

Implementation of M&V Protocol- Institutional Mechanism Perform-Achieve and Trade Scheme

An initiative supported by



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ABBREVIATIONS

BEE	<i>Bureau of Energy Efficiency</i>
DC	<i>Designated consumer</i>
DESL	<i>Development Environenergy Services Limited (Formerly Dalkia Energy Services Ltd)</i>
EC	<i>Energy conservation</i>
EE	<i>Energy efficiency</i>
ESCert	<i>Energy savings certificate</i>
GtG	<i>Gate to gate</i>
KA	<i>Kilo amperes</i>
Kcal	<i>Kilocalorie</i>
KLPY	<i>Kilo liter per year</i>
LDO	<i>Light diesel oil</i>
LNG	<i>Liquefied natural gas</i>
LTPY	<i>Lakh tonnes per year</i>
MKCal	<i>Million kilocalorie</i>
MOP	<i>Ministry of power</i>
MT	<i>Metric Ton</i>
MU	<i>Million kWh</i>
M&V	<i>Measurement & Verification</i>
PAT	<i>Perform achieve & trade</i>
SCUM	<i>Standard cubic meter</i>
SEC	<i>Specific energy consumption</i>
SHR	<i>Station heat rate</i>
TOE/MTOE	<i>Tonnes oil equivalent</i>
TPD	<i>Tonnes per day</i>

1. INTRODUCTION

The PAT framework has been developed considering the legal requirement under EC Act, 2001, situation analysis of designated consumers, national goal to be achieved by 2014-15 in terms of energy saving and sustainability of the entire scheme. The scheme aims at reduction of specific energy consumption, called 'Gate to Gate Specific Energy Consumption (GtG SEC)' by individual designated consumers (DC). Target for reduction has been set for individual DC by BEE and the same has already been notified.

The design intent of the PAT process is to insulate the DC from variability due to changes in the uncontrollable factors. The baseline conditions are defined so that the impact of uncontrollable variables can be neutralised by application of suitable adjustment factors ('Normalisation' factors in the BEE document).¹ The normalisation process for each sector is under development. It would simultaneously be necessary to develop and implement a robust M&V protocol for driving the normalisation process.

The objectives of the M&V protocol are multi-fold including:

- Identification of controllable and uncontrollable variables
- Assessment of data and information need for monitoring of the variables
- Development of data & information protocol
- Development of regression equations and methodology for the normalization
- Development of systems for information flow & management processes in line with BEE laid out criteria (Transparency, Acceptability, Measurability, Traceability & Verifiability)
- Development of organisational & institutional framework for management of the M&V process for the key stakeholders
 - Ministry of power
 - BEE
 - SDA's
 - DCs
 - Technical committees
 - Empanelled accredited energy auditors
 - Energy auditors/ESCOs

Development Environenergy Services Limited (DESL) has been contracted by Shakti Foundation to develop M&V protocol for the individual sector covered under the PAT scheme. The terms of reference of the assignment includes:

"Outlining institutional mechanism and/or arrangement for implementation of M&V plan:

- i. Eligibility criteria for the M&V agency
- ii. Accreditation process
- iii. Certification process"

¹ PAT consultative document

DESL has submitted the M&V protocol for all the eight sectors covered under the PAT scheme. This document has been prepared on institutional mechanism covering:

- M&V protocol-overview & summary
- Transaction processes & system architecture
- Envisaged roles & responsibilities of the key stakeholders
- Proposed organisation structure, key requirement & capacity need

2. M&V PROTOCOL-OVERVIEW & SUMMARY

M&V protocol for each of the eight sectors has been developed by DESL. The protocols have both common and sector specific characteristics:

- Common
 - Normalisation process
 - Reconciliation process
 - Data & information protocol
- Specific
 - Variables
 - Normalisation process

2.1 COMMON

Normalisation process

A three step approach has been proposed for carrying out the normalisation process.

The normalisation process is proposed to be carried out in three stages:

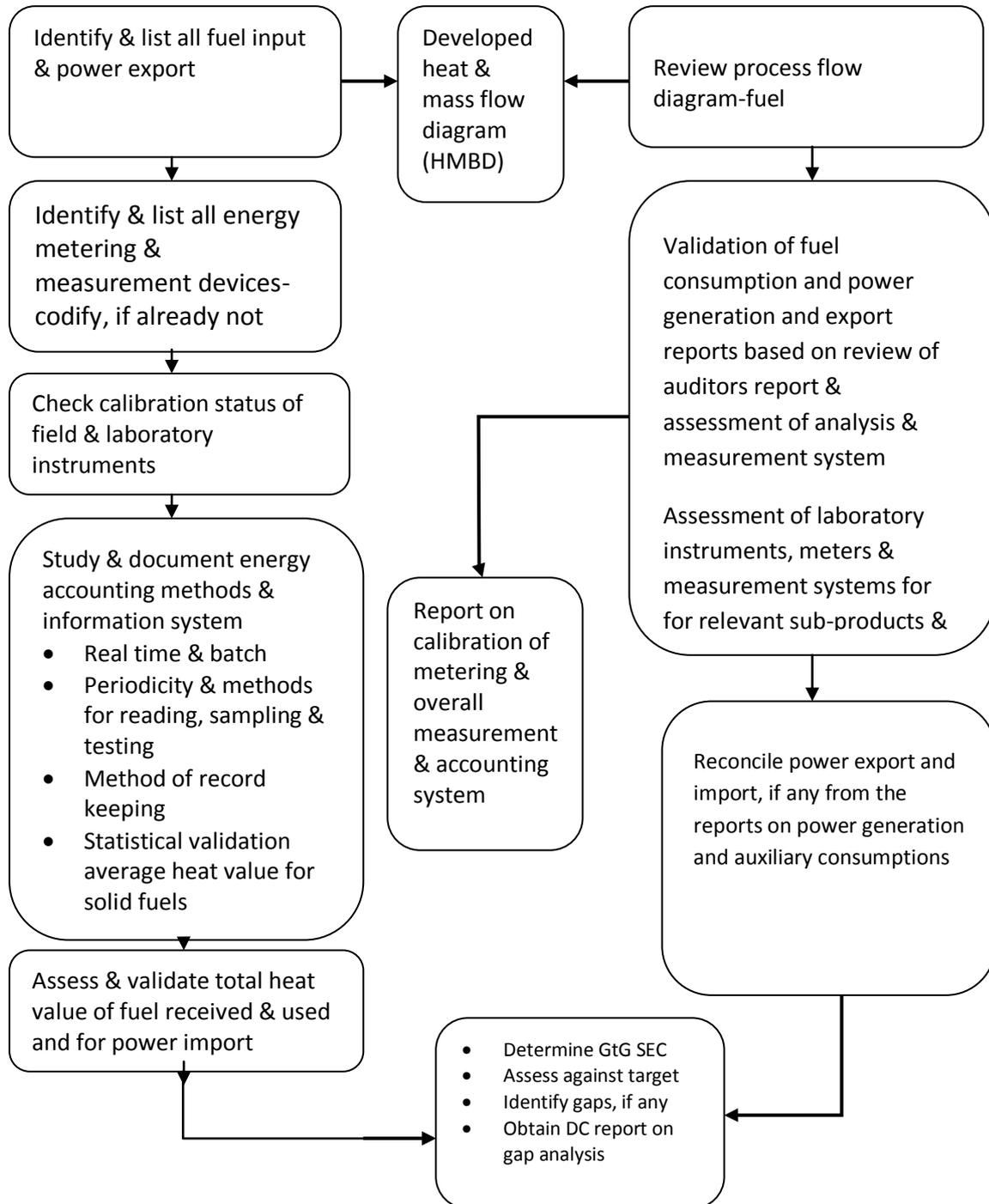
Sep-1-Determination of GtG SEC as has been done in the baseline audit report

