

PAT Pulse

Cross-Sectoral Learning & Process Innovation will drive PAT Phase-2

February 5, 2016

**Sustainability
Outlook**

 Alliance for anTM
Energy Efficient
Economy

“Be Lean, Be Mean and Be Green” -Three Elements of Energy Efficiency

- 1st Step: **Be Lean** (eliminate loads, reduce wastage, clothing as per weather conditions – energy conservation)
 - High performance envelope (right orientation, better glazing, etc.)
- 2nd Step: **Be Mean** (satisfy demand using least energy – energy efficiency)
 - LED lamps (higher lux/watt), Inverter air-conditioner (lower kW/ton, higher m2/ton)
 - Implement Waste Heat Recovery in plants
 - Install meters and sensors and implement an enterprise energy management system
- 3rd Step: **Be Green** (use less primary energy during power generation – fuel switching, renewable energy)
 - Don't use electricity for heating requirements, if possible
 - Use renewable energy to satisfy demand

Must be done in this order as each step can potentially cut your energy in half

What Does AEEE Stand For?

- AEEE does policy advocacy and works to enable a large and vibrant energy efficiency market for both energy efficient products and services.
- AEEE is the only organisation in India which works on creating awareness about energy efficiency as a resource
 - Energy efficiency is the cheapest, cleanest and fastest resource and must be the first fuel in India, before thinking about power generation from any fuel, including renewables
- AEEE advocates for data driven and evidence-based energy efficiency policies that unleashes the innovation and entrepreneurship of the private sector to create an energy-efficient economy.

Introducing 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.

MARKET INTELLIGENCE PLATFORM for creating actionable insight on resource sustainability



COLLABORATION PLATFORM
facilitating multi-stakeholder
engagement

DISCOVERY PLATFORM
for innovative sustainability
products and solutions

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

Jan 2016 issue of PAT Pulse

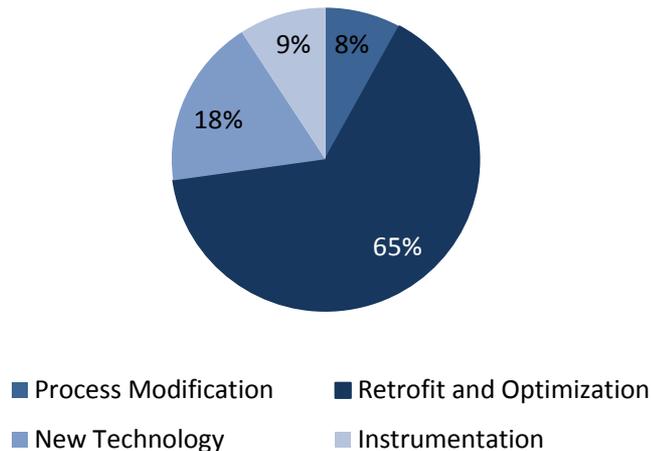
- **Focus:** Assessment of some of the key aspects of the types of projects that were undertaken by Designated consumers (DCs) in Phase 1 and the potential outlook of the stakeholders for Phase 2 of the PAT scheme. Sustainability Outlook and AEEE conducted a survey with a sample of **47 Designated Consumers (DCs)** from the 8 PAT sectors and reviewed **426 projects undertaken**.
- **Innovation lens:** Sneak peek into some of the upcoming innovative solutions such as IoT (Internet of Things) driven Smart Energy Analytics Systems, automated cleaning of condenser & heat exchanger tubes, wireless occupancy sensors etc which will help improve energy efficiency in industries.
- **Policy updates:** The issue also provides updates policy regarding proposed amendments in PAT rules as well as a timeline for widening of PAT Scheme.

Key Highlights of PAT Pulse Jan 2016

- Low cost retrofit projects dominated Phase-I
- More than 60% of projects carried out were cross-cutting rather than sector specific
- M&V process was transparent but there was insufficient time
- The outlook for the second phase is tilting towards process innovation and focusing on system efficiency.
- Need expressed by DCs for enhanced action on availability of low cost financing and ESCerts trading

Low cost retrofit projects dominated Phase-I

- Out of the 426 projects assessed, almost **65%** were focussed on retrofit and optimization
 - Linked to utility operations, motors operations, upgrade of technology components, optimization in process parameters; retrofits in plant electrical & thermal utilities; up-gradation of technology components especially in drives (like energy efficient motors, use of VFDs etc.), air compressors, HVAC systems and pumps.



