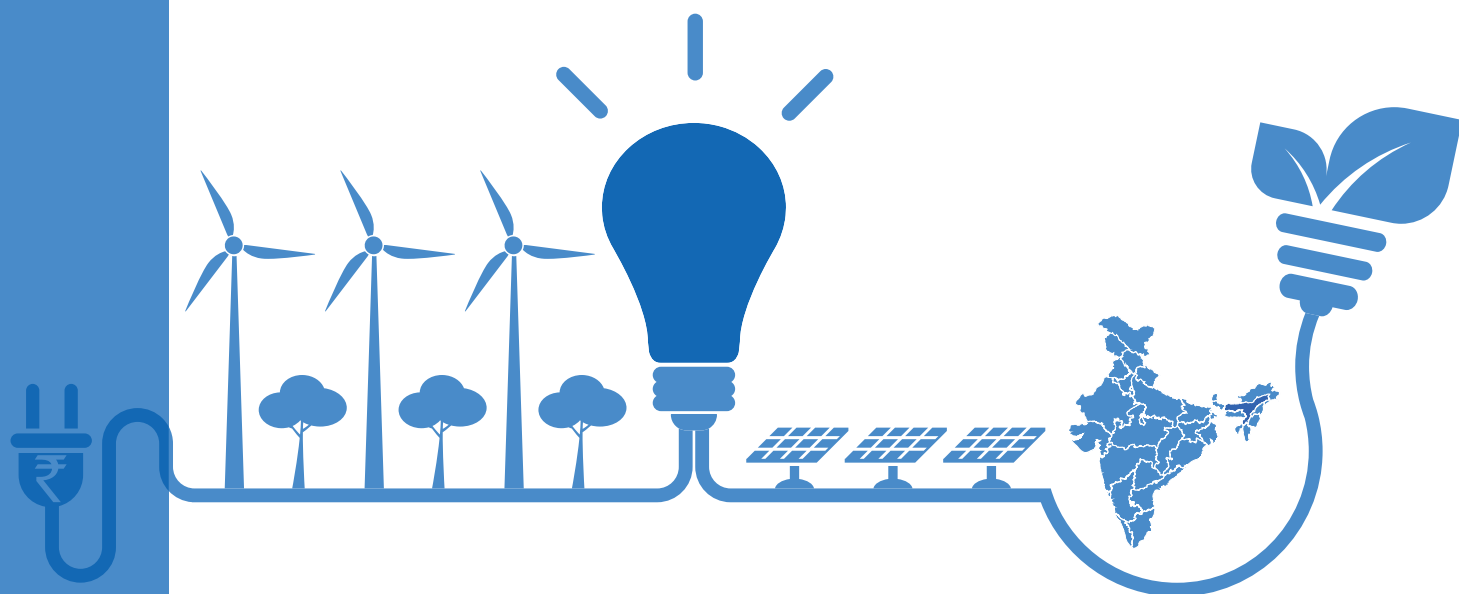


Climate Mitigation Financing Framework in Assam

2020



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Year of Publication: 2020

List of outputs

Consolidated Report

Climate Mitigation Financing Framework in Select States

Policy Briefs from four States

Climate Mitigation Financing Framework in Andhra Pradesh

Climate Mitigation Financing Framework in Assam

Climate Mitigation Financing Framework in Odisha

Climate Mitigation Financing Framework in Rajasthan

Contents

Context	.....	2
A. Existing Energy Profile, Policy and Institutional Framework for CCMA in Assam		
A.1 Existing Emissions Profile and Energy Mix	.....	4
A.2 Existing Policy and Institutional Framework for CCMA in Assam	....	5
A.2.1 SAPCC and SDG targets for CCMA	.....	5
A.2.2 Existing Policy Framework for Renewable Energy Addition	....	6
A.2.3 Existing Institutional Framework for Renewable Energy Policies	.....	9
A.2.4 Initiatives for Energy Efficiency	.....	10
A.2.5 Initiatives for Low Carbon Transport Systems	.....	10
B. Existing State Financing Framework for CCMA and Budget Analysis	.....	12
C. Key recommendations	.....	14
Annexure 1	Existing Policy and Institutional Framework for Assam	..... 15
Annexure 2	Financing Incentives and Instruments Offered Under Various CCMA Policies in Assam	..... 17
Annexure 3	Budgeted Programmes for CCMA in Assam Budget (in Rs. crore)	..... 20
List of Figures and Tables		
Figure 1a	Sectoral Breakup of GHG Emissions	..... 4
Figure 1b	Percent contribution of GHG emissions from various sectors due to fossil fuel combustion	..... 5
Figure 2	Installed capacity in MW of power generation in Assam as on 31.12.2019	..... 6
Table 1	Solar Project with Tender Notification Issued by State Nodal Agencies in 2019	..... 8
Table 2	Admissible Subsidy for Different Types of Shallow Tube Wells	..... 9
Table 3	Intermodal Transport Comparative	..... 10

Context

Over the years, most state governments have been gearing up to initiate and finance climate mitigation actions as Greenhouse Gas (GHG) emissions at state level are increasing with rapid economic growth. In India, 10 major states account for ~80 per cent of GHG emissions.^{1&2} Overall, the contribution of the North Eastern Region (NER) to India's GHG emissions is low. Among the NER states, Assam ranks first in CO₂, CH₄ and N₂O emissions, though its per capita emissions (0.84 tCO₂e) were much lower than India's, which stood at 2.28 tCO₂ in 2013.³ Despite the low GHG emissions, Assam (and the rest of the NER) has reason to be concerned about climate change as its impact increases the vulnerability of a large population which depends heavily on agriculture and forests for a livelihood. The entire region is grappling not only with the environmental impacts of the global increase in GHG concentrations, but also with the consequences of industrialisation, urbanisation and population growth, that has led to an indiscriminate exploitation of natural resources to meet increasing demand.

The shift towards a low-carbon economy, therefore, is an inescapable necessity, and the state of Assam can bring this about by mainstreaming

Climate Change Mitigation Actions (CCMAs) in its policies. This mainstreaming could be built on the premise that climate mitigation actions bring additional co-benefits for state governments, especially in meeting development goals such as generating green jobs, reducing air pollution, and improving peoples' health through a cleaner environment.⁴ The erstwhile Planning Commission of India formulated India's low carbon development plan around the central theme of co-benefits with suggestions for inclusive growth.⁵ The National Action Plan on Climate Change (NAPCC) and the 12th Five Year Plan also explicitly mention the importance of considering co-benefits in energy planning and other climate mitigation interventions. The Central Government encourages cooperative and competitive federalism among state governments for better performance on sustainability and social development targets. For example, besides the Central Financial Assistance (CFA) from the Union Budget, the earlier Central Finance Commission (which decided on tax devolution among the state governments) made recommendations for performance-based grants to be accorded to state governments for the promotion of Renewable Energy (RE).⁶ Similarly, the Sustainable Development Goals (SDGs) ratified by India in 2015,

1 The top emitters in the public electricity generation sector are Uttar Pradesh, Andhra Pradesh and Madhya Pradesh, while those in the captive electricity generation sectors are Odisha, Gujarat and Chhattisgarh. The top 10 state emitters in industry sector are Gujarat (14%), Odisha (13%), Chhattisgarh (10%), Jharkhand (9%), Karnataka (8%), Maharashtra (8%), Andhra Pradesh (7%), Tamil Nadu (6%), Rajasthan (5%), and West-Bengal (5%).