Step-2-Determination of the overall normalisation factors

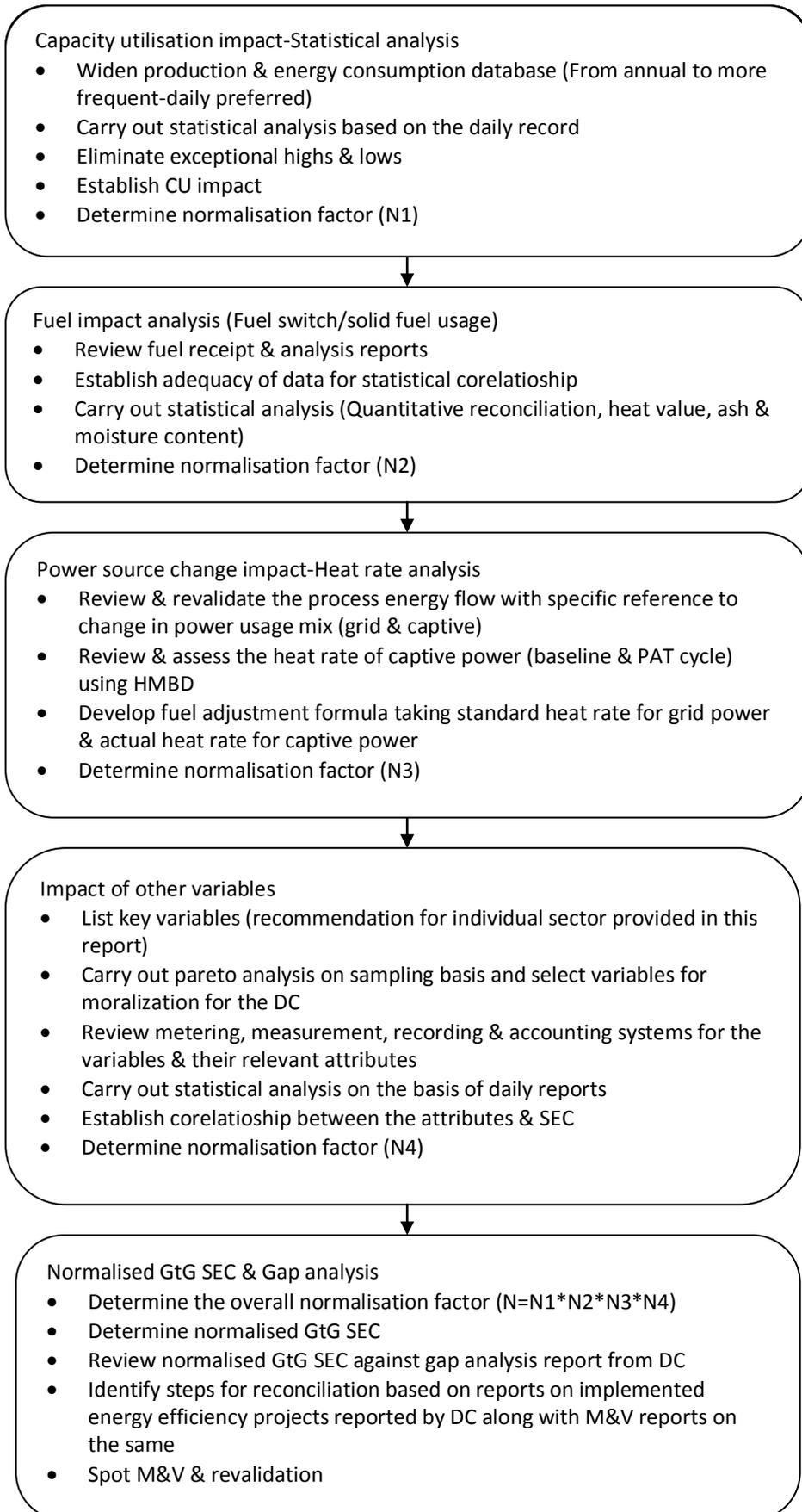
Step-3-Verification & validation based on evaluation of implemented EE projects

The process and illustrative examples are as follows:

