

AUDIT OF RENEWABLE ENERGY SECTOR IN INDIA

(a Paper by SAI India)

1. Background and Audit Planning

India launched the National Action Plan for Climate Change (NAPCC) in 2008 to mitigate climate change. One of the eight missions under NAPCC was the Jawaharlal Nehru National Solar Mission. It initially aimed to install 20,000 MW solar power capacity by 2022. It also envisaged that Renewable Energy (RE) would constitute 15 per cent of the energy mix of India by 2020. SAI India conducted performance audit of RE sector in India in the year 2014-2015.

2. Renewable Power Sector in India

India supports around 17 per cent of the world's population but its energy and electricity consumption is only around five per cent of the world's consumption. Endowed with RE potential of 889,508 MW, supply from renewables was expected to increase rapidly from 24,503 MW in March 2012 to 54,503 MW by March 2017. Following table details source wise exploitation of RE potential in India.

Exploitation of Renewable Energy potential of India (in MW)

Resource	Estimated Potential	Capacity Addition			Total capacity on 31 March 2014	% of Estimated potential
		Before 2007	During 2007-12	During 2012-14		
Solar Power	748,990	Nil	940	1,716	2,656	0.35
Wind Power	102,788	7,091	10,267	3,779	21,137	20.56
Small Hydro Power	19,749	1,976	1,419	408	3,803	19.26
Bio Power	17,981	1,185	2,042	896	4,123	22.93
Total	889,508	10,252	14,668	6,799	31,719	3.57

Ministry of New and Renewable Energy (MNRE) is the federal authority for various policy initiatives. MNRE adopted a three-fold strategy for the development, promotion and use of RE technologies across the country. Salient features of this strategy were the following.

- Providing budgetary support for research, development and demonstration of technologies;
- Facilitating institutional finance through various financial institutions; and
- Promoting private investment through fiscal incentives, tax holidays, depreciation allowance and remunerative returns for power fed into the grid.

3. Audit Objectives

Objectives of the Performance Audit of Renewable Energy Sector included examination of the progress made in following important areas.

- Increasing the contribution of RE resources in India's energy mix / electricity mix;

- Increasing access to electricity / lighting needs in remote and rural areas; and
- Promoting research, design, development and demonstration.

4. Audit Criteria

Major audit criteria were drawn from the National Action Plan for Climate Change (NAPCC) adopted by Government of India. The subsector specific guidelines issued by MNRE for various on-grid and off-grid sources of renewable energy and national Electricity Law, Regulations for tariff fixation at national / provincial level, financial rules and regulations, environmental laws, etc. were also considered as important source of audit criteria.

5. Audit Scope

The period of audit was from 2007-08 to 2013-14. The starting period was aligned with the five year planning cycle which started from April 2007 and the adoption of National Action Plan for Climate Change in 2008. Apart from the Central (federal) Government's initiatives to promote RE, the State (provincial) Governments work towards formulating concomitant State policies and their implementation was also assessed. In India, State Nodal Agencies (SNAs) play a critical role in the development of a long-term RE policy and its implementation. SNAs promote RE technologies and energy conservation measures and popularize them. They also support Research & Development (R&D), information and education activities. Therefore, apart from auditing the MNRE and institutions under it, audit was also conducted in 24 out of 29 States and the respective State Nodal Agencies.

6. Audit Methodology

The sector involved large number of stakeholders ranging from the national ministry to people at large along with other conventional stakeholders like provincial and local governments, private enterprises, non-governmental organisations, etc. To ascertain expectations of these stakeholders a workshop was held on 24 September 2013 by SAI India. Experts from MNRE, Regulatory Bodies, State Nodal Agencies, Non-Governmental Organisations (NGOs) and Renewable Power Generators Association attended the workshop. This workshop helped identify audit issues.

An Entry Conference was held on 6 August 2014 with MNRE wherein the audit objectives, audit scope and audit methodology were discussed. MNRE agreed with the objectives and methodology adopted in this Performance Audit.

A designated office in Delhi coordinated the audit involving over 24 state offices each deploying at least one team. Records of MNRE, State Governments, SNAs, other identified entities and individual beneficiaries were scrutinized using a materiality based sample. Physical verification of assets created was also conducted where necessary. Draft Audit Report (management letter) was issued to MNRE on 27 January 2015, to seek their comments and to confirm the facts and figures. MNRE's response received on 18 May 2015 was considered, draft report was modified and shared with MNRE on 16 June 2015. Exit Conference was held on 3 July 2015. Subsequent to the Exit Conference, MNRE furnished supplementary responses in July 2015 which were also considered while finalizing the report.

7. Results of audit

Important observations emerging from our audit included the following.