- The focus was found to be more on component efficiency (which can be achieved by installation of individual components with guaranteed payback) rather than system efficiency.
- This led to significantly less projects with major technology change in the first cycle of the PAT and so, only concentrated on harnessing the potential of low-hanging fruits with relatively less CAPEX.
- Most of the low-hanging fruits were tapped in this class, which required low investments and had a short term pay-back.

PAT Phase 1 was characterized by low capex, short pay-back projects

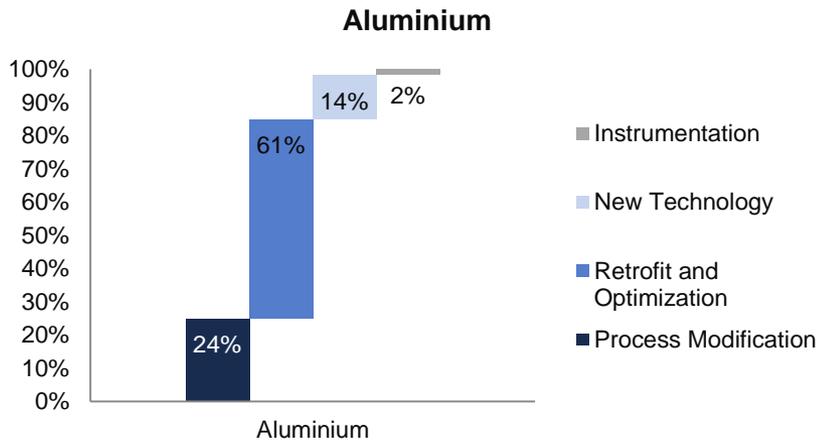
More than 60% of projects carried out were cross-cutting rather than sector specific

- **Cross-cutting projects were about 65% of total projects surveyed**
 - Installation of VFDs, adoption of energy efficient pumps, air compressors, burners and thermal insulation systems, waste heat recovery systems etc were some of the key optimization projects undertaken
- Almost 70% of the **retrofit and optimization** projects carried out under PAT phase 1 were non-sector specific and can be leveraged across multiple sectors

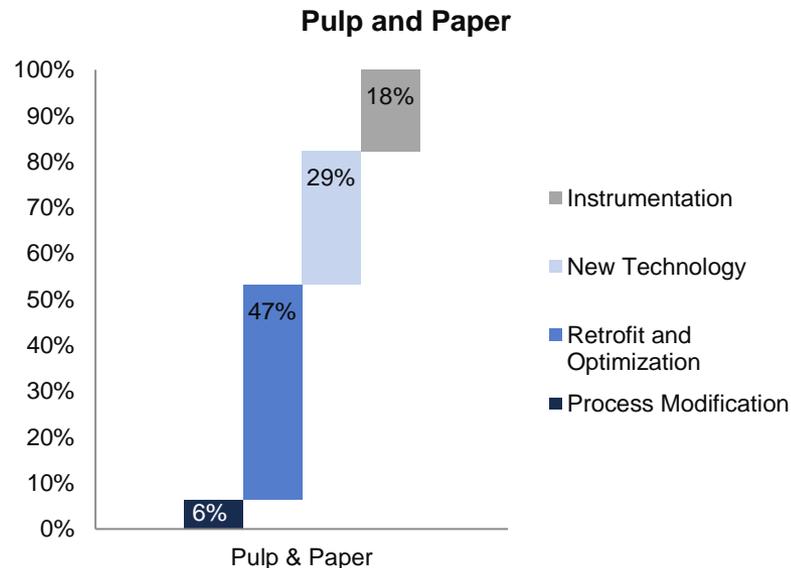
	Total Projects Studied	Cross cutting projects	Cross cutting as a % of total projects
Instrumentation projects	39	34	87%
Retrofit and Optimization projects	276	187	68%
New Technology projects	77	52	68%
Process modification projects	34	5	15%
Total	426	278	65%

- **Instrumentation and Control projects: Low adoption in Phase-I but high potential for replicability across sectors in phase-II**
 - In the category of instrumentation more than 85% of the projects are cross-cutting, but their application in phase-I has seen one of the lowest adoption across all the 8 sectors covered under the PAT scheme