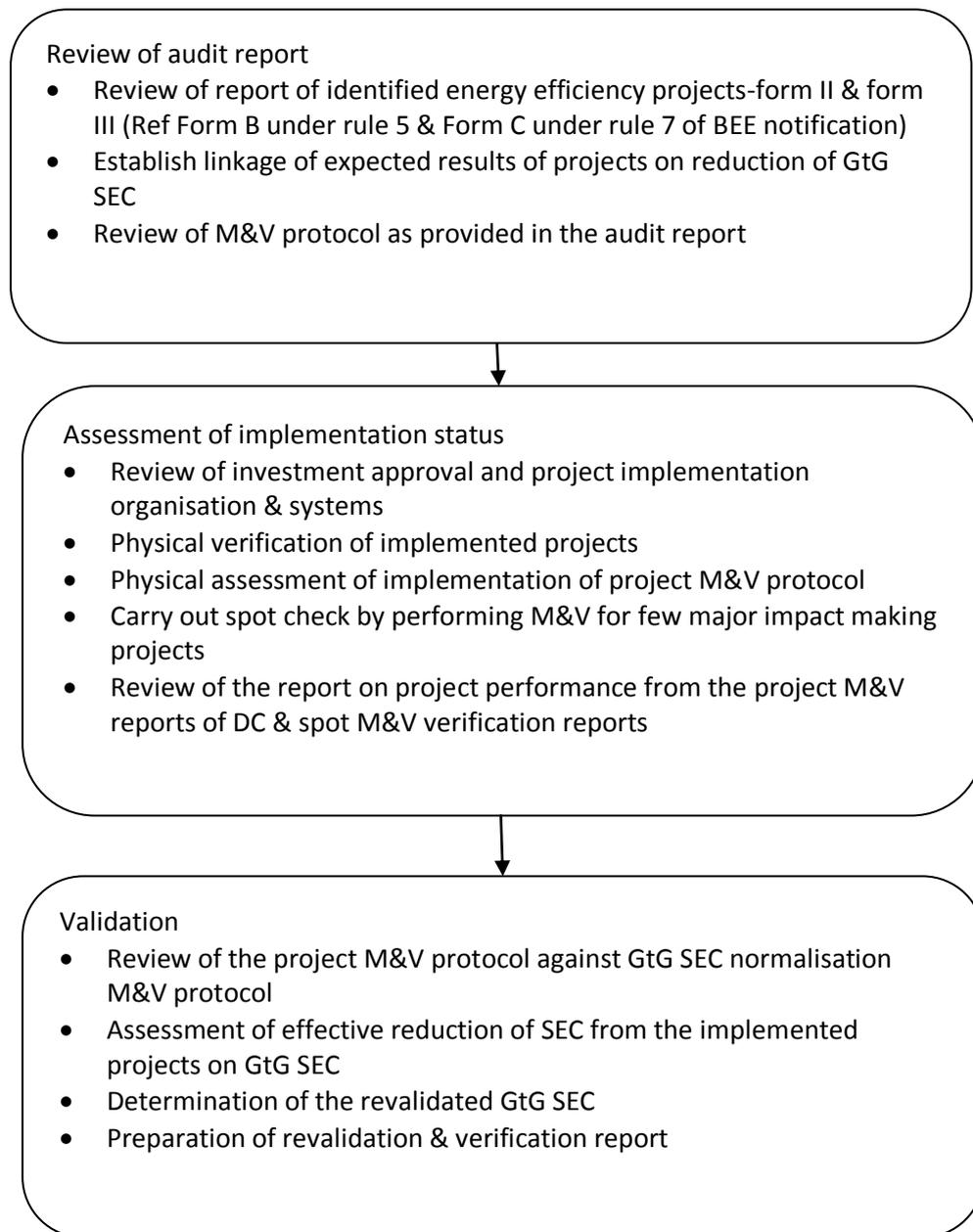
Step-1-Determination of GtG SEC



Step-2: Normalisation



Step-3-Verification



Reconciliation

The reconciliation process as outlined at step 3 of the normalisation process is to be carried out to validate the achieved GtG SEC with result from the implementation of the energy saving projects.

It is again recommended to adopt a multi-step approach for the reconciliation as illustrated below.

- Establish the GtG SEC based on the input output analysis as per baseline document
- Determine the normalised GtG SEC using the M&V protocol for normalisation

- Determine the impact of energy savings project on GtG SEC using the M&V protocol for the energy saving projects
- Reconcile the difference, if any

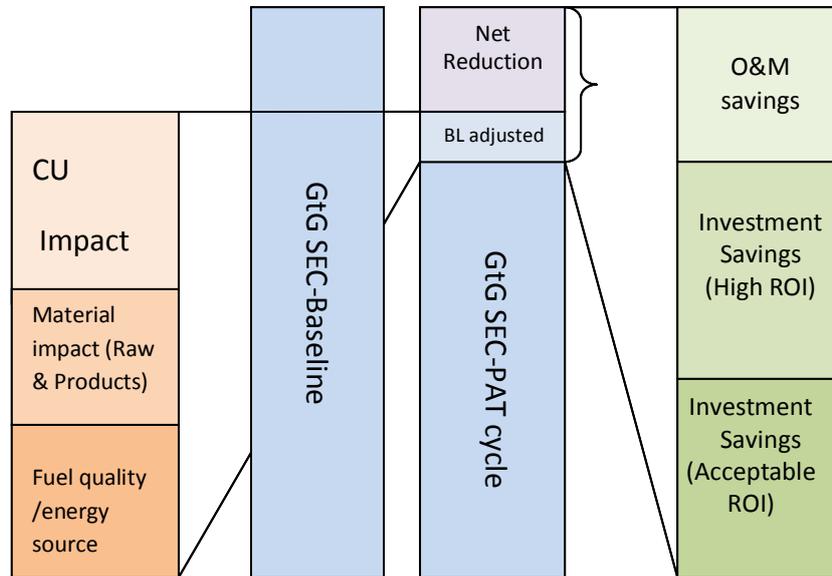


Figure 1: Normalisation & baseline adjustment

As illustrated, the unit has achieved the GtG SEC target, though the reported reduction figure may be lower (presented as net reduction in the figure). The gap is on account of change in baseline. The component of the baseline adjustment value has to be apportioned under each head based on proper analysis of data as explained above.

The gross reduction has to be reconciled by assessing the impact of energy savings projects under different heads as shown in the figure.

Data & information protocol

Sector specific data & information protocol has been developed as per the common structure illustrated below:

Table 1: Data & information protocol

ID	Data Variable	Source of Data	Data Unit	Measured (M) Calculated (C) Estimated (E)	Recording Frequency	Archival Method Electronic (E) Paper (P)	Remarks
A	Production						
A1	Production Capacity (Product A1) Main product	Balance sheet	TPY	E	Annual	E/P	
A2	Production Capacity (Product A 2)	Balance sheet	TPY	E	Annual	E/P	

ID	Data Variable	Source of Data	Data Unit	Measured (M) Calculated (C) Estimated (E)	Recording Frequency	Archival Method Electronic (E) Paper (P)	Remarks
A3	Production Capacity (Product A 3)	Balance sheet	TPY	M/C	Annual	E/P	
A4	Production (Product A1)	Daily production report	MT	M/C	Daily	E/P	
A5	Production (Product A2)	Daily production report	MT	M/C	Daily	E/P	
A6	Production (Product A3)	Daily production report	MT	M/C	Daily	E/P	
A7	Opening stock (Product A1)	Cost Audit Report	MT	M/C	Annual	E/P	
A8	Opening stock (Product A2)	Cost Audit Report	MT	M/C	Annual	E/P	
A9	Opening stock (Product A3)	Cost Audit Report	MT	M/C	Annual	E/P	
A10	Closing stock (Product A1)	Cost Audit Report	MT	M/C	Annual	E/P	
A11	Closing stock (Product A2)	Cost Audit Report	MT	M/C	Annual	E/P	
A12	Closing stock (Product A3)	Cost Audit Report	MT	M/C	Annual	E/P	
B	Power						
B1	Power import	Utility bill	Million kWh (MU)	M/C	Monthly	P	
B2	Power export	Utility billing	Million kWh (MU)	M/C	Monthly	P	
B3	Import of power from renewable	Utility billing	Million kWh (MU)	M/C	Monthly	P	
B4	Gross generation-Unit-1	DCS/Monthly report	Million kWh (MU)	M/C	Monthly	P/E	
B5	Gross generation-Unit-2	DCS/Monthly report	Million kWh (MU)	M/C	Monthly	P/E	
B6	Gross generation-Unit-3	DCS/Monthly report	Million kWh (MU)	M/C	Monthly	P/E	
B7	Auxiliary power consumption	Monthly report	Million kWh (MU)	M/C	Monthly	P/E	
B	Steam						
B8	Steam generation-Cogen	DCS	TPD	M	Daily	P/E	
B9	Steam generation-Waste Recovery	DCS	TPD	M	Daily	P/E	
B10	Steam generation-Process boiler	DCS	TPD	M	Daily	P/E	
B11	MP steam for process	DCS	TPD	M	Daily	P/E	
B12	LP steam for process	DCS	TPD	M	Daily	P/E	
C	Fuel						

