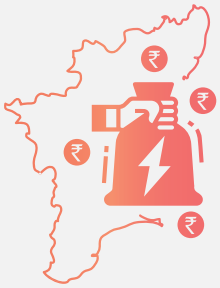

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Electricity subsidy and a just energy transition in Tamil Nadu

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Purpose

To review the current energy subsidy scheme for domestic consumers in Tamil Nadu and assess to what extent it meets the objectives of reducing energy poverty and supporting the state's energy transition.

Key messages

(i) The annual electricity subsidy allocation by the Tamil Nadu government increased by 165% over the last ten years.

(ii) The average annual subsidy allocation increase is 11.92%. The average inflation rate during the same time period was 5.03.%

(iii) The average subsidy allocation per domestic service connection show an upward trend from 2022-23 onwards. There is a 52% increase from FY 2021-22 to FY 2022-23.

(iv) 75.55% of the total subsidy allocated to domestic consumers is on account of the 50 free units per month. This subsidy is equal to the cost of a 1.52 GW of solar power plant.

(v) Adding up the subsidy and cross subsidy, households with a bi-monthly consumption higher than 500 kWh receive about 3-times the annual subsidy if compared with low consuming households of 100 kWh.

(vi) The subsidy provided by the state government is indirectly contributing to 6.11 million tonnes of CO2 emissions.

What is the purpose of electricity subsidies?

To address climate change, to promote adaptation and resilience, to eliminate energy poverty, and to ensure a just energy transition, countries and states will have to mobilise substantial financial resources. A recent study estimated that India will need to invest a 900 billion USD over the next 30 years to ensure a 'just energy transition' (Bushan 2023). While developed countries have pledged to provide climate finance to developing countries, these pledges have not been fulfilled, or are very slow to arrive, or are insufficient. Developing countries will need to find additional and alternative resources to accelerate the decarbonization of its economies and to invest into climate adaptation. The United Nations (2022) has outlined a few interventions that can help in accelerating a just energy transition. These include:

- Iron and steel
- to make renewable energy technologies a public good,
- to shift energy subsidies from fossil fuels to renewable energy, and
- to triple investments into renewables.

In 2009, G20 members committed to phasing out and rationalizing fossil fuel subsidies in the medium term (Reuters 2009). But as of 2022, fossil fuel subsidies have not been phased out, neither have they been reduced; instead fossil fuel subsidies exceeded USD 1 trillion globally for the first time. This is largely due to governments' increased subsidies to cushion consumers from rising energy prices (IISD 2023).

Energy subsidies are found in virtually every country. Justifications for their use range from social welfare protection, job creation, encouragement of renewable energy sources, promotion of economic development, to energy security. However, it may be worth examining some of the current energy subsidy schemes asking if and to what extent these subsidy schemes are contributing to a just energy transition and to what extent these subsidies align with the proposed three interventions by the UN.

Within the energy sector the electricity sector accounts for a major share of emissions, and existing energy subsidy schemes in this sector often indirectly support the incumbent energy sources, which in the case of Tamil Nadu, are coal and lignite. In Tamil Nadu, the domestic consumers' electricity tariffs are subsidized by the Government of Tamil Nadu. Other consumer categories such as agriculture, huts, power looms, hand looms and places of worship do receive electricity subsidy as well. This subsidy is currently provided by offering the consumers a reduced per kWh cost of electricity sourced from the public distribution licensee, TANGEDO, while the state government in return compensates TANGEDCO for a part of this cost reduction to the consumers.

In addition to the electricity subsidy provided by the Government, TANGEDCO, is mandated to cross-subsidise lower consumer tariffs. This is done by charging certain consumer categories, such as industries and commercial entities, a higher tariff for per unit of electricity, as it costs TANGECO to deliver the same. However, in the past years, the cross-subsidy provided was consistently and significantly higher compared to the extra charges levied. TANGEDCO was not able to recover its overall cost of supply from its revenue collection, resulting in a cumulative revenue gap of INR 1.25 lakh Crores as of March 2022 (TANGEDCO 2022). Which means that the current subsidy design - cross subsidising one consumer category to provide subsidised energy to others - compromises the financial health of TANGEDCO and jeopardises the long-term energy supply stability in the state. Financial bail outs for TANGEDCO, by both the central and state government, were required in the recent past.

Additionally, one may observe that the lion's share of electricity supplied by TANGEDCO is sourced from emission intensive thermal power plants, fuelled with coal or lignite. Therefore, when the state government subsidises consumers that procure energy from TANGEDCO it indirectly subsidises polluting power sources.