2 Ghgplatform-india.org. (2017). Analysis of Greenhouse Gas Emission Trends from 2005 to 2013. [online] Available at: <http://www.ghgplatform-india.org/Images/Publications/GHGPI-PhaseII-GHG%20Trend%20Analysis%202005-13-Sep17.pdf> [Accessed 31 Sep. 2019].

3 Uday Shankar De, T. (2013). Trend in GHG Emissions from Northeast and West Coast Regions of India. *Environmental Research, Engineering and Management*, 1(63), pp. 37-47 (2013). [online] Available at: <https://pdfs.semanticscholar.org/4b10/5b2c4243c492d9dcd96c5b07799b6479515e.pdf> [Accessed 18 Sep. 2019].

4 Sustainable Development Brief No.2 January 2016. The co-benefits of climate mitigation actions. Available at http://www.unece.org/fileadmin/DAM/Sustainable_Development_No_2_Final_Draft_OK_2.pdf

5 Planning Commission (2014). The Final Report of the Expert Group on Low Carbon Strategies for Inclusive Growth. Delhi: GOI.

6 13th Finance Commission proposed a performance-based grant of Rs. 5000 crore for the promotion of renewable energy among state governments

encourage the localisation of goals by the state government at sub-national levels. State governments, including that of Assam, have come up with an SDG vision, introducing SDG indicator-based outcome budgeting in 2017, to achieve the SDG targets set by their state.

Given the above context, this policy brief presents an assessment of the existing policy, and the institutional and financing framework adopted by the Assam government for CCMA. Currently, since most policies at the state level are driven by the Central Government, this policy brief exclusively discusses the CFA provided

to Assam under various central schemes and programmes. It primarily tracks state budgets to assess state financing for CCMA through its programmes and schemes. The first section discusses the existing emission profile for the state of Assam, and its institutional and policy framework for CCMA. The second section investigates how the financing requirements have been responded to through state budgets with the help of findings from a budget analysis. The final section of this brief presents suggestions for leveraging state finances to encourage private investment in mitigation actions in the state.



A

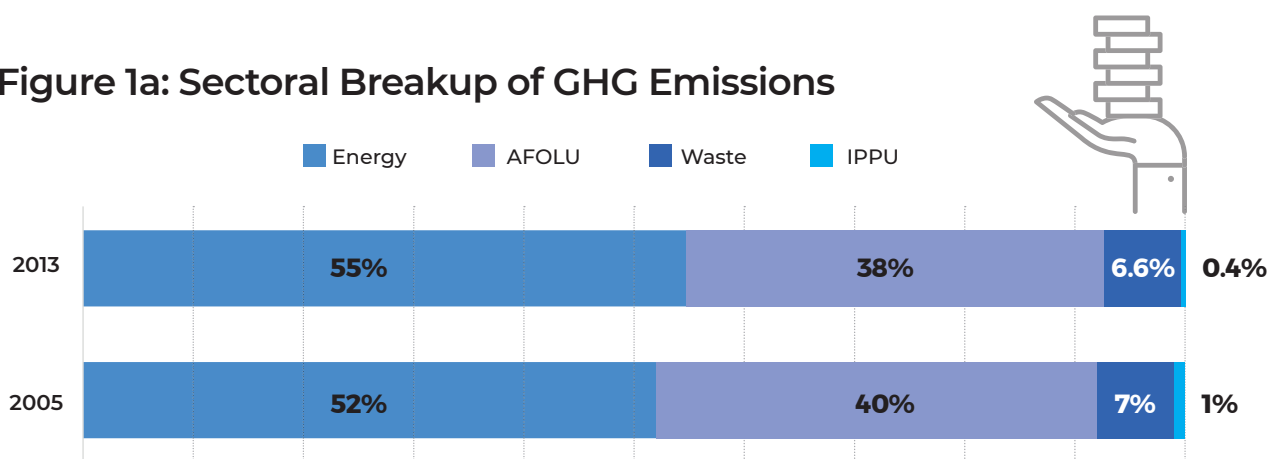
Existing Energy Profile, Policy and Institutional Framework for CCMA in Assam

A.1 Existing Emissions Profile and Energy Mix

Assam's emissions grew from 22.1 MtCO₂e in 2005 to 26.9 MtCO₂e in 2013 at an estimated compounded annual growth rate (CAGR) of 2.50 per cent. The energy sector accounted for 55 per cent of the total GHG emissions of Assam in 2013. Within the energy sector, electric-

ity generation has been a major contributor of GHG emissions over the years with an average share of ~30 per cent in total emissions from the energy sector. This is followed by fuel or energy consumption in the domestic, transportation, industrial and agricultural sectors.⁷ All these factors suggest that the energy sector should be the focus of efforts for curbing GHG emissions as shown in Figures 1(a) & 1(b).

Figure 1a: Sectoral Breakup of GHG Emissions



Source: Trend Analysis of GHG emissions in Assam, GHG Platform India

⁷ GHG Platform India (2019). Trend Analysis of GHG emissions in Assam. [Online] Available at: <http://www.ghgplatform-india.org/Images/Publications/GHGPI-PhaseIII-Trend%20Analysis%20State-Assam-Dec'19.pdf> [Accessed 2 Dec. 2019]

