

# PAT Pulse

Tracking the Perform-Achieve-Trade Scheme for Energy Efficiency

September 2016



***FINANCING ENERGY EFFICIENCY IN INDIA: WHO WILL INVEST?***

Achieving energy efficiency in industries is a priority for India from the perspective of cost savings as well as climate change. The Perform-Achieve-Trade (PAT) scheme was formulated to achieve this objective by facilitating a market based mechanism for promoting energy efficiency.

'PAT Pulse' is a quarterly briefing series on PAT with Designated Consumers (DCs), policy makers, catalysts and industry experts to capture the pulse of the energy efficiency market in India created by Sustainability Outlook and Alliance for Energy Efficient Economy (AEEE) in collaboration with Shakti Sustainable Energy Foundation. The objective of this stakeholder briefing series is to provide evidence based, market assessment tool to present the stakeholder view point, enable higher uptake of PAT through peer learning and incubate industry and policy action on energy efficiency.

## In this brief

In the second issue of PAT Pulse in May 2016, we estimated the investment potential of industrial energy efficiency interventions for the DCs across PAT sectors (excluding thermal power sector), to be about Rs. 34,000 crore (~USD5 billion) by 2020. The current issue of PAT Brief attempts to go a step further and explore the dynamics of industrial energy efficiency market from a financing point of view. The key objectives of this brief are to analyze the most optimal financing routes to realize the investment potential presented in the energy efficiency domain in PAT sectors (excluding thermal power sector) and to assess strengthening measures needed for achieving a successful and sustainable trajectory for industrial energy efficiency market in India. The key highlights of this issue include:

- Two key determinants of the financing patterns are:
  - Size of the Designated Consumer (and/or its parent). Those with fixed assets of Rs. 500 crore and above have been classified as "large"; and others are small.
  - Whether companies will put in their share of contribution as part of the overall financing; or expect 3rd parties to do so.
- Cross-cutting Technologies (e.g. VFDs, Waste Heat recovery, etc. that cut across industries) have maximum potential for Vendor finance/ESCO model
- Projects in Chlor-Alkali and Aluminium sector can account for maximum financing through project specific term loans whereas Cement and Fertilizer can get clubbed with loans within existing lines of credit
- Policy push and standardization in EE projects are key levers to realize the investment potential

## Policy updates and Innovations

The issue provides updates on policy regarding terms and conditions for Exchange of Energy Savings Certificates and the roles of multiple entities associated with the trading. The brief also provides a sneak peek into some of the upcoming solutions including water-free fabric dyeing technology, deep eutectic solvents, top gas recycling blast furnace etc.

3

Financing Energy Efficiency in India: Who will invest?

20

News Wire

15

Policy Update

26

Datebook

17

Innovation Lens

# FINANCING ENERGY EFFICIENCY IN INDIA: WHO WILL INVEST?

## Highlights:

- Two key determinant of the financing patterns are:
  - Size of the Designated Consumer (and/or its parent). Those with fixed assets of Rs. 500 crore and above have been classified as “large”; and others are small.
  - Whether companies will put in their share of contribution as part of the overall financing; or expect 3<sup>rd</sup> parties to do so.
- Cross-cutting Technologies (e.g. VFDs, Waste Heat recovery, etc. that cut across industries) have maximum potential for Vendor finance/ESCO model
- Projects in Chlor-Alkali and Aluminium sector can account for maximum financing through project specific term loans whereas Cement and Fertilizer can get clubbed with loans within existing lines of credit
- Policy push and standardization in EE projects are key levers to realize the investment potential

## Financing Industrial Energy Efficiency: a challenge, really?

The techniques and technologies to improve industrial energy efficiency have been well proven but a notable challenge for policy makers is to accelerate their adoption. PAT (Perform Achieve trade) scheme is definitely a positive step in this direction but Indian industry still has a fair ground to cover. Sustainability Outlook and AEEE engaged multiple stakeholders including industry (PAT Designated Consumers), financial institutions as also Energy Services Companies (ESCOs) to understand the current state of industrial energy efficiency financing. Discussions revealed that typically a low budget is allocated for energy efficiency projects by industries who undertake most projects with short term payback (less than 3 years).

Some of the key challenges for energy efficiency as faced by three distinct segments- the ESCOs, Banks and the DCs include:

<b>Industry</b>	<ul style="list-style-type: none"> <li>• Unwillingness to prioritize Energy Efficiency. Investments more driven by growth and revenue enhancement rather than cost savings.</li> <li>• Validation of actual savings realized from energy efficiency projects; lack of standardization a key impediment</li> </ul>
<b>Financial Institutions</b>	<ul style="list-style-type: none"> <li>• Lack of enforcement of performance contracts for energy efficiency projects</li> <li>• Difficulties in measurement and verification (M&amp;V) of energy efficiency</li> <li>• Lack of standardized project documentation and appraisal procedures</li> <li>• Lack of awareness and experience among banks for types of EE projects</li> <li>• Limited availability of collateral for project financing</li> <li>• Low ticket size of investment for the energy efficiency projects</li> </ul>
<b>ESCOs</b>	<ul style="list-style-type: none"> <li>• Weak balance sheet of most ESCOs</li> <li>• Lack of demonstrability/track record</li> <li>• Lack of capacity: perceived limited understanding and limited capacity of sector specific processes</li> <li>• Lack of standardized measuring and verification systems</li> <li>• Litigation process costly and time consuming for non-compliance with performance contracts</li> </ul>

Discussions with multiple stakeholders revealed that there is a need to demystify the financing landscape of industrial energy efficiency (EE) in India and understand the current lacunae (if any) in terms of instruments required for financing this domain in the Indian industrial sector.

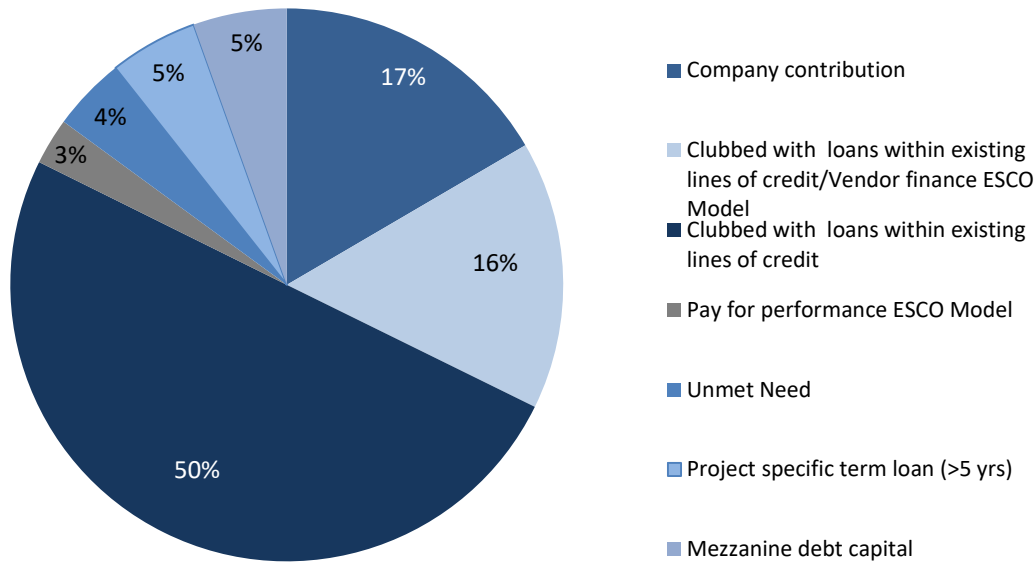
**All the stakeholders - Policy makers, Industries, Financial Institutions and Service Providers/ESCOs have varied approaches to financing energy efficiency and need of the hour is to determine the common direction which will satisfy the requirements for all of them and leap frog industrial energy efficiency market in India.**

In a bid to establish this common direction, based on extensive discussions with the stakeholders, Sustainability Outlook and AEEE have developed a framework to assess sources of capital that are likely to finance industrial energy efficiency in India in the near term.

Out of the total investment potential presented by industrial energy efficiency in the 7 sectors covered under PAT Phase 1 (excluding thermal power sector) - estimated to be approximately Rs. 34,000 crore (USD 5bn) by 2020 (refer May 2016 issue of PAT Pulse), 17% or approximately Rs 5,500 crores (USD 0.8 bn) would be required as company contribution /equity/margin money. The remaining 83%, i.e Rs 27,000 crores (USD 4.2bn) can have multiple financing routes including:

1. Project Specific Term Loan (>5 yr tenure)
2. Clubbed with loans within existing lines of credit
3. Vendor finance ESCO model
4. Pay for Performance ESCO model
5. Mezzanine Debt Capital

**Figure 1: Break-up of the total investment potential (Rs 34,000 crores) (USD5 bn) in industrial EE for PAT sectors (excluding thermal) as per likely financing routes**



Source: Sustainability Outlook and AEEE analysis

However, currently the key challenge is unwillingness of many companies to invest equity in savings projects such as those linked to energy efficiency instead of growth projects which will enhance the top line performance. The table below provides a detailed break up of sources of financing as per intervention type and sector.

