Regional Workshop on Perform , Achieve & Trade (PAT) Scheme

Modified Form 1 and Sector Specific Pro-Forma

Bureau of Energy Efficiency
INDIA

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Form 1- An Insight

- **What??**

  Form 1 is a specially designed form to capture the complete energy and production profile of a Designated Consumer (DC).

- **Why??**

  It has to be submitted to communicate the energy scenario of a plant for a particular financial year to Government of India for the purpose of energy policy decision .

- **Who??**

  Each industrial units covered under the notified sectors of EC Act, 2001 consuming above the notified threshold limit of that sector has to submit this form duly signed and stamped by the plant head and plant's energy manager.

- **When??**

  The **Energy Conservation (the form and manner for submission of report on the status of energy consumption by the designated consumers) Amendment Rules, 2015** directs every Designated Consumer (DC) to furnish in electronic form, the status of energy consumption on or before the 30th June of the said calendar year in Form 1.

- **Where??**

  The submission has to be made to the concerned State Designated Agency (SDA) and to Bureau of Energy Efficiency (BEE).

Modified Form-I & Need for Modification

- Old form-1 was Inadequate to capture the complete energy and production profile of a Designated Consumer (DC).
- Energy consumption and production profile changes over the time and hence the baseline scenario of plant doesn't match with the assessment scenario of the same plant.
- Existence of many factors beyond the control of DC, which affected the energy and production scenario.
- To neutralize effect of such factors beyond DC's control (e.g. Change in Fuel Quality, Change in Market Demand, Intermediary Product Import/Export, Power Mix etc.), the normalization of data came into picture.
- As per Govt. instructions, Form 1 should not exceed more than 2 pages, therefore, the new Form 1 was integrated with a detailed sector specific pro-forma which automatically takes care of all aspects and fills the Form 1 itself.
- Sector specific technical committees of experts were formed to prepare new Forms for each sector which would be able to capture all the relevant information of DCs.
- Accordingly, Sector Specific Pro-forma for each sector under PAT scheme was developed which led to one common form known as modified Form 1.

Form 1.pdf

Sector Specific Pro-forma

	Sector	No of Pro-forma	Name of Pro-Forma for Sub-Sector	Sub-Sector
1	Aluminium	2	Sa1, Sa2	Smelter & Cold Sheet
2	Cement	1	Sb	Cement
3	Chlor- Alkali	1	Sc	Chlor- Alkali
4	Fertilizer	1	Sd	Fertilizer
5	Iron & Steel	2	Se1, Se2	Integrated steel & Sponge Iron
6	Paper & Pulp	1	Sf	Paper & Pulp
7	Textile	4	Sg1, Sg2, Sg3, Sg4	Composite, Fiber, Spinning & Processing
8	Thermal Power Plant	1	Sh	Thermal Power Plant
9	Railways	General format for data collection of these three Sectors are available on BEE website https://beeindia.gov.in/content/pat-performa The sector specific pro-froma for these sectors are under finalisation.		
10	DISCOMM			
11	Petroleum Refinery			
	Total	13		

Sector Specific Pro-forma-Highlights

- Customised for individual sector and Sub-sectors
- 13 Different Forms for 8 sectors covered under PAT cycle-1
- Additional data input field
- Covers all basic data for Normalisation
- Inbuilt SEC Calculation Sheet
- Conditional approach for calculation
- Formulae cells are locked due to data security and reliability
- https://beeindia.gov.in/content/pat-performa

Sector Specific Pro-forma-Sections

For Manufacturing /Process Industries

- Instruction for Pro-forma filling (Locked)
- General Information Sheet
- Form-1 (Locked)
- Sector Specific Pro-forma (Formulae Cell Locked)
  - Production and Capacity Utilization Details
  - Section wise details of different products
  - Electricity and Renewable Consumption
  - Generation (DG/GT/STG/Co-Gen/WHR)
  - Fuel Consumption (Solid/Liquid/Gas/Biomass or Alternate Fuel)
  - Heat Rate of different power sources and Coal Quality
  - Miscellaneous Data for Normalisation
- Additional Equipment installation due to Environmental Concern
- Project Activities details Sheet
- CPP Details (Aluminium Sector)
- Summary Sheet (Locked)
- Normalization Calculation sheets (Locked)

Sector Specific Pro-forma-Sections

For Thermal Power Plant

- Instruction for Pro-forma filling (Locked)
- General Information Sheet (With facility to choose between Coal/Gas/Diesel based Power Plant from Drop down list)
- Sector Specific Pro-forma Form Sh (Unit Wise details)
  - Design Parameters Details
  - Operating Parameters Details
  - Generation and Other Details (Coal/Gas/Oil based)
  - APC and related Curve details
  - Coal Analysis and Gas Analysis details
  - Fuel Consumption (Solid/Liquid/Gas) details
  - Unit Loading Factor details for PLF normalisation
  - Start-up and Shut down details
  - Miscellaneous Data for Normalisation purpose
- Summary Sheet
- Normalization calculation sheets

Instructions Sheet for filling Proforma

INSTRUCTION S FOR FILLING UP THE PRO-FORMA

Sr No	Details	Note	Frequency of record	Primary Documents from where the information can be sourced and to be kept ready for verification by Accredited Energy Auditor	Secondary Documents from where the information can be sourced and to be kept ready for verification by Accredited Energy Auditor
Data to be filled up in the Excel Sheets- General Information, Pro-Forma, Addl Euip. List-Env, Project Activities List					
A	Production and capacity utilization details				
A1	Please provide Weighted average GSM or GLM of all types of Fabrics	GSM or GLM of all types of Fabrics	Annual	1) OEM Document of capacity 2) Environmental Consent to establish/operate document	1) Equipment/Section wise capacity document from OEM 2) Capacity calculation document submitted for Enviromental Consent
A2	Please provide Weighted average Count of all types of Single Yarns without converting to 40s count		Annual		
A3	Please provide the production capacity of Yarns in Spindles		Annual	1) OEM Document of Section-wise Process line 2) Environmental Consent to establish/operate document	1) Equipment/Section wise capacity document from OEM 2) Capacity calculation document submitted for Environmental Consent
A4	Please provide the production capacity of Yarns in 40s count equivalent	Tonnes	Annual	1) OEM Document of line/unit/equipment capacity 2) Enviromental Consent to establish/operate document 3) DoF Communication	1) Equipment/Section wise capacity document from OEM 2) Capacity calculation document submitted for Environmental Consent