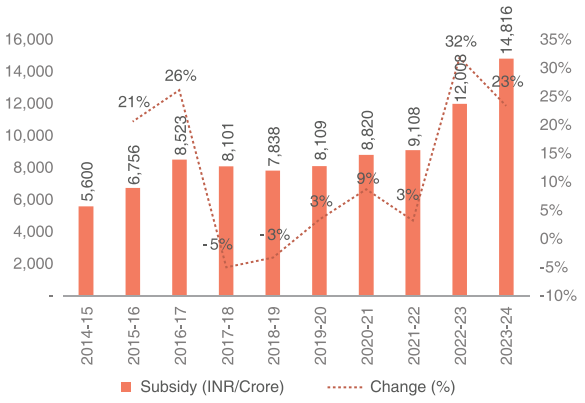
Lastly one may examine the current electricity subsidy scheme and assess to what extent it supports those that are most in need of it. Is the subsidy reaching low-income households? Does the subsidy mitigate energy poverty?

Increasing Trend in Subsidy Disbursement

165% increase over 10 years
11.92% of average annual increase

Over a 10-year time period, from FY 2014-15 to FY 2023-24 the state's overall subsidy disbursed for electricity has increased by 150% from INR 5,600 Crore to INR 14,816 Crore. This represents an average annual increase of 11.92%. This increase in annual subsidy allocation excludes financial bail outs and injections that were provided by either the central and the state governments during the same time period to TANGEDCO. Neither does this include the cross-subsidy component provided by TANGEDCO to some consumer categories.

Figure 1 Subsidy disbursement by Tamil Nadu Government (INR in Crore)



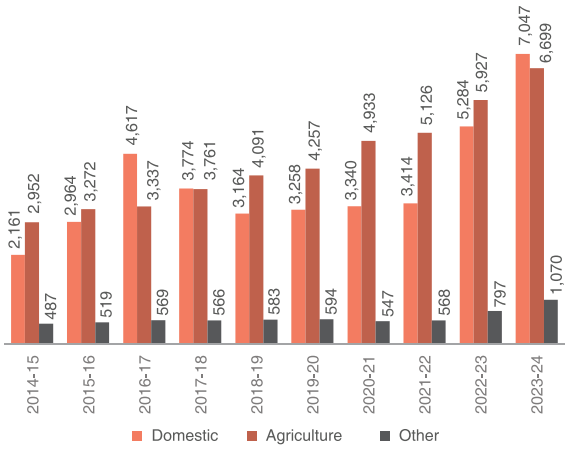
Source: TNERC 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023

Agriculture and Domestic take the lion's share

93% of subsidy are for agriculture and domestic

Out of the total subsidy amount of INR 14,816 Crore commitment in FY 2023-24, a share of 93% was allocated to agriculture and domestic consumers. The subsidy allocated for domestic consumers in FY 2023-24 is INR 7,047 Crores, while the subsidy for agricultural consumers is INR 6,699 Cores. For the first time since FY 2016-17, the subsidy allocation to domestic consumers is higher than the subsidy allocation for agricultural consumers. 'Other' consumers received a total subsidy of INR 1,070 Crores. 'Other' includes the following consumer categories: Huts, Power Looms, Hand Looms, Places of Worship and LT Industries.

Figure 2 Subsidy allocation by sector (INR in Crore)



Source: TNERC 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023

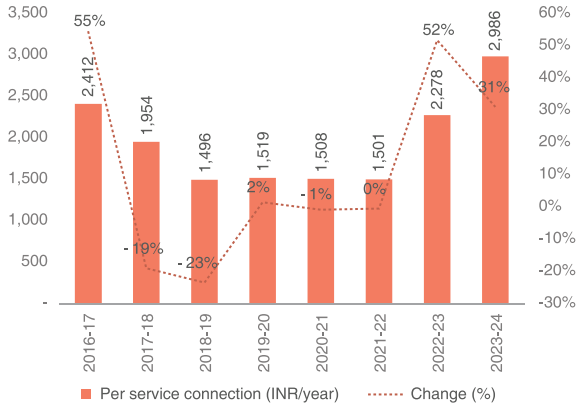
Average per service connection subsidy for domestic is increasing

52% increase from FY 2021-22 to FY 2022-23

While the average allocation per domestic service connection showed a declining trend from FY 2016-17 to 2021-22, an upward trend can be observed from 2022-23 onwards. The years with a declining trend correspond to the years in which no new consumer tariff order was passed by the Tamil Nadu Regulatory Commission (TNERC) and therefore no electricity tariff increase happened in the state. For the first time since 2017, TNERC came out with revised electricity tariffs in 2022.