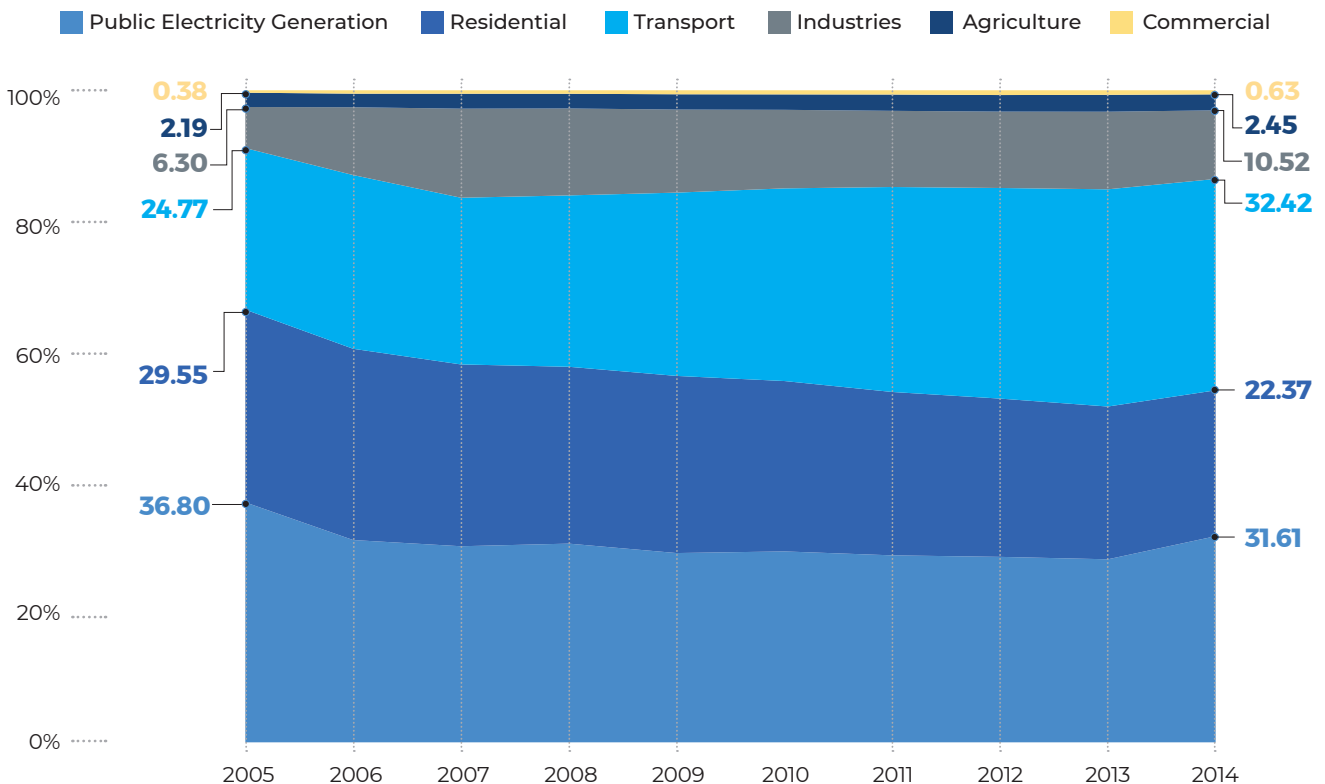
Currently, 95 per cent of power generation in the state comes from thermal power and large hydropower projects. Assam is still struggling with meeting its domestic energy demand, and produces only one-fifth of its total energy requirement. It has also been recognised that the state has a huge untapped solar power potential. According to the data released by the Central Electricity Authority, Assam has installed 2.4 per cent (41.23 MW of solar power as on December 2019) out of its total solar power potential of 663 MW⁸ as shown below in **Figure 2**.

A.2 Existing Policy and Institutional Framework for CCMA in Assam

A.2.1 SAPCC and SDG targets for CCMA

Assam's State Action Plan on Climate Change (SAPCC) identifies CCMA for the five-year period from 2015 to 2020. These include measures such as the installation of RE capacities, Energy Conservation and Energy Efficiency (EC&EE) initiatives, and deployment of low-carbon transport systems (such as an inland water-transport system and electric-based public transport). These measures are being proposed as strategies to curb GHG emissions from the energy sector, augment the power supply and improve energy access.¹⁰ Most actions mentioned in the SAPCC are yet to identify their funding sources, and available aggregate budget information does not reflect any allocation for these actions.

Figure 1b: Percent contribution of GHG emissions from various sectors due to fossil fuel combustion



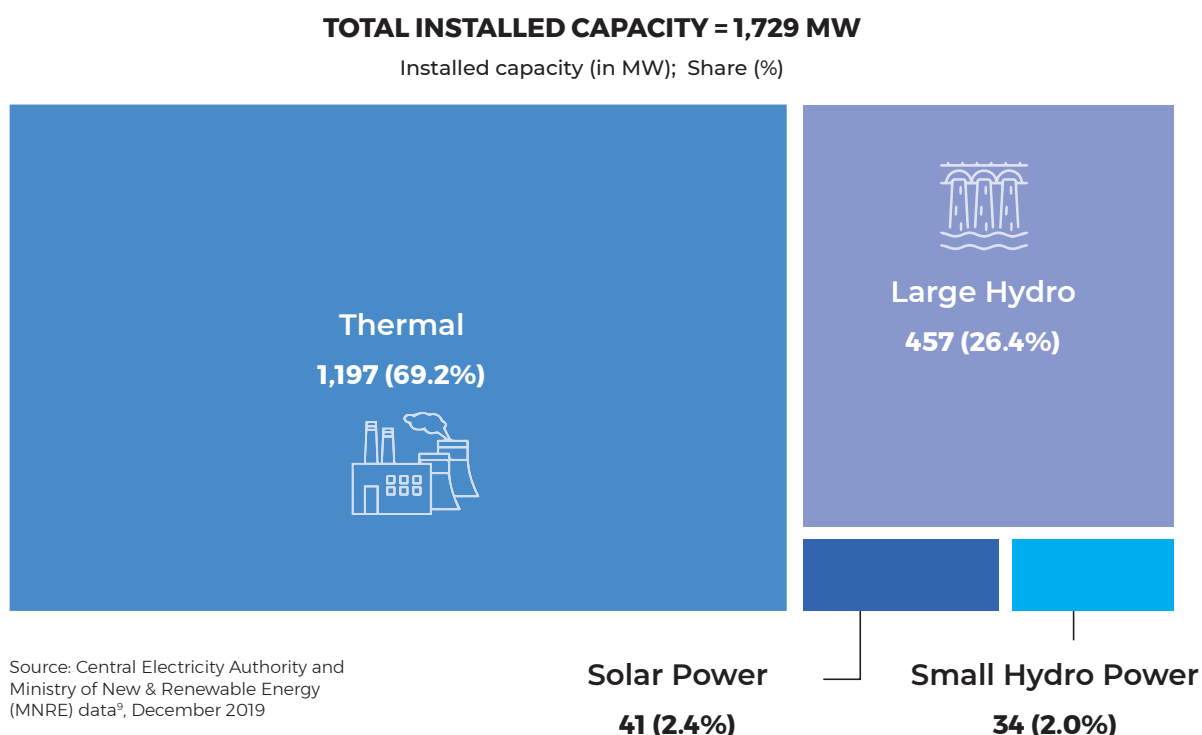
Source: Trend Analysis of GHG emissions in Assam, GHG Platform India

8 Central Electricity Authority data available at : http://www.cea.nic.in/reports/monthly/installedcapacity/2019/installed_capacity-12.pdf

9 Ministry of New and Renewable Energy (2019). <https://mnre.gov.in>. [Online] Available at: <https://mnre.gov.in/physical-progress-achievements> [Accessed 5 Nov. 2019].

10 Assam State Government (2015). Assam State Action Plan on Climate Change (2015-2020). <http://www.indiaenvironmentportal.org.in/files/file/Final%20draft%20ASAPCC%20document.pdf>.

Figure 2: Installed capacity in MW of power generation in Assam as on 31.12.2019



The Assam SAPCC proposed the creation of a dedicated institution for its implementation and constituted the Assam Climate Change Management Society, which was launched in August 2018. It was envisioned that this society would be headed by the State Chief Minister with a technical committee consisting of representatives from concerned departments.

The state has also developed an Assam SDG vision 2030, which identifies targets for affordable and clean energy. The SDG vision has established the target for the proportion of RE to total energy production by an installed capacity of 15 per cent by 2030.¹¹ The state's achievements of the SDG goals are monitored by its Transformation and Development Department,

which monitors SDG progress through its outcome budget.