General Information

Form-1 (General Information)						
Sector :- Name of the Sector						
1	Name of the Unit					
2	Year of Establishment					
3	Plant Contact Details & Address					
a	City/Town/Village					
	Post Office					
	District					
	State				Pin	
	Telephone			Fax		
b	Plant's Chief Executive Name					
	Designation					
	Telephone with STD Code			Fax		
	Mobile		E-mail		-	
4	Registered Office					
a	Company's Chief Executive Name					
	Designation					
	Address					
	City/Town/Village					
	Post Office					
	District					
	State				Pin	
	Telephone with STD Code			Fax		
5	Energy Manager Details					
a	Name					
	Designation			Whether EA or EM		
	EA/EM Registration No.					
	Telephone			Fax		
	Mobile		E-mail ID		-	

FORM-Sa1/a2/b/c/ d/e1/e2/f/g1/g2/g3/g4/h

Production and Capacity Utilization Details

- Data to be filled in the Grey/ white Cells only
- Colored cells are locked and formulae inbuilt
- Capture the Capacity and Production details of all types of Products
- Additional rows of Products may be added to capture special products
- In Built formula for calculation of Capacity Utilization

Sector: Name of the Sector

Name of the Unit	
Sub -Sector	
Type of Row Material	
Process flow Diagram	
Major Product	

S. No	Particulars	Basis/ Calculation	Unit	Previous Year	Current/ Assessment/Target Year	Source of Data
A	**Production and Capacity Utilization Details**					
i	Major Product Production Capacity					
ii	Other Product 1 Production Capacity					
iii	Other Product 2 Production Capacity					
iv	Major Product Production					
v	Other Product 1 Production					
vi	Other Product 2 Production					
vii	**% Capacity Utilisation of Major Product**					
viii	**% Capacity Utilisation of Other Product 1**					
ix	**% Capacity Utilisation of Other Product 2**					

Section wise different products details

S. No	Particulars	Basis/ Calculation	Unit	Previous Year	Current/ Assessment	Source of Data
B	**Major Product Production and Energy Consumption details**					
i	Major Product Production	Annual	Tonne			
ii	Raw material purchased from Market	Annual	Tonne			
iii	Total Electrical Energy Consumption	Annual	Tonne			
iv	Total thermal energy consumption	Annual	Tonne			
v	Opening Stock of Major Product	Annual	Tonne			
vi	**Specific Electrical energy consumption**	**Annual**	**kWh/kg**			
vii	**Specific thermal energy consumption**	**Annual**	**kcal/kg**			

Boiler Details

B7	Boiler Details					
B7.1	**Boiler 1/2/3/4/5**	**For Steam Generation (Process Boiler)**				
(i)	Type					
(ii)	Rated Capacity	Annual	TPH			
(iii)	Steam Generation	Annual	TPH			
(iv)	Steam Generation	Annual	Tonne per Year			
(v)	Type of Fuel	Annual	Name			
(vi)	Fuel Consumption	Annual	Tonne			
(vii)	Operating Pressure	Annual	kg/cm2			
(viii)	Operating Temperature	Annual	ºC			
(ix)	Design Efficiency	Annual	%			
(x)	Operating Efficiency	Annual	%			

B7.3	**Boiler Others (6/7/8/9/10)**	**Co-Gen**				
(i)	Type					
(ii)	Rated Capacity	Annual	TPH			
(iii)	Steam Generation	Annual	TPH			
(iv)	Steam Generation	Annual	Tonne per Year			
(v)	Type of Fuel	Annual	Name			
(vi)	Fuel Consumption	Annual	Tonne			
(vii)	Operating Pressure	Annual	kg/cm2			
(viii)	Operating Temperature	Annual	ºC			
(ix)	Design Efficiency	Annual	%			
(x)	Operating Efficiency	Annual	%			
B7.4	**Weighted Average Efficiency of all numbers of Boilers used for Co-Gen**	**∑ [(Efficiency of Boiler n)*(Generation of Boiler n)]/Total generation of all types of boiler**	**%**			

Steam Details

B8	Steam Details		Unit	Baseline Year (Average of three Year)	Current /Assessment/Target Year	Source of Data
B8.1	Enthalpy of HP steam	Annual	kcal/kg			
B8.2	Temperature of HP Steam	Annual	ºC			
B8.3	Pressure of HP Steam	Annual	kg/cm2			
B8.4	Enthalpy of LP steam	Annual	kcal/kg			
B8.5	Temperature of LP Steam	Annual	ºC			
B8.6	Pressure of LP Steam	Annual	kg/cm2			

Renewable Energy

- **Renewable Purchase Obligation**
  - Information to be provided for Renewable related obligation imposed by the states
  - It shall be made in terms of % for Solar and Non-Solar Renewables, Lakh kWh and in terms of MW for BY and AY

- **Renewable Energy Generator**
  - Information is sought for the plant, which has an authorisation from MNRE as Renewable Energy Generator in MW
  - RE Certificates (REC): Nos of REC obtained as RE generator for Solar and Non Solar Renewable generation
  - Quantum of Energy in MWh sold under preferential tariff as RE generator

