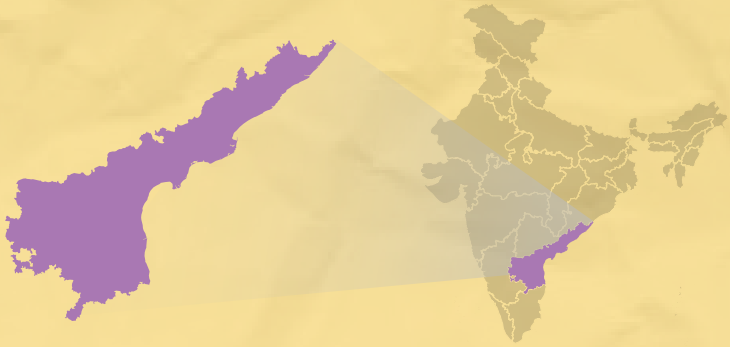


Policy Brief

Andhra Pradesh's Policy and Budgetary Priorities for Transitioning towards Green Economic Recovery

2022

CBGA

Published on: October 2022

Andhra Pradesh's Policy and Budgetary Priorities for Transitioning towards Green Economic Recovery

About Policy Brief: The factsheet highlights current efforts by the State of Andhra Pradesh towards financing climate change mitigation actions in various sectors such as; power, agriculture, transport and urban development. It identifies policy measures for long-term transformation towards green economic recovery.

This policy brief is prepared under the Project:

Building Knowledge and Capacity for Green Economic Recovery of the States in India

Policy Brief

Andhra Pradesh's Policy and Budgetary Priorities for Transitioning towards Green Economic Recovery

2022

CBGA

Table of Contents

List of Figures

Section 1
Introduction

1.1 Objectives

The goal of this policy brief is to present the ongoing efforts of the Andhra Pradesh government in its transition to clean energy and to identify issues in its path to a Green Economic Recovery (GER).

To this end, this report seeks to:

- Understand the impact of the COVID-19 pandemic on Andhra Pradesh's overall spending and its efforts in **climate change mitigation** through a review of baseline indicators, and to track financial resources available for spending on a clean energy transition.

- Understand the conduciveness of State Budgetary Expenditure for clean energy transition; specifically, to lay down progressive budgetary provisions aimed at greening the economic recovery.

- Assess climate change mitigation policies in Andhra Pradesh's energy, transport and urban development sectors and analyse the State's participation in various national climate change mitigation programmes.

1.2 Scope

This factsheet analyses the different drivers of Andhra Pradesh's economy, measures taken by the state to reduce its GHG emissions and policies that align with a Green Economic Recovery. It also looks at the fiscal performance of the State before COVID-19, at present, and the various policy interventions made with an outlook for a carbon-neutral economy. It has been observed that the total expenditure in the energy sector has reduced from 6.7% in 2019-20 to 3% in 2020-21 and slightly increased to 4% in 2021-22. The budget heads from various sectors, mainly energy, have been studied to assess if there has been a shift in financing priorities and how it has affected outlays for schemes and programmes for climate change mitigation. The study has analysed cross-sectional supplementary information pertaining to direct or indirect support measures for climate change mitigation interventions. Budget data covering inclusive and cohesive measures for climate financing is collated from 2017-18. The factsheet identifies gaps in and opportunities for a Green Economic Recovery.

This study looks at financing of climate change mitigation actions by State Governments through their internal sources and presents an analysis of the opportunities available and the constraints hindering the process. This policy brief seeks to achieve the following objectives:

Improve understanding of the roles and responsibilities of State-level institutions, and the inter and intra–agency coordination between them, in implementing climate change mitigation policies.

i) To quantify climate-related allocations and expenditure made through the budgetary system and extra-budgetary channels, including financial assistance from the Central Government and institutional finance from NBFIs.

ii) To strengthen stakeholders' capacity to formulate informed policy proposals and innovative financing instruments that efficiently deliver actions for climate change mitigation.

1.3 Methodology

The resource envelope of Andhra Pradesh's power sector has been assessed and plausible estimates on finances made across the following channels:

A. Budgetary allocations from the Energy Department, Government of Andhra Pradesh

B. Share of international loans in budgetary allocations from the Energy Department

C. Internal and Extra Budgetary Resource (IEBR) reimbursement to Andhra Pradesh through Central PSUs in the power and renewable energy sector

D. Finance Commission Grants (if any) with respect to clean energy

Key sources of information reviewed were as follows:

- Budget documents of various State departments
- International loans routed through departmental budgets
- Recommendations of the Fourteenth and Fifteenth Finance Commissions
- Union Budget documents pertaining to renewable energy and transfers to the Andhra Pradesh government
- State Budget documents, State-level policies and framework through the New and Renewable Energy Development Corporation of Andhra Pradesh (NREDCAP)
- Energy distribution through the Andhra Pradesh State Electricity Regulation Commission (APSERC)

A trend analysis of Andhra Pradesh's Total Budget Expenditure (TBE) for various departments has been carried out covering pre-COVID years and the present. The State's overall physical progress on renewable energy targets and other outcome indicators through implementation of various policies and regulations is also collated. Key sources of information include:

- The Andhra Pradesh State Economic Survey
- Greenhouse gas inventory for various sectors of Andhra Pradesh's economy available online at GHG Platform-India
- State Budget documents and Detailed Demand for Grants (DDGs) pertaining to the Energy Department from financial years 2017-18 to 2022-23
- Ministry of New and Renewable Energy (MNRE) and Central Electricity Authority (CEA) data on the progress on State-wise targets pertaining to renewable energy
- Status of Andhra Pradesh's Renewable Energy Purchase Obligation
- Annual Transmission and Distribution Losses

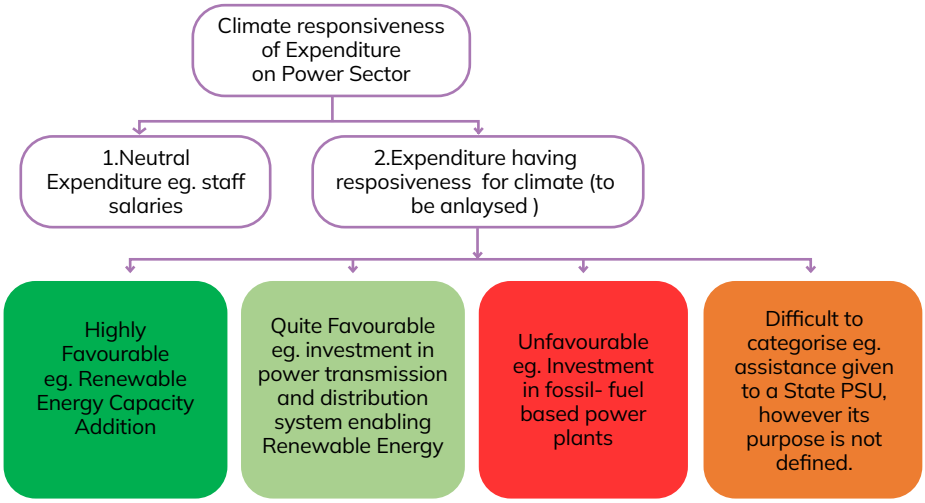
Andhra Pradesh's overall progress on renewable energy targets and other important outcome indicators were collated. Interventions from different agencies were assessed for their feasibility to achieve low-carbon development. The main sectors covered were energy, transport and urban development. In the transport sector, policies for the promotion of public transport and electric mobility were assessed. In the urban development sector, central sector schemes that could possibly aid in climate change mitigation were considered. In the energy sector, the main points from various renewable energy policies were highlighted. Solar is the main component of Andhra Pradesh's renewable energy and hence, the State's Solar Export Policy was extensively analysed. Mission guidelines were studied for an understanding of up-skilling efforts (if

Figure 1: Climate Responsiveness Categorization

Step 1: Identification of key department(s) for power sector

Step 2: Identification of Budget lines that is, neutral or "with climate mitigation responsiveness"

Step 3: Rating the responsiveness of budget expenditure for Climate Change Mitigation (clean energy transition)



any) for jobs in renewable energy and other climate change mitigation sectors, such as Electric Mobility. Our key information sources were:

- Andhra Pradesh State Renewable Energy Policy
- Andhra Pradesh State Solar Policy
- Andhra Pradesh State Solar Export Policy
- Andhra Pradesh State Wind Policy
- Andhra Pradesh Electric Vehicle Policy
- Programmes and schemes with co-benefits for climate change mitigation appearing in news media where segregated budget data is not available
- Union government guidelines for setting up climate change resilient smart cities
- Central government guidelines for specific programmes to promote electric vehicles, such as the Faster Adoption and Manufacturing of Electric and Hybrid Vehicles (FAME)-II scheme
- Central scheme-specific portal providing information on State-wise performances. This is available for FAME-II, *Pradhan Mantri Kisan Urja Suraksha and Utthan Maha Abhiyan* (PM-KUSUM), and energy efficiency related schemes.