ID	Data Variable	Source of Data	Data Unit	Measured (M) Calculated (C) Estimated (E)	Recording Frequency	Archival Method Electronic (E) Paper (P)	Remarks
C1	Imported coal quantity	Monthly cost audit reports	LTPY	M/C	Monthly	P/E	
C2	Imported coal GCV	Lab analysis report	Kcal/Kg	M/C/E	Per Consignment	P/E	
C3	Domestic coal quantity	Monthly cost audit reports	LTPY	M/C	Monthly	P/E	
C4	Domestic coal GCV	Lab analysis report	Kcal/Kg	M/C/E	Per Consignment	P/E	
C5	Lignite/petcoke quantity	Monthly cost audit reports	LTPY	M/C	Monthly	P/E	
C6	Lignite/petcoke quality	Lab analysis report	Kcal/Kg	M/C/E	Per Consignment	P/E	
C7	Biomass quantity	Monthly cost audit report	LTPY	M/C	Monthly	P/E	
C8	Biomass quality	Lab analysis report	Kcal/Kg	M/C/E	Per Consignment	P/E	
C9	HSD quantity	Monthly cost audit report	Kilo Liter/year	M/C	Monthly	P/E	
C10	HSD quality-density	Lab analysis report	Kg/Liter	M/C	Per Consignment	P/E	
C11	HSD quality-GCV	Lab analysis report	Kcal/Kg	M/C	Per Consignment	P/E	
C12	Furnace oil (FO) quantity	Monthly cost audit report	Kilo Liter/Year	M/C	Monthly	P/E	
C13	FO quality-density	Lab analysis report	Kg/Liter	M/C	Per Consignment	P/E	
C14	FO quality-GCV	Lab analysis report	Kcal/Kg	M/C	Per Consignment	P/E	
C15	PNG/LNG-Quantity	Utility bill	Million SCUM/year	M	Monthly	P/E	
C16	PNG/CNG-Quality	Lab analysis report	Kcal/CUM	M/C	Daily	P/E	
D	Fuel Usage for Power Generation						
D1	Imported coal	Monthly cost audit report	LTPY	M/C/E	Monthly	P/E	
D2	Indian coal	Monthly cost audit report	LTPY	M/C/E	Monthly	P/E	
D3	Lignite	Monthly cost audit report	LTPY	M/C/E	Monthly	P/E	
D4	Biomass	Monthly cost audit report	LTPY	M/C/E	Monthly	P/E	
D5	HSD/FO	Monthly cost audit report	KLPY	M/C/E	Monthly	P/E	
D6	PNG/LNG	Monthly cost audit report	Mn SCUM	M/C/E	Monthly	P/E	
E	Raw materials used						
E1	RM 1 (Main RM)	Daily	TPD	M/C	Daily	P/E	

ID	Data Variable	Source of Data	Data Unit	Measured (M) Calculated (C) Estimated (E)	Recording Frequency	Archival Method Electronic (E) Paper (P)	Remarks
		production report					
E2	RM 2	Daily production report	TPD	M/C	Daily	P/E	
E3	RM 3	Daily production report	TPD	M/C	Daily	P/E	
F	Conversion factors	Equivalent					
F1	Product 2 to main product	M&V protocol	Factor	C	PAT cycle	P/E	
F3	Product 3 to main product	M&V protocol	Factor	C	PAT cycle	P/E	
F4	RM 2 to main RM	M&V protocol	Factor	C	PAT cycle	P/E	
F5	RM 3 to main RM	M&V protocol	Factor	C	PAT cycle	P/E	
G	Other variables*						
G1	V1	---report	(App unit)	M/C	Daily	P/E	
G2	V2	---report	(App unit)	M/C	Daily	P/E	
G3	V3	---report	(App unit)	M/C	Daily	P/E	

*Sector specific

2.2 SPECIFIC

The specific issues pertain to the individual sector, mainly the sector specific uncontrollable variables and DC in the sector in respect of unit specific corelationship of variables with GtG SEC.

Key Variables

Following table shows the recommended list of variables to be factored for the normalisation for the different sectors.

Table 2: Variability factors

Factors	Applicability to Sectors*								Impact/remarks
	Aluminium	Cement	Chlor-Alkali	Fertiliser	Iron & steel	Paper	Pulp & Textile	Thermal Power	

Raw materials	X	X	X	√	√	√	X	X	Major in case of fertiliser in case of change in feedstock and pulp & paper in case of use of market pulp and to some extent of Iron in case of change of mine
Coal/Fuel	√	√	√	√	√	√	X	√	Impact on all plants having captive power plants
Product mix	X	√	X	√	X	X	√	√	Normalisation process for some sectors provided in BEE document-to be done for the rest
Capacity utilisation	√	√	X	√	√	√	√	X	In the chlor-alkali industry SEC increases with CU.
Anode sourcing	√	X	X	X	X	X	X	X	Major impact if the unit outsources anode compared to self manufacture
Cell current density & other factors	√	X	√	X	X	X	X	X	BEE document has provided normalisation methodology for certain factors for the chlor-alkali industry
Source of power & steam and accounting method	√	√	√	X	√	√	√	X	Normalization would be required in case of change in the draw of power from captive to grid of vice versa. For the fertiliser sector, FICC methodology would take meet the need. For cement sector too, the current practice can address the issue.

The baseline audit reports do not have data and information, which can help in freezing the list of sector specific variables and establish their corelationship with GtG SEC for individual sector. This needs to be done and would remain as one of the key task before BEE and the sectoral technical committees.

Normalisation process-specific

On freezing of the sector specific variables, each DC would have to take the following steps for development of the unit specific normalisation process in line with sectoral guideline.

- Review of the present system of information management & establish PAT complying data & information protocol
- Establish M&V protocol for the energy saving projects
- Establish communication protocol (BEE & SDA)
- Carry out periodic normalisation process and use BEE PATNET for communication
- Identify need for change/modifications
- Liaise with BEE/SDA/Technical committees and freeze the final system to be followed for normalisation at the end of project cycle

3. INSTITUTIONAL MECHANISM

3.1 Framework

The organisational framework for the M&V protocol is to be developed within the overall framework of the PAT organisation process, schematically illustrated below.