Electricity Consumption and Renewable Energy

C	Electricity Consumption					
C.1	Electricity from Grid / Other (Including Colony & Others)	Formula	Unit	Baseline Year (Average of three Year)	Current /Assessment/Target Year	Source of data
(i)	Purchased Electricity from Grid	Annual	Lakh kWh			
(ii)	Renewable Energy (through Wheeling)	Annual	Lakh kWh			
(iii)	Electricity from CPP located outside from plant boundary (Through Wheeling)	Annual	Lakh kWh			
(iv)	Renewable Purchase obligation of plant (RPO) (Solar & Non-Solar)	Annual	%			
(v)	Renewable Purchase obligation of plant (RPO) (Solar & Non-Solar)	Annual	Lakh kWh			
(vi)	Renewable Purchase obligation of plant (RPO) (Solar & Non-Solar)	Annual	MW			
(vii)	Renewable Energy generator as approved by MNRE	Annual	MW			
(viii)	Quantum of Renewable Energy Certificates (REC) obtained as a Renewal Energy Generator (Solar & Non-Solar)	Annual	MWh			
(ix)	Quantum of Energy sold under preferential tariff	Annual	MWh			
(x)	Plant Connected Load	Annual	kW			
(xi)	Contract demand with utility	Annual	kVA			
(xii)	**Total Units**	**(i)+(ii)+(iii)**	**Lakh kWh**	**0**	**0**	
(xiii)	**Total Electricity Purchased from grid/ Other with out colony/construction power etc**	**Formula**	**Lakh kWh**	**0**	**0**	
(xiv)	**Equivalent Thermal Energy of Purchased Electricity from Grid / Other without colony/construction power etc**	**(viii)x860/10**	**Million kcal**	**0**	**0**	

Generation from DG and CPP

				Previous Year	Current Year	Source of Data
C.2	**Own Generation**					
C.2.1	***Through DG sets***					
(i)	Grid Connected		Yes/No			
(ii)	Install Capacity	Annual	MW			
(iii)	Annual generation	Gross Unit Generation	Lakh kWh			
(iv)	Designed Heat Rate	Annual	kcal/kWh			
(v)	Operating Heat Rate	Annual	Kcal/kWh			
(vi)	Fuel used	Annual	Kilo Litre			
(vii)	Auxiliary Power Consumption (APC)	Annual	%			
(viii)	Running Hours	Annual	Hrs			
C.2.2	***Through Steam turbine/ generator***					
(i)	Grid Connected		Yes/No			
(ii)	Install Capacity	*Annual*	MW			
(iii)	Annual Gross Unit generation	Annual	Lakh kWh			
(iv)	Auxiliary Power Consumption (APC)	Annual	%			
(v)	Design Gross Heat Rate	Annual	kcal/ kWh			
(vi)	Operating Heat Rate	Annual	Kcal/kWh			
(vii)	Plant Load Factor (PLF)	Annual	%			
(viii)	Running Hours	Annual	Hrs			
(ix)	Break down hrs due to internal, Planned and external factor	Annual	Hrs			
(x)	Plant low load due to Internal Factors/ Breakdown in Plant	Annual	Hrs			
(xi)	Plant low load due to External Factors like Fuel Unavailability/ Market demand/External Condition	Annual	Hrs			
(xii)	**Plant Availability Factor (PAF)**	**Formula**	**%**			
(xiii)	**Plant Load Factor (PLF)**	**Formula**	**%**			
(xiii)	**% of loss due to external Factors**	**Formula**	**%**			

Please select from Drop Down List

Generation from GT and WHR

C.2.3	*Through Gas turbine*	Formula	Unit	Current Year	Previous Year	Source of data
(i)	Install Capacity	*Annual*	MW			
(ii)	Annual Gross Unit generation	Annual	Lakh kWh			
(iii)	Auxiliary Power Consumption	Annual	%			
(iv)	Design Heat Rate	Annual	kcal/ kWh			
(v)	Operating Heat Rate	Annual	Kcal/kWh			
(vi)	Plant Load Factor (PLF)	Annual	%			
(vii)	Running Hours	Annual	Hrs			
C.2.4	*Through Waste Heat Recovery*					
(i)	WHR Capacity	Annual	MW			
(ii)	Annual Generation	Annual	Lakh kWh			
(iii)	WHR Running Hours	Annual	Hrs			
(iv)	Auxiliary Power Consumption	Annual	%			
(V)	Steam Generation for Process	Annual	TPA			
(Vi)	Percentage conversion to conventional steam generation		%			
(Vii)	Steam Pressure	Annual	kg/cm2			
(viii)	Steam Temperature	Annual	ºC			
(ix)	Steam Enthalpy	Annual	kCal/kg			
(x)	Chiller Capacity	Annual	TR			
(xi)	Total TR Production from Chiller for Process	Annual	TR			
(xii)	Percentage conversion to conventional Chiller	Annual	%			

Generation from Co-Gen Extraction cum Condensing

C.2.5	*Through Co-Generation (Extraction Cum Condensing)*	*Through Co-Generation (Extraction/Back Pressure)*				
(i)	Grid Conneted		*Yes/No*			
(ii)	Install Capacity	*Annual*	MW			
(iii)	Annual Gross Unit generation	Annual	Lakh kWh			
(iv)	Auxiliary Power Consumption	Annual	%			
(v)	Design Heat Rate	Annual	kcal/ kWh			
(vi)	Operating Heat Rate	Annual	Kcal/kWh			
(vii)	Plant Load Factor (PLF)	Annual	%			
(viii)	Running Hours	Annual	Hrs			
(ix)	Input Steam Enthalpy	Annual	kcal/kg			
(x)	Input Steam Pressure	Annual	Kg/cm2			
(xi)	Input Steam Temperature	Annual	ºC			
(xii)	Input Steam Flow rate	Annual	TPH			
(xiii)	**Steam Extraction 1**					
(xiv)	Steam Pressure	Annual	Kg/cm2			
(xv)	Steam Temperature	Annual	ºC			
(xvi)	Steam Enthalpy	Annual	Kcal/kg			
(xvii)	Mass Flow Rate	Annual	TPH			
(xviii)	**Steam Extraction 2**					
(xix)	Steam Pressure	Annual	Kg/cm2			
(xx)	Steam Temperature	Annual	ºC			
(xx)	Steam Enthalpy	Annual	Kcal/kg			
(xxi)	Mass Flow Rate	Annual	TPH			