Actions and outlook of Designated Consumers (DCs) in the sectors surveyed

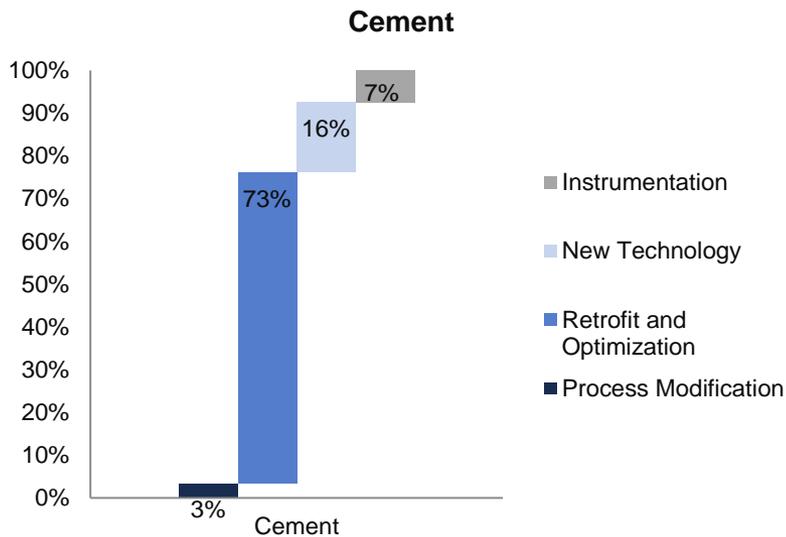


- The Aluminium sector, introduced new in-house technologies (such as CRYSTAL additive for dosing inside furnace by Hindalco, use of slotted anodes by NALCO) which have come to be regarded as best-in-class among its various industries.
- However, considering the long time required for in-house R&D activities, capacity ramp-up and reaping the benefits of EE projects, a few DCs are found to have made a pitch for increasing the cycle duration for the second phase of PAT.
- The aluminium sector had the most number of process modification projects as compared to other sectors.

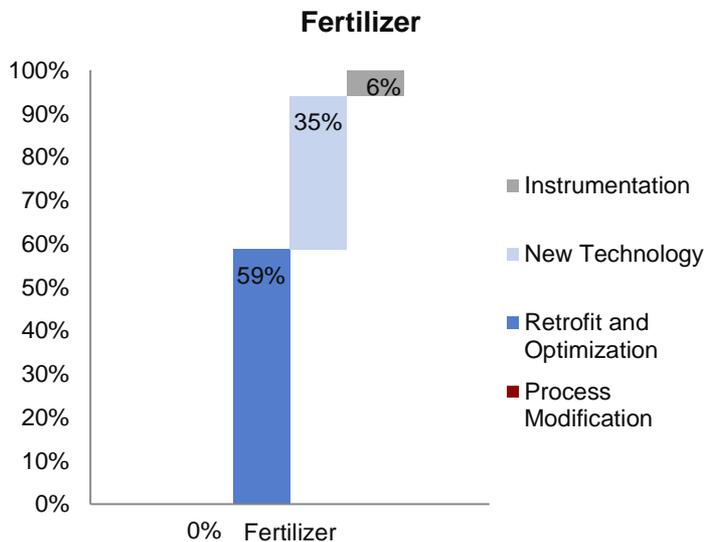


- Paper and Pulp sector saw a significant adoption of energy efficient pumps and motors. This sector also had the largest sectoral share in instrumentation projects with 14 out of the total 27 such surveyed projects being carried out here.
- Almost 80% of all the projects assessed for this sector were cross-cutting in nature.
- With increased use of renewables through bagasse based/black liquor based energy generation, the paper and pulp sector has been vying for getting dual benefits of RECs and ESCerts.

