

An Assessment of Perform Achieve and Trade Mechanism - A Case Study of Industries in District Ropar, Punjab

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ABSTRACT

Climate change is the critical challenge faced by the humanity which needs to be addressed with good scientific understanding and knowledge as well as the steps initiated at national and global level. National Mission for Enhanced Energy Efficiency (NMEEE) is an innovative initiative taken by Government of India to address climate change and to provide legal consent for the implementation of energy efficiency measures through the institutional mechanism of Bureau of Energy Efficiency (BEE). NMEEE has four components. This paper highlights one of the components, Perform Achieve Trade (PAT), which means market based mechanism to enhance cost effectiveness of improvements in energy efficiency in energy intensive large industries through certification of energy savings that could be traded.

Punjab Energy Development Agency (PEDA) has been designated by the Punjab State as the nodal agency for planning, overseeing and guiding the activities to mitigate the climate change. PEDA is indulged in accomplishing monitoring procedure, feedbacks and verification regarding targets assigned by Government under PAT. The paper uses both Primary, as well as Secondary sources to analyse the contribution of PEDA in PAT scheme by undertaking a study on industries situated in District Ropar. Paper will discuss methods to check targets, achievement awards, failure penalties, discussion and audit reports of PEDA and future planning of industries to achieve energy efficient targets. This paper is beneficial for planners of PAT mechanism and the agencies who conduct workshops for State Designated Agencies and Designated Consumers.

Keywords: Perform Achieve and Trade, Punjab Energy Development Agency, Industries, National Mission for Enhanced Energy Efficiency

1. INTRODUCTION

In recent years, both developed and developing countries have paid greater attention to improving Energy Efficiency (EE) because of the rising prices of electricity and the growing demand for finite and diminishing fossil fuel resources. Improved energy efficiency is one of the most cost-effective ways to reduce global greenhouse gas emissions. It also enhances energy security of the countries

by reducing energy demand. To date, energy efficiency has become one of the priority fields in the energy, economic and climate change policies of many countries globally. [1] India is faced with the challenge of sustaining its rapid economic growth while dealing with the global threat of climate change. The EC Act, 2001 received the assent of the President on the 29th September, 2001 as an Act to provide for efficient use of energy and its conservation and for matters connected therewith or incidental thereto. The *Bureau of Energy Efficiency* (BEE) under the provisions of the EC Act, 2001 has been established with effect from 1st March, 2002 with the primary objective of reducing energy intensity of the Indian economy. This is expected to be achieved with active participation of all stakeholders, resulting in accelerated and sustained adoption of energy efficiency in all sectors. [2]

Punjab Energy Development Agency (PEDA) has been designated by the State as the nodal agency responsible for spearheading Energy Efficiency efforts to identify and oversee energy conservation programs, including those mandated by Bureau of Energy Efficiency. In addition to planning, overseeing and guiding the activities, PEDA will coordinate, regulate and enforce the provisions of the EC Act 2001. Central Government initiated a step National Mission for Enhanced Energy Efficiency (NMEEE) to fight against climate change.

National Mission of Enhanced Energy Efficiency: NMEEE is one of the eight missions under the National Action Plan on Climate Change (NAPCC). The scheme has been approved by the cabinet and it got implemented on 2010-2011. The objective of the Mission is to achieve growth with ecological sustainability by devising cost effective strategies for end- use demand side management. The Ministry of Power (MoP) and BEE have been entrusted with the task of preparing the implementation plan for the NMEEE and to upscale the efforts to create and sustain market for energy efficiency to unlock investment of around Rs. 74,000 Crores. NMEEE has four major components which provide for a multi-pronged approach for achieving energy efficiency in the country.