Fuel Consumption Details

- There are separate entries for Solid, Liquid and Gaseous fuel
- The information are required for Fuel consumption in the plant on As Fired Basis (AFR)
- However, for cross-verification of the fuel used for production, moisture contents in coal/Lignite/biomass as on received basis is desired.
- There are separate entries for the fuels used for process and power generation
- Landed cost of the fuel is required to be entered for the last purchase of that financial year
- For renewable energy used in the process, the energy will not be included in the calculation of Plant's thermal energy consumption
- However, if it is used for the power generation and is connected with grid, the same will be included in the calculation of total annual energy consumption of the plant
- By selecting Yes/No in the cell of "Grid Connected" this condition could be initiated

Fuel Consumption

D	Solid Fuel Consumption					
D.1	***Coal (Indian)***			**Previous Year**	**Current Year**	**Source of Data**
(i)	Landed Cost of fuel (Last purchase)	Basic Cost+Taxes+Freight	Rs/Tonne			
(ii)	Average Gross calorific value (As Fired Basis)	Annual	kcal/ kg			
(iii)	Average Total Moisture in coal	Annual	%			
(iv)	Quantity purchased	Annual	Tonne			
(v)	Quantity used for power generation (CPP)	Annual	Tonne			
(vi)	Quantity used for power generation (Co-Gen)	Annual	Tonne			
(vii)	Quantity used for process	Annual	Tonne			
(viii)	**Total Quantity Consumed**	**(v)+(vi)+(vii)**	**Tonne**	**0**	**0**	
(ix)	**Thermal Energy Used in Power Generation (CPP)**	**(ii)x(v)/1000**	**Million kcal**	**0**	**0**	
(x)	**Thermal Energy Used in Power Generation (Co-Gen)**	**(ii)x(vi)/1000**	**Million kcal**	**0**	**0**	
(xi)	**Thermal Energy Used in Process**	**(vii)x(ii)/1000**	**Million kcal**	**0**	**0**	
D.2	***Pet coke***					
(i)	Landed Cost of fuel (Last purchase)	Basic Cost+Taxes+Freight	Rs/Tonne			
(ii)	Average Gross calorific value As fired Basis	Annual	kcal/ kg			
(iii)	Average Total Moisture	Annual	%			
(iv)	Quantity purchased	Annual	Tonne			
(v)	Quantity used for power generation (CPP)	Annual	Tonne			
(vi)	Quantity used for power generation (Co-Gen)	Annual	Tonne			
(vii)	Quantity used for process	Annual	Tonne			
(viii)	**Total Quantity Consumed**	**(v)+(vi)+(vii)**	**Tonne**	**0**	**0**	
(ix)	**Thermal Energy Used in Power Generation (CPP)**	**(ii)x(v)/1000**	**Million kcal**	**0**	**0**	
(x)	**Thermal Energy Used in Power Generation (Co-Gen)**	**(ii)x(vi)/1000**	**Million kcal**	**0**	**0**	
(xi)	**Thermal Energy Used in Process**	**(vii)x(ii)/1000**	**Million kcal**	**0**	**0**	

Fuel Consumption

D.6	***Bio mass or Other purchased Renewable solid fuels (pl. specify) baggase, rice husk, etc.***	***Thermal Energy Input through Biomass not to be taken into account***		**Previous Year**	**Current Year**	**Source of Data**
(i)	Landed Cost of fuel (Last purchase)	Basic Cost+Taxes+Freight	Rs/Tonne			
(ii)	Average Gross calorific value as fired	Annual	kcal/ kg			
(iii)	Average Total Moisture	Annual	%			
(iv)	Quantity purchased	Annual	Tonne			
(v)	Quantity used power generation (CPP)	Annual	Tonne			
(vi)	Quantity used power generation (Co-Gen)					
(vii)	Quantity used for process	Annual	Tonne			
(viii)	**Thermal Energy Used in Power Generation(CPP)**	**(ii)x(v)/1000**	**Million kcal**	**0**	**0**	
(ix)	**Thermal Energy Used in Power Generation (Co-Gen)**	**(ii)x(vi)/1000**	**Million kcal**	**0**	**0**	
(x)	**Thermal Energy Used in Process**	**(ii)x(vii)/1000**	**Million kcal**	**0**	**0**	
D.7	***Solid Waste (pl. specify and refer CPCB guidelines, enclosed) rubber tyres chips, Municipal Solid waste etc.***	***Thermal Energy Input through solid waste, mentioned in CPCB guidelines, not to be taken into account***				
(i)	Landed Cost of fuel (Last purchase)	Basic Cost+Taxes+Freight	Rs/Tonne			
(ii)	Quantity purchased	Annual	Tonne			
(iii)	Average Gross calorific value as fired	Annual	kcal/ kg			
(iv)	Quantity used power generation (CPP)	Annual	Tonne			
(v)	Quantity used power generation (Co-Gen)	Annual	Tonne			
(vi)	Quantity used for process heating	Annual	Tonne			
(vii)	**Total Quantity Consumed**	**(iv)+(v)+(vi)**	**Tonne**	**0**	**0**	
(viii)	**Thermal Energy Used in Power Generation(CPP)**	**(iv)x(iii)/1000**	**Million kcal**	**0**	**0**	
(ix)	**Thermal Energy Used in Power Generation (Co-Gen)**	**(v)x(iii)/1000**	**Million kcal**	**0**	**0**	
(x)	**Thermal Energy Used in Process**	**(vi)x(iii)/1000**	**Million kcal**	**0**	**0**	
D.8	**Total Solid Energy Used in Power Generation (CPP)**	**Formula**	**Million kcal**	**0**	**0**	
D.9	**Total Solid Energy Used in Power Generation (Co-Gen)**	**Formula**	**Million kcal**	**0**	**0**	
D.10	**Total Solid Energy Used in Process**	**Formula**	**Million kcal**	**0**	**0**	