We have also looked at the Climate Responsiveness Categorisation of different budget heads in the energy department (Figure 1)

Section 2

Issues in the landscape of policies, budgets and efforts for GER of the State

2.1 Andhra Pradesh's Economic Recovery

Andhra Pradesh has very high renewable energy potential. The State formulated a "Green Vision 2029" to achieve sustainable development, recognising that energy would be a key sector in achieving climate change mitigation targets, and setting ambitious plans to increase RE capacity by 2029. It aims to achieve a 30% share in renewable energy, 50% in green cover for the state, 100% drought proofing, 60% water use efficiency, 100% solid and liquid waste management infrastructure that is resilient to disasters, and reduced greenhouse gas emissions. The State has put tremendous effort into all the building blocks of a green economy. This policy brief presents the initiatives of the State towards achieving a green economy (AP green vision).

However, to achieve these targets, there is an urgent need to scale up the financing for these objectives by the State Government. This policy brief analyses trends in the State financing of climate change mitigation actions, particularly in curbing GHG emissions from the energy sector through the addition of renewable energy (RE) capacities in the state. The study also includes other interventions of significance contributing to climate change mitigation, either by reducing fuel consumption through energy efficiency measures or by increasing the uptake of clean fuels in energy consuming processes. Some of the interventions covered in this policy brief include energy efficiency measures, measures for sustainable transportation such as mass transit systems or deployment of Electric Vehicles (EVs) and charging infrastructure, measures aimed at cleaner industrial production processes, and energy production from urban or rural waste. Since energy consumption is required across sectors such as industries (steel, fertilisers etc.), agriculture, rural and urban infrastructure development, the scope of the brief includes policies and financing trends for actions aimed at curbing GHG across these sectors, yielding mitigation benefits.

2.2 Impact of COVID-19

The report assesses State budget data, mainly from the energy sector, analyses development processes in Andhra Pradesh and identifies different growth drivers that can help achieve a Green Economic Recovery. It examines the impact of the COVID-19 pandemic on public financing of climate change mitigation measures in various sectors. There are several starting points for a Green Economic Recovery at the sub–national level based on varying social, economic, and political contexts. This policy brief presents a comprehensive review of the performance, financing framework and mainstreaming of low-carbon strategies in the major sectors of the State. It presents an in-depth analysis of the State's energy sector financing over the last five years. It tries to benchmark "favourability" of expenditure towards climate change mitigation. Gaps in aligning the State's climate financing to a Green Economic Recovery are also highlighted to facilitate transformational interventions and policy recommendations.

The figure shows Andhra Pradesh's energy sector expenditure compared to the overall state expenditure

Figure 2: Trends in Andhra Pradesh's Total Budget Expenditure (TBE) for energy sector

	Total State Budget Expenditure (Rs. crore)	Energy sector budget (Rs. crore)	Energy Versus Total state expenditure (%)
2018-19			
BE	191,063.61	4,193.30	**2.19**
A	163,959.95	2,187.87	**1.33**
2019-20			
BE	227,975.00	6,861.03	**3.01**
A	173,700.91	11,693.70	**6.73**
2020-21			
A	187,101.77	6,183.80	**3.31**
RE	185,467.59	6,176.14	**3.33**
2021-22			
BE	229,779.27	6,637.24	**2.89**
RE	208,106.57	12,768.30	**6.14**
2022-23			
BE	256,256.56	10,281.04	**4.01**

Source: CBGA analysis Of the Andhra Pradesh Budget and Detailed Demand for Grants for Energy Department, Andhra Pradesh

in recent years. The onset of the COVID-19 pandemic seems to have caused a variation in the percentage share allotted to the energy sector. There is a dip from 2019-20 A (6.73%) 2020-21 A (3.31%) in post COVID year. This is a significant decrease in the allocation of funds for the energy sector (Figure 2).

Amidst the COVID-19 pandemic, Andhra Pradesh registered a modest Gross State Domestic Product (GSDP) of Rs. 6,51,624 crore for the year 2020-21 (A), estimated at Constant (2011-12) Prices as against Rs. 6,68,848 crore. The overall GSDP reduced from 7.23% to -2.58% in 2020-21 (A). This shows a negative growth rate for the state after a significant improvement in previous years. Key sectors such as industry (-3.26) and services (-6.71) were the most impacted by the pandemic (AP Socioeconomic Survey, 2020-21).

According to the Centre for Monitoring Indian Economy (CMIE), Andhra Pradesh had an unemployment rate of 20.5% even with limited restrictions during the second wave of Covid (April-May 2020). Prior to this, it was as low as 5.8%. Andhra Pradesh's unemployment rate is more than the national average of 11.9%.

In 2021-22, amidst the COVID-19 pandemic, the Andhra Pradesh government increased its health budget allocation by 21.11% to Rs. 13,830.44 crore. Also, the State provided cashless health care services to the COVID affected people, irrespective of their economic status. A total of 2,09,765 patients

Figure 3: Trends in Andhra Pradesh's Total Budget Expenditure (TBE) for Renewable Energy (RE) sector budget

	RE expenditure (Rs. crore)	Share of RE in total energy expenditure (%)
2018-19		
BE	308.65	**0.07**
A	65.66	**0.03**
2019-20		
BE	35.59	**0.01**
A	3.60	**0**
2020-21		
A	4,037.11	**0.65**
RE	4,047.92	**0.66**
2021-22		
BE	4,532.51	**0.68**
RE	8,794.86	**68.88**
2022-23		
BE	4,500.00	**43.77**

Source: CBGA analysis Of Andhra Pradesh Budget and Detailed Demand for Grants for Energy Department, Andhra Pradesh

Figure 4: Distribution of TBE across government sectors

Amount (Rs Crore)

	Environment, Forests, Science and Technology	Agriculture and Co-Operation and Food, Civil Supplies and Consumers Affairs	Municipal Administration and Urban Development	Panchayat Raj and Rural Development	Transport, Roads and Buildings	Water Resources	Total
2017-18 A	4,054	9,114	4,244	21,536	2,545	8,937	146,944
2018-19 A	2,550	8,860	6,562	28,423	2,610	14,355	163,960
2019-20 A	12,016	6,334	4,878	11,503	3,012	5,335	173,701
2020-21							
BE	7,542	15,412	8,150	16,757	6,589	11,806	224,789
RE	6,538	9,453	5,426	17,234	5,503	5,238	185,468
A	6,462	10,310	4,166	17,535	5,395	5,436	187,102
2021-22							
BE	7,444	14,907	8,727	18,912	7,594	13,238	229,779
RE	13,197	12,347	8,055	15,727	5,976	8,428	208,107
2022-23 BE	10,966	15,107	8,796	19,243	8,581	11,482	256,257

Share in State's total budget expenditure (%)

	Environment, Forests, Science and Technology	Agriculture and Co-Operation and Food, Civil Supplies and Consumers Affairs	Municipal Administration and Urban Development	Panchayat Raj and Rural Development	Transport, Roads and Buildings	Water Resources
2017-18 A	2.76	6.2	2.89	14.66	1.73	6.08
2018-19 A	1.56	5.4	4	17.34	1.59	8.76
2019-20 A	6.92	3.65	2.81	6.62	1.73	3.07
2020-21						
BE	3.36	6.86	3.63	7.45	2.93	5.25
RE	3.52	5.1	2.93	9.29	2.97	2.82
A	3.45	5.51	2.23	9.37	2.88	2.91
2021-22						
BE	3.24	6.49	3.8	8.23	3.3	5.76
RE	6.34	5.93	3.87	7.56	2.87	4.05
2022-23 BE	4.28	5.9	3.43	7.51	3.35	4.48

Source: CBGA analysis Of Andhra Pradesh Budget and Detailed Demand for Grants for Energy Department, Andhra Pradesh

were treated with a preauthorised amount of Rs. 732.16 crore (AP Socioeconomic Survey, 2021-22).

The budget for the energy sector has been further divided to include a renewable energy budget if it directly leads to a reduction in greenhouse gases (GHG). A further detailed categorisation can be seen in Annexure 1 (methodological note). The trend suggested a gradual increase in the share of RE expenditure in the energy sector budget since the pandemic. The increase in 2021-22 (RE) and 2022-23 (BE) (Figure 3) is due to the state's investment in the YSR 9-hour Power Supply scheme which primarily used solar energy for its power generation.