Financing route	Type of Interventions	Financing need (Rs crores)/(USD mn)
<b>Clubbed with loans within existing lines of credit</b>	<b>Cross-Cutting Technologies</b> <ul style="list-style-type: none"> <li>DCs where VFD and WHR account for significant proportion of overall capex and DCs balance sheet is strong</li> <li>Super-efficient Boilers for large DCs (fixed assets&gt;Rs 500 cr)</li> </ul>	Rs 5,764 Cr (USD 873 million)
	<b>Process interventions (with short term/&lt;3 yr payback)</b> <ul style="list-style-type: none"> <li>Textile - High Speed Carding Machine</li> <li>Aluminium - Seal Pot System for Condensate Recovery; Slots in the anode</li> <li>Pulp &amp; Paper -Installation of Extended Delignification System for Cooking of Wood</li> <li>Fertilizer - Vapour Absorption System, Retrofitting Steam Turbines for Higher Efficiency</li> <li>Chlor-Alkali - Ion exchange membrane cell process</li> <li>Cement - Vertical roller mills; Use of EAF Slag; Clinker cooler retrofits; use of flyash</li> </ul>	Rs 5,761 Cr (USD 873 million)
	<b>Process interventions (with medium term/3-5 yr payback)</b> <ul style="list-style-type: none"> <li>Cement - High efficiency clinker coolers</li> <li>Fertilizers - Vapour Absorption System; Two Stage Regeneration in CO2 Removal System; Adiabatic Pre-reformer</li> <li>Pulp &amp; Paper - Firing of Black Liquor at High Concentration</li> <li>Iron and Steel - Waste Heat recovery from sinter bed; Coke Dry Quenching</li> </ul>	Rs 5,162 Cr (USD 782 million)
<b>Clubbed with loans within existing lines of credit/Vendor finance ESCO Model</b>	<ul style="list-style-type: none"> <li>VFDs across sectors where the investment is not significant proportion of overall capex</li> </ul>	Rs 5,235 Cr (USD 793 million)
<b>Pay for performance ESCO model</b>	<ul style="list-style-type: none"> <li>Textile and Pulp &amp; Paper- Super efficient Boilers for small DCs (fixed assets&lt;Rs 500 cr)</li> <li>WHR for small DCs (fixed assets&lt;Rs 500 cr)</li> </ul>	Rs 909 Cr (USD 138 million)
<b>Project Specific Term Loan (&gt;5 yr tenure)</b>	<ul style="list-style-type: none"> <li>Chlor-Alkali- Anode and Membrane replacement along with Zero gap conversion of Electrolyser</li> <li>Aluminium-Inert anode (PBANOD) in Hall Heroult Process</li> </ul>	Rs 1, 722 Cr (USD 261 million)
<b>Mezzanine Debt Capital</b>	<ul style="list-style-type: none"> <li>DCs where VFD and WHR account for significant proportion of overall capex and DCs balance sheet is stretched</li> </ul>	Rs 1, 800 Cr (USD 277 million)
<b>Unmet Need</b>	<ul style="list-style-type: none"> <li>Chlor-Alkali: Anode and Membrane replacement along with Zero gap conversion of Electrolyser</li> <li>Aluminium: Inert anode (PBANOD) in Hall Heroult Process</li> </ul>	Rs1400 cr (USD 218 milion)

Source: Sustainability Outlook and AEEE analysis

## 50% of the investment potential can be financed by getting clubbed with loans within existing lines of credit

Out of the total financing potential of Rs 34,000 crores (USD 5bn), 50% or about Rs. 16,600 crore (USD 2.5bn) can be financed by loans within existing lines of credit.

About 16% or ~Rs 5,200 crore (USD 800m) could be financed either by existing credit lines or through vendor finance ESCO Model depending on the preference of the DC undertaking the intervention. If the DC has the ability to bring its (equity) contribution to the project, then it is likely to get financed through existing lines. Otherwise it would get financed through vendor financed lines/ supplier credit.

5% or Rs1700 crores (USD 260m) from the remaining can be supported by project specific term loan (with greater than 5 year tenure), about 5% or Rs 1800 crores (USD 277m) through mezzanine debt crores and about 3% of the total investment potential, i.e Rs. 909 crores (USD 140m) exclusively through Pay for performance ESCO model. As per our estimates, about 4% or Rs 1400 crores (USD200m) of financing need maybe unmet with the existing financing options.

Clubbing with loans within existing lines of credit is the most optimal route for financing energy efficiency interventions in case:

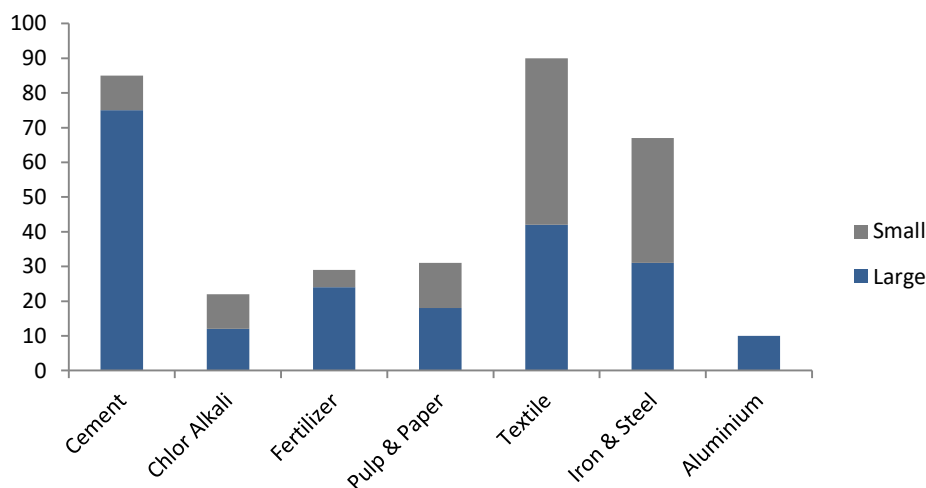
1. The intervention under consideration is process linked to process improvement which does not account for a significant amount of capex (compared to total capex of the firm) and has a short term payback (less 3 years)
2. The intervention is a cross cutting technology, with short term (less 3 years) or medium term (3-5 years) payback, and savings from the intervention are measurable.

For sectors such as Cement, Fertilizer, Iron and Steel, most of the interventions considered for the purpose of this analysis are likely to be completely financed by getting clubbed with loans within existing lines of credit which the DCs may be using as they fall in either of the two categories as stated above.

**Large DCs likely to fund EE through Internal accruals but Vendor/ESCO route promising for small DCs**

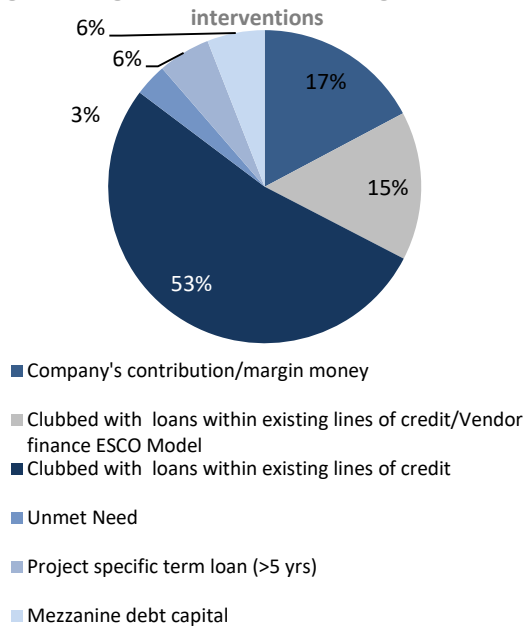
The choice of likely financing route is significantly impacted by the size of the firm/DC under question. For this analysis, if the fixed assets of a DC are more than Rs. 500 crore, it has been classified as “large”. Based on this classification, the figure below provides a sector wise break-up of the DCs in terms of size.

**Figure 2: Break-up of DCs in PAT cycle 1 according to their size**

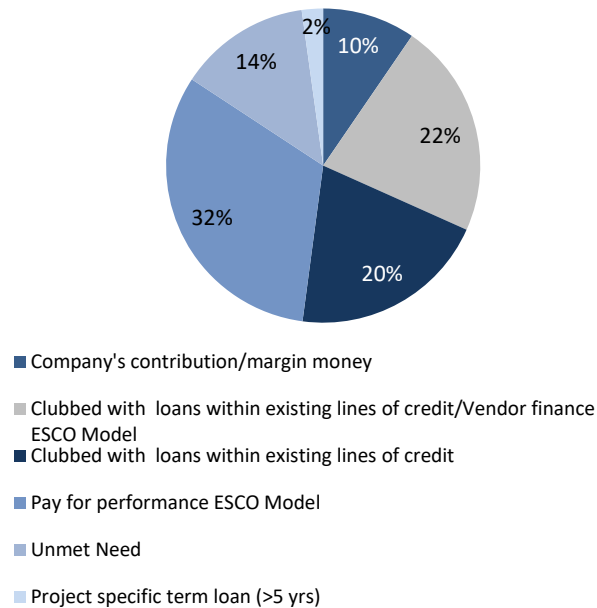


While 212 of the total 334 DCs (excluding thermal power plants sector) considered in this study are large, remaining 122 are small DCs. The maximum number of large DCs are in the Cement sector (75 out of the total 85 DCs) and the minimum small size DCs in case of Aluminium sector (none of the 10 DCs included are small in size). In contrast, there is almost an equal division between the large and small sized DCs in the Iron & Steel, Textile, Pulp & Paper and Chlor-Alkali sectors.