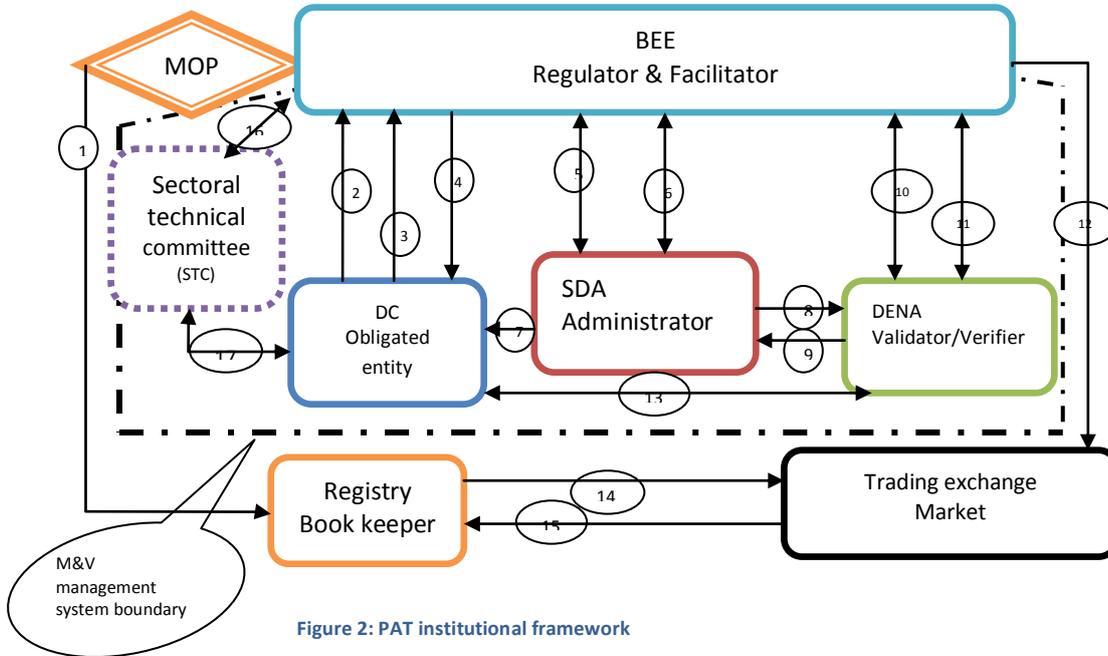


Figure 2: PAT institutional framework

1-Updated obligation of DCs (Surplus/deficit); 2-E-filing of information as per formats; 3-Apply for ESCerts through PAT Assessment Document (PAD); 4-Issuance of ESCerts; 5-Updating list of DCs/DENAs; 6-Information on improvement of baseline; 7-Check reports/advisory/enforcement; 8-Validation/verification reports; ; 9- Validation/Verification reports; 10-Empanelment application; 11-Empanelment; 12-Issuance of ESCerts; 13- Validation/Verification process; 14: ESCert information update; 15-Settlement details; 16-Normalisation advisory; 17-Sectoral normalisation protocols

The role of sectoral committees (STC) would be advisory in nature assisting BEE in development of guidelines for the normalisation process & M&V protocol for carrying out normalisation exercise in determination of GtG SEC for individual DCs. All the other agencies are directly involved in one or all of the implementation related functions.

The roles and responsibilities of the individual stakeholders for the normalisation and M&V work and requirement of capacity have been assessed by perusal of the PAT notification document, available information on the subject in the public domain and review of the sectoral M&V protocols prepared by DESL.

3.2 Roles of Key Stakeholders

The roles of stakeholders for development of the normalisation process and M&V protocol have not been clearly articulated in the notification except for allowing normalisation for variables beyond control of the DC and mention that such a process would be developed. The roles of different agencies can at this stage be best constructed based on the review of the overall framework and proposed normalisation process and M&V protocol developed by DESL for different sectors.

The various roles assessed to be performed in the normalisation process & M&V protocol include administration and regulation and services delivery. The key stakeholders are BEE, SDAs, STC, DC & DENA.

BEE

As the regulator & administrator of the PAT program, BEE has the lead role in both program development & extension and program administration. The key functions under the twin role include:

- Regulatory
 - Making recommendations to the Government on resetting the baseline & targets for individual DCs without impacting the sectoral & overall targets, if required
 - Assisting Government in issuing amendment to the notification, if required
- Administrative
 - Approval of the sectoral normalisation process & M&V protocol
 - Preparation of the guidelines for the DCs for carrying out the normalisation exercise and submission of periodic reports
 - Empanelment of DENA
 - Preparation of procedure manuals for the DENAs for validation and verification process and certification of normalised GtG SEC figures prepared by DCs
 - Capacity buildings for SDAs
 - Information management system

SDAs

The SDAs are entrusted with certain statutory functions, which are related to the normalisation process (Text box-1). It may require the SDA to carry out a detailed process and equipment study for norms and standards. Thus, even for review of the baseline and target, SDA shall play a significant role should any of the DC applies for review of baseline and target for the purpose of normalisation. The roles are accordingly, assessed as follows

- Administrative
 - Review of the baseline and targets and normalisation process for individual DC and making recommendation reports to BEE
 - Inspection & enforcement for M&V related systems

- Assist BEE in information management process
- Technical
 - Review of validation & verification report
 - Assessment of performance energy consuming equipments & system
 - Ascertaining of energy consumption norms & standards

Text Box 1: Administrative role of SDA

The designated agency may appoint, after the expiry of five years from the date of commencement of this Act, as many inspecting officers as may be necessary for the purpose of ensuring compliance with energy consumption standard specified under clause (a) of section 14 or ensure display of particulars on label on equipment or appliances specified under clause (b) of section 14 or for the purpose of performing such other functions as may be assigned to them.

Subject to any rules made under this Act, an inspecting officer shall have power to –

- (a) inspect any operation carried on or in connection with the equipment or appliance specified under clause (b) of section 14 or in respect of which energy standards under clause (a) of section 14 have been specified;
- (b) enter any place of designated consumer at which the energy is used for any activity and may require any proprietor, employee, director, manager or secretary or any other person who may be attending in any manner to or helping in, carrying on any activity with the help of energy to afford him necessary facility to inspect –
 - (A) any equipment or appliance as he may require and which may be available at such place;
 - (B) any production process to ascertain the energy consumption norms and standards

STC

The sectoral technical committees have played vital role in promoting the PAT program amongst the DCs and providing assistance to BEE in establishing rationales for setting sectoral and individual DC targets. These technical committees can continue to play similar roles in development of sectoral normalisation process and M&V protocols. In addition to providing technical inputs to BEE, these committees can be given a role for acting as a technical clearance house for the DCs by providing guidance to individual DC for addressing their baseline and normalisation issues.