Fuel Consumption

E	Liquid Fuel Consumption					
E.1	***Furnace Oil***	***Basis/Formula***	**Unit**	**Previous Year**	**Current Year**	**Source of Data**
(i)	Landed Cost of fuel (Last purchase)	Basic Cost+Taxes+Freight	Rs/Tonne			
(ii)	Gross calorific value	Annual	kcal/ kg			
(iii)	Quantity purchased	Annual	kilo Litre			
(iv)	Average Density	Annual	kg/ltr			
(v)	Quantity used for power generation (DG Set)	Annual	kilo Litre			
(vi)	Quantity used for power generation (CPP)	Annual	kilo Litre			
(vii)	Quantity used for process Heating	Annual	kilo Litre			
(viii)	**Total F. Oil Consumption as fuel**	**((iv)+(v)+(vi)) x(iii)**	**Tonne**	**0.0**	**0.0**	
(ix)	**Thermal Energy Used in Power Generation (DG Set)**	**[((iv))x(iii)]x(i)/1000**	**Million kcal**	**0.0**	**0.0**	
(x)	**Thermal Energy Used in Power Generation (CPP)**	**[((v))x(iii)]x(i)/1000**	**Million kcal**	**0**	**0**	
(xi)	**Thermal Energy Used in Process**	**(i)x(vi)*(iii)/1000**	**Million kcal**	**0**	**0**	
E.2	***High Speed Diesel (HSD)***					
(i)	Landed Cost of fuel (Last purchase)	Basic Cost+Taxes+Freight	Rs/Tonne			
(ii)	Gross calorific value	Annual	kcal/ kg			
(iii)	Quantity purchased	Annual	kilo Litre			
(iv)	Average Density	Annual	kg/ltr			
(v)	Quantity used for power generation (DG Set)	Annual	kilo Litre			
(vi)	Quantity used for power generation (CPP)	Annual	kilo Litre			
(vii)	Quantity used for material handling / Transportation (Raw material handling , etc)	Annual	kilo Litre			
(viii)	Quantity used for process heating	Annual	kilo Litre			
(ix)	**Total HSD Consumption as fuel**	**[(iv)+(v)+(viii)]x(iii)**	**Tonne**	**0.00**	**0.00**	
(x)	**Thermal Energy Used in Power Generation (DG Set)**	**[((iv))x(iii)]x(i)/1000**	**Million kcal**	**0**	**0**	
(xi)	**Thermal Energy Used in Power Generation (CPP)**	**[((v))x(iii)]x(i)/1000**	**Million kcal**	**0**	**0**	
(xii)	**Thermal Energy Used in Process**	**(vii)x(iii)x(i)/1000**	**Million kcal**	**0**	**0**	

Fuel Consumption

E.5	***Liquid Waste (pl. specify and refer CPCB guidelines, enclosed)***	***Thermal Energy Input through Liquid waste, mentioned in CPCB guidelines, not to be taken into account***				
(i)	Landed Cost of fuel (Last purchase)	Basic Cost+Taxes+Freight	Rs/Tonne			
(ii)	Gross calorific value	Annual	kcal/ kg			
(iii)	Quantity purchased	Annual	kilo Litre			
(iv)	Average Density	Annual	kg/ltr			
(v)	Quantity used for power generation (DG Set)	Annual	kilo Litre			
(vi)	Quantity used for power generation (CPP)	Annual	kilo Litre			
(vii)	Quantity used for process	Annual	kilo Litre			
(viii)	**Total Liquid waste Consumption as fuel**	**[(iv)+(v)+(vi)]x(iii)**	**Tonne**	**0**	**0**	
(ix)	**Thermal Energy Used in Power Generation (DG Set)**	**(iv)x(iii)x(i)/1000**	**Million kcal**	**0**	**0**	
(x)	**Thermal Energy Used in Power Generation (CPP)**	**(v)x(iii)x(i)/1000**	**Million kcal**	**0**	**0**	
(xi)	**Thermal Energy Used in Process**	**(vi)x(iii)x(i)/1000**	**Million kcal**	**0**	**0**	
E.6	**Total Liquid Energy Used in Power Generation (DG Set)**	**E.1.(viii)+E.2.(vii)+E.3.(vii)+E.4.(ix)+E.5.(ix)**	**Million kcal**	**0.0**	**0.0**	
E.7	**Total Liquid Energy Used in Power Generation (CPP)**	**E.1.(ix)+E.2.(viii)+E.3.(viii)+E.4.(x)+E.5.(x)**	**Million kcal**	**0**	**0**	
E.8	**Total Liquid Energy Used in Process**	**E.1.(x)+E.2.(ix)+E.3.(ix)+E.4.(xi)+E.5.(xi)**	**Million kcal**	**0**	**0**	