**Figure 3: Large DCs- Potential financing routes for EE interventions**



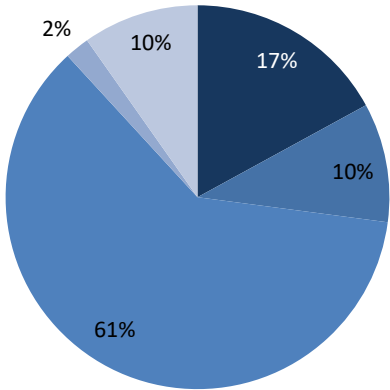
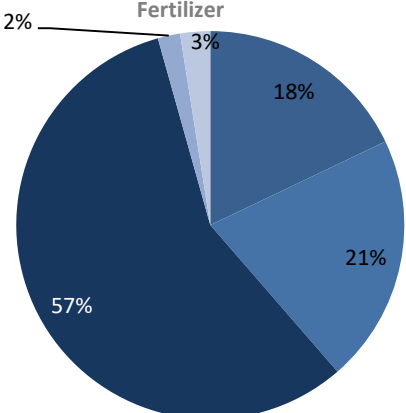
**Figure 4: Small DCs- Potential financing routes for EE interventions**



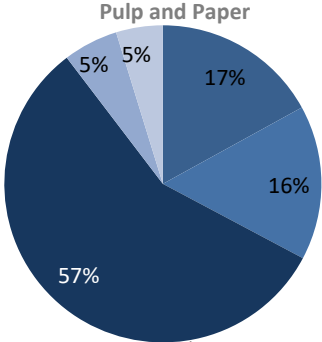
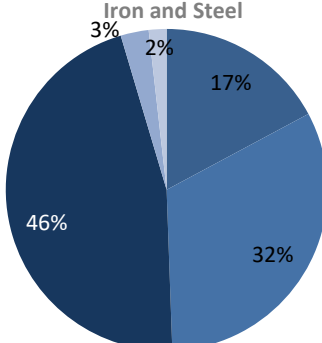
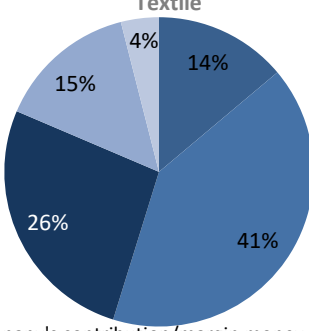
Within the large DCs, those with large balance sheets, who have strong existing relationships with banks, the most likely and optimal route for energy efficiency interventions is clubbing the financing requirements with existing lines of credit. While this route can account for upto 53% or about Rs. 16,000 crore of the total Rs. 25,400 crore investment potential for large DCs, the remaining investment potential can be potentially split across project specific term loans (>5 yrs tenure) (5%) and mezzanine debt capital (6%). Around 3% remains unmet for large DCs. About Rs 4700 crores or 15% of the total financing requirement may be either met through vendor finance ESCO model or clubbed with existing loans depending on the preference of the DCs.

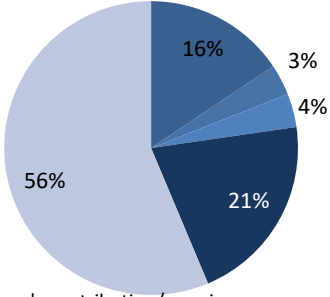
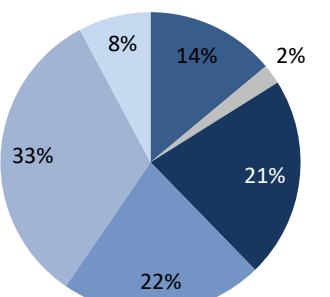
However, with smaller DCs (whose fixed assets are less than Rs 500 crores) the story is different. There is a larger potential of pay for performance ESCO model with 32% (Rs.900 crore ) of the total EE investment potential potentially getting funded through that route and another 22% (Rs 610 crores) getting split between vendor finance ESCO model and getting clubbed with existing loans. An additional 20% (Rs. 560 crores) can be financed primarily by getting clubbed with existing loans. About 2% of the total potential, which amounts to Rs. 60 crore, can be potentially met through project specific term loan while about Rs. 375 crore (14%) can remain as unmet needs for financing energy efficiency within small DCs.

**Sector wise break up of potential financing routes**

Overall sector-wise break-up of financing routes	Description
<p style="text-align: center;"><b>Cement</b></p>  <ul style="list-style-type: none"> <li>■ Company's contribution/margin money</li> <li>■ Clubbed with loans within existing lines of credit/Vendor finance ESCO Model</li> <li>■ Clubbed with loans within existing lines of credit</li> <li>■ Pay for performance ESCO Model</li> <li>■ Mezzanine debt capital</li> </ul>	<p><b>Likely financing pattern:</b> In the Cement sector, out of the total investment potential of Rs. 15,000 crores, 60% or approx. Rs. 9000 crores can most likely get clubbed with loans within existing lines of credit while another 10% or Rs 1500 crores can be split between vendor finance ESCO model and getting clubbed with existing loans. Another 10% of the total financing requirement can be met through mezzanine debt capital.</p> <p><b>Types of projects to be financed:</b> This split is observed primarily because of the fact that all the process interventions considered within cement sector (such as vertical roller mills for finish Grinding, using EAF slag –CemStar, high efficiency Clinker Cooler retrofit and increased use of fly ash— <b>have short term payback of less than 3 years and account for a relatively low percentage of overall capex for the cement plant (&lt;3%), thus most likely to be funded by internal accruals/existing lines of credit only.</b></p> <p>For cross-cutting technologies (CCT) - VFD and WHR, the small DCs can potentially opt for financing through Equipment Vendors/ESCOs if those alternative sources of capital are available.</p>
<p style="text-align: center;"><b>Fertilizer</b></p>  <ul style="list-style-type: none"> <li>■ Company's contribution/margin money</li> <li>■ Clubbed with loans within existing lines of credit/Vendor finance ESCO Model</li> <li>■ Clubbed with loans within existing lines of credit</li> <li>■ Pay for performance ESCO Model</li> <li>■ Unmet Need</li> </ul>	<p><b>Likely financing pattern:</b> Out of the total estimated investment potential of Rs 3900 crores in the fertilizer sector, 57% or about Rs. 2200 crore can be met through loans within existing credit lines, while 2% (Rs. 72 crores) can be funded by pay for performance ESCO model and 3% (Rs. 97 crore) can be classified as unmet need. Around 21% or Rs 807 crores can be split between vendor finance ESCO model and getting clubbed with existing loans.</p> <p><b>Types of projects to be financed:</b> This break-up can be attributed to the fact that within Fertiliser sector, the considered process-interventions (installation of Vapour Absorption system, two stage regeneration in CO2 Removal System, retrofitting Steam Turbines for higher efficiency, using an Adiabatic Pre-reformer) account for a small percentage of overall capex but have a medium term payback (3-5 years) which makes loans within existing lines of credit as most optimal route for large DCs but an unmet need for small DCs. No interventions qualify for project specific term loan.</p>



Overall sector-wise break-up of financing routes	Description
<p><b>Pulp and Paper</b></p>  <ul style="list-style-type: none"> <li>■ Company's contribution/margin money</li> <li>■ Clubbed with loans within existing lines of credit/Vendor finance ESCO Model</li> <li>■ Clubbed with loans within existing lines of credit</li> <li>■ Pay for performance ESCO Model</li> <li>■ Unmet Need</li> </ul>	<p><b>Likely financing pattern:</b> In the Pulp &amp; Paper sector, out of the total investment potential of ~Rs. 2300 crore, 57% or approx. Rs.1300 crore can most likely be funded through loans within existing lines of credit, 6% (Rs.130 crore) be most likely funded through pay for performance ESCO model while 5% (Rs. 115 crore) would be unmet need.</p> <p><b>Types of projects to be financed:</b> This sector has a significant scope of CCTs including VFDs, Super-Efficient Boilers and WHR which are likely to get financed through vendor financing route or ESCO model, especially for small DCs. The intervention related to firing of Black Liquor at High Concentration is unlikely to have the optimal financing route available for small DCs and thus this intervention would have an unmet need. No interventions qualify for project specific term loan or mezzanine debt capital in this sector.</p>
<p><b>Iron and Steel</b></p>  <ul style="list-style-type: none"> <li>■ Company's contribution/margin money</li> <li>■ Clubbed with loans within existing lines of credit/Vendor finance ESCO Model</li> <li>■ Clubbed with loans within existing lines of credit</li> <li>■ Pay for performance ESCO Model</li> </ul>	<p><b>Likely financing pattern:</b> The Iron &amp; Steel sector witnesses a likely potential of about Rs. 5500 crore out of which 46% or about Rs. 2500 crore can be clubbed with loans within existing lines of credit and almost 32% can be split between vendor finance ESCO model and existing loans. Approximately 3% (Rs. 150 crore) can be financed through pay for performance ESCO model route and 2% (Rs.100 crore) can be classified as unmet needs.</p> <p><b>Types of projects to be financed:</b> This split can be attributed to the fact that a larger proportion of total financing, either for CCTs- VFD, WHR or for process interventions (Waste Heat recovery from sinter bed, Coke Dry Quenching, Top Pressure Recovery Turbine, Programmed heating in coke oven) — can be optimally funded through existing lines of credit, especially for large DCs. The smaller DCs can adopt the pay for performance ESCO model for CCTs like VFD and WHR.</p>
<p><b>Textile</b></p>  <ul style="list-style-type: none"> <li>■ Company's contribution/margin money</li> <li>■ Clubbed with loans within existing lines of credit/Vendor finance ESCO Model</li> <li>■ Clubbed with loans within existing lines of credit</li> <li>■ Pay for performance ESCO Model</li> <li>■ Unmet Need</li> </ul>	<p><b>Likely financing pattern:</b> In the Textile sector, out of the total Rs. 1600 crore investment potential, 27% or approx. Rs.430 crore can most likely be funded by getting clubbed with loans within existing credit lines while 40% will be split between this route and vendor finance ESCO model. 15% or approx. Rs 235 crores can be funded by pay for performance ESCO model.</p> <p>With a significant mix of small DCs in the sector, pay for performance ESCO model for CCTs such as VFD, WHR and super-efficient boilers is likely to form a relatively large chunk of the financing mix.</p> <p>Replacement of lighter spindle in place of conventional spindle in a Ring Frame, a process improvement intervention (accounting for 4% or Rs. 64 crore) which doesn't involve significant capex investment is likely to have an unmet financing need primarily due to the long term payback of investment.</p>