In FY 2023-24 the average annual subsidy per domestic service connection is INR 2,986. The average annual increase from 2016-17 to 2023-24 of 11.92% is higher than the average inflation rate for the same time period - 5.03% (Statista 2023), which means that the average annual inflation corrected increase of the subsidy was greater than 5%.

Figure 3 Average subsidy per domestic consumer service connection



Free units account for a major share

75.55% of the subsidy allocated to domestic consumers is for the 50 free units

This subsidy is equal to the cost of a 1.52 GW of solar power plant

All domestic consumers in Tamil Nadu benefit from a total of 50 free energy units (kWh) per month. This is made possible by the energy subsidy provided by the Tamil Nadu Government and by the cross-subsidy provided by TANGEDCO. In FY 2023-24, 11,638 million units (MU) of free electricity were delivered to the domestic consumers in the state, this came at a cost to the Tamil Nadu government of INR 5,324 Crore.

Table 1 Subsidy cost of free units to domestic for FY 2023-24

Domestic consumer slabs (bi-monthly consumption)	No. of services (lakhs)	Free Units delivered (MU)	Subsidy cost of free units (INR in Crore)
Up to 100 units (slab 1)	77	2,004	917
Above 100 units and up to 200 units (slab 2)	60	3,615	1,654
Above 200 units and up to 500 units (slab 3)	81	4,900	2,242
Above 500 units (slab 4)	18	1,119	512
Total	**236**	**11,638**	**5,324**

If the subsidy would have been used to invest into solar energy generation, a solar energy plant with a capacity of 1.52 GW could be deployed. This solar plant would have generated 2,798 MU of clean energy per year. This annual generation is equal to 50% of all free energy units provided to slab 1 and slab 2 consumers.

Table 2 Subsidy cost of free units in solar energy terms

Cost per MW solar	3.50	INR in Crore
Subsidy cost of free units	5,324	INR in Crore
Solar energy capacity	1,521.20	MW
Solar energy generation	2,798.39	MU
Solar energy generation as a share of :		
free units slab 1	140%	
free units slab 1 & 2	50%	
free units slab 1, 2 & 3	27%	
free units all slabs	24%	

Subsidy allocation is skewed towards high consumers

7.60% of the high consuming households receive 26.78% of subsidy

Apart from the subsidy cost for free units, the state government provides additional subsidy for domestic consumers. The total subsidy commitment allocated by the state government in FY 2023-24 for the domestic consumers was INR 7,047 Crore. 32.63% of consumer with a bi-monthly electricity consumption below 100 kWh receive 9.74% share of the allocated government subsidy, whereas 7.63% of consumers in the highest consumption slab (>500 kWh bi-monthly) received a share of 26.78% of the allocated subsidy. If one assumes that the bi-monthly household electricity consumption is a reasonable proxy-indicator for household income, then the current high income households benefit from a higher subsidy allocation as compared to low-income households. Clearly this cannot be the objective of an energy subsidy design.

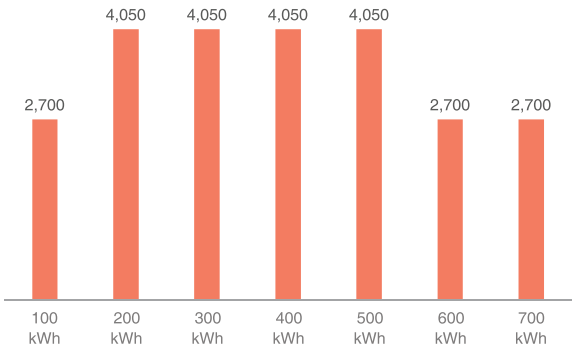
Table 3 Average subsidy disbursement by consumption slabs

Domestic consumer slabs (bi-monthly consumption)	No. of services (lakh)	Slab share on total service connections (%)	Estimated tariff subsidy (INR Crore)	Slab share on total subsidy (%)
Up to 100 units	77	32.6%	916.74	9.74%
Above 100 units and up to 200 units	60	25.4%	2,116.84	28.87%
Above 200 units and up to 500 units	81	34.3%	3,424.46	34.60%
Above 500 units	18	7.6%	589.08	26.78%
Total	**236**	**100.0%**	**7,047.12**	**100.00%**

Source: TNERC 2023

Looking at incremental bi-monthly consumption intervals of 100 kWh each, it is found that households with a bi-monthly consumption between 200 kWh and 500 kWh receive the highest annual subsidy allocation of INR 4,050.