Fuel Consumption

F	Gaseous Fuel					
F.1	***Compressed Natural Gas (CNG/NG/PNG/LNG)***		**Unit**	**Previous Year**	**Current Year**	**Source of Data**
(i)	Landed Cost of fuel (Last purchase)	Basic Cost+Taxes+Freight	Rs/SCM			
(ii)	Gross calorific value	Annual	kcal/SCM			
(iii)	Quantity purchased	Annual	Million SCM			
(iv)	Quantity used for power generation	Annual	Million SCM			
(v)	Quantity used for transportation, if any	Annual	Million SCM			
(vi)	Quantity used for process heating	Annual	Million SCM			
(vii)	**Total CNG Consumption as fuel**	**(iii)+(v)**	**Million SCM**	**0**	**0**	
(viii)	**Thermal Energy Used in Power Generation**	**(iii)x(i)/1000**	**Million kcal**	**0**	**0**	
(ix)	**Thermal Energy Used in Process**	**(v)x(i)/1000**	**Million kcal**	**0**	**0**	
F.2	***Liquefied Petroleum Gas (LPG)***					
(i)	Landed Cost of fuel (Last purchase)	Basic Cost+Taxes+Freight	Rs/Tonne			
(ii)	Gross calorific value (kcal/SCM)	Annual	kcal/kg			
(iii)	Quantity purchased	Annual	Million Kg			
(iv)	Quantity used for power generation	Annual	Million Kg			
(v)	Quantity used for process heating	Annual	Million kg			
(vi)	**Total LPG Consumption as fuel**	**(iii)+(iv)**	**Million kg**	**0**	**0**	
(vii)	**Thermal Energy Used in Power Generation**	**(iii)x(i)**	**Million kcal**	**0**	**0**	
(viii)	**Thermal Energy Used in Process**	**(iv)x(i)**	**Million kcal**	**0**	**0**	
F.3	**Total Gaseous Energy Used in Power Generation**	**F.1.(vii)+F.2.(vi)**	**Million kcal**	**0**	**0**	
F.4	**Total Gaseous Energy Used in Process**	**F.1.(viii)+F.2.(vii)**	**Million kcal**	**0**	**0**	

Fuel Consumption-Others

F.5	***Energy Import (Steam)***					
(i)	Total HP Steam Import	Annual	Tonne			
(ii)	Enthalpy of HP Steam	Annual	kCal/kg			
(iii)	Temperature of HP Steam	Annual	ºC			
(iv)	HP Steam Pressure	Annual	kg/cm2			
(v)	Total LP Steam Import	Annual	Tonne			
(vi)	Enthalpy of LP Steam	Annual	kCal/kg			
(vii)	Temperature of LP Steam	Annual	ºC			
(viii)	LP Steam Pressure	Annual	kg/cm2			
(ix)	**Total Thermal Energy Import (Steam)**	**Annual**	**Million kCal**	**0.00**	**0.00**	
F.6	***Energy Export (Steam)***					
(i)	Total HP Steam Import	Annual	Tonne			
(ii)	Enthalpy of HP Steam	Annual	kCal/kg			
(iii)	Temperature of HP Steam	Annual	ºC			
(iv)	HP Steam Pressure	Annual	kg/cm2			
(v)	Total LP Steam Import	Annual	Tonne			
(vi)	Enthalpy of LP Steam	Annual	kCal/kg			
(vii)	Temperature of LP Steam	Annual	ºC			
(viii)	LP Steam Pressure	Annual	kg/cm2			
(ix)	**Total Thermal Energy Export (Steam)**	**Annual**	**Million kCal**	**0.00**	**0.00**	

Gross Heat Rate and Coal Details

- Gross Heat Rate of DG/CPP/GT will be automatically calculated based on the Energy Consumption and generation provided
- The quality parameters of coal used in CPP will be inserted for Coal quality Normalisation
- The elemental analysis such as proximate and ultimate shall be provided on yearly weighted basis
- The formulae provided for conversion from proximate to Ultimate will be used for finding out the value of H2 in the baseline year, if ultimate analysis has not been performed for coal during baseline year

Performance Indicator and GHR

H	Gross Heat Rate		Unit	Previous Year	Current Year	Source of Data
H.1	Gross Heat Rate of DG Set	E.6x10/C.2.1.(ii)	kcal/kWh	0.00	0.00	
H.2	Gross Heat Rate of CPP (Steam Turbine)	(D.8+E.7+F.3)x10/ C.2.2.(ii)	kcal/kWh	0.00	0.00	
H.3	Gross Heat Rate of CPP (Gas Turbine)	F.3/10*C.2.3.(ii)	kcal/kWh	0.00	0.00	
H.4	Gross Heat Rate of Co-Gen(Extraction cum Condensing)	Formula	kcal/kWh	0.00	0.00	
H.5	Gross Heat Rate of Co-Gen(Extraction/Back Pressure)	Formula	kcal/kWh	0.00	0.00	
H.6	*Weighted Average Heat Rate*	*Formula*	*kcal/kWh*	*0.00*	*0.00*	

I	Coal Quality in CPP (As Fired Basis)		Unit	Previous Year	Current Year	Source of Data
i	Ash	Annual	%			
ii	Moisture	Annual	%			
iii	Hydrogen	Annual	%			
iv	GCV	Annual	kcal/kg			

Additional Information

I.1	Coal Quality in CPP (As Fired Basis)		Unit	Previous Year	Current Year	Source of Data
i	Ash	Annual	%			
ii	Moisture	Annual	%			
iii	Hydrogen	Annual	%			
iv	GCV	Annual	kcal/kg			

I.2	Un Scheduled Plant Shutdown		Unit	Previous Year	Current Year	Source of Data
i	Hot to Cold stop due to external factor	Annual	Hours			
ii	Hot to Cold stop due to external factor	Annual	Nos			
iii	Hot to Cold stop due to external factor (Electrical Energy Consumption)	Annual	Lakh kWh			
iv	Cold to Hot start due to external factors	Annual	Hours			
v	Cold to Hot start due to external factors	Annual	Nos			
vi	Cold to Hot start due to external factors (Electrical Energy Consumption)	Annual	Lakh kWh			

Normalization Factors- Broad Categorization

- **Capacity Utilization**
  - **Availability of Fuel/Raw Material** (Effect on Capacity Utilisation)
  - **Natural Calamity/Rioting/Social Unrest/Labor Strike/Lockouts** (Effect on Capacity Utilisation)
  - **Start/Stop**
- **Product Mix & Intermediary Product** (Import/Export)
- **Fuel Mix (Pet Coke Utilization in Kiln)**
- **Power Mix** (Imported & Exported from/ to the grid and self-generation from the captive power plant)
- **Fuel Quality**
- **Low PLF**
- **Raw Material Quality**