A.2.2 Existing Policy Framework for Renewable Energy Addition

The overall state policy framework for the promotion of RE and Energy Efficiency (EE) measures in Assam is largely drawn from the Central RE and EE policies. In Assam, the state policies for RE include the Assam Small Hydro Policy, 2007¹² and the Assam Solar Energy Policy, 2017 [9 &10]. Being a part of the NER, Assam has an opportunity to use incentives (in the form of concessions) available to special cat-

¹¹ Assam 2030 Our Dream Our Commitment Available at : https://transdev.assam.gov.in/sites/default/files/portlet/level_2%5Bcurrent-domainmachine-name%5D/ASSAM_2030_Our_Dream__Our_Commitment.PDF Small Hydro Power (SHP) projects are those that produce electric power of not more than 25 megawatt (MW). These are further divided into three parts: small (capacity of 2 MW to 25 MW), mini (100 KW and 2 MW) and micro power plants (up to 100 KW). SHP plants can be set up in a small area of just 2 acres.

¹² Special Category Status (SCS) is a classification given by the Centre to assist development of states that face geographical and socio-economic disadvantages such as hilly terrains, strategic international borders, economic and infrastructural backwardness, and non-viable state finances.

egory states (SCS) such as higher subsidies.¹³ Along with these policies and incentives, the state follows the Central Government regulations on setting Renewable Purchase Obligations (RPOs) and for the procurement of power from the Grid-Connected Solar PV Power Projects. These are as declared under the RPO and its Compliance Regulations 2010, (Third Amendment), 2019 and the MNRE guidelines for a tariff-based competitive bidding process.¹⁴ Following the tariff-based competitive bidding process, Assam in association with the Solar Energy Corporation of India Ltd (SECI) has issued a tender notification for various Solar Parks and Grid-Connected Solar Roof Top Projects, as shown in Table 2.

A.2.2.1 .Assam Small Hydropower Policy, 2007

The Assam Hydro Policy 2007 has identified the potential for the development of small hydropower (SHP) projects with a 117 MW capacity at about 88 identified locations. It offers several incentives to the project developers, which include: no royalty for up to 5MW of power produced; no wheeling charges in case power is sold to power distribution companies (DISCOMs); banking of energy for fixed period spans of 6 months; exemption of entry tax on all equipment and building materials for the project; and exemption from an environmental impact assessment if the land requirement for SHP is less than 5 hectare. Despite these incentives, Assam has utilised only 35 MW of hydro power capacity until now according to the Ministry of New and Renewable Energy's (MNRE) 2019 physical progress data [13]. Incentives offered under the state policy are over and above the CFA provided by the MNRE, which has continued to provide financial incentives to small hydropower developers by way of capital subsidy for commercial projects, giving an

impetus to the growth of the sector. Assam offers tremendous potential for developing SHP projects. However, distributing power output is a major deterrent for SHP developers because of the varying hydrological and climatic factors. Making transmission lines available for SHPs is a major challenge for Assam, as most plant sites are in remote areas and not connected to the state grid. In cases of transmission lines exceeding a few kilometers, the independent power producers' (IPPs) investment on transmission infrastructure increases. According to the SHP policy of the state, the cost of transmission lines in excess of 5 km is to be borne by the IPPs/Users society and the Assam Power Generation Corporation Ltd. (APGCL) on mutually agreed terms and conditions. There is a need for innovative financing mechanisms to ensure investments in the transmission infrastructure for Small Hydro Projects.

A.2.2.2 .Assam Solar Energy Policy, 2017

The Assam Solar Energy Policy has set a target of 590 MW of solar power to be produced in the state by 2019-20 through the use of various modes of technologies, such as Grid-Connected Solar, Grid-Connected Solar Roof Top and Off-Grid Mode Solar applications. Incentives offered under the scheme include: exemption from wheeling and transmission charges; exemption from cross-subsidy surcharges for third party sale; exemption from electricity duty for three years; exemption from statutory clearances; and other concessions allowed by the MNRE. Assam has installed only 41.23 MW of solar power, which is 7 per cent of its solar energy target of 590 MW. This low achievement of targets indicates the need for a policy review by the state government.

13 MNRE (2017). Guidelines for Tariff Based Competitive Bidding Process for Procurement of Power from Grid Connected Solar PV Power Projects. MNRE, Available at: https://mnre.gov.in/sites/default/files/webform/notices/Clarification-Guidelines-for-TBCB-process-for-procurement-of-power-from-GCSPV-projects_0.pdf.

14 MNRE (2017). Guidelines for Tariff Based Competitive Bidding Process for Procurement of Power from Grid Connected Solar PV Power Projects. MNRE, Available at: https://mnre.gov.in/sites/default/files/webform/notices/Clarification-Guidelines-for-TBCB-process-for-procurement-of-power-from-GCSPV-projects_0.pdf.

Table 1: Solar Project with Tender Notification Issued by State Nodal Agencies in 2019

Scheme / Location in Assam	Auction driven by	Available Central/ State Financial Assistance	Plant Capacity	Tendering Process	Upper Ceiling for Quoted Tariff
Solar Park under National Solar Mission (NSM) – Amguri District	SECI	Subsidy of Rs. 20 lakh per MW (or 30 per cent of the total capital cost, whichever is lower) and Rs. 25 lakh per park to prepare detailed project report	Capacity 70 MW	Tariff-based competitive bidding process (standard bidding process)	Rs. 3.50/kWh
Grid-connected Solar Photovoltaic (PV) projects in four regions¹⁵	Assam state driven (under state budget)	Build, own and operate model. Land is to be procured by project developer	25 MW in each of the four regions	Reverse Auction process ¹⁶	Rs. 4.48/ kWh
Off-grid Rooftop Solar Projects Rural Primary Healthcare Centres (PHCs)	Assam state driven (by Assam Energy Development Agency {AEDA})	Under Renewable Energy Service Company (RESCO) model ¹⁷	940 kW	Competitive bidding	Tariff discovered through bidding
Off-grid Floating Solar Projects Jor Pukhuri in Guwahati	Assam state driven	—	15 kW	—	Tariff discovered through bidding
Grid-Connected Roof Top Solar PV Power Plants in Social and Institutional Buildings [23]	Assam state driven (by AEDA)	Under Renewable Energy Service Company (RESCO) model or Capex model ¹⁸	14 MW	—	Tariff discovered through bidding

Source: Assam state agency for Renewable Energy

- 15 The breakup of 4 regions with 100 MW capacity is as follows: (i) 25 MW of grid-connected Solar PV will be developed in Cachar, Hailakandi, and Karimganj districts. (ii) 25 MW of grid-connected Solar PV will be developed in the Sonitpur, Nagaon, Morigaon, Karbi Anglong, Dima Hasao, Lakhimpur, and Dhemaji districts. (iii) 25 MW of grid-connected Solar PV will be developed in the Goalpara, Bongaigaon, Barpeta, Nalbari, and Kamrup districts (iv) 25 MW of grid-connected Solar PV will be developed in the Dhubri, Kokrajhar, Chirang, Baksa, Udalguri, and Darrang districts.
- 16 A reverse auction is held such that developers of system-side renewable distributed generation projects bid the lowest prices they would be willing to accept to develop renewable energy projects. The projects are then scrutinised to ensure they meet the minimum project viability requirements.
- 17 For projects developed under RESCO mode, beneficiaries do not need to pay any amount. Assam Energy Development Agency (AEDA) has fixed a tariff of Rs. 3.43 (-\$0.05)/kWh payable for 25 years for the projects.
- 18 Under the CAPEX mode, a subsidy to the tune of Rs.42,203 (-\$657.3)/kW will be provided to projects with capacity ranging between 1 kW and 10kW. For projects with a capacity between 19 kW-100 kW, a subsidy of Rs.39,186 (-\$610)/kW will be provided. Moreover, a subsidy of Rs.36,176 (-\$563.5)/kW will be made available to the projects which have a capacity ranging between 100 kW-500 kW.

