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Citizen consumer and civic Action Group

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To

Mr. Vikram Kapur, I.A.S.
Additional Chief Secretary/ CMD
Tamil Nadu Generation and Distribution
Corporation Limited
NP K R Ramasamy Maaligai
144, Anna Salai, Chennai 600 002.

Dr. Subhodh Kumar
Joint Managing Director
Tamil Nadu Generation and Distribution
Corporation Limited
NP K R Ramasamy Maaligai,
144, Anna Salai, Chennai 600 002.

Dear Sirs,

I write to you from Citizen consumer and civic Action Group (CAG), a 33 year old non-profit, non-political and professional organisation that works towards protecting citizens' rights in environmental, consumer and civic issues, and promoting good governance processes including transparency, accountability, and participatory decision making.

In laying out the capacity addition plan for Tamil Nadu, the Energy Department's Policy Note for 2019-20 lists ongoing projects to be completed by year 2022-23 which carry a cumulative capacity of 5,700 MW and have a financial outlay of over Rs. 47,000 crore. This includes the Ennore Thermal Power Station-Expansion; Ennore SEZ; NCTPS Stage III; Uppur and Udangudi Thermal Power Projects.

This implies that in the next 3 years, the state plans to increase installation every year by around 6.25% to meet the increasing demand, of which over 90% would be through coal-based thermal power plants. Besides these, the state government has also proposed five new coal projects with a total capacity of 11,300 MW. This includes the Ennore Thermal Power Station- Replacement, Udangudi Expansion Stage II, Udangudi Stage III, Kadaladi Thermal Power Project, and the Cheyyur Ultra Mega Power Project.

1

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The rationale for such an increase in the state's electricity generation capacity needs to be questioned. It has to be noted that since 2009-10, the state's annual electricity requirement rose at a Compounded Annual Growth Rate (CAGR) of 3.72%¹ until 2017-18, although its installed capacity in the same period rose at a CAGR of 7.61%. This capacity addition was mostly achieved through fossil fuels, especially coal. The planned capacity addition, being well beyond the expected growth in demand, will contribute to an irreparable degradation of the water, soil and air quality of the state. Recent reports² of fall in electricity demand in the state (and across the country), also calls for a more realistic estimate of demand growth.

This is especially relevant in a time like this when the state is grappling with an unprecedented challenge posed by water scarcity. Inland power plants like the Mettur Thermal Power Station (MTPS) and Thoothukudi Thermal Power Station (TTPS) are huge drains of our precious water sources, the Cauvery and the Thamirabarani respectively. MTPS-I alone consumes on an average 93,364 KL per day³. This is roughly the amount of water that 6,91,585 people could use to meet their daily domestic water usage, assuming a 135-litre daily requirement per capita as per the BIS Code of Basic Requirements for Water Supply, Drainage and Sanitation⁴.

While coastal plants do not drain our freshwater sources, their impacts on seawater and the marine environment is just as harsh. Desalination plants, which coastal power plants rely on to use seawater, are energy-intensive themselves, whose brine alters the composition of seawater it is let into, affecting the marine ecosystem. The rejected brine and the marine outfall, where the water used in the boiler is returned to the sea, are often significantly warmer than the ambient sea temperature, posing serious concerns⁵.

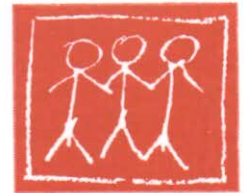
¹ Source: CEA Annual Reports

² <https://www.thehindu.com/news/national/tamil-nadu/state-power-demand-down-over-4-year-on-year-in-august/article29512761.ece>

³ Water consumption as declared in the Environmental Statement, 2017-18

⁴ http://dasta.in/wp-content/uploads/2015/04/CB_Code_2002.pdf

⁵ <https://www.thermalwatch.org.in/resources/impact-coal-fired-power-plants-fisheries-problems>



As a state constituting 15% of India's coastline, Tamil Nadu should plan for development without contributing to global warming and sea level rise, which coal plants contribute heavily to, and which bear on our monsoons⁶ and agricultural productivity, besides affecting the livelihood of people living along and depending on the sea.