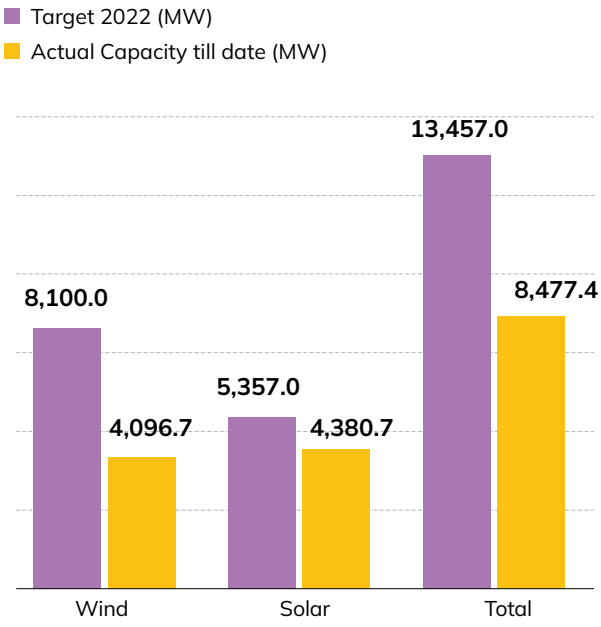
The budget data for other departments also share a similar trend (Figure 4). As it can be seen from the figure, the percentage share of all departments has reduced significantly from 2019-20 (A) to 2020-23 BE. The only sector that does not seem to have been impacted by the COVID-19 pandemic is the Panchayati Raj and Rural Development Department. This department shows a rise in expenditure from 2019-20 A (6.6%) to 22-23 BE (7.51%)

2.3 Inability to meet its RE targets

The AP solar policy, 2018 aims to add a minimum of 5,000 MW of total power capacity in the next five years. The policy also targets promotion of off grid/distributed renewable energy, encourages deployment of solar agricultural pump sets and local manufacturing of RET equipment. The wind power policy, 2018 aims to generate 8,100 MW of energy, develop and promote wind power generation in the state with a view to meeting the growing demand for power in an environmentally and economically sustainable manner.

A 2022 NITI Aayog study suggests that Andhra Pradesh has only reached 4% of its total renewable energy potential. According to the MNRE, the solar and wind energy sectors in Andhra Pradesh have very high potential of 38.5 GW and 44 GW respectively. Figure 5 shows the target vs actual capacity where Andhra Pradesh is still 4978 MW short.

Figure 5: Target vs Actual Capacity in the renewable energy sector (Wind and Solar)



Source: NITI Aayog, 2022

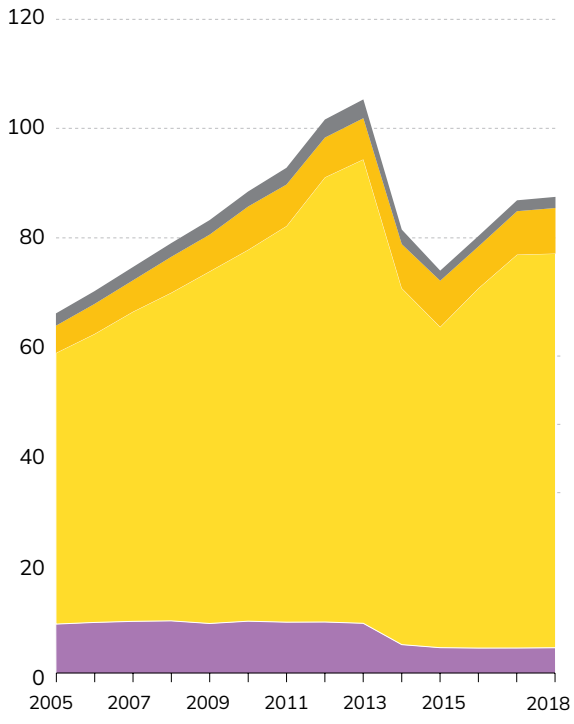
Section 3

Sectors most relevant to Green Economic Recovery of the State

The energy sector has been the highest contributor to GHG emissions in Andhra Pradesh. From 2005 to 2018, there has been a 45% increase (49.72 to 72.33 MT) in GHG emissions in the energy sector. If this trend continues, it is predicted that GHG emissions from the energy sector would be 81 MT in the year

Figure 6: Sector-Wise GHG emissions

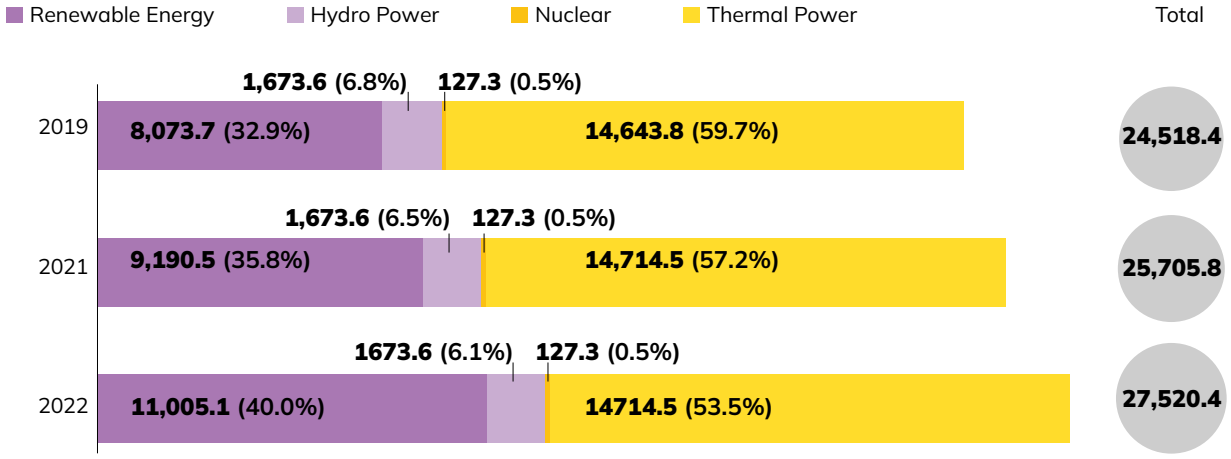
	Emission estimates (Mt CO_2e)				
	Agriculture, Forestry & Other Land Use	Energy	Industrial Product and Process Use	Waste	Grand Total
2005	9.1	49.7	5.0	2.3	**66.1**
2006	9.4	52.9	5.5	2.4	**70.2**
2007	9.6	56.8	5.8	2.4	**74.6**
2008	9.7	60.2	6.6	2.5	**79.0**
2009	9.2	64.6	6.8	2.7	**83.3**
2010	9.7	68.1	8.0	2.8	**88.5**
2011	9.5	72.7	7.6	3.1	**92.8**
2012	9.5	81.6	7.3	3.3	**101.7**
2013	9.3	85.1	7.6	3.5	**105.4**
2014	5.4	65.4	8.1	2.7	**81.5**
2015	4.8	58.9	8.5	1.9	**74.0**
2016	4.7	66.0	7.7	1.9	**80.4**
2017	4.7	72.2	8.0	2.0	**86.9**
2018	4.8	72.3	8.4	2.0	**87.5**



Source: GHG Platform India

2022. It can be observed from Figure 7 that thermal energy has the highest installed capacity among all energy sectors. Thermal, being a non-renewable source of energy, will not aid in the goal of GHG reduction. Additionally, the CEA data shows that in 2021, the capacity of thermal power plummeted 57%, while the overall contribution of renewable energy increased to 35.75%.

Figure 7: Installed Capacity of power from different sources (MW)



Source: CEA data 2019, 2021, 2022

Section 4

Tracking of available finances for State's financing for GER

The state's budget resources for power sector financing

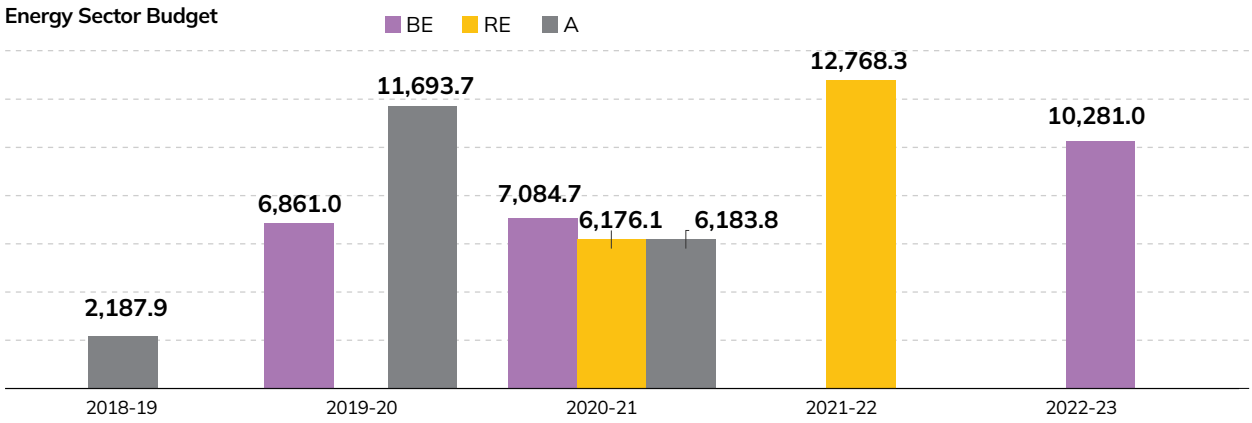
The Budget of Andhra Pradesh's Energy department is estimated to be Rs 10,281 crore for FY 2022-23 (BE) (Figure 9). No grants were recommended for the renewable energy sector for any State in the Fourteenth and Fifteenth Finance Commissions. Given below is an estimate of contributions from different channels to the State's Budget resource envelope for energy financing.