Table 2: Admissible Subsidy for Different Types of Shallow Tube Wells

Types of Shallow Tube Well (STW)	Approved Unit Cost (Rs.)	Subsidy Pattern	Maximum Admissible Subsidy (Rs.)
Diesel & Electric Water Pumping			
STW with diesel Centrifugal Pump (CP)-Set (4 & 5 hp, 45 m depth)	32,350	0.5	16,175
STW with electrical CP-Set (2hp and 45 m depth)	13,600	0.5	6,800
Solar Water Pumping			
STW with Solar Photo Voltaic (SPV) Water Pumping System consisting of surface pump (2hp, 45m depth)	1,87,489	0.85	1,59,366

Source: Assam's State Agriculture Department

A.2.2.3 .Initiatives for decentralised RE application - Solar Irrigation Pumps

State funding for solar irrigation pumps (SIPs) in Assam is done by providing subsidies to small and medium farmers, with a maximum of two hectares of land. Assam is largely following the equity-cum-subsidy model for individual farmers and self-help groups/farmer associations. Under this, the shortlisted suppliers provide SIPs at benchmark costs to the farmers/associations, and a share is borne by the government or a donor such as the National Bank for Agriculture & Rural Development (NABARD)/bank in the form of a capital subsidy. The subsidy is disbursed to beneficiary farmers under the direct benefit transfer mode. It amounts to 85 per cent of the total solar PV pump set cost and 50 per cent of the total cost of civil works involved, as per the costs approved by the Agricultural Department.¹⁹ Most SIP projects are identified as State-Owned Priority Development Projects (SOPDs) and are accounted for in the state bud-

get documents since 2017-18.²⁰

Recently, the Central Government has launched the *Kisan Urja Suraksha evam Uthaan Mahabhiyan* (KUSUM) scheme for the installation of grid-connected solar pumps for farmers. Under the scheme, farmers can generate an additional income by selling excess generated power to state DISCOMs. According to the MNRE data, Assam has been assigned a target of installing 700 standalone solar pumps and 100 solarised grid-connected pumps in the first year of the scheme.

A.2.3 Existing Institutional Framework for Renewable Energy Policies

The Power Department is the nodal department in the state for formulating guidelines on RE. The Assam Power Distribution Company Limited (APDCL) and the Assam Power Generation Corporation Limited (APGENCO) are nodal agencies for implementing grid-connected

¹⁹ Agriculture Department, Assam (2016). Rural Infrastructure Development Fund (RIDF) guidelines for installation of solar pump. Agriculture Department Assam.

²⁰ Irrigation programmes in the state, in general, received financial assistance from the Accelerated Irrigation Benefit Programme (AIBP) funded by the Central Government. Assistance was also received from Non-Lapsable Central Pool of Resources (NLCPR), Assam Rural Infrastructure and Agricultural Services Project (ARIASP) funded by the World Bank, NABARD as well as North East Council funds, apart from the state's own resources.

Table 3: Intermodal Transport Comparative

	Carries Ton per Kilometer (TKM)	Operative cost per TKM	CO ₂ Emmissions (gram/ TKM)[30]
Railways	24	1.41	86
Highways	85	2.58	110
IWT	105	1.06	70

Source: World Bank Report²²

RE projects, which includes managing project allotments through tendering, providing registration of projects, and availing subsidies under the MNRE guidelines. The Assam Energy Development Agency (AEDA) under the Science and Technology Department acts as the implementing agency for the execution of RE demonstration projects, general awareness, research and development for off-grid RE technologies, and accreditation of projects under the RE Certificate Mechanism.

A.2.4 Initiatives for Energy Efficiency

According to the estimates presented in the National Strategic Plan for Energy Efficiency (2017-2031), Assam has the potential of saving 1.153 million tonnes of oil equivalent (Mtoe) of energy by 2031 through EE and energy conservation measures in the domestic, commercial, industrial, municipal, transportation and agricultural sectors. The Chief Electrical Inspector-cum-Adviser, Government of Assam is the Assam State Designated Agency (ASDA) for the EE and conservation programme under the EC Act, 2001.²¹ The ASDA is responsible for coordinating, regulating and enforcing provisions of the EC Act within the state. The Assam State Energy Conservation Fund has been created through a contribution of Rs. 2 crore each from the Bureau of Energy Efficiency (BEE) under

the Ministry of Power (MoP) and the state government. Most EE initiatives in the state are centrally funded through the MoP's PSU – the Energy Efficiency Service Limited (EESL). Besides ASDA which acts as a regulator for energy efficiency activities in the state, state institutions such as the Assam Power Distribution Company Limited (APDCL) and the Assam Hydrocarbon & Energy Company Limited (AHECL), are coordinating LED bulb distribution for domestic use under Unnat Jyoti by Affordable LEDs for All (UJALA) scheme of the EESL. The scheme for the distribution of solar study lamps for students is also being implemented in remote areas where households have poor grid connectivity. In addition, the EESL is the implementing agency for the Atal Jyoti Yojana (AJAY), a sub-scheme under the Off-Grid and Decentralised Solar Application Scheme of the MNRE. Under this scheme, Solar LED Lights are to be installed in rural, semi-urban and urban areas for public use. According to AJAY scheme's dashboard, 6633 LED streetlights had been installed in Assam until February 2020.

A.2.5 Initiatives for Low Carbon Transport Systems

Inland water transport (IWT) is considered more energy-efficient, emitting less CO₂ per ton-km, compared to transport modes like road or rail. This benefits the climate, and makes the trans-

21 Assam State Designated Agency under EC Act (2001). Available at: <http://asda.gov.in/ec.htm>.

22 Gille, Johan. 2011. Energy efficient Inland Water Transport (IWT) in Bangladesh (English). Washington DC: World Bank. Available at: <http://documents.worldbank.org/curated/en/403571468209055949/Energy-efficient-Inland-Water-Transport-IWT-in-Bangladesh>

23 <http://egazette.nic.in/WriteReadData/2016/168716.pdf>. National Waterways Act (2016)

24 Ministry of Shipping, 2001. Inland Water Transport Policy, Ministry of Shipping, Government of India, New Delhi

port mode more cost-efficient than others. Furthermore, there are enormous socio-economic and environmental advantages that water transportation has over all other modes.