This calls for a rethink of our energy security strategy in such a way that we meet the growing energy demands without jeopardising our available limited resources and ensuring good health and quality of life for the residents of the state. This challenge offers a great opportunity for the state to achieve decarbonised energy security - required as part of the Paris Agreement 2015 and also accomplish the ambitious solar targets it has set for itself in the Solar Policy 2019. These twin objectives can be met by the TANGEDCO channelling its efforts and resources towards solar energy, which it has in the past.

Although solar energy is non-polluting and does not consume as much water as other energy sources, it does face a hurdle in terms of the land it requires. The discom can tide over this challenge by pursuing the options of solar leasing for small-scale and rooftop installations, and by co-utilisation of agricultural land with farmers.

As against the 6.25% annual capacity addition (totalling 5,700 MW) planned in the state until 2022-23, capacity addition at a modest yet adequate annual rate of 4% for the same period would require only an additional installation of 3,878 MW in this period. This can be accomplished by a combination of rooftop solar PV installations in government buildings, public spaces and in households, besides commissioning of utility-scale solar parks in locations acquired for coal plants. We are presenting herewith a few measures TANGEDCO can adopt to achieve energy security without compromising the state's endangered natural wealth, especially land, air, and water.

1. Improve Performance of Existing Power Plants to meet growing demand:

⁶<https://www.theatlantic.com/science/archive/2019/01/indias-monsoon-powerful-agent-climate-change/579940/>



Ahead of installing more capacity to meet rise in demand, TANGEDCO should focus on optimising the performance of existing plants. For the state sector, the national average Plant Load Factor (PLF) for the last three years, has been at 56.29%. In Mettur, MTPS-I, whose plants have been functioning for 29-33 years, PLF has dropped from 84.71% from 2014-15 to 69.41% in 2017-18. This is based on the generation data submitted by TANGEDCO, in the annual Environmental Statement (Form V). Thoothukudi Thermal Power Station, which was functioning at 90.04% of its installed capacity in 2012-13, operated sub-optimally at 77.0% in 2015-16. This is a problem common to more recent units, like MTPS-II, which also recorded a modest PLF of 65.57% in 2016-17- the fourth year of its operation.

TANGEDCO should consider channelising its efforts in increasing the performance of these plants, by upgrading their equipment - if required - and ensuring coal availability for these. The available resources should further be used to procure the pollution control devices to mitigate the environmental impacts of these coal plants, as per the revised emission standards set by the Ministry of Environment, Forests and Climate Change, through a Notification in 2015.

2. Achieve Capacity Addition through Solar Parks in proposed and old Coal Plant sites:

If in the sites of the proposed Ennore-Replacement Project, Udangudi Stage II and Stage III plants alone, for which land is available or acquisition is underway according to the Policy Note, solar parks are developed, the returns would be huge: Based on the national average PLF for the state sector in the past 3 years (56.29%), the net useful capacity addition from these coal plants would amount to only 1,857.5 MW. In the same land, solar plants to the tune of 706 MW can be installed, using less than 0.1% of the daily water the thermal power plants would require for operations. This is assuming an average PLF of 19% for solar PV plant. The project investment would also reduce by 86% from the proposed Rs. 23,000 crore to about Rs. 3,175 crore for these solar plants. This allows TANGEDCO additional resources to be ploughed into further incentivising rooftop solar for households or for entering rooftop leasing in a big way.

Nearly one-third of the thermal power plants in Tamil Nadu are operating beyond their useful life of 30 years. This includes state-owned power projects including



units of the Mettur Thermal Power Station and Thoothukudi Thermal Power Station, besides the Neyveli Thermal Power Station. They will require to be decommissioned, which presents a huge opportunity to solarise them, by using the land occupied by these power plants for developing utility-scale solar projects. For example, in Mettur, Units I, II and III have been functional for more than 3 decades, while the fourth will reach 30 years by 2020. The main plants have been built on an area of 360 acres, in whose place a solar park with a capacity of 90 MW can be developed. The water required for operating the solar park would only be 0.05% of the Cauvery water consumed by the long-serving thermal power plants. Even this water - consumed for cleaning the panels - can be filtered and reused.