- **Environmental Concern** (Additional Environmental Equipment requirement due to major change in government policy on Environment)
- **Biomass/Alternate Fuel Unavailability**
- **Construction Phase or Project Activities**
- **Addition of New Line/Unit** (In Process & Power Generation)
- **Unforeseen Circumstances**
- **Renewable Energy**
- **APC Normalization**
- **Start-up/ shut downs due to external factors**

Miscellaneous Data for Normalization

- Separate Sheet to be filled for additional equipment installation due to Environmental concern and on going project activities
- The sheet will automatically calculates the Energy to be normalized
- The data are also required pertaining to Biomass/Alternate Fuel unavailability and its replacement with fossil fuel
- The consumption thus entered will be calculated in a separate Normalisation sheet

Miscellaneous Data for Normalization

J	Miscelleneous Data #					
J1	Additional Equipment installation after baseline year due to Environmental Concern			Previous Year	Current Year	Source of Data
(i)	Additional Electrical Energy Consumed	Annual	Lakh kWh	0		
(ii)	Additional Thermal Energy Consumed	Annual	Million kcal	0		

J2	Biomass/ Alternate Fuel availability (as per Sr. No D.6/D.7/E.5)					
(i)	Biomass replacement with Fossil fuel due to Biomass un-availbility (used in the process)	Annual	Tonne			
(ii)	Alternate Solid Fuel replacement with Fossil fuel due to Alternate Solid Fuel un-availbility (used in the process)	Annual	Tonne			
(iii)	Alternate Liquid Fuel replacement with Fossil fuel due to Alternate Liquid Fuel un-availbility (used in the process)	Annual	Tonne			
J 3	Project Activities (Construction Phase)					
(i)	Electrical Energy Consumed due to commissioning of Equipment	Annual	Lakh kWh	0		
(ii)	Thermal Energy Consumed due to commissioning of Equipment	Annual	Million kcal	0		

Miscellaneous Data for Normalization

- Due to the gate to Gate concept for Specific Energy consumption, the input energy and production needs to be considered for new line/unit if it commissions in the same plant boundary.
- However, during the stabilization period of a new line under commissioning, the energy consumption is very high w.r.t the production/generation. Hence, following methodology will follow
  - In case a DC commissions a new line/production unit before or during the assessment/target year, it shall be considered once the Capacity Utilization of that line has touched / increased over 70%.
  - Energy consumed and production made (if any) during any project activity during the assessment year, needs to be exclusively monitored and will be subtracted from the total energy and production in the Assessment year.
  - Similarly, the same methodology will be applied on a new unit installation for power generation (CPP) within the plant boundary.

- The thermal and electrical energy consumed till 70% of its Capacity utilisation for any new unit/line needs to be entered in this section
- The total production till 70% of its CU also to be entered

Miscellaneous Data for Normalization

J 4	New Line/Unit Commissioning		Unit	Previous Year	Current Year	Source of Data
(i)	Electrical Energy Consumed due to commissioning of New process Line/Unit till it attains 70% of Capacity Utilisation	Annual	Lakh kWh			
(ii)	Thermal Energy Consumed due to commissioning of New Process Line/Unit till it attains 70% of Capacity Utilisation	Annual	Million kcal			
(iii)	Yarn Production till new line attains 70% of Capacity utilisatiion	Annual	Tonns			
(iv)	Date of Commissioning (70% Capacity Utilisation)	Date				
(v)	Electrical Energy Consumed from external source due to commissioning of New Line/Unit till it attains 70% of Capacity Utilisation in Power generation	Annual	Lakh kWh			
(vi)	Thermal Energy Consumed due to commissioning of New Line/Unit till it attains 70% of Capacity Utilisation in Power generation	Annual	Million kcal			
(vii)	Date of Commissioning (70% Capacity Utilisation)	Date				
J 5	**Unforeseen Circumstances**					
(i)	Electrical Energy to be Normalized	Annual	Lakh kWh			
(ii)	Thermal Energy to be Normalized	Annual	Million kcal			
# Authentic documents in support of claim in Thermal and Electrical Energy is required						

Additional Equipment List-Environmental Concern

List of additional Equipment installed due to Environmental Concern after baseline year

Name of the Unit	,	

Sr No	Equipment Name	Equipment Sr No	Section	Date of Commissioning	Electrical Rated Capacity	Thermal Rated Capacity	Running Load	Running Hours	Assesment Year 2014-15 Electricity Consumption $	Assesment Year 2014-15 Thermal Consumption $$	Source of Data	Remarks
				Date	kW	Million kcal/annum	kW	Hours/ Annum	Lakh kWH/ Annum	Million kcal/Annum		
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
Total					0	0	0	0	0	0		

$ Equipment wise Energy Meter Reading or Energy Management System Data required in support of the claim

$$ Equipment wise Document related to consumption of Liquid Fuel, Solid Fuel Alternate Fuel is required in support of the claim

Additional Equipment List-Project Activities

List of Equipment and Energy consumed during project activity up to commissioning during the Assessment year

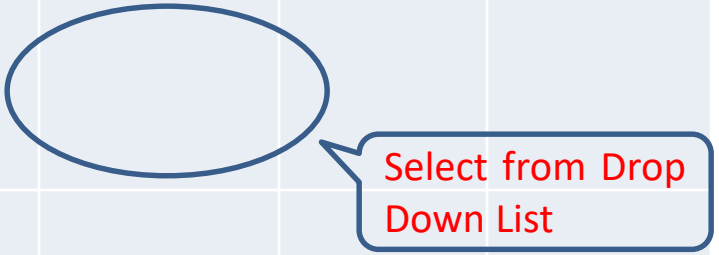
Name of the Unit	,	

Sr No	Equipment Name	Equipment Sr No	Section	Project Activity Start Date	Date of Commissioning	Electrical Rated Capacity	Thermal Rated Capacity	Running Load	Running Hours	Assesment Year 2014-15 Electricity Consumption $	Assesment Year 2014-15 Thermal Consumption $$	Source of Data	Remarks
				Date	Date	kW	Million kcal/annum	kW	Hours/ Annum	Lakh kWH/ Annum	Million kcal/Annum		
1												Separate meter for additional activities project	
2													
Total						0	0	0	0	0	0		