Despite its merits, IWT operations are constrained by several factors such as narrow width during dry weather, siltation and bank erosion, and inadequate vertical and horizontal clearances due to a large number of overhead structures. In addition, it is hampered by limited availability of infrastructure and terminals for cargo handling, and inadequate connectivity to roads/rails. To integrate IWT into the national transportation system and to provide a solution to these hurdles, the Government enacted the National Waterways Act 2016²³ and the Inland Vessel Draft Act 2016. Through the aforementioned, it created a single consolidated legislative framework to declare 111 water bodies as national waterways (NWS). Of these, 15 NWS (10 per cent of the identified waterways) lie in Assam. Once a waterway is recognised as a national waterway, the development and regulation of shipping and navigation by mechanically propelled vessels comes under the jurisdiction of the Central Government. However, rights over the usage of water and ownership of appurtenant land, minerals, metals, sand etc. continue to be with the state government. Assam has dedicated agencies, such as the Inland Water Transport Directorate and the Assam Inland Water Transport Development Society (AIWTDS) under the Transport Department to implement the various IWT projects. The World Bank is assisting Assam in the modernisation of IWT through a phase-wise project. Besides this,

most IWT schemes are Central schemes, with a 100 per cent grant from the Government of India.²⁴ Some key incentives and assistance being offered by the Ministry of Shipping, GoI, to the state governments are:

- Assistance for the creation of IWT infrastructure in North Eastern States, including Sikkim, under the Centre Sector Scheme with a 100 per cent grant.
- Establishment of a state-level IWT authority and their capacity building.
- Permission to Inland Water Transport Authority of India to raise funds through bonds from financial markets to increase investments in this sector.
- Exemption from Goods and Service Tax (GST) on transportation of goods by inland waterways.

Assam is also seeking to procure 100 electric buses under the Central government scheme - Faster Adoption and Manufacturing of Electric Vehicles in India (FAME) Phase - II through the Assam State Road Transport Corporation (ASRTC).²⁵ The state is also taking initiatives for the development of a metro rail project in Guwahati city under CFA being provided through the Central Government Metro Rail Policy 2017.

[See Annexure 1 for a summary of the existing policy and institutional framework and Annexure 2 for financing incentives and instruments offered under various CCMA policies in Assam]

25 Assam set to procure 100 electric buses under second phase of FAME program. December 2019. Available at: <https://mercomindia.com/assam-procure-100-electric-buses-under-second-phase-fame-program/>

B

Existing State Financing Framework for CCMA's and Budget Analysis

Various budget related documents of relevant departments were reviewed for the period from 2015-16 to 2019-20 for budget estimates (BE) of the ensuing year, revised estimates (RE) of the previous year and actual estimates of completed years. Disaggregated information has been collated till the minor head level. The state finances were tracked for the following three components:

Component A: State financing of state schemes on clean energy and other climate mitigation actions through budgets.

Component B: CFA under the various Central Sector Schemes provided to Assam as a special category state under the NER, for financing various CCMA's.

Component C: Institutional financing from Government owned non-banking financing institutions such as the Indian Renewable Energy Development Agency (IREDA) and the Solar Energy Corporation of India (SECI). These are in the form of loan disbursements to the state department / state nodal agency (such as AEDA, APDCL) or project developers via state institutions.

Some of the key findings from the budget tracking exercise are as follows:

1. Most clean energy projects are budgeted

for by the Electricity and the Irrigation Department in the state. The utilisation level of the allocated budget across various climate schemes is almost 100 per cent.

2. IREDA had sanctioned Rs. 330 crore as a loan until 2018-19 for the development of various RE projects in Assam.
3. Most EE policies in the state are implemented with EESL funding. The State Energy Conservation Fund, which is worth Rs. 4 crore is the only dedicated fund available in the state for EE activities.
4. State departments responsible for climate change mitigation actions, such as measures for promoting EE, and low carbon transportation are channeling their finances through dedicated agencies. For example, the state DISCOM (APDCL) and the Assam IWT Development Society (AIWTDS) are dedicated for EE initiatives and IWT development, respectively. Dedicated agencies operate based on the central and state policy frameworks and sign MOUs with the government.
5. Assam has received 100 per cent grant assistance as CFA under the various Central Sector Schemes for IWT. The budget data of the last three years reflects that the utilisation level of such grants and loan assistance is nearly 100 per cent. The budgetary data for

the transport sector shows that large financial assistance – of around Rs. 300 crore per annum – is available. This includes spending on the creation of dedicated institutions for IWT such as the Inland Water Transport Society, training and capacity building of the crew, improving infrastructure and modernisation of equipment.

6. The World Bank had sanctioned a Rs. 630

crore loan to Assam (as an externally aided project) for the development and modernisation of an integrated IWT system.

Annexure 3 presents budget data for various CCMA projects such as solar projects, IWT and mass transit road transport, and solar irrigation pumps from the sources discussed above.



C

Key recommendations

Key recommendations emerging from the review of the existing policy, institutional and financial framework are as follows:

- 1.** Currently, the projected financial outlays for CCMAAs identified in the SAPCC are not reflected in budget documents. There is a need to clearly establish linkages between the SAPCC and public financial flows. The state government could adopt a special statement on climate budgeting to report state finances for mitigation actions. This will lead to a more targeted financing of the sector. The Government could also consider creating a web-enabled dashboard on available state finances for climate change mitigation actions with their specific objectives and conditions. This will improve transparency and accountability in the management of state finances for climate change actions and assist in the identification of areas in need of investments.
- 2.** Budgetary allocations for the transport sector suggest that the Assam government is financing the bus transport system, which is largely a conventional fuel based system. Since the Central Government is initiating policy measures towards shifting the cities' mobility in the direction of cleaner fuel based mobility, a part of budgetary allocations currently being deployed for fuel based buses should be employed for the introduction of newer technologies. For instance, ushering in an electric mobility system and creating an enabling ecosystem by setting up charging stations, and establishing manufacturing units. Budgetary provisions can also be made for adding connectivity through an intermodal transport system for better efficiency.
- 3.** Currently, the upfront cost of diesel and electric pumps is much lower than that of solar pumps. However, expert's say that the operational cost of solar pumps goes down by 80 per cent due to the saving in electricity charges over time, which improves their long term adoptability.²⁶ Also, various co-benefits associated with solar pumps increase their long term sustainability. The government should facilitate the creation of a supportive ecosystem for the adoption of solar-based irrigation pumping with a gradual phase-out of budgetary support for conventional pumps. The co-benefits associated with solar irrigation pumps can offer an opportunity for collaboration with investors seeking multiple objectives. Newer schemes for grid-connected solar agricultural pumps such as the KUSUM scheme should be explored and even tea gardens with wastelands should be included under schemes in the state proposal.
- 4.** Recently, SHPs have been recognised as a source of RE and have thus been exempted from the requirement of environmental clearances subject to local environmental and forest regulations. This has increased their credibility to apply under the Renewable Energy Certificate (REC) mechanism. The state government can encourage SHPs by providing better purchase tariffs under the REC mechanism. Independent power producers should be encouraged to establish SHPs in clusters, wherever geographically possible, so that the transmission infrastructure can be deployed on a wide scale. State financing instruments targeting

²⁶ Cost benefit analysis of adopting solar energy pumps for jalswarajya schemes in Sangli district: A case study (2013). Available at: <https://www.ijser.org/researchpaper/Cost-benefit-analysis-of-adopting-solar-energy-pumps-for-jalswarajya-schemes-in-Sangli-district.pdf>.

the transmission infrastructure requirement for SHPs need to be designed. This will improve a project's commercial viability, their clustering and help in drawing investments. The budget-

ary allocation for augmenting transmission infrastructure could reduce the burden on IPPs.