3. Meet Shortfall in Energy Requirement, if any, through Solarising Rooftops in Greater Chennai and Public Land:

TANGEDCO should speed up its plan to install solar PV systems on the rooftops of government buildings, which was announced by the Energy Minister in the Legislative Assembly in 2018⁷. All available buildings within the Greater Chennai Corporation limit - including residential, commercial, industrial, public land - could be utilised for rooftop solar installations.

According to a report *Rooftop Revolution: Unleashing Chennai's Solar Potential*⁸, published in April 2018, land within the Greater Chennai Corporation limits have a combined rooftop PV potential of 1,380 MW. The report also estimates that some of the Tier II cities in the state - Salem, Tiruppur, Coimbatore, Tiruchirappalli, Madurai and Erode - have a combined solar rooftop PV potential of 2,443 MW. Only utilising these two, totalling about 3,800 MW, would enable the state to achieve its 3,600 MW target as part of the Solar Policy for consumer category solar energy systems. By installing rooftop PV systems in Government buildings in other cities and towns, the required additional capacity can be achieved. By bringing the generation closer to the point of consumption, this will

⁷<https://www.thehindu.com/news/national/tamil-nadu/tn-to-harness-rooftops-for-solar-energy/article24728148.ece>

⁸https://storage.googleapis.com/planet4-india-stateless/2018/06/REPORT_Rooftop_Revolution_FULL_Hyd_-Chenn_Web_6Apr18.pdf



also achieve reduction in AT&C losses, and avoid the need for investment in evacuation infrastructure from centralised large scale thermal power plants.

4. Launch Solar Leasing Programmes to promote Rooftop Solar among Low Income Groups:

To meet the growing demand for energy, the state should consider solar leasing, wherein consumers with available rooftop space but without adequate monetary resources can lease out rooftop spaces to TANGEDCO. Under this model, the utility will aggregate the rooftops of consumers willing to lease out their rooftop space for solar PV. The utility will also select developers under a competitive bidding programme to install and maintain these rooftop solar PV systems, whose generation will be consumed locally. Not only do the consumers become self-reliant in their energy needs; this also creates a revenue stream for them in the form of leasing rental for sharing valuable rooftop space, besides providing insulation from solar thermal radiation (a measure urgently needed to mitigate the impact of climate change). Such utility-driven solar rooftop programme is being tried out on a pilot basis in Andhra Pradesh⁹. The water utilised for maintaining these solar panels can be reused upon filtering.

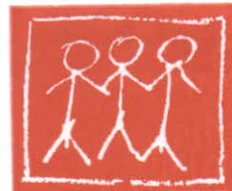
5. Promote Effective Land Co-utilisation through Solar Installations in Agricultural Land:

As against ground-mounted solar panels, which render the land inutilisable otherwise and affect the biodiversity thriving on these lands, Agrophotovoltaics (or agrivoltaics) promotes mounting solar panels at a height, beneath which cropping is undertaken. Besides promoting energy self-reliance for the agriculture land owners, and promoting better land utilisation, this method has been found to increase yield, leading to more interest¹⁰ in agrivoltaics in India. The solar modules can provide shade to the plants, and help reduce water loss due to evaporation. In a pilot project undertaken in Maharashtra in 2018, it was found that this recorded a 40% increase in yield in tomato and cotton crops¹¹. The discom should take this up on a pilot basis, in consultation with the Agriculture Department, which has already embraced solar energy as a potential

⁹ <http://www.aperc.gov.in/admin/upload/SolarRoofToporderin.pdf>

¹⁰ <https://www.pv-magazine-india.com/2019/09/27/india-prepares-to-embrace-agrivoltaics/>

¹¹ <https://www.ise.fraunhofer.de/en/press-media/press-releases/2019/agrophotovoltaics-hight-harvesting-yield-in-hot-summer-of-2018.html>



ally, and is promoting green energy initiatives in the form of solar powered pumping systems and solar driers¹².

Please let us know in case any information is required about the methodology for the calculations made herewith; we would be glad to provide the details available with us. It is sincerely hoped that the state, as a forerunner in promoting solar energy, will consider these recommendations, and expedite the growth of the renewables sector for energy security without further endangering our water resources and air quality.

Regards,

Om Prakash Singh
Executive Director
Director - Environment and Climate Action

¹² http://cms.tn.gov.in/sites/default/files/documents/agri_e_pn_2019_20.pdf