- 1. Perform Achieve and Trade (PAT):** It is a market, based mechanism to enhance cost effectiveness of improvements in energy efficiency in energy-intensive large industries and facilities, through certification of energy savings that could be traded. The scheme includes the following project steps:

[1] *United Nation Economic Commission for Europe, Promoting Energy Efficiency Investments for Climate Change Mitigation and Sustainable Development, 2012-2014, retrieved from http://www.unece.org/energy/gee21/promoting_eei.html as on 5-4-2014*

[2] *Ministry of Law, Justice and Company Affairs, The Energy Conservation Act- 2001, 2001, retrieved from http://powermin.nic.in/acts_notification/energy_conservation_act/introduction.htm as on 1-4-2014*

- **Goal setting:** Set a specific energy consumption (SEC) target for each plant, depending on level of energy intensity (specific energy consumed = energy use / output) of that plant. The target will specify by which percentage a plant has to improve its energy intensity from the base line value in a period of three years.
 - **Reduction phase:** Within a three-year period (2009-2012) the designated consumers try to reduce their energy intensity according to their target.
 - **Trading phase:** Those consumers who exceed their target SEC will be credited tradable energy permits. These permits can be sold to designated consumers who failed to meet their target. Designated Consumers who fail to achieve their target have to compensate this failure by buying permits. If they fail to do either of this, they may have to pay penalties.
2. **Market Transformation for Energy Efficiency:** MTEE is another scheme launched by BEE to achieve the aim of the National Mission on Enhanced Energy Efficiency. The scheme aims to accelerate the shift to energy efficient appliances in designated sectors through innovative measures and to make the products more affordable. Two sub programmes are now operational and they are the BLY (Bachat Lamp Yojana) and the SEEP (Super Efficient Equipment Programme).
3. **Energy Efficiency Financing Platform (EEFP):** The national Mission on Enhanced Energy Efficiency aims to create a mechanism that would help finance, demand side management programmes in all sectors by capturing future energy savings. The finance costs will be recovered from the energy savings, which will also reduce the subsidy bill of the state government. EEFP will provide instruments like bankable detailed project reports and other risk mitigation measures to enhance comfort for lenders towards aggregated energy efficiency projects.
4. **Framework for Energy Efficient Economic Development (FEED):** The Enhanced Energy Efficiency mission aims to develop Fiscal instruments to promote energy efficiency in a way that allows for the creation of mechanisms to help finance demand side management programmes in all sectors by capturing future energy savings. The Framework for Energy Efficient Economic Development (FEEED), has been conceptualized to achieve this objective and two fiscal instruments to promote energy efficiency, namely:
- The Partial Risk Guarantee Fund (PRGF)
 - Venture Capital Fund for Energy Efficiency (VCFEE) are being developed^[3]

^[3]Punjab State Action Plan On Climate Change, Chapter 10: Mission on Enhanced Energy Efficiency, 2012, retrieved from http://www.indiaenvironmentportal.org.in/files/file/Punjab_action_plan_on_Climate_change.pdf as on Jan10, 2013, 13:32

Perform Achieve and Trade: PAT programme aims to promote energy efficient technology, which is one of the factors of the National Mission on Enhance Energy Efficiency (NMEEE) launched by the Government of India. The PAT mechanism is implemented by the Bureau of Energy Efficiency (BEE) and first cycle will run over 2012–2015 for eight sectors covering 478 designated consumers. PAT is a national initiative in India, in addition to CDM implemented by UNFCCC on climate change. [4]

International Approach: The PAT mechanism is a unique scheme that, perhaps, does not have any international benchmark. However, while designing the scheme, a survey of best practices and lessons learnt from several international schemes was undertaken.

1. **European Union Emission Trading Scheme (EU ETS)** - The Scheme is one of the EU's key measures for delivering its commitments under the Kyoto Protocol and for delivering its objective of demonstrating leadership in reducing emissions of greenhouse gases.
2. **Climate Change Agreements (CCAs)** - CCAs are voluntary mechanisms that encourage energy efficiency in energy intensive industries in the UK.
3. **CRC Energy Efficiency Scheme (CRC)** - It has been designed to raise awareness in large organisations and encourage changes in behaviour and infrastructure.
4. **Tradable White Certificates (TWCs)** - Under this mechanism, producers, suppliers or distributors of electricity, gas and oil are required to undertake energy efficiency measures for the final user.
5. **United Kingdom Emission Trading Scheme (UK ETS)** - The scheme aimed to secure cost-effective emissions reductions and give UK companies early experience of emissions trading.
6. **UK Renewables Obligation (RO)** - It is the Government's main policy mechanism for incentivising renewable electricity in the UK.
7. **Regional Greenhouse Gas Initiative (RGGI)** - It is a mandatory scheme in the United States aiming to reduce greenhouse gas emissions.
8. **New South Wales Greenhouse Gas Abatement Scheme (NSW GGAS)** - It aims to reduce greenhouse gas emissions associated with the production and use of electricity.