Annexure 1: Existing Policy and Institutional Framework for Assam

Assam Policies for CCMA	Installation of Renewable Energy (RE) Capacities	Energy Efficiency and Energy Conservation (EE & EC)	Low Carbon Development (LCD) of Transport System	Sustainable Habitat (waste to energy, biogas, solar-based water pumping and supply, green buildings etc.)
State Policy & Regulations	Assam Small Hydro Policy, 2007 ²⁷	State Energy Conservation (EC) Mission under Energy Conservation Act, 2001 [12]	National Waterways Regulations, 2016	Assam Urban Solid Waste Management Policy (Draft), 2018
	Assam Solar Energy Policy, 2017 ²⁸		The Assam Inland Water Transport Regulatory Authority Act, 2018	
	Renewable Purchase Obligation (RPO) and its Compliance Regulations, 2010, (Third Amendment), 2019 ²⁹		Inland Water Transport Policy, 2001	
	Guidelines for Tariff-Based Competitive Bidding Process for Procurement of Power from Grid-Connected Solar PV Power Projects ³⁰		Inland Vessel Act, 1917	
State Government's Departments and Institutions	Power (Electricity Department) - nodal department	Assam State Designated Agency (ASDA) for Energy Efficiency	Inland Water Transport Directorate (IWTD),	Department of Urban Development, Assam
	Assam Energy Development Agency (AEDA) under Department of Science & Technology – implementing agency for RE (for off-grid RE Technologies, Biogas)	Assam Power Distribution Company Limited	Transport Department, Assam	

27 Assam State Electricity Board (2007). Policy for Small Hydro Development. Guwahati: ASEB

28 Assam Energy Generation Company Limited (2018). Assam Solar Energy Policy. AEGCL, https://www.aegcl.co.in/06022018Gazette-Solar_Policy.pdf

29 aerc.nic.in. (2019). Draft Assam Electricity Regulatory Commission (Renewable Purchase Obligation and its Compliance) Regulations, 2010, (Third Amendment), 2019. [online] Available at: http://aerc.nic.in/AERC_Draft_RPO_2019.pdf [Accessed 24 Oct. 2019]

30 Ibid

Annexure 1: Existing Policy and Institutional Framework for Assam

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State Government 's Departments and Institutions	Assam Power Distribution Company Limited (APDCL) and Assam Power Generation Company Limited (APGCL) – nodal agency for grid-connected RE projects	(APDCL as DISCOM) for BEE funded Demand Side Management (DSM) programmes	Assam Inland Water Transport Development Society	Municipal Corporations
	Assam Electricity Regulatory Commission (AERC) (for RPO) Regulatory		<ul style="list-style-type: none"> ● (AIWTDS) for coordinating World Bank assisted IWT project ● Assam State Transport Corporation ● Ministry of Development of North Eastern Region (Centre) ● Ministry of Shipping (Centre) 	
Central and State Government Programmes / Schemes being implemented in Assam	Centrally Sponsored Schemes under National Solar Mission (Solar Parks etc.)	UJALA scheme for LED distribution with APDCL (DISCOM) and AHCL	Centrally Sponsored Scheme for National Waterways - 2	Solar City Programme – Guwahati & Jorhat
	Small Hydro Projects	AJAY scheme of MNRE for solar LED street lighting in remote areas	(Brahmaputra River)	Smart street lighting
	National Biogas and Manure Management Programme	Solar study lamp scheme of MNRE	Inland Water Transport Projects (World Bank assisted)	Managing Waste to Energy Projects viz. Borsola Beel (Lake) Guwahati Smart City project in Assam
	Improved Cook Stoves Programme, Solar Lantern Study Lamps etc.		Swachh Kamakhya - Clean & Green Technology (for augmentation of electric buses)	
	Rural Electrification Programme using off-grid technologies such as solar roof top power plants		Electric bus procurement under FAME-II scheme	

Annexure 2: Financing Incentives and Instruments Offered Under Various CCMA Policies in Assam

CCMA Policy	Central or State Policy	Offered Incentives	Financing Instruments
Small Hydro Policy			
Assam Small Hydropower Policy , 2007 (up to 25 MW)	State Policy	<ul style="list-style-type: none"> • No royalty for up to 5MW • No wheeling charges in case power is sold to a DISCOM • Banking of energy within fixed period spans of 6 months • Exclusion of entry tax for all equipment and building materials for the project • Exemption from Environmental Impact Assessment (EIA) if the land requirement of SHP is less than 5 hectares • Offered incentives over and above the CFA 	<ul style="list-style-type: none"> • Accelerated depreciation • Assam Electricity Regulatory Commission is setting a generic tariff for small hydro project technologies (Rs./kWh)as follows; <ul style="list-style-type: none"> • Below 5 MW – Rs.4.97 (2017-18) and Rs.5.01 (2018-19) • 5 MW to 25 MW – Rs. 4.20 (2017-18) and Rs.4.22 (2018-19)
MNRE Small Hydropower Project (SHP) Programme with incentive (above 0.1 MW to 25 MW)	Central Policy	<ul style="list-style-type: none"> • Central Financial Assistance for special category states for Private Project Developers from North Eastern States, Uttarakhand and Himachal Pradesh • Rs. 1.5 crore / MW, limited to Rs. 5.00 crore per project • CFA for Renovation and Modernisation of existing SHP (for all states & UTs) • Rs.10,000/kW (1000 KW capacity project) • Rs. 1 crore/MW limited to Rs. 10.00 crore per project 	<ul style="list-style-type: none"> • 50 % of CFA as first installment will be released after placement of order for electro-mechanical equipment along with 50 % loan sanction taken from bank (if any) • Rest 50 % after commissioning of project
Solar Policy			
Assam Solar Energy Policy, 2017 for Solar Parks (Minimum of 25 MW)	State Policy	<ul style="list-style-type: none"> • Selling 100 per cent of solar energy produced to Assam DISCOM • Promotion of solar power plant under REC mechanism • Extension of support to developers participating in the MNRE scheme by state government • No statutory clearance required from any district or state authority or department for setting up of solar plants under the Policy, on lands or property otherwise not barred by any Act, rule or judicial or executive order 	<ul style="list-style-type: none"> • Tariff setting based on competitive bidding process approved by Assam Electricity Regulatory Commission (AERC³¹) • Exemption on wheeling, transmission & cross subsidy surcharge and electricity duty

31 Feed-in tariff financing instrument offers a guaranteed price for fixed periods of time for electricity produced from RE sources

Annexure 2: Financing Incentives and Instruments Offered Under Various CCMA Policies in Assam