DENA

The designated energy auditor, DENA (also called accredited energy auditor) is responsible for ensuring that the systems and processes adopted by the DC for determination of GtG SEC and data and information protocol have been maintained in conformity with the various notifications and information memorandum submitted by DC to BEE/SDA from time to time (Text box-2).

Such agencies would therefore, be required to perform different roles such as technical review of manufacturing processes & energy consumption patterns, system variabilities and their impact on energy consumption, application of M&V protocols associated with EE projects and programs and

normalisation issues including application of statistical methods and finally performance of audit and verifications including integrity of data and information protocol.

Text Box 2: DENA & M&V Protocol (Section-6, PAT Notification)

The accredited energy auditor shall independently evaluate each activity undertaken by the designated consumer for compliance with the energy consumption norms and standards and entitlement or requirement of energy savings certificate, to ensure that they meet with the requirements of these rules.

(A) The accredited energy auditor, in order to assess the correctness of the information provided by the designated consumer regarding the compliance with energy consumption norms and standards shall-

- (a) Apply standard auditing techniques;
- (b) Follow the rules and regulation framed under the Act;
- (c) Integrate all aspects of verification, and certification functions;
- (d) Make independent technical review of the opinion and decision of the verification team; also take into consideration, a situation where a particular activity may or may not form part of the activities related to the compliance with the energy consumption norms and standards, and the procedure for the assessment shall include,-

(B) Document review, involving

- (i) Review of data and its source, and information to verify the correctness, credibility and interpretation of presented information;
- (ii) Cross checks between information provided in the audit report and, if comparable information is available from sources other than those used in the audit report, the information from those other sources and independent background investigation;

(C) Follow up action, involving-

- (i) Site visits, interviews with personnel responsible in the designated consumers' plant;
- (ii) Cross-check of information provided by interviewed personnel to ensure that no relevant information has been omitted or, over or under valued;
- (iii) Review of the application of formulae and calculations, and reporting of the findings in the verification report.

(D) The accredited energy auditor shall report the results of his assessment in a verification report and the said report shall contain,

- (a) The summary of the verification process, results of assessment and his opinion along with the supporting documents;
- (b) The details of verification activities carried out in order to arrive at the conclusion and opinion, including the details captured during the verification process and conclusion relating to compliance with energy consumption norms and standards, increase or decrease in specific energy consumption with reference to the specific energy consumption in the baseline year;

DC

The designated consumer has to develop the normalisation process including M&V protocol for its facility in conformity with the sectoral normalisation guidelines prepared by BEE, institute data and information management system as per the M&V protocol and submit periodical reports to BEE/SDA. They are also responsible for facilitating verification work by the DENA and inspection work by the SDA.

The roles of the stakeholders discussed above is briefly summarised in the following table under appropriate heads².

Table 3: Summary-Roles of stakeholders (M&V Protocol)

Function	BEE	SDA	STC	DENA	DC
Governance/Over sight	<p>Development of sectoral normalisation & M&V protocol guidelines</p> <p>Review of SDA recommendation reports on normalisation issues from DCs and making appropriate recommendation to MOP</p> <p>Development of guidelines for DCs for carrying out normalisation and reporting of GtG SEC</p>	<p>Review of normalisation reports from individual DCs & recommendation reports to BEE</p>	<p>Assisting BEE in preparation and finalisation of sectoral normalisation manual & M&V protocols</p>	<p>Nil</p>	<p>Nil</p>
Program administration	<p>DENA empanelment</p> <p>Procedure for use of normalisation guideline & M&V protocol for verification & check verification</p> <p>Capacity building</p> <p>Information management system</p>	<p>Inspection & enforcement</p> <p>Review of norms & standards</p> <p>Review of verification & check verification reports</p> <p>Assisting BEE in information system</p> <p>Capacity building</p>	<p>Nil</p>	<p>Timely submission of verification and check verification reports</p>	<p>Timely submission of data, information, reports to BEE/SDA</p> <p>Facilitating inspection by SDA</p>
Delivery	<p>Revised target for individual DCs, if required</p> <p>Achievement of energy saving against overall target</p> <p>Market for ESCerts</p>	<p>Baseline updates</p>	<p>Nil</p>	<p>Baseline updates</p> <p>Check compliance & ESCert assessment</p>	<p>Energy savings against targets</p>

² An analytical institutional framework for implementation of EE projects-ESMAP, World Bank

3.3 Organisation design-principles

The organisation processes & systems for the three key agencies (BEE, SDA & DENA) would have to address to:

- Proposed institutional model
- Task performance as per roles
 - Volume
 - Requirement of skill competence
- Responsiveness to the contingencies

The objective of this report is to specifically address to the organisational issues in the context of M&V protocol. This has to be eventually integrated into the overall framework considering the other tasks that need to be performed as illustrated in overall PAT framework at Figure-2.

Proposed institutional model

The task performance as per the present arrangement has been captured at Table-3. The institutional model would require a collaborative arrangement between private players such as the DCs & DENAs and the Government bodies such as BEE & SDAs. The private industry has gained considerable insight into design, development and implementation of M&V protocol from implementation of CDM projects and to some extent ESCO performance contract projects. Since past couple of years, a voluntary program has been launched by AEEE³ for development of 'Certified M&V Professionals'. This has helped in creating a cadre of EE M&V professionals in the industrial sector. The present resource base includes:

- Certified Energy Managers & Auditors by BEE
- Certified 'M&V Professionals' by AEEE
- 'Designated operational entities (DOE)' by CDM EB
- Professional EE & Carbon Consulting organisations
- Accredited ESCOs

It should be possible to create a pool of service providers from these agencies for the tasks to be performed by DENAs, DCs & STCs and facilitating development of structures as well as of additional skill competencies required for performing the M&V related tasks. The methodology for testing and qualifying such individuals and organisations can be developed in line with relevant provisions in the PAT notification document.

M&V organisations at BEE & SDA would require different approach due to multiplicity of roles to be performed by these agencies under the overall PAT framework.

³ Alliance for energy efficient economy, a non-profit organisation promoted by energy efficiency business & other organisations in India

The PAT project is a first of its kind to be implemented anywhere in the world. The institution building process is therefore, would be evolutionary in nature based on learning from each of the preceding stages. However, some insights can be had from the different institutional models used globally for implementation of EE projects in general. Seven different institutional models have been found to be working in different countries (Text box 3)².