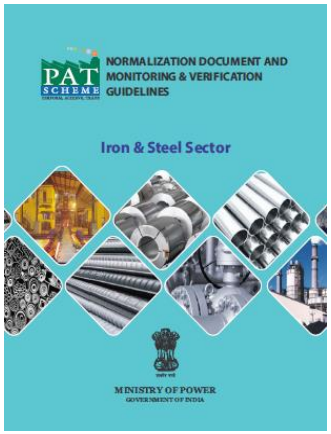
- ❑ Equipment wise Energy Meter Reading or Energy Management System Data required in support of the claim
- ❑ Equipment wise Document related to consumption of Liquid Fuel, Solid Fuel Alternate Fuel is required in support of the claim

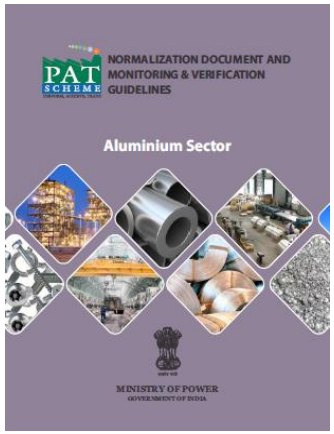
Documents

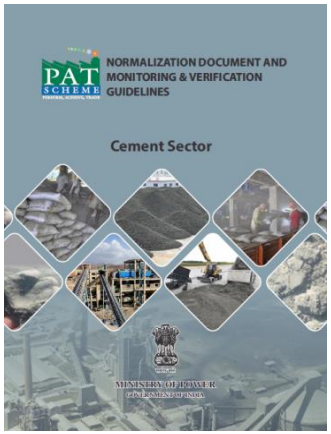
K	Documentation for Normalisation			Previous Year	Current Year	Source of Data
(i)	Fuel Quality in CPP-Document Available for Normalisation		Yes/No			
(ii)	Intermediary Product-Document Available for Normalization		Yes/No			
(iii)	PLF- Document Available for Normalisation		Yes/No			
(iv)	Power Mix-Document Available for Normalisation		Yes/No			
(v)	Product Mix-Document Available for Normalisation		Yes/No			
(vi)	Notional Energy for other Factors		Yes/No			

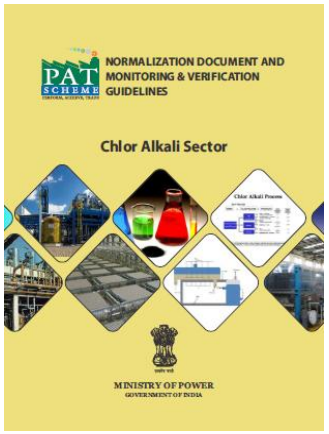


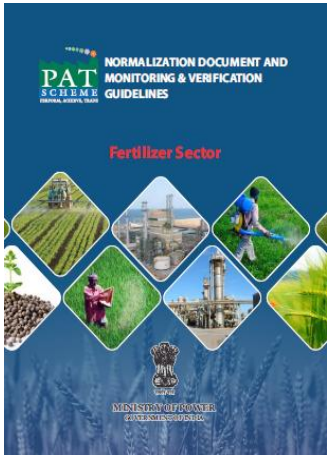
Normalization Documents and M&V guidelines

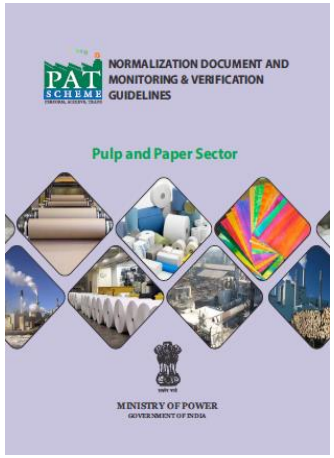


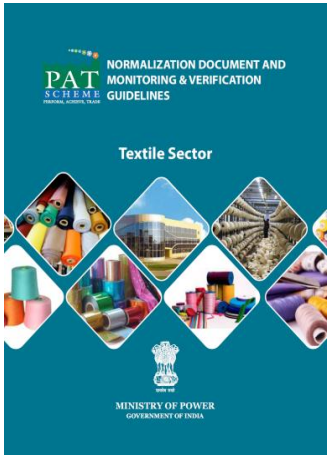


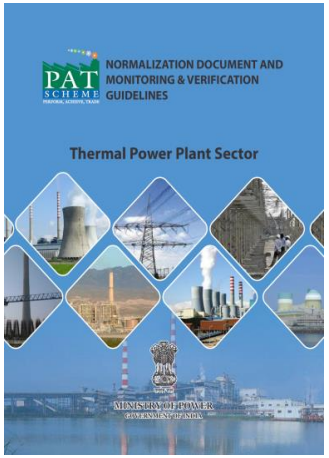












https://beeindia.gov.in/content/pat-3

Conclusion

- The Supporting Pro-forma is made with the purpose of capturing the data for Production and Energy as well as for the Normalization while maintaining the old format of Form-1 for ease of data entry

- Once complete data is filled in the Pro-forma, the SEC after Normalization of plant automatically comes out in the summary sheet enabling the DC to see the status of GtG SEC of the plant

- The DC can even integrate the Pro-forma into their MIS for reporting purpose

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