Figure 8: Loans and Advances routed through Andhra Pradesh Budget (Rs Crore)

Major Head: 6801- Loans for power projects Sub-Minor Head	2018-19 A	2019-20 A	2020-21 A	2021-22 BE	2021-22 RE	2022-23 BE
11- WB & AIIB (World Bank & Asian Infrastructure Investment Bank) - Loans for APTRANSCO for 24X7 Power for all Project	184.6	100.2	95.9	300.0	680.5	543.1
13- KFW - Germany - Green Energy Corridors Intra State Transmission System in Andhra Pradesh	62.4	0.0	0.0	22.1	197.6	0.0
06- Loans to Andhra Pradesh Transco for Modernisation and Strengthening of Transmission system in Hyderabad Metropolitan Area	0.0	0.0	0.0	0.0	0.0	0.0
07- Loans to APTRANSCO for High Voltage Distribution System (HVDS)	0.0	0.0	0.0	0.0	0.0	0.0
11- WB & AIIB (World Bank & Asian Infrastructure Investment Bank) - Loans for APTRANSCO for 24X7 Power for all Project	40.7	10.1	0.0	18.4	0.0	119.6
13- KFW - Germany - Green Energy Corridors Intra State Transmission System in Andhra Pradesh	0.0	0.0	0.0	4.5	4.5	0.0
07- Loans to APTRANSCO for High Voltage Distribution System (HVDS)	0.0	0.0	0.0	0.0	0.0	0.0
11- WB & AIIB (World Bank & Asian Infrastructure Investment Bank) - Loans for APTRANSCO for 24X7 Power for all Project	12.7	13.1	0.0	57.6	8.3	37.3
13- KFW - Germany - Green Energy Corridors Intra State Transmission System in Andhra Pradesh	0.0	0.0	0.0	1.4	1.4	0.0
05- Loans to APTRANSCO for Servicing loans taken by the DISCOMS	0.0	4689.7	0.0	0.0	0.0	0.0
Major Head: 7475- Loans for other general economic services						
01- Loans to AP State Fibernet Limited	0.0	0.0	0.0	0.0	0.0	0.0
Total	300.3	4813.0	95.9	404.1	892.3	700.0

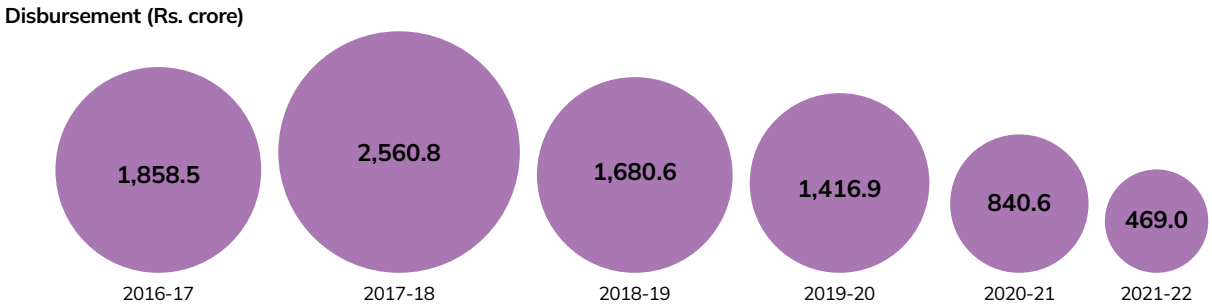
Source: Detailed Demand for Grants for Odisha State Energy Department (Energy Department, Odisha Government 2021)

Figure 9: Budgetary allocation by the Andhra Pradesh Energy Department (Rs crore)



Source: Detailed Demand for Grants for Andhra Pradesh State Energy Department (Energy Department, Andhra Pradesh Government 2021)

Figure 10: Disbursement through central PSUs such as Indian Renewable Energy Development Agency (IREDA) to Andhra Pradesh (Rs. crore)



Source: IREDA Annual Report 2021-22

Section 5

Bringing in cohesiveness in public financing of climate actions of the State

5.1 Policy and institutional landscape for climate change mitigation

The figures below highlight institutes and organisations in the state that work towards the goal of GHG reduction and achieving a Green Economic Recovery. Various other State departments deploy clean energy technologies under their developmental schemes in coordination with the Departments of Energy and Infrastructure and Investment Department and the NREDCAP.

Figure 11: Various policies initiated by the State government

	Policy Name	Policy Brief
RE Export Policy	Andhra Pradesh Renewable Energy Export Policy (2020)	Power generated from solar and wind projects would be exported outside the State. Resource allocation on a "first-come, first-serve" basis by the Nodal Agency by seeking online applications. Priority will be given to project developers intending to set up energy export projects along with manufacturing facilities in the State.
Solar	Andhra Pradesh Solar Power Policy-2018	To achieve a minimum total solar power capacity addition of 5,000 MW in the next five years in the State with a view to meet the growing demand for power in an environmentally sustainable manner. To develop solar park(s) with necessary utility infrastructure facilities to encourage developers to set up solar power projects in the State. To deploy solar-powered agricultural pump sets to meet power requirements of farmers. To promote local manufacturing facilities which will generate employment in the State.
Wind	Andhra Pradesh Wind Power Policy-2018	To encourage, develop and promote wind power generation in the State with a view to meet the growing demand for power in an environmentally and economically sustainable manner. To attract private investment to the State for the establishment of large wind power projects. To promote investments for setting up manufacturing facilities in the State, which can generate gainful local employment.
Solar-Wind	Andhra Pradesh Wind-Solar Hybrid Policy - 2018	To achieve renewable energy capacity of 18000 MW by the year 2021-22. To provide a framework for the promotion of large grid-connected wind-solar PV systems for optimal and efficient utilisation of transmission infrastructure and land, reducing the variability in renewable power generation and thus achieving better grid stability. Offered incentives are: ● 50% of the cross-subsidy surcharge shall be paid for third party sale provided the source of power is from wind-solar hybrid power projects setup within the State. ● Transmission/distribution charges are exempted up to 50% of the applicable charges for wheeling of generated power.

Figure 12: State institutes working towards Green Economic Recovery

Function	Central level	State level in Andhra Pradesh
Policy	Ministry of New and Renewable Energy, Ministry of Power, Central Electricity Authority	State Nodal agency - New and Renewable Energy Development Corporation of Andhra Pradesh (NREDCAP)
Regulation	Central Electricity Regulation Commission	Andhra Pradesh State Electricity Regulation Commission (APSERC)
Generation	Central Sector Undertakings (e.g., NTPC, NHPC)	Andhra Pradesh Power Generation Corporation (APGENCO)
Transmission	Central transmission Utility (e.g., Power Grid Corporation of India Ltd.)	Transmission Corporation of Andhra Pradesh (APTRANSCO)
Distribution		Andhra Pradesh Southern Power Distribution Corporation (APDISCOM)

Figure 13: Central Sector Schemes

State Government Department	Other collaborating State PSU / Company and Central PSU	State project	Central Scheme
Agriculture and Fisheries Department	NREDCAP and APDISCOM, MNRE	Solar PV water pumping Programme	Decentralised Renewable Energy Power (for example, the recently launched KUSUM scheme)
Panchayats and Rural Development Department	NREDCAP and AP TRANSCO	Solarisation of borewell NTR Jalasiri phase -II	Decentralised Renewable Energy Power
Industries and Commerce Department	NREDCAP	Industries and Commerce Policy for 25 percent subsidy for RET installation for industrial use	Renewable Energy Schemes by MNRE
Municipal Administration & Urban Development Department	Swachh Andhra Corporation (SAC)	Waste to Energy Projects	Swachh Bharat Abhiyan
Municipal Administration & Urban Development Department	NREDCAP, APDISCOM, APSEEDCO	Energy efficient street lighting	Street Lighting National Project (SLNP)in urban areas
Panchayats and Rural Development Department	APSEEDCO, NREDCAP and EESL as Central PSU	Panchayat LED street lighting	Street Lighting National Project (SLNP) in rural areas.
Industries and Commerce Department	Ministry of Heavy Industries & Public Enterprises, Government of India and EESL	Promotion of EV/ battery manufacturing Electric Mobility Policy Implementation 2018-2023	FAME India Scheme (Scheme for faster adoption and manufacturing of hybrid electric vehicles)
Roads and Transport Department and, Municipal Administration & Urban Development Department	Ministry of Housing and Urban Affairs (Central)	Metro rail in Smart cities such as the new capital city of Amaravati	New Metro Rail policy 2017

Source: CBGA's compilation from various policy documents of the Andhra Pradesh government

These departments support the state's actions for the addition of clean energy, building energy efficiency and other climate change mitigation actions such as deploying low-carbon transport systems and waste-to-energy projects. Most schemes and programmes are designed based on the policy guidelines of the Central government. Various departments work with dedicated State corporations and Central Ministries or PSUs for implementing various State schemes and programmes. The Andhra Pradesh government is making efforts to promote the decentralised application of renewable energy through various programmes and schemes. However, many of these schemes have had no allocations post 2018-19.