Overall sector-wise break-up of financing routes	Description
<p style="text-align: center;"><b>Chlor Alkali</b></p>  <ul style="list-style-type: none"> <li>■ Company's contribution/margin money</li> <li>■ Clubbed with loans within existing lines of credit/Vendor finance ESCO Model</li> <li>■ Clubbed with loans within existing lines of credit</li> <li>■ Unmet Need</li> <li>■ Project specific term loan (&gt;5 yrs)</li> </ul>	<p><b>Likely financing pattern:</b></p> <p>For Chlor-Alkali sector, the maximum proportion of financing for energy efficiency projects/process interventions can be most likely met by project specific term loan (with greater than 5 years tenure), with a share of 60% or approximately about Rs. 300 crore of the total Rs. 530 crore investment potential with this sector. 4% or Rs. 19 crore can be most likely funded primarily by getting clubbed with loans within existing lines of credit primarily for Ion Exchange Membrane Cell Process -Adaptive Control system. Investment potential of Rs. 110 crore out of the total is the unmet financing need of this sector which is primarily linked to the small DCs wanting to undertake Anode and Membrane replacement along with Zero gap conversion of Electrolyser.</p> <p>Financing for CCTs i.e. VFD can be most likely done through loans within existing lines of credit route or vendor finance route depending on the size of the DC.</p>
<p style="text-align: center;"><b>Aluminium</b></p>  <ul style="list-style-type: none"> <li>■ Company's contribution/margin money</li> <li>■ Clubbed with loans within existing lines of credit/Vendor finance ESCO Model</li> <li>■ Clubbed with loans within existing lines of credit</li> <li>■ Unmet Need</li> <li>■ Project specific term loan (&gt;5 yrs)</li> <li>■ Mezzanine debt capital</li> </ul>	<p><b>Likely financing pattern:</b></p> <p>For Aluminium sector, 33% or Rs. 1400 crore approximately out of the total investment potential of about Rs. 4300 crore for the sector, would require project specific term loan (with greater than 5 year tenure). This is primarily linked to investment in Inert anode (PBANOD) in Hall Heroult Process which requires significant capex and has a long term payback. DCs with strong balance sheets would be able to fund this intervention through the above mentioned route but this will be an unmet need (22%, i.e. Rs. 960 crore) for those with stretched balance sheets. 21% of the total investment potential in the sector or about Rs. 950 crores can be most likely met by getting clubbed with loans within existing lines of credit route as these are for short term payback with high return. Some portion of the CCTs (approximately 8% or Rs. 340 crore) can be most optimally funded through mezzanine debt capital. There is limited scope for vendor/ESCO finance route in this sector.</p>

## Cross Cutting Technologies have maximum potential for Vendor/ESCO finance

Energy efficiency interventions such as Variable Frequency Drive (VFD), Waste Heat Recovery (WHR) and super efficient boilers which find applicability across multiple industry sectors, are likely to be most amenable for financing offered by the equipment supplier (vendor finance) or the project being implemented by ESCOs.

**Vendor finance/ESCO model presents a Rs 6000 crore potential in the 7 PAT sectors (except thermal power plant sector)**

Several reasons can be attributed to this likely trend for CCTs, including:

- Energy saving are easily measurable/quantifiable
- Do not have a significant upfront capex (as a % of overall capex for the firm)
- Payback are usually short term

## Rs 1400 crore (~USD 200m) is the unmet need with existing financing instruments

Out of the total Rs. 34,000 crore investment potential, approximately, 4% or Rs. 1400 crore, is currently the unmet financing need for Energy Efficiency projects/process interventions.

The maximum share of unmet financing need is for Inert anode (PBANOD) in Hall Heroult Process within Aluminium sector which is a process change characterized by significant capex and long term payback, thus rendering it difficult for DCs with stretched balance sheet to raise new project finance for it.

Table: List of interventions whose financing needs are unmet

Sector	Intervention	Financing need (Rs crores)	Share of total unmet need
Chlor-Alkali	Anode and Membrane replacement along with Zero gap conversion of Electrolyser	110	8%
Pulp & Paper	Firing of Black Liquor at High Concentration	114	8%
Textile	Replacement of lighter spindle in place of conventional spindle in a Ring Frame	64	4%
Fertilizer	Installation of Vapour Absorption System	6	0.5%
Fertilizer	Two Stage Regeneration in CO2 Removal System	30	2%
Fertilizer	Using an Adiabatic Pre-reformer	62	4%
Iron & Steel	Waste Heat recovery from sinter bed	10	1%
Iron & Steel	Coke Dry Quenching	88	6%
Aluminum	Inert anode (PBANOD) in Hall Heroult Process	954	66%

## **Key levers to realize the investment potential: policy push and standardization in EE project definitions**

1. Policy push to prioritize Energy Efficiency - Across the board, conversations with DCs, ESCOs, lenders and solution vendors revealed that a greater push at a policy level was required to spur action and prioritize Energy Efficiency investing. These can include:
  - a. More stringent Energy Efficiency norms and a policy that levels playing field for all companies in a sector
  - b. Providing tax incentives for industry (companies) to adopt ESCO route like it was done in China, which may encourage the industry in this direction.
2. Developing standardized M&V protocol, project document templates, reporting templates, underwriting procedures and capacity building of lenders to understand energy efficiency financing and more so ability to make use of existing lines/guarantee facilities
3. Standardized pay for performance contracts to be created coupled with the use of advanced measurement systems to quantify savings generated against dynamic baselines which would reduce the risk perception associated with some of the energy efficiency interventions and allow greater participation by ESCOs in the industrial energy efficiency market. This would also include:
  - a. Exploring pooling of standardized projects by ESCO in order to make the ticket size of debt more meaningful and diversify the risk for a bank (provided the ESCO's balance sheet allows it)

Conclusively, one can simply put that perhaps a 'market-maker' is missing- to bring industry, financial institutions and ESCOs together. Collaboration is very important to take a combined responsibility for the bigger issue—i.e. enhancing the energy efficiency among industries in an ethical, responsible and definitely in a sustainable way.

## Methodology

Sustainability Outlook and AEEE have developed a decision matrix which will help assess the most optimal route for financing energy efficiency interventions. This matrix considers the following variables:

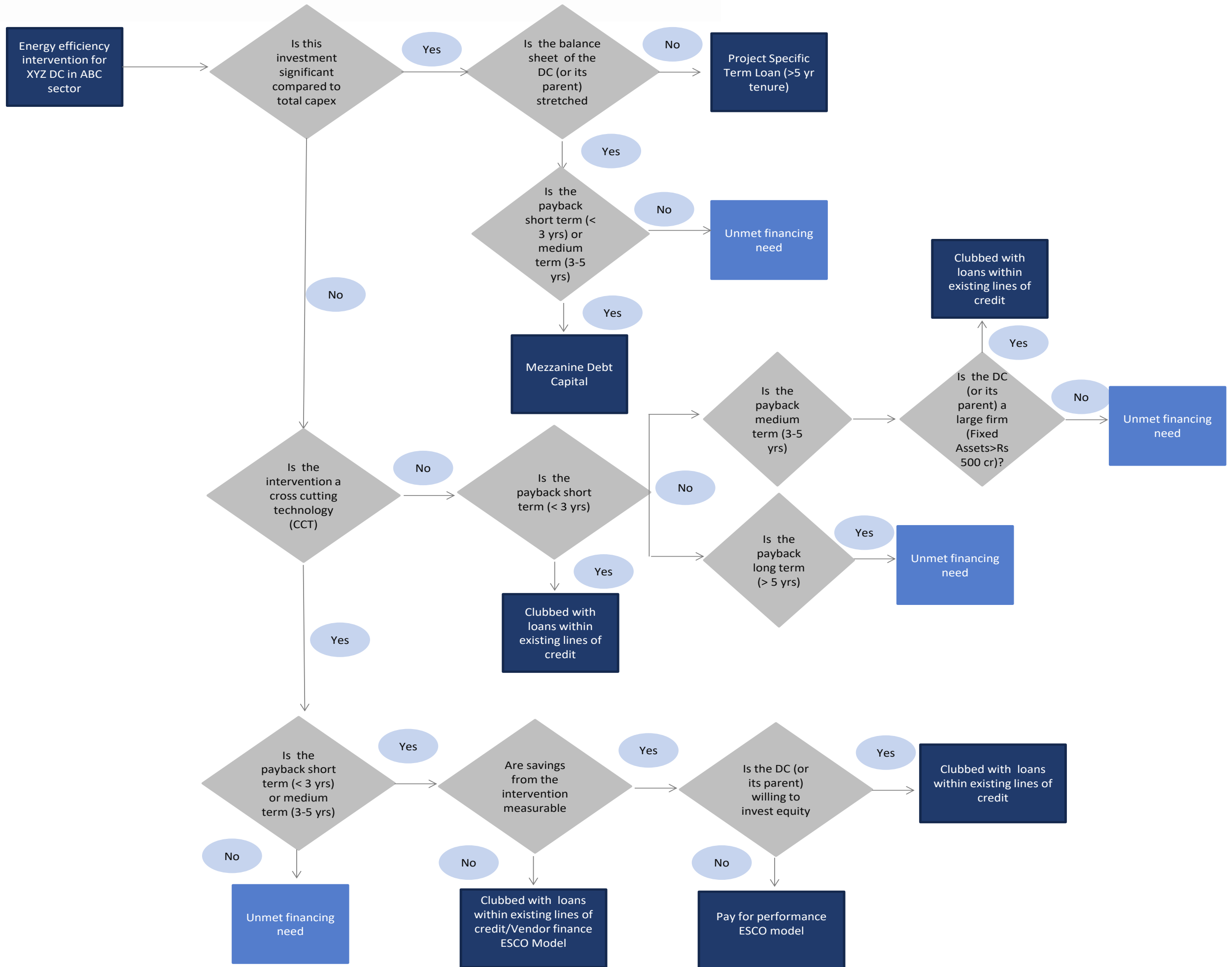
1. Type of Energy Efficiency intervention
  - a. What is the significance of capital expenditure required for the intervention (as a percentage of total capex required by the firm to set up manufacturing capacity in that sector)? (any intervention which requires more than 3% of the firm's capex has been considered as significant)
  - b. What is the simple payback of intervention? (less than 3 years is classified as short term, between 3 and 5 years as medium term and greater than 5 years as long term payback)
  - c. Whether the intervention is a cross cutting technology or linked to process improvement?
2. Type of firm undertaking the intervention
  - a. Size of fixed assets (as a measure to gauge the size of the firm)
  - b. Strength of the balance sheet