[4] Shakti Sustainable Foundation, Report on Capabilities and Requirements of State Designated Agencies in India, 2013, retrieved from <http://shaktifoundation.in/cms/UploadedImages/sda%20final%20report.pdf> as on 1-4-2014

9. **Chicago Climate Exchange (CCX)** - CCX is a voluntary, legally binding greenhouse gas reduction and trading system for emission sources and offset projects in North America and Brazil.
10. **US Acid Rain Programme (ARP)** – It aims to reduce overall atmospheric levels of sulphur dioxide and nitrogen oxides, which cause acid rain.
11. **China's Top-1000 Energy-Consuming Enterprises Program** - It targets energy efficiency improvements in the 1,000 largest enterprises that together consume one-third of all China's primary energy. [⁵]

The industry sector is the largest user of commercial segment, with necessary technology tie-ups, where energy in India, accounting for 42% of the country's desirable, would be established. [⁶] To enhance energy efficiency in industries, the Perform, Achieve and Trade (PAT) mechanism is created with the basic green energy concept similar to the Energy Efficiency Portfolio Standard mechanisms in United State, Tradable Green certificates in Europe and similar programmes in other countries.

The Energy Conservation Act empowers the central government to notify the DCs based on the annual energy consumption of a plant by comparing with the threshold limit prescribed for the sector. The Government, in March 2007 notified units in nine industrial sectors, namely aluminium, cement, chlor-alkali, fertilizers, iron and steel pulp and paper, railways, textiles and thermal power plants, as Designated Consumers (DCs). The PAT scheme is currently applicable for eight designated sectors as listed above, with railways being excluded in the first instance. As per the Energy Conservation Act, it is mandatory for all the designated energy consumers to get energy audit conducted by an Accredited/ Designated Energy Auditor (DNA) and to designate or appoint an Energy Manager. BEE has taken up the challenge of creating a cadre of professionally qualified energy managers with expertise in energy management, project management, financing and implementation of energy efficiency projects, and policy analysis. The PAT framework includes the methodology for setting the Specific Energy Consumption (SEC) target for each Designated Consumer (DC) and its target for SEC reduction. [⁷] The PAT mechanism is also

[⁵]Bureau of Energy Efficiency, *PAT Consultation Document,2011*, retrieved from http://beeindia.in/NMEEE/PAT%20Consultation%20Document_10Jan2011.pdf as on 7-4-2014

[⁶]Government of India, *National Action Plan on Climate Change*, retrieved from http://pmindia.gov.in/climate_change_english.pdf as on 17-2-2014

[⁷]Kumar Rajesh, Agarwala Arun, *Energy certificates REC and PAT sustenance to energy model for India*, *Renewable and Sustainable Energy Reviews* 21 (2013), 315–323, retrieved from <http://ac.els-cdn.com/S1364032113000270/1-s2.0->

designed to promote enhanced energy efficient technology in industry to achieve their SEC improvement target in a cost-effective manner. The additional certified energy savings in the form of Energy Saving Certificates (ESCert) can be traded with other designated consumers who could use these certificates to comply with their own Specific Energy Consumption reduction targets. Penalty for noncompliance is Rs. 10 lakhs and is also linked to the value of non-compliance measured in terms of the market value of tones of oil.^[8]

Energy Saving Certificates (ESCert): An ESCert is an instrument issued by an authorized body guaranteeing that a stipulated amount of energy savings has been achieved and has entered the Indian Energy Efficiency mandate under the PAT scheme. Each certificate is a unique tradable commodity that gives property right over additional units of intangible bundle of societal and environmental benefits created by energy saved over and above the baseline level. ESCerts provide a platform for parties to trade the attributes of energy savings.