5.2 Promotion of low-carbon development of urban infrastructure

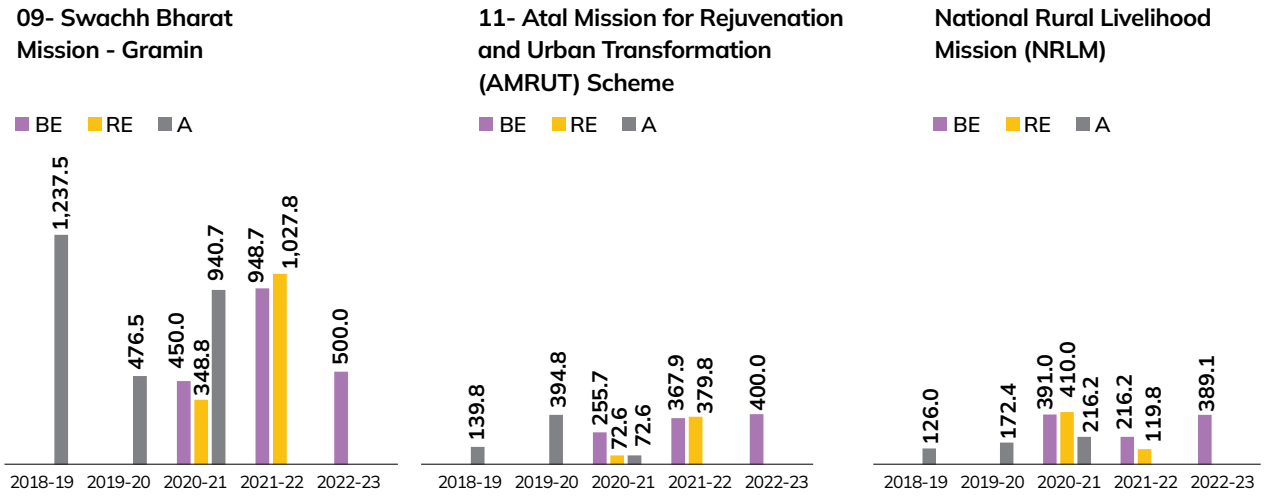
The Municipal Administration and Urban Development Department is responsible for the growth, development, and management of urban areas in the state. There are several schemes set up by the union and state governments for urban development, such as the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Smart Cities Project, Swachh Bharat Mission and so on. It should be noted that these schemes do not have segregated budgeted information for interventions with climate relevance or a specified renewable energy component. (For a detailed breakdown on the distribution of funds, refer to Annexure 1).

5.3 Low carbon budgetary expenditure in the transport sector

The Andhra Pradesh government passed the Electric Mobility Policy 2018-23 to promote electric vehicles (EVs). According to the policy, by 2024, one lakh EV charging stations will be built, all government buses and commercial vehicles will be made electric and Rs. 30,000 crore will be invested by the State to realise these goals. While a dedicated State-level corporation, the Smart Mobility Corporation will be established to implement this policy, an MoU has

Figure 14: Expenditure in various urban development schemes (Rs Crore)

Department	Panchayat Raj and Rural Development	Municipal Administration and Urban Development	Panchayat Raj and Rural Development
Major Head	2215- Water Supply and Sanitation	2217- Urban Development	2515- Other Rural Development Programmes
Sub-Minor Head (Scheme)	09- Swachh Bharat Mission - Gramin	11- Atal Mission for Rejuvenation and Urban Transformation (AMRUT) Scheme	National Rural Livelihood Mission (NRLM)



Source: CBGA analysis of Andhra Pradesh State Budget and Detailed Demand for Grants for Department of Energy, Andhra Pradesh Energy, Andhra Pradesh

already been signed with the Central PSU, Energy Efficiency Service Limited (EESL) for operational guidance. The EESL, for the first time, has entered into an agreement with NREDCAP and APDISCOMs for the supply of 1 lakh EVs in February 2018. Other targets mentioned in the policy are:

I. Convert 100% of the Andhra Pradesh State Road Transport Corporation (APSRTC) bus fleet of over 11,000 buses into electric buses (Battery Electric Vehicles or Fuel Cell Electric Vehicles) by 2029, with the first phase being 100% conversion in the top four cities by 2024.

II. Phase out all fossil-fuel based commercial fleets and logistics vehicles in top four cities by 2024 and all cities by 2030.

III. Convert all government vehicles, including vehicles under government corporations, boards and government ambulances, to EVs by 2024.

Some incentives offered under the policy are:

I. Complete reimbursement of road tax and no registration fee for development of EV manufacturing parks.

II. Provide 10% of Fixed Capital Investment (FCI) up to a maximum of Rs. 20 crore for first two units under the large vehicle category in each segment of EVs (two-wheelers, three-wheelers, four-wheelers, buses), battery and charging equipment, hydrogen storage and manufacture of hydrogen fuelling equipment.

III. Reimburse stamp duty for purchase or lease of land for industrial use. Some investment declarations by the State departments under the policy are:

I. State power DISCOMs will invest in setting up both slow- and fast-charging networks in government buildings and other public places. These charging points will be accessible to both government and private vehicles.

II. DISCOMs will set up the charging infrastructure on their own or through third-party operators using appropriate Public Private Partnership (PPP) models. Such costs can be recovered as part of the Aggregate Revenue Requirement (ARR).

III. APSRTC depots, bus terminals and bus stops will have charging stations.

IV. Public parking spaces will be mandated to have charging stations.

V. Government buildings will prepare a roadmap to set up charging or swapping stations in all of their parking spaces.

VI. Charging networks will be installed at least every 50 km on highways and on other major roads

Andhra Pradesh's EV market is at a nascent stage. The figure below depicts the total number of EVs sold in the State.

Figure 15: Total EVs sold in Andhra Pradesh

Model	Total
2 Wheelers	
L1	13,759
L2	8,809
3 Wheelers	
e-cart	1,178
e-rickshaw	49
L5M	653
L5N	350
4 Wheelers	
M1	2
Total	**24,800**

Source: FAME-II Ministry of Heavy Industries portal accessed in October 2022

The role of the State government is very important in progressively accelerating adoption, diffusion, and deployment of electric mobility. The State bus transport system, which is managed by the Andhra Pradesh State Road Transport Corporation (APSRTC) (Figure 16), also faces many problems such as low productivity, conflicts with trade unions, capacity shortages and financial constraints. It is equally important to bridge these existing gaps in operations while introducing new EV policies or establishing an understanding with investors.

Until recently, the APSRTC was seeking a "demand creation incentive" for proposals from operators for procurement, operation, and maintenance of 350 electric buses under the Centre's FAME scheme (Figure 15). Demand incentives under FAME are offered in the form of an upfront reduced purchase price, which will be reimbursed to the original equipment manufacturer (OEM) by the Government of India. Such a demand-generating incentive is meant to provide an initial push to electric mobility. The State government may have to find ways of "future pricing the operation of e-buses" by leveraging the expertise of different stakeholders to make sustained efforts for the adoption of electric mobility (FAME-II portal).

Demand incentives under the FAME-II scheme offered by the Central government's Department of Heavy Industry (DHI) are to the tune of Rs .20,000 per KWh for buses and trucks. The maximum number of e-buses to be supported across India is 7,090. The Andhra Pradesh government cannot solely depend on this scheme to achieve its state target of 100% conversion of all buses to EVs by 2029. In terms of fiscal incentives offered through budgetary support by the State government, there is no allocation from its budgets for the purchase of EV buses yet. Also, there are no allocations for the purchase of fuel-based buses after the 2019-20 budget. This might be due to the poor fiscal health of the Andhra Pradesh government.