Keeping the above metrics in mind, the optimal financing routes for the energy efficiency interventions considered for the purpose of this analysis (refer PAT Pulse May issue for a detailed list of energy efficiency interventions), are primarily the following:

6. Project Specific Term Loan (>5 yr tenure)
7. Clubbed with loans within existing lines of credit
8. Vendor finance ESCO model
9. Pay for Performance ESCO model
10. Mezzanine Debt Capital

The analysis has also found that suitable financing routes do not exist for certain EE interventions and thus their financing needs remain unmet.

# Energy Efficiency Financing Decision Matrix



# POLICY UPDATE

## **Submission of Action Plan under PAT cycle - II and Energy Consumption details in “Form-1” for 2015-16-registration.**

With reference to Rule 5 of the Energy Conservation (Energy Consumption Norms and Standards for Designated Consumers, Form, Time within which, and Manner of Preparation and Implementation of Scheme, Procedure for Issue of Energy Savings Certificate and Value of Per Metric Ton of Oil Equivalent of Energy Consumed) Rules, 2012-- every notified Designated Consumer (DC) is expected to submit a scheme to the State Designated Agency (SDA) with a copy to Bureau of Energy Efficiency (BEE), within three months of the issue of the notification, which may include-

“a. Action plan containing inter-alia, a brief description of identifying energy saving measures to comply energy consumption norms and standards by the target year;

b. The estimated cost of each identified energy saving measures;

c. Implementation plan to achieve energy consumption norms and standards through implementation of energy saving measures or through purchase of energy savings certificates.” (BEE 2016)

Every Designated Consumer is also expected to submit the status of energy consumption in Form-1 in the electronic form to the concerned SDA, with a copy to Bureau within three months from the end of the previous financial year, with reference to the Clause (a), (b) of Sub-Rule (1) of Rule (3) of The Energy Conservation (The Form and Manner for Submission of Report) Rules, 2007.

In view of the above, each DC notified under S.O. 1264 (E) dated 31' March, 2016 was obligatory to submit the Action Plan under PAT cycle-II and status of energy consumption details in Form-1 to the concerned SDA with a copy to BEE by 30th June, 2016. In case of non-compliance with the decided timeline, the respective DC would be liable for penalty under Section 26 of the Energy Conservation Act, 2001.

Source: [https://beenet.gov.in/GuideLine/New%20Profile\\_2%20\(00000004\).pdf](https://beenet.gov.in/GuideLine/New%20Profile_2%20(00000004).pdf)

## **Central Electricity Regulatory Commission (Terms and Conditions for Dealing in Energy Savings Certificates) Regulations, 2016.**

CERC notified the Central Electricity Regulatory Commission (Terms and Conditions for Dealing in Energy Savings Certificates) Regulations on 6<sup>th</sup> June 2016 for the development of market in energy for exchange of transferable and saleable Energy Savings Certificates (ESCerts).

There are specific functions designated to the Registry, the Administrator, the Commission and it is clearly specified in this regulation that the value and validity of ESCerts shall be as specified in the Energy Conservation Rules. With regards to the dealing with the certificates, fees and charges as well as the pricing of these ESCerts, clear statements and conditions have been provided, like:

- For dealing in the Certificates, following rules and regulations have been specifically laid out:  
(1) ESCerts shall be dealt only through the Power Exchange and not in any other manner.

- (2) The frequency of transaction of ESCerts, through Power Exchanges, shall be on monthly basis or in such periodicity for all registered and eligible entities as per the procedure approved by the Commission.
  - (3) In any dealing session, an eligible entity shall not place sale bids in excess of total ESCerts held in its Registry Account, else these entities would be treated as defaulter.
  - (4) Eligible entities with more than three cases of default specified in sub-regulation 10(7) in a cycle shall be barred from transaction of ESCerts for next six months, notwithstanding any penalty due to be imposed as per the provisions of the Energy Conservation Act, 2001.
  - (5) The Power Exchanges, on receipt of confirmation report shall-
    - (a) “aggregate all the buy bids and the confirmed sell bids and determine the market clearing price and the market clearing volume and the transaction results shall be published on the website of the concerned Power Exchange;
    - (b) The matching mechanism on Power Exchanges for ESCerts transaction shall be closed bid double-sided auction.” (CERC 2016)
- Pricing of a Certificate - a) the denomination of one ESCert shall be equal to energy consumed in terms of one metric Ton of Oil Equivalent (mtoe) and b) the market price of ESCerts shall be as discovered through the process of bidding at the respective Power Exchange.
  - The Commission in consultation with BEE may from time to time determine Fees and Charges by order which would be payable by the Eligible entities to the Registry.

Lastly, the power to relax certain norms for specific affected party(s) and the power to issue directions necessary in furtherance of the objective and purpose of the Regulations, is held supremely by the SERC itself.

Source: <http://www.cercind.gov.in/2016/regulation/Noti124.pdf>



# INNOVATION LENS

Some of the latest technologies and innovations in the area of energy efficiency that have demonstrated their reliability successfully are listed below

## Deep Eutectic Solvents cluster

### Applicable sector:

This technology has one of the best applications in the Pulp and Paper industry and is also applicable for chemical industry. Apart from providing DES-based papermaking and sheet forming, Deep Eutectic Solvents (DES) can be used to eliminate water from papermaking entirely, prepare the stock and eventually, remove contaminants. It is expected that in future, DES could be used for recycled fibre processing and dissolving ink residues in paper which is recovered.

### Key Benefits and likely impact:

- Produces high quality cellulose, sulphur-free/unchanged lignin and hemicellulose.
- Revenue from the sales of chemicals through DES has the capability to cover most of the costs of cellulose production and it's estimated that a value increase of Rs.14, 780.43 to 22,170.64 (200-300 euros) per tonne of wood can successfully occur.
- Highly energy efficient as their processes does not require high temperatures.
- Bio degradable and Exerts low vapor pressure
- Mixable with H2O and non-toxic
- Exists as non-volatile and possesses low flammability
- Provides energy reduction by 40%
- Provides CO2 reduction by 20%
- The true savings lie outside the mill boundaries:
- If lignin is able to replace aromatics in the chemical industry, DES can provide up to -90% overall energy and CO2 savings



**ISPT**  
Source: [ISPT](#)

**Description:** Deep Eutectic Solvents (DES) are renewable, nature-based, biodegradable, cost-effective, low-volatile and energy efficient, as their processes do not require high temperatures. The best aspect of this technology is that they fully replace traditional pulping processes. Produced by plants, DESs open the opportunity for producing pulp at low temperatures and at atmospheric pressure itself. Any type of biomass could be dissolved into lignin, cellulose and hemicellulose along with minimal energy, emissions and residues using DESs. This new omnivorous pulp mill concept is expected to further allow tailor-made fibers to be produced, using a broader variety of raw materials and with significantly lesser use of energy, along with use of fewer chemicals. This would easily bring down the investment costs also to be less than half from that of a traditional chemical pulp mill. Cost-effective pulp production units, as much as 50 kilo-tonne per annum can be effective using DESs, meeting the growing demand for more localized production units, which ideally should close to resources. Hence in this way, DES-based installations can successfully cater to local and regional markets, reducing transportation, emissions and costs at the same time.

Source: [http://www.unfoldthefuture.eu/uploads/report\\_final\\_for\\_emailing\\_latestv08.pdf](http://www.unfoldthefuture.eu/uploads/report_final_for_emailing_latestv08.pdf),  
<http://www.ispt.eu/roadmap/deep-eutectic-solvents-cluster/>,  
<http://www.cepi.org/system/files/public/documents/events/EuropeanPaperWeek2015/Heiner%20Grussenmeyer%20-%20Provides%20public%20kick-off%2019-11-15.pdf>

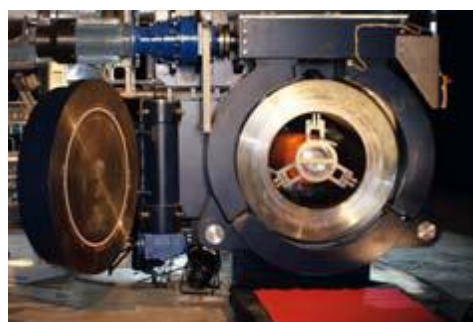
## DyeCoo's water-free fabric dyeing technology

### Applicable sector:

The technology uses supercritical carbon dioxide instead of water for dyeing (fabric) textiles. Firms like Nike and have used this waterless technology by DyeCoo, naming the process as "ColorDry".