Figure 4 Average annual subsidy allocation by consumption slab (INR)

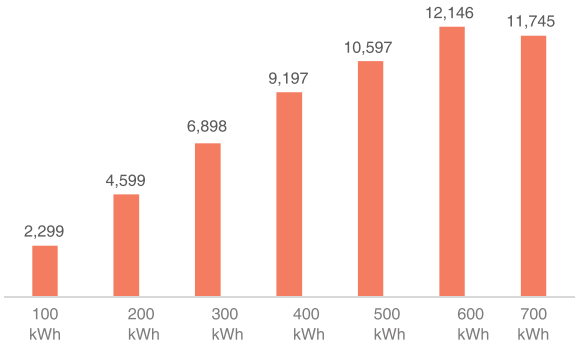


Cross subsidy allocation is skewed towards high consumers

5-times more cross subsidy allocation for high consumers

With an average of INR 12,146 per year the cross subsidy allocation is highest for consumers with a bi-monthly energy consumption of 600 kWh. This is 5-times the amount as compared to consumers with a bi-monthly consumption of 100 kWh. The current cross subsidy scheme is designed to favour households with higher consumption.

Figure 5 Average annual cross subsidy allocation by consumption intervals (INR)

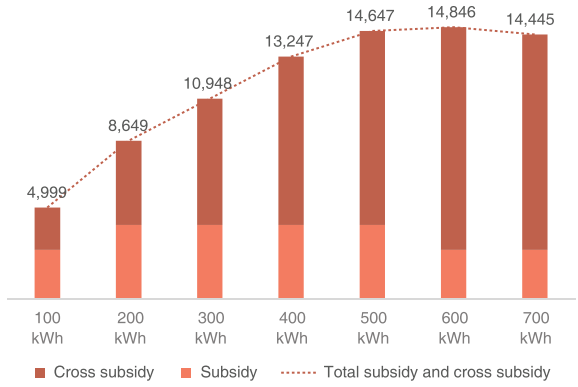


Subsidy and cross-subsidy skewed towards high consumers

3-times more subsidy for high consumers

Adding up the subsidy and cross subsidy allocation by consumption slab we find that the 500 kWh, 600 kWh and 700 kWh receive the highest annual benefits. The subsidy for these households is in the range of INR. >14,000. This is nearly 3-times as much as the subsidy for low consuming households with a bi-monthly consumption of 100 kWh.

Figure 6 Total subsidy allocation by consumption intervals (INR)



Subsidies are supporting emission intense electricity

The subsidy is indirectly contributing to 6.11 million tonnes of CO2 emissions

As the major share of TANGEDCO's electricity is sourced from coal and lignite power plants, the emission intensity per unit of subsidized electricity is high. With the annual subsidy allocation by the State Government of Tamil Nadu of INR 6,787.47 Crore and an average cost of supply per unit of electricity of 8.33 INR/kWh, the Government subsidy allocation has paid for approximate 8,146 MU of energy supplied by TANGEDO to domestic consumers. Assuming an average carbon intensity of 0.75 tCO2/MWh of electricity supplied by TANGEDCO, then the subsidy allocation by the state government resulted in carbon emissions of 6.11 million tonnes of CO2 in FY 2023-24.

On the one hand, the state is committed to spend substantial public funds on climate adaptation and climate mitigation and on the other hand there is substantial subsidy allocation that is indirectly utilised to pay polluting power generators.

Conclusion and recommendations

Energy subsidies are meant to ensure that key policy objectives of a country or state are being met. These objective may include reducing energy poverty, increasing energy security and reducing pollution. Also the three objectives suggested by the United Nations maybe considered (e.g. (i) to make renewable energy technologies a public good, (ii) to shift energy subsidies from fossil fuels to renewable energy, and (iii) to triple investments into renewables).

In Tamil Nadu electricity subsidy is currently provided to certain consumer categories. A reform of incumbent energy subsidy scheme for electricity could help in unlocking the much needed financial resources required to support an equitable and just energy transition. It could also help reducing the states subsidy and TANGEDCO cross-subsidy burden. Alternative subsidy mechanisms could be considered. Such an approach may target multiple policy objective at the same time; it may accelerate the energy transition, increase the investment into renewables and reduce emissions, while supporting low income households.

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