Figure 16: Andhra Pradesh government spending on fuel-based public transport (Rs crore)

Department	Transport, Roads and Buildings						
Sub-Minor Head	43- Assistance to APSRTC for purchase of buses	43- Assistance to APSRTC for purchase of buses	**43- Assistance to APSRTC for purchase of buses**	05- Loans to APSRTC for purchase of buses	05- Loans to APSRTC for purchase of buses	05- Loans to APSRTC for purchase of buses	**05- Loans to APSRTC for purchase of buses**
Detailed Head	310- Grants-in-Aid	310- Grants-in-Aid	**310- Grants-in-Aid**	001- Loans to APSRTC for purchase of buses	001- Loans to APSRTC for purchase of buses	001- Loans to APSRTC for purchase of buses	**001- Loans to APSRTC for purchase of buses**
2017-18							
BE	0.0	0.0	**0.0**	230.0	0.0	9.0	**239.0**
A	0.0	0.0	**0.0**	230.0	19.0	0.0	**249.0**
2018-19							
BE	150.0	50.0	**200.0**	0.0	0.0	0.0	**0.0**
A	120.0	40.0	**160.0**	0.0	0.0	0.0	**0.0**
2019-20							
BE	50.0	0.0	**50.0**	0.0	0.0	0.0	**0.0**
A	50.0	16.7	**66.7**	0.0	0.0	0.0	**0.0**
2020-21							
BE	0.0	0.0	**0.0**	0.0	0.0	0.0	**0.0**
RE	0.0	0.0	**0.0**	0.0	0.0	0.0	**0.0**
2021-22							
BE	0.0	0.0	**0.0**	0.0	0.0	0.0	**0.0**

APSRTC: Andhra Pradesh State Road Transport Corporation
Source: Detailed Demand for Grants for Transport, Road and Buildings Department, Government of Andhra Pradesh

5.4 Interventions by the State government to drive clean energy initiatives in the agriculture sector

The Department of Agriculture and the Fisheries Department along with NREDCAP and APDISCOMs have jointly implemented the Solar PV Water Pumping programme since 2014-15. The Central government has recently launched a new scheme called Kisan Urja Suraksha Evam Utthaan Mahabhiyan' (KUSUM), which allows solarisation of existing grid-connected agriculture pumps to make farmers independent of grid supply, and enables them to sell the surplus power generated to the APDISCOMs and earn extra income. In the coming years, the Solar PV Water Pumping programme will be extended to widen income-generation opportunities for farmers. The extended Solar PV programme will help in reducing the financial burden of the APDISCOMs on account of the electricity subsidy given to farmers. (CBGA AP analysis, 2020)

Besides these standalone solar-based agriculture pumps under KUSUM, the Andhra Pradesh government has made significant improvements in the agriculture sector and its GHG emission goals. One of the major sources of GHG emission in this sector is the consumption of electricity. The government has announced that it will purchase electricity from the Solar Energy Corporation of India (SECI) in 2024 and will supply it free of cost to over 18 lakh farmers across the State for nine hours a day. (Indian Express, 2021) In order to make this process more sustainable, the State government has planned to set up a 10, 000 MW solar power project through the state-run Green Energy Corporation Limited to generate power for the next 25 years. This might reduce the subsidy burden of the government with the supply of cheaper renewable energy to farmers.

Section 6

Enhancing the performance of the state in achieving the targets of climate change policies

6.1 Responsiveness to power budget expenditure Power budget expenditure responsiveness

We followed the previously discussed methodology to categorise the line expenditure of the power budget and assess its climate responsiveness. As described, the budget is categorised into five main parts based on priority—Highly Favourable, Quite Favourable, Neutral, Unfavourable and Difficult to Categorise.

Through the summation of category-wise expenditure (Figure 17), it was found that spending on promotion of renewable energy is miniscule in Andhra Pradesh's power sector budget. The State needs to prioritise renewable energy.

The State's power budget was analysed, and expenditure categorised according to this climate mitigation impact. The largest share in budget expenditure has been categorised as "Quite Favourable" till 2019-20 (A). This is primarily because Andhra Pradesh has spent much capital on secondary aspects such as transmission and distribution or rural electrification, which indirectly help in the reduction of GHG emissions. Moreover, this only achieves a short-term goal. Since 2020-21 (A) , the highly favourable category has had the largest share and this is due to the addition of solar power generation in the YSR 9-hour Free Power Scheme (Figure 19). Annexure 1 provides the rationale used for categorisation, describes the methodology in detail and shows its application on the CBGA microsite.

Figure 17: Andhra Pradesh power sector budget expenditure responsiveness towards climate change mitigation- Amount under various caegories (Rs crore)

	Highly Favourable	Quite Favourable	Neutral	Unfavourable	Total
2017-18 A	312.0	378.9	32.9	3,000.0	3,723.8
2018-19 A	65.7	829.5	42.7	1,250.0	2,187.9
2019-20 A	3.6	6,676.6	93.6	4,919.8	11,693.7
2020-21 A	4,047.9	1,481.0	654.8	0.0	6,183.8
2021-22 BE	4,532.5	1,914.5	190.2	0.0	6,637.2
2021-22 RE	8,794.9	1,792.4	2,181.1	0.0	12,768.3
2022-23 BE	4,500.0	3,788.0	1,993.0	0.0	10,281.0

Figure 18: Andhra Pradesh power sector budget expenditure responsiveness towards climate change mitigation-Share in expenditure (%)

	Highly Favourable	Quite Favourable	Neutral	Unfavourable	Total
2017-18 A	312.0	378.9	32.9	3,000.0	3,723.8
2018-19 A	65.7	829.5	42.7	1,250.0	2,187.9
2019-20 A	3.6	6,676.6	93.6	4,919.8	11,693.7
2020-21 A	4,047.9	1,481.0	654.8	0.0	6,183.8
2021-22 BE	4,532.5	1,914.5	190.2	0.0	6,637.2
2021-22 RE	8,794.9	1,792.4	2,181.1	0.0	12,768.3
2022-23 BE	4,500.0	3,788.0	1,993.0	0.0	10,281.0

Source: CBGA analysis Of Andhra Pradesh Budget and Detailed Demand for Grants for Energy Department, Andhra Pradesh

Figure 19: Percentage share of different interventions/schemes within the "Highly Favourable" category

% Share of different interventions within Highly Favourable Category

	2017-18 A	2018-19 A	2019-20 A	2020-21 A	2021-22 BE	2021-22 RE	2022-23 BE
Renewable Energy Scheme (Major Head 2810)	23.3	0.0	0.0	0.0	0.0	0.0	0.0
Hydro Power	1.4	5.0	100.0	0.0	0.0	0.0	0.0
Y.S.R. Nine Hour Free Power Subsidy(Solar Based)	0.0	0.0	0.0	100.0	99.0	98.0	100.0
Green Energy Corridor, Assistance to PSUs for- APSEEDCO for Energy Efficiency, APGECo (AP Green Energy Corporation)	75.3	95.0	0.0	0.0	1.0	2.0	0.0

Source: CBGA analysis Of Andhra Pradesh Budget and Detailed Demand for Grants for Department of Energy, Andhra Pradesh

6.2 Progress in renewable energy capacity addition in Andhra Pradesh

As of August 2022, Andhra Pradesh had a total Renewable Energy capacity of 9306 MW. It is a renewable energy rich state with solar power occupying the largest share of 4,505.80 MW in total renewable capacity followed by wind power at 4,096.65 MW. Small hydro projects account for 162.11 MW, biomass power for 378.1 MW, biomass energy co-generation for 105.57 MW and waste to energy for 82.37 MW (Figure 20).

As per a 2017 study done by Palchak et al, wind and solar energy account for 51% of total generation in Andhra Pradesh and meet 56% of the demand . This has led to a 48% reduction in the generation of coal power and 55% reduction in gas. With the increase in RE use in the State, imports will fall by 6.6% annually, which will lead to a 5% annual rise in exports. Andhra Pradesh is no longer energy scarce, and with the rising trend in RE addition, the State should soon be energy independent.

Figure 20: Renewable energy capacity in Andhra Pradesh

Total capacity	**9,896.64**
Small Hydro Power	**162.11**
Wind Power	**4,096.65**
Bio-Power	**566.04**
BM Power/Bagasse Cogen.	378.10
BM Cogen. (Non-Bagasse)	105.57
Waste to Energy	53.16
Waste to Energy (Off-grid)	29.21
Solar Power	**4,505.80**
Ground Mounted	4,146.01
Roof Top	146.36
Off-grid/ Distributed	88.34

Source: MNRE, Installed capacity, September 2022

Section 7

Improving the social development of the State

The Andhra Pradesh government has introduced a few upskilling schemes with the aim of creating jobs and aiding a Green Economic Recovery through clean energy transition. The key schemes are:

7.1 Skill Development

Pradhan Mantri Kaushal Vikas Yojana (PMKVY)

PMKVY is the flagship scheme of the Ministry of Skill Development & Entrepreneurship (MSDE). It is implemented by the National Skill Development Corporation (NSDC). The objective of this skill certification scheme is to enable a large number of Indian youth to take up industry-relevant skill training that will help them in securing a better livelihood.

Electronics System Design and Manufacturing (ESDM)

This scheme aims at upskilling students/ unemployed youth in the ESDM sector by:

- Encouraging new investments in training in the ESDM sector by industry
- Utilising those who are undergoing studies in schools (IX standard onwards)/ ITIs/ Polytechnics/ UG colleges (non-engineering) as well as school dropouts/unemployed youth by arming them with additional skills that are recognised by industry for employment in the ESDM sector
- Facilitating the evolution of processes/norms for (1) certification of various courses (2) providing opportunities to move up the value chain and (3) recognition of institutions conducting such courses in line with industry requirements

Rural Development & Self-employment Training Institute(RUDSETI)

This training programme targets women and unemployed youth. Most of the women who started their small business units soon after the RUDSETI training possessed some basic knowledge in their respective trades. This not only led to an increase in the availability of capital for the backward sections of society, but also created financial independence.