### Key Benefits and likely impact:

- Minimum to no water consumption, least use of chemicals,
- Requires no drying
- Two times or double efficiency in terms of time.
- CO<sub>2</sub> used is reclaimed from existing industrial processes, by recycling 95% of it in a setting of closed loop system.
- By eliminating the need to use water, along with addition of efficient colour absorption and short batch cycles – this technology proves to be energy efficient.



Source: [Dyecoo.com](http://Dyecoo.com)

**Description:** In this new machine launched by Dutch company DyeCoo Textile Systems BV, the usage of water as a solvent in fabric wet processing is replaced by supercritical carbon dioxide. As per DyeCoo, "Supercritical CO<sub>2</sub> has liquid-like densities, which is advantageous for dissolving hydrophobic dyes, and gas-like low viscosities and diffusion properties, which can lead to shorter dyeing times compared to water. Compared to water dyeing, the extraction of spinning oils, the dyeing and the removal of excess dye can all be carried out in one plant in the carbon dioxide dyeing process which involves only changing the temperature and pressure conditions; drying is not required because at the end of the process CO<sub>2</sub> is released in the gaseous state. The CO<sub>2</sub> can be recycled easily, up to 90% after precipitation of the extracted matter in a separator"

Source: <http://www.dyecoo.com/pdfs/colourist.pdf>, <http://www.dyecoo.com/co2-dyeing/>

## Clearflo Technologies' Water softener plant

### Applicable sector:

The technology is best applicable, both for residential and commercial purposes and among the industries, it pertains to all such sectors which have extensive use of hard water, like- within textile Sector, chemical factories.

### Key Benefits and likely impact:

- Enables great reduction in operational costs pertaining to water softening
- Less priced, hence feasible for all large/small DCs
- Low power consumption
- Reduction of scales and clogging from pipes and vessels
- Automatic facilities to start the recharging cycle and so easy to operate.
- Increases the efficiency of appliances and the plumbing systems along with enhancing their service life too.
- Reduction of scales and clogging from pipes and vessels
- Automatic facilities to start the recharging cycle and so easy to operate.
- Increases the efficiency of appliances and the plumbing systems, along with enhancing their service life.
- Can operate as automatic, semi-automatic or manual.



Source: [ClearFlo Technologies](http://ClearFlo Technologies)

**Description:** Designed as highly efficient plant, for converting any type of hard water into soft water removing

the calcium, magnesium, sodium and iron from water, this water softener plant is offered by Clearflo Technologies which offers other related equipment too for industrial applications, pertaining to energy consumption and hence ensure energy efficient practices. It is well-acknowledged that the hardness of water assumes prime importance in many applications, e.g. the preparation of drinking water, or the water in breweries and sodas, but also for cooling water and boiler feed water. Conceptually, water softeners are specific ion exchangers that are designed to remove ions, which are positively charged. They essentially remove calcium (Ca<sup>2+</sup>) and magnesium (Mg<sup>2+</sup>) ions, where these two ions are often referred to as 'hardness minerals'. Sometimes, softeners are even applied to remove iron and when used for that purpose, the softening devices are able to remove up to five milligrams per litre of dissolved iron.

Source: <http://clearflo.in/water-softener-chennai.html>, <http://clearflo.in/water-softeners-for-%20hard-water.html>

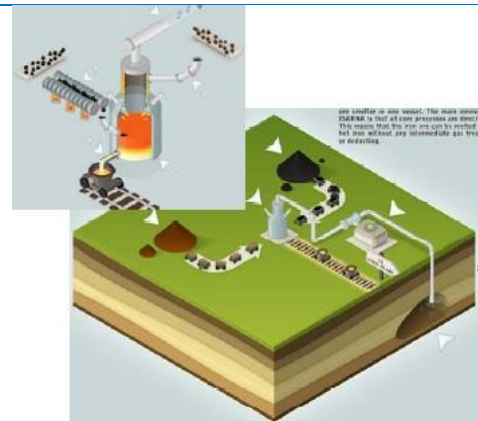
## Ulcos' Top Gas Recycling Blast Furnace

### Applicable sector:

This technology finds its application in the Iron and Steel industry. It has developed as an effective alternative to improve the performance of blast furnace.

### Key Benefits and likely impact:

- Requires effectively lower amount of coke
- Feasibility of a 26% coke saving/ton Hot Metal from the current BF coke consumption
- Feasibility of a 15% reduction of CO<sub>2</sub>/t-High Rupturing Capacity is expected without CCS (Carbon Capture and Storage) and up to 50% CO<sub>2</sub> Reduction is expectedly possible with CCS.



Source: [Ulcos](http://www.ulcos.com)

**Description:** This technology, the Top Gas Recycling Blast Furnace conceptually relies on separation of the off gases so that the useful components can be easily recycled back into the furnace and eventually be used as a reducing agent. This would not only reduce the amount of coke needed in the furnace, but also through injecting Oxygen(O<sub>2</sub>) into the furnace instead of preheated air, it removes unwanted Nitrogen(N<sub>2</sub>) from the gas, facilitating Carbon dioxide (CO<sub>2</sub>) Capture and Storage (CCS).

Source: [http://www.ulcos.org/en/research/blast\\_furnace.php](http://www.ulcos.org/en/research/blast_furnace.php), <http://ietd.iipnetwork.org/content/top-gas-recycling-blast-furnace-0>

## NEWS WIRE

### Key News Highlights

#### **The Carbon Trust UK in partnership with BEE India conceptualizes Rs 5000 crore fund for Energy Efficiency in MSMEs**

**August 30, 2016**

Bureau of Energy Efficiency (BEE), the focal Government of India agency to promote energy efficiency will collaborate with the Carbon Trust UK, leading UK agency to promote energy efficiency and reduce carbon footprints, to launch a Rs 5000 crore fund for promoting industrial energy efficiency.

The concept of the fund proposed as Industrial Energy Efficiency Fund (IEEF), with a corpus of Rs 5000 crore, will focus primarily on micro small and medium industries, though large, energy consuming industries will also be assisted under the fund. Key components of the IEEF are tailored to address the major barriers to energy efficiency action within industry and the components also include coordination, promotion, advice and finance matters.

Within its chief aims, the fund has been designed to support a range of energy efficiency technologies starting from technology development to deployment.

In the recent meeting of the industry representatives held regarding this at New Delhi, the detail operating plan of the IEEF was presented by the experts from the carbon Trust, U K, who also invited comments from the stakeholders on operationalizing the fund. Representatives from the MSME sector requested for a simple process for availing assistance from the fund and professed for widespread involvement of Energy Service Companies (ESCO)s in implementing energy conservation projects in MSMEs.

Stress on upgrading and upscaling the manufacturing processes in the MSMEs was also suggested by the sector representatives for enhancing energy efficiency while collectively vouching for a component on skill development under the Fund.

Unanimously, it was agreed that a cluster mode will be the most economic approach to implement energy efficiency projects in MSMEs.

Source: <http://knnindia.co.in/news/newsdetails/msme/the-carbon-trust-uk-in-partnership-with-bee-india-conceptualizes-rs-5000-cr-fund-for-energy-efficiency-in-msmes>

#### **Energy Efficiency Services to raise Rs 10,000 crore**

**August 26, 2016**

To speed up the expansion and meet the rising demands case, State-owned Energy Efficiency Services (EESL), which is primarily engaged in LED bulbs distributions, plans to raise Rs 3,500 crore this financial year and another Rs 6,500 crore next fiscal. While the company is set to raise Rs 500 crore from the domestic bond market, it plans to sell green masala bonds worth Rs 700 crore to overseas investors in November 2016.

It is through the privately placed corporate bonds that EESL aims to raise its two-three tranches of similar size -- the first tranche is expected to open for subscription in a week or two since it has already mandated Trust Investments as sole investment banker.

According to Saurabh Kumar, Managing Director, EESL, "Our fund requirement has trebled this year compared to the last financial year. The demand for energy efficient appliances is very high in India as our country has signed an international agreement to bring down carbon emissions. He further added, "We would be aiming to raise Rs 6,500 crore next financial year as we are growing fast; in two years' time, we would think of listing our company in stock exchanges also."

Domestic bonds are plausibly expected to be of five to seven-year's maturities while the rupee-denominated green masala bonds shall most likely mature in three-five years. It's interesting to note that, overseas investors take the exchange rate risk in masala bonds unlike dollar-denominated bonds.

Among EESL's chief operations, it procures LED bulbs and power saving fans in bulk from a host of manufactures including Surya, Havells and Phillips through tenders at significantly lower prices than market rates and subsequently, distributes them. It has been in talks with large investment bankers to offer "green masala" following NTPC, the national power generator, which is also one of its major stakeholders along with Power Finance Corporation and Rural Electrification Corporation. Domestically in India, the company has recently been rated as AA with structured obligation, a sort of sovereign guarantee that adds to investor confidence.

In future, EESL is planning to introduce energy efficient pumps for farmers. Also being engaged with many urban local bodies in several states including Andhra Pradesh, Jharkhand, Rajasthan, Odisha, Jammu and Kashmir, and Maharashtra in supplying LED street lights, it's keen to explore opportunities through the government's proposed 100 smart cities plan.