An ESCert can be represented in units of electricity saving such as 1 MWh⁵ (1 ESCert is issued for 1 MWh of energy saved over and above the set target). This is followed by the implementation of the energy saving scheme by the DCs. The savings out of this scheme is measured on the basis of the baseline energy requirement and the scheme is then put through the process of third party verification by designated energy auditors. ^[9] The BEE has also set up a registry and exchanges for the trading of ESCert, creation of records for trading and cancellation of ESCert, to enable cross-sectoral use of ESCerts. There will be different targets for subsequent PAT cycles. The SEC reduction target will be progressively stringent in subsequent PAT cycles to keep pace with the national energy efficiency mission. ^[10]

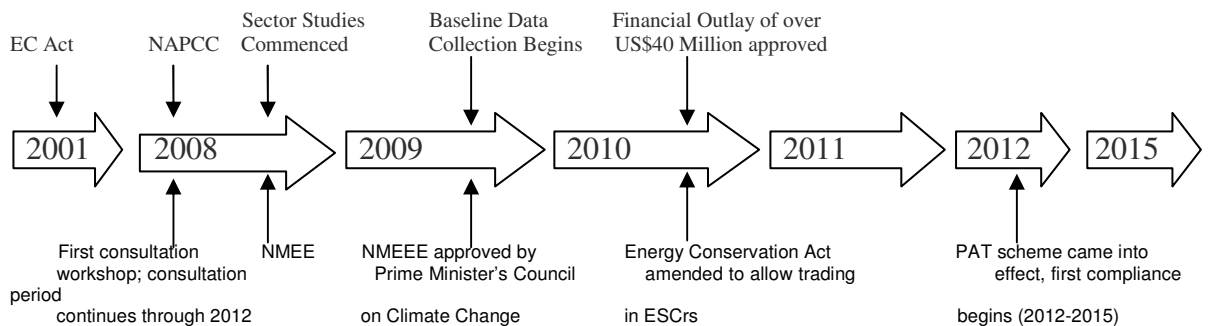
S1364032113000270-main.pdf?_tid=cf3b4284-c08d-11e3-b50c-00000aab0f27&acdnat=1397120285_83958b79b43be28d6eb4648ec4e34c06 as on 7-4-2014

^[8]*Bureau of Energy Efficiency, PAT Consultation Document,2011, retrieved from http://beeindia.in/NMEEE/PAT%20Consultation%20Document_10Jan2011.pdf as on 6-4-2014*

^[9]*Bhattacharya Tanushree, Kapoor Richa, Energy saving instrument – ESCerts in India, Renewable and Sustainable Energy Reviews, 16 (2012) 1311– 1316, retrieved from http://ac.els-cdn.com/S1364032111004850/1-s2.0-S1364032111004850-main.pdf?_tid=9d2f5812-bfbf-11e3-ad79-00000aacb35d&acdnat=1397031724_a624e3145ea15ab3a78cfa4aa1bd93ac as on 7-4-2014*

^[10]*International Emission Trading Association, The World's Carbon Markets: A Case Study Guide to Emissions Trading,2013, retrieved from http://www.ieta.org/assets/Reports/EmissionsTradingAroundTheWorld/edf_ieta_japan_case_study_september_2013.pdf as on 7-4-2014*

Fig 2 Timeline for Perform Achieve and Trade Scheme [11]



Role of PEDAs in PAT Scheme: The BEE has been engaged in building the capacity of the SDAs in the implementation of the PAT scheme over the last few years. The key responsibilities of the SDAs under amended EC Act include:

- Updation and maintenance of list of Designated Consumers and ensure the submission of energy return form by each DC every year.
- Maintaining the list of Designated Energy Auditors (DENAs).
- Develop a Market mechanism for ESCerts and promote transfer of knowledge in energy efficiency.
- Inspection of Designated Consumer for compliance to energy consumption norms and standards and makes provisions for levying penalty for the defaulters.
- Exchange of information among all stakeholders relating to ESCerts trading mechanism through a central on-line integrated information system.
- Enable tracking, monitoring and reporting energy reduction details.
- Access information available on PAT NET to calculate and levy penalty on designated consumers.
- Provide information to BEE through PAD (PAT Assessment Document)
- Gather, monitor and analyse data reported by DCs to identify any uneven aberrations in energy savings so as to conduct on site audits.
- Receive trading details and obligations from trading exchanges.
- Obtain audit details conducted by DENAs through PAT NET.
- Act as the body responsible for adjudicating matters related to penalizing the DCs for non compliance. [12]

[11] Singh Neelam, *Creating market support for energy efficiency: India's Perform, Achieve And Trade scheme*, Climate and Development Knowledge Network, 2013, retrieved from http://cdkn.org/wp-content/uploads/2013/01/India-PAT_InsideStory.pdf as on 2-4-2014

So PEDA plays a significant role by creating a database for BEE, DENA, Energy Managers, DCs and other stakeholders.