CCMA Policy	Central or State Policy	Offered Incentives	Financing Instruments												
Solar Policy															
National Solar Mission – Grid-Connected Roof Top Solar Power Plants	Central Policy	<p>Benchmark cost for grid-connected roof top solar power plants for the year 2019-20, inclusive of total system cost, installation, commissioning, insurance, annual maintenance and applicable fees ³²</p> <table border="1"> <thead> <tr> <th>Capacity</th> <th>Cost (Rs./Wp)</th> </tr> </thead> <tbody> <tr> <td>1- 10 kW</td> <td>59</td> </tr> <tr> <td>10-100 Kw</td> <td>53</td> </tr> <tr> <td>100- 500 kW</td> <td>50</td> </tr> </tbody> </table>	Capacity	Cost (Rs./Wp)	1- 10 kW	59	10-100 Kw	53	100- 500 kW	50	Subsidy				
Capacity	Cost (Rs./Wp)														
1- 10 kW	59														
10-100 Kw	53														
100- 500 kW	50														
Assam Solar Energy Policy, 2017 for Captive Solar Plants	State Policy	Using at least 51 per cent consumption of electricity generated in solar plants and selling surplus. The surplus energy may be sold to Assam DISCOM	Exemption on wheeling, transmission & cross subsidy surcharge. Electricity duty for captive solar power plants availing open access												
Assam Solar Energy Policy, 2017 for Decentralised Off-Grid Solar Technologies	State Policy	<ul style="list-style-type: none"> For micro irrigation & drinking water supply- a maximum subsidy up to 30 % of the capital cost of the system For micro / mini solar grids for village electrification under guidelines of Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) – a Central Scheme For other solar PV applications, such as solar home lights, solar street lights and off-grid solar power plants for use in stand-alone mode by individual and communities - maximum subsidy of 20 % of the capital cost of system 	<ul style="list-style-type: none"> Combination of subsidies and loan 												
Assam ERC's Renewable Purchase Obligation and its Compliance Regulations, 2010, (Third Amendment), 2019, September 2019	State Regulation	<p>RPO for FY 2020, FY 2021, and FY 2022 will be 17.5%, 19%, and 21% respectively, which comprise solar and non-solar as shown below:</p> <table border="1"> <thead> <tr> <th></th> <th>Solar</th> <th>Non-Solar</th> </tr> </thead> <tbody> <tr> <td>FY 2020</td> <td>7.25%</td> <td>10.25%</td> </tr> <tr> <td>FY 2021</td> <td>8.75%</td> <td>10.25%</td> </tr> <tr> <td>FY 2022</td> <td>10.50%</td> <td>10.75%</td> </tr> </tbody> </table>		Solar	Non-Solar	FY 2020	7.25%	10.25%	FY 2021	8.75%	10.25%	FY 2022	10.50%	10.75%	Renewable Energy Purchase Obligation
	Solar	Non-Solar													
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FY 2022	10.50%	10.75%													

³² MNRE (2019). Office Memorandum: Benchmark costs for Grid connected Roof Top Solar Power Plant for year 2019-20. [online] Available at: <https://mnre.gov.in/sites/default/files/uploads/benchmark%20cost%202019-20%20%281%29.pdf> [Accessed 24 Sep. 2019].

Annexure 2: Financing Incentives and Instruments Offered Under Various CCMA Policies in Assam

CCMA Policy	Central or State Policy	Offered Incentives	Financing Instruments
Low Carbon Transport			
The National Waterways (NW) Act, 2016	Central Regulation	<p>15 waterways out of 111 NWs, including NW No. 2 for Brahmaputra River are listed as National Waterways for Assam. 100 per cent grant from Ministry of Shipping for development of NWs in the state of Assam. Target for IWT addition in Assam:</p> <ul style="list-style-type: none"> ● Increase in IWT share of cargo traffic from 3 to 10 per cent to make it 35 million metric tonnes per annum (MMTPA) ● A 100 per cent regulated ferry services sector will provide safe, efficient and economical service to 18 million passengers per annum ● The total additional direct and indirect employment generation is estimated to be 2 million 	<ul style="list-style-type: none"> ● Exemption from Goods and Service Tax (GST) on transportation of goods by inland waterways ● Assistance to create IWT infrastructure in North Eastern States, including Sikkim, under the Central Sector Scheme with 100 per cent grant ● Establishment of state level inland water transport authority and their capacity building ● Inland Water Transport Authority of India permitted to raise funds through bonds from financial markets to increase investments in this sector
Faster Adoption and Manufacturing of Electric Vehicles FAME-II scheme of GOI	Central Scheme of Electric Mobility	Swachh Kamakhya - Clean & Green Technology (for augmentation of Electric Buses to give public transport connectivity to Kamakhya Temple) ³³	Grant for procuring electric buses

³³ Under the Swachh - Kamakhya scheme, the fleet of e-buses is proposed to be procured in 6 phases of 2 years each, thereby increasing the e-bus fleet strength to 100 by 2027.

Annexure 3: Budgeted Programmes for CCMA in Assam Budget (in Rs. crore)

Promotion of Renewable Energy

State Department	Code	Programme	2015-16 A	2016-17 BE	2016-17 RE	2016-17 A	2017-18 BE	2017-18 RE	2017-18 A	2018-19 BE	2018-19 RE	2019-20 BE
Electricity	2246	Amguri Solar Power Project	-	-	-	-	-	40	26.41	0	0	0
Electricity	2273	15 MW Namrup Solar Power Project	-	-	-	-	0	0	0	23.63	23.63	5
Irrigation	1523	Solar Deep Tube Well (DTW) scheme in Biswanath district	-	-	-	-	-	0	0	2	2	2
Irrigation	1523/ 667	Solar (electrical works for DTW)	-	-	-	-	11	0	0	300	300	26
Irrigation	1523/ 982	DTW scheme with solar system in Behali area	0	3.75	3.75	0	13.75	13.75	1.14	13.75	13.75	13.75
Scientific Services & Research	3425	Floating Solar Power Plant	-	-	-	-	-	-	-	-	1.24	0.26
Scientific Services & Research	2810	Bio-energy Research & Development	-	-	-	-	-	-	0.1	-	0.1	0.075
Road & Transport	5055	Capital Outlay on Road Transport	177.5	177.5	0	72.81	58.72	36.08	80.06	112.19	194.19	152.5
Road & Transport	5056	Capital Outlay on Inland Water Transport	0	0	0	0	0	78.79	22.16	78.79	74.42	118.75
Road & Transport	5772	Assam Inland Water Transport Development Society	0	0	0	67.28	0	51.28	16	51.28	50	100
Road & Transport	3056	Inland Water Transport	146.31	158.83	108.43	191.41	129.87	142.64	143.76	157.32	160.2	177.87
Road & Transport	1395	Crew Training Centre of Inland Water Transport	2.13	2.14	1.27	2.41	1.42	2.27	1.67	2.27	1.85	2.04
Urban Development		Guwahati Metro Rail project				0	0	5	5	5	5	1

Report on Climate Mitigation Financing Framework in Assam

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Acknowledgements

We are thankful to Shakti Sustainable Energy Foundation (SSEF) for supporting CBGA for this project. We are thankful to Mr. Pustav Joshi and Mr. Raghav Anand from SSEF for providing useful feedback and suggestions on earlier versions of this publication. We are also thankful to officials from Assam's Energy Department for providing useful insights on clean energy financing by the state.

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The project studies policy, institutional and fiscal measures which four select states, viz., Andhra Pradesh, Assam, Odisha and Rajasthan are undertaking to mitigate climate change, along with a reflection on the suitability of the budgetary provisions in meeting their State Action Plan on Climate Change (SAPCC).



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Shakti Sustainable Energy Foundation works to facilitate India's transition to a cleaner energy future by aiding the design and implementation of policies that promote clean power, energy efficiency, sustainable transport, climate policy and clean energy finance.

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