Text Box 3: EE Institutional model		
Type	Brief description	Examples
Government agency	Agency with broad energy responsibilities	US DOE Danish Energy Authority
Government agency	Agency focusing primarily on clean energy	Australian Greenhouse office Mexico: CONAE
Government agency	Agency focusing entirely on EE	India: BEE Thailand: DEDE Brazil: PROCEL
Independent statutory authority	Authority created by statute to promote clean energy of EE	UK Energy Saving Trust Sustainable Energy Ireland
Independent corporation	A corporation under Government ownership	South Africa: NEEA Korea Energy Management Corporation
Public-private partnership	A corporation under joint ownership	Polish National Energy Conservation Agency Germany: DENA
Non-Government organisation	Non-profit organisation	Austrian Energy Agency Croatia Energy Institute

The pros and cons of different models have been analysed in detail. From the PAT perspective, key issues can be summarised as:

- Statutory & non-statutory functions
- Program funding

- Ability to attract skill competence required at both BEE & SDAs
- Required speed of transactions

A Government agency would be always in a better position for performance of the statutory functions. It is also far easier for Government agencies to get access to fund. On the other hand, a private or PP or NGO model would be able to better perform in attracting talents and transaction management.

It may therefore, be necessary to create an institutional process in which:

- BEE/SDA to perform all the statutory function required for oversight and administration of the scheme
- The functions requiring higher degree of technical skill is outsourced to professional organisation with sectoral technical committees performing the oversight functions
- Automating and outsourcing the entire information and transaction processes

Transaction Volume

The transaction volume and consequently, the demand of services from the BEE and SDA would depend upon several factors such as:

- Project phase
- Number of DCs & their status
- Diversity factor

Current phase

In the current PAT cycle, the demand would keep on increasing with the progress of the project. Initially, BEE and to some extent SDAs would have to be prepared for responding to specific queries from the DCs on various issues such as:

- Correction of mistakes in the baseline documents
- Inclusion of DCs as per the energy usage cut-off limit-might have been inadvertently left out
- Normalisation & M&V
- Submission of action plan documents
- Etc

Different kinds of issues could arise during project implementation phase and validation phase; issue such as significant change in the baseline scenario, for example capacity expansion, technology change etc not foreseen during the baseline study.

Next phase would comprise of issuance of ESCerts, check verification, inspection and enforcement etc.

The institutional structure of SDAs in different States has to factor the number and complexity of DC structure in a particular State. The number of DCs in different States and their distribution in different sectors are shown in figures 3 & 4 respectively.