2. OBJECTIVE

PEDA has a total of 22 Designated Consumers in the State. In Ropar district there are four industries which are chosen as Designated Consumers. They are Punjab Alkalies and Chemical Ltd., National Fertilizer Limited, Ambuja Cement Limited and Guru Gobind Singh Super Thermal Power Station. The main objective of paper is to analyse the contribution of PEDA in PAT scheme and highlighting some loopholes of Govt. institutions while rendering their services under this scheme while undertaking a study on industries situated in District Ropar. Firstly the primary audit is done by DENAs appointed by central Government in consultation with BEE and simultaneously energy audit is done by SDAs. In accordance with both audits DCs are chosen.

3. METHODOLOGY

The paper comprises both primary as well as secondary data. Primary data is collected by using telephonic interview method and general discussion. It includes

1. The officials of PEDA who are involved in PAT scheme
2. The Energy Managers of industries chosen as Designated Consumers.

Secondary data is collected through annual reports and documents provided by PEDA.

4. FINDINGS

Table 1 A list of Designated Consumers of Ropar District and their Targets for the year 2012-13 to 2014-15 under the PAT Scheme

Sr. No.	Designated Consumers	Sector	Baseline energy consumption norms and standards in metric ton of oil equivalent (TOE) per unit of product for the baseline year (average of three years).	Energy consumption norms and standards in metric ton of oil equivalent (TOE) per unit of product for target year.

^[12]Shakti Sustainable Foundation, *Report on Capabilities and Requirements of State Designated Agencies in India, 2013*, retrieved from <http://shaktifoundation.in/cms/UploadedImages/sda%20final%20report.pdf> as on 1-4-2014

	Name		Specific energy consumption (TOE/Ton of Product)	Product Output (Ton)	Specific energy consumption (TOE/Ton of Product)
1.	Punjab Alkalies and Chemical Ltd.	Chlor Alkali	0.319	88,959	0.299
2.	National Fertilizers Limited	Fertilizer	0.704	489008	0.528
3.	Ambuja Cement Limited	Cement	0.0201	2800401.57	0.0189
4.	Guru Gobind Singh Super Thermal Power Station	Thermal Power Plant	0.2922	9008	2830

(Source- Punjab Energy Development Agency Documents)

The role of PEDDA in PAT scheme is very limited. BEE is leading the process with in-house and external technical experts and auditing agencies. PEDDA is not assigned with a large amount of tasks as defined in the PAT consultation document. PEDDA participates little in the responsibility of choosing the Designated Consumers and no participation is authorized in appointing DENAs and Energy Managers. It is not empowered to monitor and evaluate the reports send by DCs by doing field visits to industries in the form of follow-ups to analyze the performance and working of Industries. There is no trained staff in PEDDA specific to PAT to engage in activities like providing proper and adequate training to Designated Consumers regarding Energy efficient appliances and the methods to achieve their targets as assigned by Govt. of India. The workshops conducted by PEDDA in consultation with BEE for Designated Consumers does not provide in-depth knowledge to consumers regarding saving of energy and the procedure to prepare correct energy reports in the form of FORM-1. PEDDA is just playing a role of bridge between Designated Consumers and BEE.

5. CONCLUSION AND SUGGESTIONS

SDAs are very familiar with renewable energy, technologies, policies, and implementation at the state level and they play a significant role in regulating Energy Conservation activities in the state. PEDDA has pool of technically qualified manpower, but has shortage of staff trained in Energy Efficiency technologies, policies, PAT process, industry processes for Designated Consumers and related areas. Monitoring the PAT scheme and ensuring the correctness of certificates to be issued is a complex and challenging task. So BEE should involve PEDDA much in displaying and exchanging information related to the performance of Designated Consumers. In case of verifications associated with penalties and issue of more ESCerts, BEE should empower PEDDA to

timely intervene with their compiled energy saving reports as prepared independently by them. BEE should initiate half yearly meetings with all SDAs to communicate regarding the progress of Designated Consumers and to discuss the further matters to achieve the targets of Designated Consumers. PEDDA can improve its efficiency in PAT scheme by initiating more interactive sessions with Energy Managers and Energy Auditors of Designated Consumers. There is thus a need for improved co-ordination between these agencies for the smooth and effective implementation of the PAT scheme.