The Andhra Pradesh government is also implementing some central sector schemes such as the Suryamitra Skill Development Programme, the aim of which is to train individuals for employment in the solar sector.

Suryamitra Skill Development Programme (SSDP)

The MNRE has mandated the National Institute of Solar Energy as the nodal agency for implementation of the Suryamitra Skill Development Programme). The goal of this programme is to improve the skills of youth so that they can capitalise on the jobs created by the solar industry. They would thus be well-equipped to work on operations and maintenance, and their skills will come in useful both in India and abroad. As part of the SSDP, the candidates will also be prepared to become new entrepreneurs in the solar energy sector. This 600-hour residential programme will also be part of the Make in India

scheme. Andhra Pradesh has two training centres for SSDP, at Visakhapatnam and Prathipadu (Suryamitra Web portal).

7.2 Agriculture

Integrated Pest Management (IPM)

IPM has been introduced in India to reduce the serious impact of highly toxic pesticides on people's health and the environment. It is taught in farmer field schools and is an effective educational approach to build essential knowledge and decision-making skills among farmers. The goal is to reduce pesticide application and reduce harvesting time.

YSR Nine Hours Free Power Supply

The government has been implementing the ambitious scheme of providing nine hours of daytime power free to the agriculture sector, free power to SC/ST families and power to aqua farmers at cheaper prices. Aqua farmers would get power at Rs. 1.50 per unit. This will benefit 53,649 families. This facility will be provided in the daytime during the kharif season and at night time to farmers who make a specific request.

PM Kusum Yojana

The Pradhan Mantri Urja Suraksha evam Utthaan Mahabhiyan (PM KUSUM) scheme is an initiative by the Government of India aimed at ensuring reliable daytime power supply for irrigation, reducing the subsidy burden on DISCOMS, and providing farmers additional sources of income. Under this component, individual farmers having grid connected agricultural pumps will be supported to solarise their pumps. Solar PV capacity up to two times the pump capacity in kW is allowed under the scheme, so that the farmer will be able to use the generated solar power to meet his irrigation needs and get additional income by selling surplus solar power to DISCOMs. The Andhra Pradesh Eastern Power Distribution Company Limited (APEPDCL) is implementing a pilot project wherein all inefficient AC pump-sets on a feeder have been replaced with solar BLDC pump-sets as per MNRE specifications for standalone solar water pumps, along with a 5-year insurance policy and warranty. Power generated through the solar panels is fed to the BLDC pump, and when the pump is not in operation, the solar power is exported to the grid through a grid tied inverter. An incentive is available to participating farmers at the rate of Rs. 1.50/kWh for net injection (PM Kusum guidelines, 2019).

7.3 Clean Energy

Small Hydro Power Programme

The objective of the SHP programme is to encourage the state Government entities and Independent Private Producers to set-up new small hydro projects in a phased manner. The scheme also envisages providing support for the setting up of watermills for electrical and mechanical applications in remote and far-flung areas.

The Jawaharlal Nehru National Solar Mission (JNNSM)

The Jawaharlal Nehru National Solar Mission (JNNSM), or the National Solar Mission, is an initiative of the Government of India and State Governments to promote solar power in India. The objective of JNNSM is to:

- Establish India as a global leader in solar energy by creating the policy conditions for its deployment across the country
- Supplement grid power and develop solar power projects throughout the country thereby reducing transmission costs and losses
- Provide long-term visibility and a roadmap for solar power development, helping realise India's goal of becoming a manufacturing hub in the Solar PV segment

Section 8

Policy takeaways and recommendations for the State's transition towards GER

Here are a few key observations from the study:

- From 2015 to 2018, state budgetary allocations for the transport sector were mostly sourced through loans. Currently, there is no information on government investments for the promotion of EVs and no disaggregated budget data is available for interventions aimed at creating EV infrastructure such as charging stations.

- Solar projects are vital to achieving clean energy targets, but there needs to be a holistic approach to involve them in the State's schemes. One example is Andhra Pradesh's decision to augment the capacity of solar power by offering it under the YSR Nine-Hour Free Power Supply Programme for farmers.

- Andhra Pradesh is one of the few States in India that has invested heavily in wind energy. According to the new Wind-Solar Policy, wind and solar projects would reduce transmission and distribution costs by half. This is a great incentive to promote renewable energy in the State.

- The waste management aspect of the circular economy has been neglected in the State's climate finance. Budget documents suggest a significant expenditure in central schemes such as Swachh Bharat Mission and AMRUT, but they are not specifically mentioned of clean technologies for example, Waste to energy plants.

- Other State departments such as the Panchayat Raj and Rural Development Department, also deploy decentralised renewable energy projects in rural areas. The Jalasiri Phase–II programme features the installation of solar pump sets for pumping water from wells for irrigation.

- A boost to the State's skilling programme in the renewable energy sector is needed and in the initial stages, the Andhra Pradesh government could take help from the Centre or follow the models used by States such as Bihar and Odisha, which have successfully implemented such programmes.

The COVID-19 pandemic has affected multiple aspects, from environment, health and hygiene to polity and governance. To recover in a sustainable manner, the State must take a holistic approach and be more inclusive and transparent in its Green Budget finances. The state's solar programme, even though it has been progressing well, needs to be better structured to achieve its total potential. Capital investment and infrastructure in the renewable energy sector would be of no use if the State does not have enough skilled and trained individuals. Hence, upskilling is also of great importance.

- The Government of Andhra Pradesh funds most off-grid renewable energy projects, such as solar water heating systems, upgraded chulhas, and other solar energy projects, including solar lights. State budgetary allocations are unpredictable in terms of trends, which is mostly owing to the elimination of various State programmes, or their transfer to State PSUs or their absorption

into other Central government schemes. State government funding has traditionally been used to assist small-scale renewable energy projects (such as Electrification of Dalit Settlements, etc.) in distant locations where private investment is minimal.

- There is a need to have greater transparency in the State's financing of climate related schemes. It has been seen that clarity on available finances, their specific objectives and conditions increase investor confidence and lead to better utilisation of available finances. The State government could create an online dashboard of finances available for climate change mitigation actions. This will enable more transparency and accountability.

- Since EVs have long-term sustainability and other benefits associated with them, the Andhra Pradesh government could allocate a part of its budget to create EV-supporting infrastructure instead of purchasing fuel-based buses. Such a budget-neutral approach would enable the government to deploy supporting infrastructure for EV mobility or undertake other activities such as consumer awareness programmes without incurring an additional financial burden. In the initial phases of EV penetration, the aim of the Andhra Pradesh Government should be to gradually reduce dependence on fuel-based public transport and develop an e-public transport system, by allocating adequate financial resources for the demand side or EV supporting infrastructure.

The State can develop a framework for creation of livelihoods from Decentralised Renewable Energy (DRE) technologies and capacity building. The local population can be employed in this sector for their livelihood generation.

Decentralised/off-grid Renewable Energy (DRE) powered livelihood solutions have the potential to reduce and eventually eliminate the reliance on diesel, particularly in rural settings, and can supplement the grid supply. Apart from creating jobs, these applications would help in achieving self-reliance, which is important for an inclusive and green economic recovery by the State.

- Andhra Pradesh is heavily dependent on external loans for its transmission and distribution network. Often, this increases the burden on state finances due to need for co-financing by the grantee state. Currently, high Transmission and Distribution (T&D) losses are proving unsustainable for private investment in the RE sector. The State should explore new climate finance mechanisms such as Green Bonds to leverage investment in transmission and distribution infrastructure in association with technical assistance from IREDA and MNRE.

- The state should also have a dedicated climate budget, wherein clean energy financing could be focused keeping the goal of climate mitigation in mind. A Climate Responsive Budgeting (CRB) landscape will initiate green economic development of the state and guide the state finances in a coordinated and well-structured manner.

There could be greater transparency in State climate finance data. It has been seen that clarity on available finances, their specific objectives and conditions increases investor confidence and leads to better utilisation of funds.

