PAT Pulse

SIZING THE ENERGY EFFICIENCY INVESTMENT OPPORTUNITY IN INDIAN INDUSTRY

May 20, 2016
Introducing PAT Pulse

- ‘PAT Pulse’ is a quarterly briefing series on PAT with 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.

- PAT Pulse a neutral platform to present and share unbiased views and experiences of the key stakeholders of PAT scheme, primarily the DCs and provide linkage

May 2016 issue of PAT Pulse

- **Focus:** Sustainability Outlook and AEEE created a detailed bottom-up model to assess the investment opportunity, the findings of which are presented in this issue of PAT Pulse

- **Innovation lens:** Sneak peek into some of the upcoming innovative solutions such as IoT (Internet of Things) driven lighting and process automation, coating process for textiles, power converters and CO2 recovery solutions.

- **Policy updates:** The issue also provides updates on policy regarding terms and Conditions for Exchange of Energy Savings Certificates and the roles of multiple entities associated with the trading.
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Industrial Energy Efficiency: INR 34,000 crore market opportunity by 2020 (excluding Thermal Power Sector)

- Cross cutting technologies such as Variable Frequency Drives (VFD) and Waste Heat Recovery (WHR) Systems account for 21% and 24% of the estimated investment potential respectively, with the majority share (52%) being held by sector specific process improvement techniques.

- In the coming 3-4 years, Chlor Alkali (95%) and Aluminium (74%) sectors have the maximum percentage of the total sectoral investment potential in process linked interventions.

- Textile has the least percentage (5%) of total sectoral opportunity being driven by process, with the rest 95% coming from cross cutting applications such as VFD, WHR and super-efficient boilers.

- Iron and Steel and Cement sectors present a balanced portfolio of potential between process improvement linked interventions and cross-sectoral ones.
Sector Specific Process Improvements estimated to have maximum investment potential: Rs 17,000 crores

- Cement sector is estimated to have the maximum scope in terms of quantum of investment followed by fertilizer
- The investment for each of the process interventions assessed has considerable variation – with some being relatively less capex intensive than the others.
- The total investment per sector is also dependent on the number of DCs to which the process intervention under focus is potentially applicable

Investment potential of process linked interventions

- Cement: 48%
- Iron and Steel: 19%
- Fertilizer: 12%
- Aluminium: 10%
- Textile: 8%
- Pulp and Paper: 3%
- Chlor Alkali: 0%
- 0%
Potential market of Rs 7,000 crore for Variable Frequency Drives across sectors

- VFD has seen limited adoption when the technology was nascent due to high risk perception.
- **Sectors including Iron and Steel, Cement, Aluminum and Fertilizer have a sizable potential for this application.**
- As per the views of multiple stakeholders, including DCs, Energy Auditors and other industry experts, VFDs are likely to see strong uptake across manufacturing units and be one of the early target interventions under the 2nd cycle of PAT.
Rs 8,000 crore Waste Heat Recovery Market estimated for 7 PAT sectors

- High Temperature WHR systems based on Rankine cycle have a high potential in the Iron and Steel and Cement sectors in India.
- Based on our estimates, the potential for High grade waste heat recovery in the Cement sector alone is around 630 MW, with the present operational capacity estimated to be around 120 MW.
- Low Temperature WHR systems by way of Process Integration are more economical (payback of 6 months-2 years) than WHR systems for Power Generation (payback of 3-8 years).
- Policy has incentivized adoption of WHR in Industry.
Textile and Paper and Pulp sectors have significant market Potential of Super Efficient Boilers for Process Heating

The overall market for super-efficient boilers which is realizable by 2020 has been estimated to be Rs 900 crores with textile sector accounting for 67% of the total estimate.

Out of the estimated market of around Rs 100 crores (based on current boiler capacity across the sectors of focus) which is likely to be penetrated over the next 3-4 years, the lion’s share is expected to be consumed by fertilizer sector (39%) followed by textile (27%).
Key accelerators and decelerators of EE interventions in the industry

Key Challenges

• Lack of clarity in ESCerts trading is leading to uncertainty amongst DCs who are unable to clearly assess the monetary impact of PAT scheme.

• Large saving potential interventions require high capex

• Practical constraints other than capex, such as lack of space, production shut down, lack of suppliers, changing fuel prices etc. also limiting the adoption of EE interventions linked to process improvement.

• Lack of robust ESCO models of financing to make investments more attractive

Way Forward

• Enhanced technical competencies of service providers and DCs
  – Capacity building of service providers
  – Training within DCs

• Need for market making mechanism

• Robust and innovative financing models
Innovation lens

Mitsubishi Heavy Industries Ltd

Recovering CO2 from flue gas using KM CDR Process. The flue gas is directed to a vessel during the process for the solvent to selectively capture the CO2. The solvent rich in CO2 is then directed to another vessel for heat exchange and then pumped into the stripper thus yielding CO2 of high purity (99.9 vol. percent or more).

CanmetENERGY

Innovative Ejector Technology which is smaller and can utilize wide varieties of operating refrigerants in comparison to traditional ejector. This innovative technology has the ability to bring about Improvement in energy efficiency by 20%, Decrease in energy compressor requirement by 10%, Reduction of 15-30% in the operating costs related to CO2 removal.

Nordic Power Converters

This innovative technology can be utilized for any application, requiring power converters, like LED lighting. It is appropriate for both DC/DC and AC/DC power converters and for high and low power levels. Due to its unique design, switching losses are eliminated and the need for many unreliable electrical components like electrolytic capacitors is wiped out. Increases in lifetime by removal of less reliable electrical components Decrease in size and weight by 80%.

Monforts

Eco-applicator Soft Coating Solution process uses roller for application of the coating material on the fabric (twin-roller for dual-sided application) and hence eliminates the requirement of the conventional, less efficient wet-on-wet padder technology. The use of this technology involves minimal liquor application and hence reduces initial moisture content to 40% in comparison to 60% in padder system, thus reducing the drying time and bringing about substantial energy savings.
Upcoming issues of PAT Pulse

**Smart and Efficient Production/Manufacturing**
- Identifying potential gaps, challenges and opportunities in adoption of smart technologies in achieving process efficiency
- Capturing current market interest and outlook 2020 in implementing smart technologies in process operations

**EE Financing: Learnings and Way Forward**
- Focus on the assessment of the majorly applied business models – ESCO financing
- Understanding the Escerts market
- Analyzing international practices/models for EE financing and identifying key learnings for the Indian context

**PAT influence 2016/ Outlook 2017: Energizing Energy Efficiency Market in India**
- PAT experiences, learnings and challenges and developing an Outlook based on areas covered in market briefs
- Inter-sectoral performance analysis (of focus sectors) across: M&V, financing gaps and opportunity, Outlook for investments for second cycle
- Outlook for forthcoming year including expected trends and challenges
How you can engage in PAT Pulse

• Engage in the upcoming PAT briefs and contribute to it

• Share your energy efficiency innovations for the innovation lens.

To engage with us on PAT as well as other industrial efficiency focus areas, please contact
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