Renewable Purchase Obligation

As against NAPCC target of achieving energy mix of 15 per cent of RE sources in energy use by 2020, the national achievement had reached only till 4.51 per cent by 2013-14 which was around 50 per cent of the target envisaged until that year. The State / Provincial Distribution Licensees and other obligated entities had not fixed Renewable Purchase Obligations (RPO) in sync with the NAPCC norms.

Grid Connected Renewable Power

Solar Power

The government could exploit only a very miniscule portion (0.35 per cent) of the estimated potential.

The Regulatory framework for electricity generation was a State / provincial subject of legislation and MNRE had not formulated guidelines for central net metering leading to different States adopting different models in implementing net metering.

Wind Energy

There was no competition and / or transparency at occasions in the wind energy sector either with respect to tariff fixation or allocation of sites to the developers.

Small Hydro Power

There were implementation bottlenecks like acquisition of land, completion of feasibility studies and preparation of Detailed Project reports, design issues as well as forest and environmental clearances. All of this had led to time and cost overruns in many cases.

Biomass Power

There were instances of non-traceable biomass plants, inoperative plants, plants working at lower capacities, plants installed with different specifications than approved and plants using non-permitted fuels.

Off-Grid Renewable Power

Solar Photovoltaic Systems

47 per cent of the off-grid systems were not working, one per cent of the systems were found missing and five per cent of the systems were given to ineligible beneficiaries.

Biogas and Manure Management

Physical verification revealed that 26 per cent biogas plants were actually not working due to reasons like damage, non-maintenance, non-availability of raw material etc. Some were using wrong fuels.

Research, Design, Development and Demonstration

It was observed that although a large number of sanctioned projects were in alignment with focus areas identified under various divisions, deliverable outcome was not achieved in a majority of projects. This was partly due to the fact that industry participation could not be secured in the projects where it was envisaged.

Monitoring of the projects by MNRE was lax, as in many cases, project progress reports were not submitted by the implementing agencies and project completion reports were not evaluated by MNRE or by third parties.

8. Audit recommendations

Renewable Purchase Obligation

MNRE should firm up relevant guidelines and enforce the purchase obligations.

Grid Connected Renewable Power

Solar Power

MNRE should focus on development of solar energy in the States endowed with high potential and formulate guidelines for net metering for boosting generation.

Wind Power

MNRE should focus on development of wind energy in the States endowed with high wind energy potential, provide better evacuation infrastructure and forecasting techniques.

Small Hydro Power

Bottlenecks in project completion be removed.

Biomass Power

MNRE must review power generation from sanctioned biomass projects to ensure that these are operating as per specifications and only on renewable resources (fuels).

Off-Grid Renewable Power

Solar Photovoltaic System (SPV) and Biogas

MNRE may set up an effective mechanism, in coordination with the State agencies, to ensure that the off-grid systems are properly maintained and remain functional through their useful life.

Research, Design, Development and Demonstration

Project Completion Reports of research projects should invariably be vetted by field experts and peer groups before their acceptance, to validate the presented output.

9. Impact and subsequent developments

The Audit Report was placed in Parliament of India in December 2015. Print media of the country especially the one dealing with business and finance took note of the Audit Report at national level.

The conclusions of the Audit Report would help the government in achieving its targets of creation of capacity for renewable energy. The findings have also helped in identifying what is wrong at the level of the State Government and State Nodal Agencies.

The Government in June 2015 decided to step up of India's solar power capacity target under the Jawaharlal Nehru National Solar Mission (JNNSM) by five times, reaching 100,000 MW by 2022. With this ambitious target, India will become one of the largest Green Energy producers in the world, surpassing several developed countries. This is expected to abate over 170 million tonnes of CO₂ over its life cycle. The audit conducted by SAI India would help the government to increase its effectiveness in achieving this goal of sustainable development through Renewable Energy.

10. Lessons Learnt

Conducting audit at right time helps Government in amending the policies and taking further effective measures to deliver results in a given field. We observed that after

dismal achievement of potential renewable energy was highlighted by us, the Government adopted ambitious targets for solar power generation.

Audit Report did not explicitly mention use of INTOSAI guidance although due audit processes were scrupulously followed in setting audit objectives, selection of audit criteria, communication with the audited entity, collection and analysis of evidence, reporting etc. as expected under various INTOSAI guideline documents.

Sheer volume of audit activity was very huge making it an arduous task as many projects and beneficiaries were located in remotest parts of the sampled geographical / administrative units. The audit was co-ordinated centrally from national capital and lot of check lists and templates were used to manage it effectively. Photographs were collected during field visits as important audit evidence. A mid-term experience sharing and problem resolution mechanism was adopted to avoid inconsistencies in the evidence collected and to clarify doubts of the field audit teams.

Audits conducted on sustainable development issues like the one conducted by SAI India on Renewable Energy Sector in India can add value to the efforts of national governments in achieving the sustainable development targets of the nation.