References

- Andhra Pradesh Socio Economic survey, 2021-22, http://www.apsdps.ap.gov.in/WeatherPages/publications.html
- Andhra Pradesh Electric Vehicle Policy file:///C:/Users/subra/Downloads/AP%20Policy_final%20(1).pdf
- CEA installed capacity report - https://cea.nic.in/installed-capacity-report/?lang=en
- Fame II vehicle count, https://fame2.heavyindustries.gov.in/dashboard.aspx
- Green Vison, http://apvision.ap.gov.in/GreenVision.php
- GHG platform India. http://www.ghgplatform-india.org/economy-wide
- Goel, J., 2020. CBGA, Climate Mitigation Financing Framework in Andhra Pradesh. Undertaking to mitigate climate change, URL- https://www.cbgaindia.org/wp-content/uploads/2020/09/Climate-Mitigation-Financing-Framework-in-Andhar-Pradesh.pdf
- MNRE- Scheme Portal https://mnre.gov.in/
- MNRE PN Kusum guidelines, https://mnre.gov.in/img/documents/uploads/file_s-1584510468666.pdf
- NITI Aayog, 2022. State Renewable Energy Capacity Addition Roadmap. Action Plan 2022 and Vision 2030: Summary of findings, https://www.niti.gov.in/writereaddata/files/Executive-Summary.pdf

- NITI Aayog, 2022. State Renewable Energy Capacity Addition Roadmap. Action Plan 2022 and Vision 2030: Summary of findings, https://www.niti.gov.in/writereaddata/files/Executive-Summary.pdf

- Indian Express, 2021, Andhra to buy solar power from SECI, supply to farmers for free, [Online], https://indianexpress.com/article/cities/hyderabad/andhra-to-buy-solar-power-from-seci-supply-to-farmers-for-free-7622851/
- News Minute, 2021. AP budget: Health allocation increased, gender and child budget introduced. [online] Available at: https://www.thenewsminute.com/article/ap-budget-health-allocation-increased-gender-and-child-budget-introduced-149216
- Palchak, D., Cochran, J., Deshmukh, R., Ehlen, A., Soonee, R., Narasimhan, S., Joshi, M., McBennett, B., Milligan, M., Sreedharan, P. and Chernyakhovskiy, I., 2017. GREENING THE GRID: pathways to integrate 175 gigawatts of renewable energy into India's electric grid, vol. I—national study. https://www.nrel.gov/docs/fy18osti/70948.pdf
- Vision Management Unit, APSDPS, Planning Department, Government of Andhra Pradesh, 2016. Inventory of Green House Gas Emissions for Andhra Pradesh. Vijayawada, Andhra Pradesh: Sunrise Andhra Pradesh, Vision 2029.

Annexure 1: Categories of Budget Responsiveness

Highly Favourable | Quite Favourable | Neutral | Unfavourable

	Nature of Budget Expenditure	Rationale for Categorisation
1	New and Renewable Energy Related Expenditure (major Head 2810)	This expenditure under major Head 2810, support a transition to a low carbon development (LCD) of the power sector with promotion of renewable energy.
2	Expenditure related to Hydroelectric Power Generation	Budget lines related to "hydropower generation" are categorised under the highly favourable category as the government, under its New Hydroelectricity Policy, has approved 'renewable energy status' for large hydel projects. Earlier, only smaller projects of less than 25 Megawatt (MW) capacity were categorised as renewable energy. In addition, large-scale hydro projects are considered as a separate source of energy. Hence, expenditure related to maintenance, equipment supplies, installation and head works has been put under Tungabhadra Hydro-Electric (Joint) Scheme
3	Expenditure meant for providing Grant-in-aid Assistance in Public sector and other undertakings explicitly mandated only for renewable energy	This expenditure is categorised as Highly Favourable and includes items such as *Assistance to Andhra Pradesh Green Energy Corporation Limited*
4	Expenditure related to Energy Efficiency Initiatives	Improving energy efficiency is the key tool in reducing GHG emissions besides addition of Renewable Energy and Energy Conservation. For example, *Assistance to Andhra Pradesh State Energy Efficiency Development Corporation* has been put under the Highly Favourable category.
5	Expenditure related to Transmission and distribution networks	Expenditure in Transmission and Distribution infrastructure supports the integration of renewable energy into the power grid. It supports parallel development of low-carbon power-generation capacity using renewables alongside transitioning away from fossil fuel-based energy. However, a dedicated corridor is being constructed through KFW funding assistance in Andhra Pradesh, and since it is dedicated to Renewable Energy Transmission, it has been placed in the Highly Favourable Category.
6	Expenditure related to intra-state (within the state) distribution networks	Expenditure in Interstate Distribution infrastructure supports the integration of renewable energy by improving strength of power systems with a reduction in Average Transmission, Distribution & Commercial(AT& D) losses. Power utilities in States indirectly supports promotion of net-metered based off-grid RE technology installation.
7	Expenditure with respect to Rural Electrification Programmes by States	Most of the expenditure with respect to Rural electrification falls under Central Sponsored Schemes such as SAUBHAGYA *Pradhan Mantri Sahaj Bijli Har Ghar Yojana, Deendayal Upadhyaya Gram Jyoti Yojana* (DDUGJY) or the State's own initiatives for rural electrification. The scope of work of the DDUGJY and most of the rural electrification programmes includes agriculture feeder separation, laying down low-tension electric lines, and strengthening and augmentation of the sub-transmission and distribution network in rural areas. This is leading to support for a parallel development of low-carbon power generation capacity, using renewables in the end.

Continued on next page...

Annexure 1: Categories of Budget Responsiveness

Highly Favourable | Quite Favourable | Neutral | Unfavourable

	Nature of Budget Expenditure	Rationale for Categorisation
8	Expenditure on Free Power (Largely Fossil Fuel based) Supply to Farmers till 2019-20 under YSR nine hour free power supply	This expenditure has been placing a huge burden on the State government and at the same time derailing the transition towards clean energy. It has therefore been categorised as Unfavourable. There is a need to develop a roadmap by States to phase out free subsidies for fossil fuel-based power supply as it reduces the market scalability of off-grid RE technologies and locks in state expenditure on technologies unfavourable to reducing GHG emissions. This expenditure is also inconsistent with the goal of promoting solar-based agriculture pumps / other off-grid RE technological solutions. The Government of Andhra Pradesh had been providing free electricity to farmers until 2019 -20 and hence the budget expenditure prior to 2019-20 has been categorised as Unfavourable.
9	Expenditure related to salaries, pay allowances and secretariat-related work	This expenditure does not have a significant responsiveness on emissions. It therefore does not actively contribute to climate change, nor does it help reduce GHG emissions. The expenditure is on administrative or secretariat purposes, salaries, allowances etc. However, expenditure related to salaries of employees specified under the Renewable Energy Department is categorised as Highly Favourable.
10	Expenditure on Solar-Based Power Supply to Farmers, 2020-21 onwards.	After 2020-21, the Government of Andhra Pradesh decided to provide solar energy for agriculture consumption. The State government has shown its commitment in providing nine hours of quality free power to farmers and has approved a proposal to set up 10,000 MW of solar power projects. A State Government order issued by the Energy Department states that the new project aims to switch to solar power, which costs less, and provide nine hours' free power supply to agricultural consumers. The Government has already commissioned solar power projects for the purpose of agriculture consumption and subsidies. The Government is giving subsidies to farmers for Renewable Energy-based free power supply after this order was implemented in 2020-21. This version of the methodology categorises expenditure under the YSR scheme post 2020-21 in the Highly Favourable category.

1 Andhra Pradesh Government Order No. MS-18 dated 15-06-2020, Abstract Providing nine hours day time free power supply to the Agricultural Sector on a sustainable basis - Establishment of 10,000 MW's of Solar Power Projects- Approval of Proposals of APGECL- Orders- Issued Dated 6-06-2020. Available at: https://goir.ap.gov.in/

Green Economic Recovery of Andhra Pradesh

Authors: Subrata Rath and Jyotsna Goel

Technical Inputs: Khwaja Mobeen Ur Rehman and Malini Chakravarty

Editorial Inputs: Monu Rajan and Shuchita Rawal (CBGA)

You can reach the authors at ssrath@cbgaindia.org and info@cbgaindia.org

Designed by: How India Lives (www.howindialives.com)

Published by Centre for Budget and Governance Accountability
B-7 Extn./110A (Ground Floor), Harsukh Marg, Safdarjung Enclave, New Delhi-110029
Phone: +91-11-49200400/ 401/ 402 Website: www.cbgaindia.org Email: info@cbgaindia.org
Follow us on: cbgaindia.org | Facebook | Twitter
Explore the open data portal on budgets in India at: https://openbudgetsindia.org

About the Project:

Building Knowledge and Capacity for Green Economic Recovery of the States in India

The project is meant to build knowledge and capacity for facilitating the green recovery of the State economies in India, following the sharp economic downturn due to the COVID-19 pandemic. The research will help in develop knowledge resources and recommendations that State Government actors could refer to for incorporating climate mitigation actions under their economic revival measures. The project is supported by New Venture Fund.

About CBGA:

CBGA is an independent, non-profit policy research organisation based in New Delhi. It strives to inform public discourse through rigorous analysis of government budgets in India; it also tries to foster people's participation on a range of policy issues by demystifying them.

For further information about CBGA's work, please visit www.cbgaindia.org or write at: info@cbgaindia.org

Follow us on: cbgaindia.org | Facebook | Twitter

CBGA