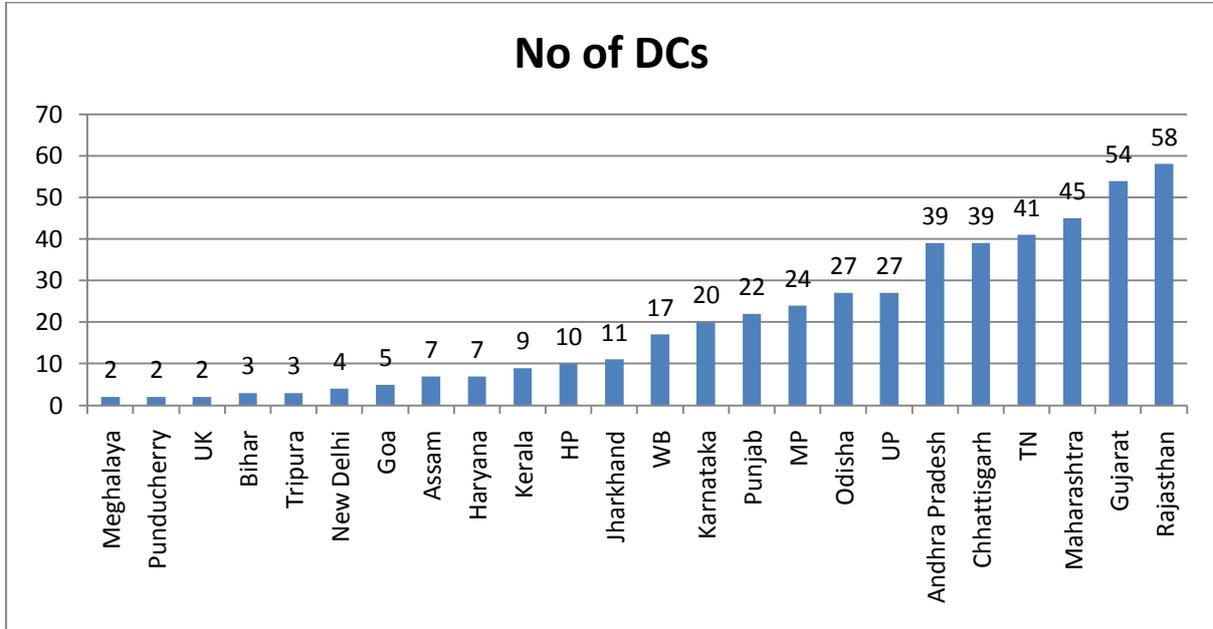


Figure 3: Number of DCs in different States

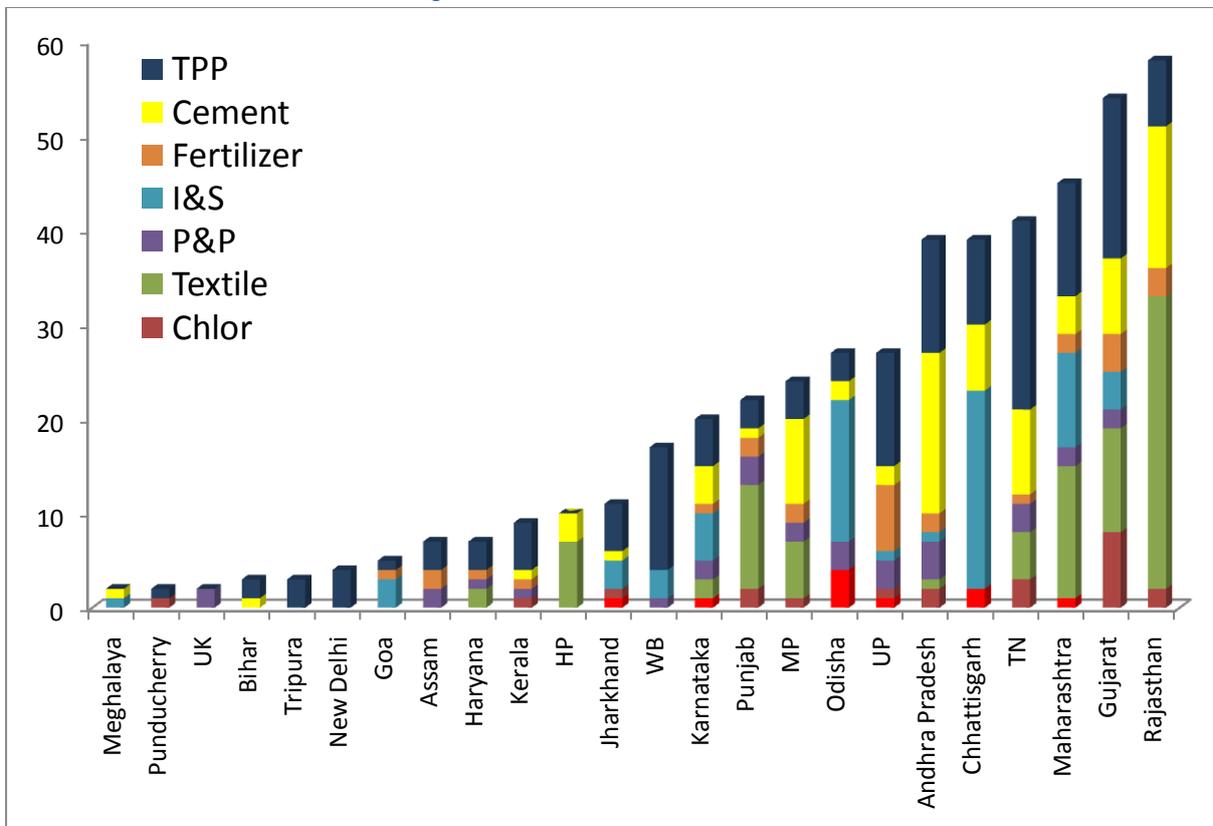


Figure 4: Composition of DCs in different States

From the above, it is observed that there are number of States having less than 10 DCs. Similarly, it is also seen that there are quite a few States with sectoral presence of three or less. It is obvious that the organisation structure of the SDAs and the transaction processes to be followed could be designed factoring these diversities.

It is also seen that there some sectors are very dominantly present in some States; examples of Textile in Rajasthan, Cement in Andhra Pradesh, Thermal Power in Tamil Nadu, Iron & Steel in Odisha etc. SDAs in such States could be developed to provide some of the sector specific services to the SDAs in other States. For this, BEE could assist development of “Sector Specific PAT Centre of Excellence (CoE)” in the States. Similarly, SDAs in States with very small number of DCs could collaborate to develop regional PAT service centers with support from BEE.

Expansion phase

As and when the PAT program is expanded by widening and deepening, larger number of units would become DCs. Learning from the current phase and subsequent phases would help in continually upgrading and changing the organisation model.

4. PROPOSED STRUCTURE

Based on the review of the proposed function and suggestion on outsourcing, model organisation structure has been designed specifically for implementation of the PAT scheme for the BEE and major SDAs as depicted at figures 5 & 6 respectively.

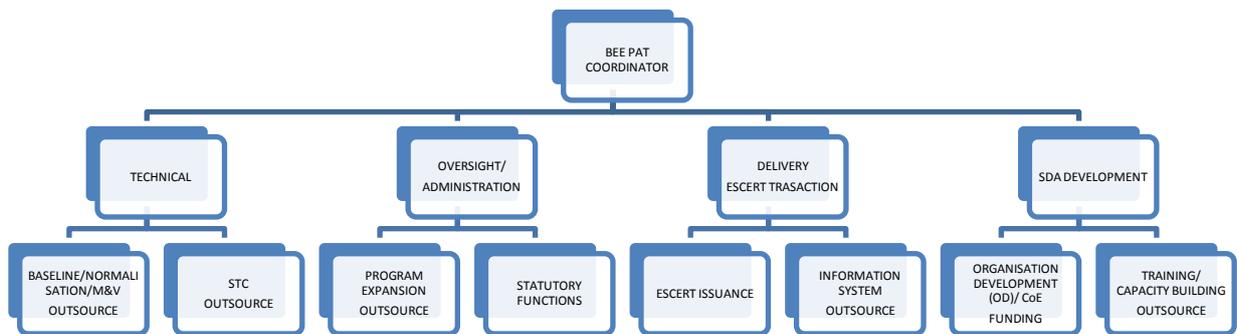


Figure 5: Proposed organisation BEE-PAT

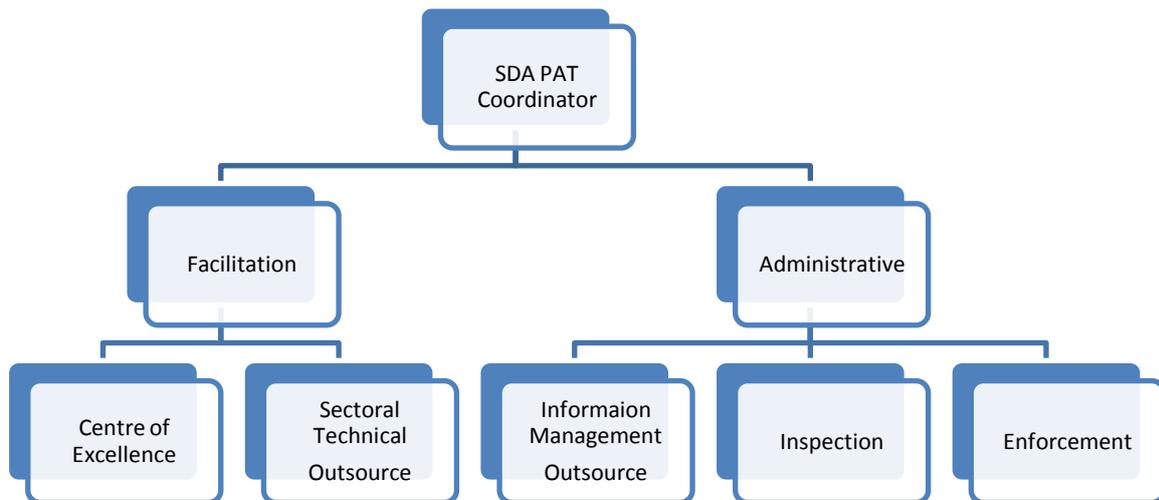


Figure 6: Proposed SDA Organisation for PAT

With a view to assess the number of persons and the requirement of skill competence, dummy transaction process can be initiated with outsourcing help. This would help in getting ready with the required structure and systems.

5. CAPACITY BUILDING

On finalisation of the organisation structures, number of initiatives would have to be taken up by BEE as well as SDAs. These would include:

- Mapping of required skill competency for different positions in the individual organisations
- Assessment of infrastructural support system, budgetary approval and building of the infrastructure
- Development of transaction processes
- Development of information network
- Development of terms of reference for outsourced services and bidding
- Recruitment and organisation building
- Preparation of training modules and conduct of the training program
 - PAT program
 - Technical-overall & sectoral
 - Baseline & Normalisation methodologies
 - M&V protocol
 - Transaction processes
 - Information management processes
 - Enforcement processes

All of these efforts would require major support, both organisational and financial in a very quick time.

It is recommended that these issues are discussed by BEE with various agencies providing technical assistance for implementation of PAT projects (such as USAID PACE-D, Shakti Sustainable Foundation and others) and their supports obtained for engagement of Consultants for the capacity building task at BEE and SDAs.