Source: <http://economictimes.indiatimes.com/markets/bonds/energy-efficiency-services-to-raise-rs-10000-crore/articleshow/53877649.cms>

## **New energy efficiency rating methodology for ACs**

**August 25, 2016**

Bureau of Energy Efficiency (BEE) introduced a new star rating methodology called ISEER (Indian Seasonal Energy Efficiency Ratio) for air conditioners which will not only address the issue of different climatic zones in India but also the performance of air conditioners during higher temperatures.

ISEER measures energy efficiency of air conditioners based on a weighted average of performance at outside temperatures, ranging between 24 and 43 degree Celsius and being based on Indian weather data. The best part is that the consumers can now purchase air conditioners with higher efficiency leading to lower electricity bills.

Previously, air conditioners in India have been tested under the IS 1391 methodology at standard operating conditions of outside temperature of 35 degree Celsius. As per the Indian Weather Data Handbook, 2014, weather profile of 54 major cities reveals that in a year, 65 per cent of the total numbers of hours have a temperature above 24 degree C (5778 hours out of 8760).

According to Sanjay Seth, BEE Secretary, "the new methodology for rating system will bring in higher energy efficiency of appliances and reduce energy consumption." Further he added, "The standards have been developed while keeping changing Indian temperature in mind. Such innovations will help us achieve the objective sooner."

Since June 2015, ratings based on ISEER have been introduced on a voluntary basis for Variable Speed (Inverter) Air Conditioners and they have been proposed to be merged with fixed speed air conditioners in the mandatory regime from January 2018. This rating has already been adopted by some of the leading manufacturers.

Source: [http://www.business-standard.com/article/companies/new-energy-efficiency-rating-methodology-for-ac-116082400678\\_1.html](http://www.business-standard.com/article/companies/new-energy-efficiency-rating-methodology-for-ac-116082400678_1.html)

## **Corporate Investment in Energy Efficiency ‘at an All-Time High’**

**July 19, 2016**

A major new survey, namely the Energy Efficiency Indicator (EEI) survey by Johnson Controls of over 1,200 facility and energy management executives in India, United States, Brazil, China and Germany has revealed that interest and investment in energy efficiency, especially the planned corporate investments are at an all-time high. Among the key significant implications, it was noted that the trend of decoupling economic growth from energy consumption will continue, especially in India and cutting carbon pollution sharply would be as super-cheap as all the independent analyses have been saying for years. About 72 percent of global respondents expect to increase investments in energy efficiency and onsite renewables over the next year, while only 42 percent expected such an increase in 2013. For India, a whopping 89 percent of respondents expect to increase investments, where in China, the figure is 85 percent for the same.

Some other key findings of this survey include- “42 percent of organizations are willing to pay a premium to lease space in a certified green building versus 15 percent in 2013; “62 percent of organizations said they are very or extremely likely to have one or more facilities able to operate off the grid in the next ten years; “80 percent of organizations plan to achieve nearly zero, net zero or positive energy status for at least one of their facilities versus 49 percent in 2013”

(Thinkprogress.org 2016)

Investment decision by companies have been “increasingly considering” factors such as greenhouse gas reduction, customer and employee attraction, enhanced reputation, government policy and investor expectations, though reducing business costs is still the top driver of efficiency investments. Further, it has also been observed that fundamentally energy efficiency is the low-hanging fruit that grows back. As the technology keeps improving, smart control systems keep getting smarter, and knowledge spreads to more people, the efficiency resource never gets exhausted. In the U.S., a key driver of the decoupling of electricity use and GDP growth has been the state policies promoting energy efficiency, in particular Energy Efficiency Resource Standards (EERS) and new regulations that decouple a utility’s revenues from the amount of electricity they generate and sell.

Energy efficiency investments have also been remarked for boosting worker health and productivity: A major 2014 International Energy Agency report’s central conclusion of “Capturing the Multiple Benefits of Energy Efficiency” was that the economically viable energy efficiency investments, if they uptake, have the potential to boost the cumulative economic output by USD 18 trillion through 2035. The report also found that green building design can achieve significant health benefits, like-reduced medical costs and higher worker productivity, which amount to 75% of the overall benefits and this way, the non-energy benefits of energy efficiency upgrades, can be as much as three times the size of the energy savings.

Finally, for keeping the cost of climate action low, Energy efficiency is the key. It not only helps ensuring the total health, environmental and productivity gains but the benefits from its action vastly exceed the costs of inaction.

Source: <http://thinkprogress.org/climate/2016/07/19/3774267/energy-efficiency-investments/>

## **Developing Nations’ Energy Intensity Down 40% Since 1990**

**July 13, 2016**

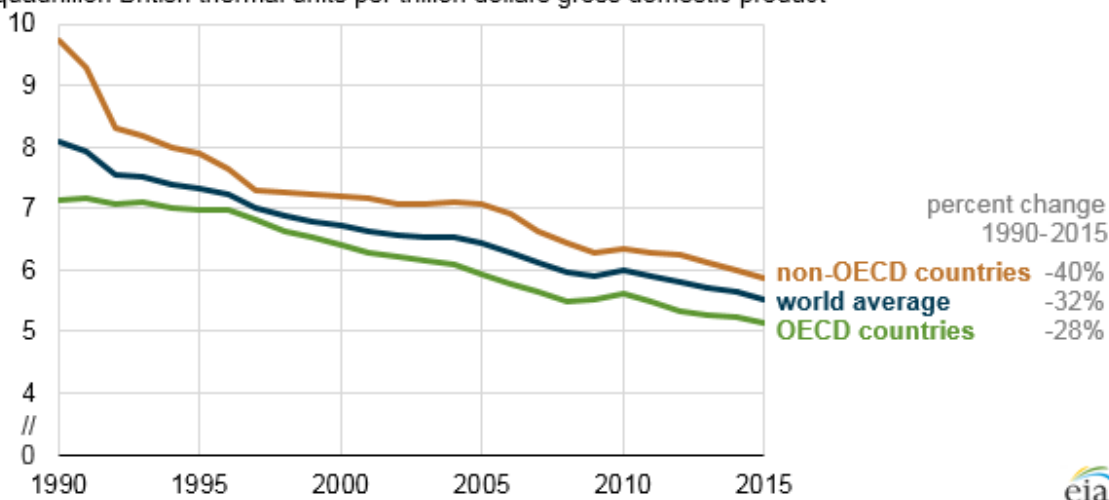
Undeniably, the energy intensity of developed nations has been falling from some time but now, even the energy consumption per unit of gross domestic product is falling in developing nations, and at a much faster rate.

According to new data from the U.S. Energy Information Administration, most developing countries started out with higher levels of energy intensity, so on average their energy intensity is still higher than those in developed nations, but that gap has been observed to be shrinking.

Trends in World Energy Intensity from 1990-2015

**World energy intensity, 1990-2015**

quadrillion British thermal units per trillion dollars gross domestic product



For the OECD and non-OECD economies, gains in industrial energy efficiency are responsible for much of the drop in overall energy intensity as countries with heavy manufacturing tend to use more GDP per dollar. Globally, it is expected that the energy intensity should continue to drop across much in the coming years.

In 2014, the U.S. and China, the two nations with the largest and most energy-intense economies, pledged to joint targets for reducing carbon dioxide emissions, and in this regard, the White House has a goal to double the energy productivity by 2030. But 2015 December's Paris climate agreement, in which nearly 200 countries agreed to take steps to limit the global temperature increase to 1.5 degrees Celsius, has apparently overshadowed the non-binding target made by the U.S. and China. After the Paris agreement, more than 100 banks that manage a combined total of \$4 trillion in assets called for a doubling of energy efficiency by 2030. Increasing the efficiency of industrial motors is another large and enormously untapped, opportunity globally.

According to Jigar V. Shah, executive director of the Institute for Industrial Productivity, it is not like a long-ago made conclusion that energy intensity will decline continuously, everywhere and hence, with rapid urbanization, industrial energy efficiency needs to move forward at a steady rate just to match with the pace. However, it is quite likely that that energy intensity could fall further, even as megacities continue to grow, with the Paris climate agreement in background and increased availability of more energy-efficient equipment too.

Source: <http://www.greentechmedia.com/articles/read/developing-nations-energy-intensity-down-40-since-1990>

**YES Bank & SIDBI join for financing energy efficiency projects**

July 11, 2016:

A Memorandum of Understanding has been signed between YES Bank, India's fifth largest private sector Bank and SIDBI, for financing Energy Efficiency Projects program under the Partial Risk Sharing Facility (PRSF) mechanism. This pact is YES Bank's latest endeavor in its continuing commitment in financing and promoting clean energy projects. PRSF has been sponsored by the World Bank and it has support from the Global Environment Facility (GEF) and Clean Technology Fund (CTF). SIDBI has been appointed as the Project Execution Agency and it will be extending the guarantee for securing up to 75% of the loan amount, up to INR 15 Crores extended by YES BANK to the MSMEs under PRSF.

The PRSF mechanism is expected to provide credit guarantee to more than 500 Energy Service Companies (ESCO) implementing Energy Efficiency projects which would eventually mobilize financing of around USD 127 million.

Further, significant energy savings of the tune of 1,002.1 Gwh and CO2 emissions reductions of the tune of 0.734 million tons are expected to result from this project. Transformation of the energy efficiency (EE) market in India by promoting increased level of EE investments, particularly through energy service performance contracting (ESPC) delivered through Energy Service Companies (ESCOs) is the primary objective of this project. The idea is to reduce the risk commercial banks face in providing credit to the stakeholders by successful completion such projects through the expected PRSF support. It is also expected to showcase the viability of ESPC market for scaling up implementation of energy efficiency projects in Micro, Small and Medium Enterprises (MSMEs), large industries, municipalities, and buildings sector in India. YES Bank is the first bank to be empanelled as a participating financial institution (PFI) under this facility.

According to Mr. Sumit Gupta, Group President, Retail Banking Assets Group, YES Bank, "financing of Energy Efficiency Projects is still at a nascent stage in India. YES BANK is privileged to be the first bank to sign up with SIDBI for the prestigious facility. We are confident that this project will be instrumental in transforming the energy efficiency landscape in India. Since inception, YES BANK has followed a Responsible Banking ethos and taken the lead in financing green and renewable energy projects, and this partnership is another endeavor in this direction."

According to Shri Ramesh Dharmaji, Chief General Manager, SIDBI-- role of SIDBI in improving Energy Efficiency in MSMEs through innovative financial mechanisms in the past has been immense and such Risk Financing by Banks for developing Energy Efficiency Market by Energy Service Companies is highly needed today. Further, PRSF fund is unique and first of its kind in the country and it has rightly commenced its operation in view of the larger goals of achieving GHG Emission Reduction through Energy Efficiency, aligned with India's commitment towards this objective.

Source: [http://www.moneycontrol.com/news/sme/yes-banksidbi-join-for-financing-energy-efficiency-projects\\_7003381.html](http://www.moneycontrol.com/news/sme/yes-banksidbi-join-for-financing-energy-efficiency-projects_7003381.html)

## **BRICS nations to work on energy saving agenda**

**July 5, 2016:**

A draft action plan has been brought by BRICS nations to jointly work on research as well as technological development to promote energy saving and efficiency through a host of initiatives that could be supported by the group's development bank. Few of the "broad elements" which were agreed upon, include- building capacities, sharing best practices and policies, developing technology, promoting energy efficient and saving methods/tools by business entities as well as financing of such initiatives through BRICS Development Bank.

According to B P Pandey, Additional Secretary (Power), "South African government is supporting energy efficient lighting programme in the country. In India, we have taken up four programmes in this direction. Under the Paris Agreement, India is committed to reduce emissions by 30-35 per cent by the year 2030. Accordingly, we have launched a series of programmes aimed at improving energy efficiency. The National Mission on Lighting, star-labeling of appliances, energy saving in the industrial sector through PAT (Perform, Achieve, Trade) and implementation of Energy Conservation Building Code. all are aimed at improving energy efficiency and reducing emissions." He further added that the Centre has set a target of producing 160 GW of renewable energy by 2022. "By 2030, 40 per cent of our (electricity) installed capacity will be renewable energy. Solar power is becoming more competitive these days with price being less than Rs 5 per unit. China has gone in a big way in solar energy and we can emulate that." – B P Pandey said.

According to the Ministry of Power, "The joint statement (of BRICS) capturing deliberations reiterated the commitment of the Member countries to pursue cooperation in the field of energy saving and energy efficiency through joint research and technology projects; technology transfer; conferences, lectures and seminars; and exchange of experience and best practices."



Source: <http://economictimes.indiatimes.com/industry/energy/power/brics-nations-to-work-on-energy-saving-agenda/articleshow/53062931.cms>

## **India Targets \$8.9 Billion in Energy Efficiency Cost Savings**

**June 29, 2016:**

India is planning to replace energy-intensive appliances with more efficient designs, which is expected to save as much as 600 billion rupees (\$8.9 billion) a year, according to the head of the government arm heading the country's drive.

"The federal power ministry's plan to replace incandescent lights with LED bulbs and use energy-efficient irrigation pumps, fans and air conditioners can cut about 30 gigawatts of peak-hour generation demand in three years" said Saurabh Kumar, managing director of Energy Efficiency Services Ltd., a joint venture of four government-run power companies. He further added that cost-saving estimates are calculated using a power price of 4 rupees per kilowatt hour. "The LED bulbs program is expected to result in savings of about 100 billion kilowatt hours a year, while replacing half of the 20 million irrigation pumps will result in annual savings of 25 billion kilowatt hours. Another 25 billion kilowatt hour a year of savings is expected from efficient air-conditioners" Kumar said.

Efficient energy use to conserve resources and help curb environmental damage in a fossil-fuel driven economy has been emphasized by Prime Minister, Narendra Modi. This plan is significant towards fulfilling his promise of providing around-the-clock electricity to every household by 2019. The drive for efficiency adds another challenge for the power producers as the goal of universal power is hamstrung by money-losing state distributors that struggle to pay for electricity, which ends up resulting in outages and idle generation capacity.

"Clearly the space for conventional power producers in India is shrinking. "It's possible that we may see hardly any thermal capacity addition in the next five years." " said Debasish Mishra, a partner with Deloitte Touche Tohmatsu LLP in Mumbai.

Source: <http://www.bloomberg.com/news/articles/2016-06-29/india-targets-8-9-billion-in-energy-efficiency-cost-savings>

## DATEBOOK

### **ECEEE's Industrial Efficiency 2016**

<b>Date</b>	12 - 14 September 2016
<b>Location</b>	Die Kalkscheune, Berlin, Germany
<b>Type of event</b>	Conference
<b>Organiser</b>	European Council for an Energy Efficient Economy (ECEEE)
<b>Key themes</b>	Prime focus on industrial energy efficiency, its need and discussion on ways to harvest the huge potential for savings in the industry sector, in terms of energy efficiency. Financing for industrial energy efficiency would also be discussed.
<b>Link</b>	<a href="http://www.eceee.org/events/calendar/2016/2016-industrial-efficiency-conference">http://www.eceee.org/events/calendar/2016/2016-industrial-efficiency-conference</a>

### **Educational Training on Energy Efficiency and Demand Response Policy**

<b>Date</b>	27 September 2016
<b>Location</b>	Oakland, California
<b>Type of event</b>	Training Session
<b>Organiser</b>	California Energy Efficiency Industry Council
<b>Key themes</b>	Raising the policy IQ and delivering career-building insights to demystify California's policies on energy efficiency and demand response, providing an overview of California's very early days of energy "conservation" starting in the 1960's through today and identifying how major events have influenced the policy landscape not just relevant for California but for other nations too. Also relevant for job seekers to understand how pending or recently decided policies and legislation impact their job in the energy efficiency and demand response industries.
<b>Link</b>	<a href="http://efficiencycouncil.org/training2016/">http://efficiencycouncil.org/training2016/</a>

### **Industrial Energy Efficiency Workshop**

<b>Date</b>	28 September 2016
<b>Location</b>	MSU Coastal Research & Extension Center (CREC), Mississippi, U.S.
<b>Type of event</b>	Workshop
<b>Organiser</b>	Mississippi Manufacturers Association
<b>Key themes</b>	Designed to give the attendees- ranging from plant managers, energy efficiency professionals to business and policy-decision makers, the knowledge to not only evaluate their energy consumption patterns, but also seek opportunities for increasing the efficiency of their operations.
<b>Link</b>	<a href="http://bit.ly/2c8s67p">http://bit.ly/2c8s67p</a>

### **11<sup>th</sup> Southern African Energy Efficiency Convention 2016**

<b>Date</b>	8 - 9 November 2016
<b>Location</b>	Johannesburg, South Africa
<b>Type of event</b>	Convention
<b>Organiser</b>	Southern African Association for Energy Efficiency (SAEE)
<b>Key themes</b>	Providing a platform for effective networking, educating the participating delegates and creating awareness creation through assessing the big picture regarding how and where exactly all the economic and market forces, new technologies, industry trends and regulatory developments can merge to shape critical decisions of any organization's energy and economic future.
<b>Link</b>	<a href="http://www.sae.org.za/cabout.aspx">http://www.sae.org.za/cabout.aspx</a>

## Disclaimer

For private circulation only. The views/analysis expressed in this report/document do not necessarily reflect the views of Shakti Sustainable Energy Foundation. The Foundation also does not guarantee the accuracy of any data included in this publication nor does it accept any responsibility for the consequences of its use.

## About Shakti Sustainable Energy Foundation

Shakti Sustainable Energy Foundation works to strengthen the energy security of India by aiding the design and implementation of policies that support energy efficiency and renewable energy

## About Sustainability Outlook

Sustainability Outlook, a division of cKinetics is a market access, insight and collaboration platform tracking actions related towards enhanced resource management in the Indian economy. Sustainability Outlook provides market analysis and data tracking services, news and intelligence updates, and creates momentum towards specialised sustainability interventions by facilitating a structured process for multi-party collaboration.

### Contact

Market Access & Insights Team  
[mait@sustainabilityoutlook.in](mailto:mait@sustainabilityoutlook.in)

## About AEEE

AEEE is an industry association created for the specific purpose of convening companies and organizations (manufacturing companies, end users, service providers, utilities, academic and R&D institutes and other non-profit organisations) interested in creating a thriving energy efficiency sector in India and providing a unique platform to actively participate and support in energy efficiency policy formulation and analysis.

### Contact

Alliance for an Energy Efficient Economy  
[info@aeee.in](mailto:info@aeee.in)

Sustainability Outlook™ and cKinetics™ are trademarks of cKinetics Consulting Service Private Limited, its parent, or subsidiaries thereof. Other product and company names mentioned herein may be trademarks and/or registered trademarks of their respective owners. Sustainability Outlook™ assumes no liability or responsibility for any errors or omissions in the content of this report and further disclaims any liability of any nature for any loss whatsoever caused in connection with using the information on this report. By accessing Sustainability Outlook™ reports and services, you agree to the following terms, and your viewing of and any use of the information is subject thereto: <http://sustainabilityoutlook.in/content/page/terms>

Licensed by cKinetics Consulting Services Private Limited under Creative Commons Attribution-NonCommercial 4.0 International  
<http://creativecommons.org/licenses/by-nc/4.0/>