Actions and outlook of Designated Consumers (DCs) in the sectors surveyed

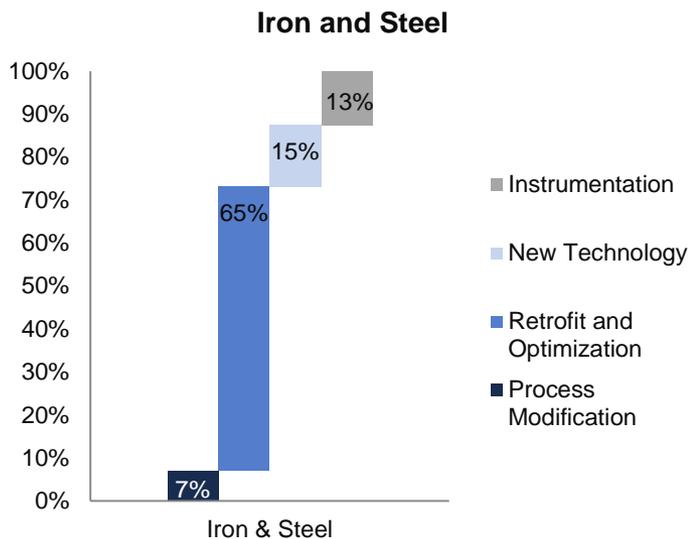


- Even though the Indian cement industry is amongst the most energy efficient in the world, the focus was found to be more on retrofit and optimization projects.
- 64% of the total projects assessed for this sector are cross-cutting across sectors. Low and Medium Voltage VSD and VFD, Energy efficient fans and motors are some of the generic interventions which form a major chunk of the optimization projects. DCs in this sector were predominantly categorized by large cash rich companies who have mostly used internal accruals to finance energy efficiency projects in Phase 1 of PAT.

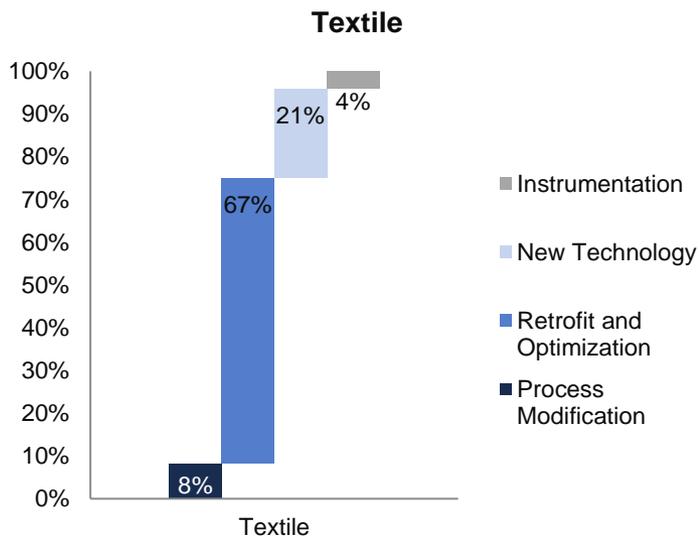


- Energy efficiency activities in industries in the fertilizer sector are largely driven by pre-set energy consumption norms which are required to be met in order to access government subsidy.
- Owing to the stronger policy push outside of PAT scheme, the sector feels the scheme adds to its burden of reporting and doesn't incentivize it to adopt energy efficiency practices beyond the existing targets set for it by the government.

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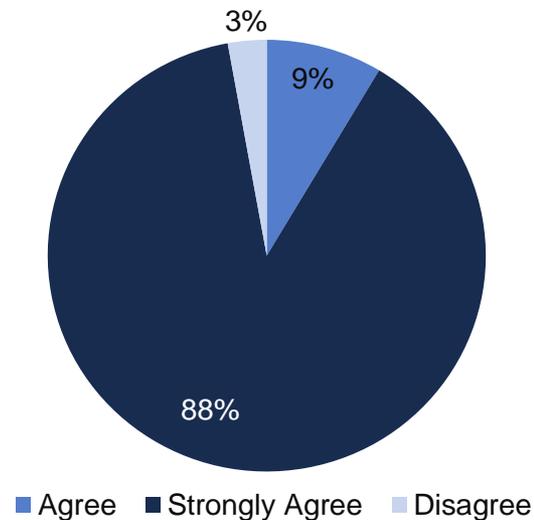
- The Iron and Steel industry has to be competitive in the Global market for its products to sell: hence increasing efficiency to beat global standards is another key driver.
- The response from DCs indicates that owing to the high investment (ranging from Rs 2 Cr to Rs 40 Cr) and lengthy payback times up to 45 months associated with making major technology changes; most projects have been limited to retrofits. The willing to pay penalties for not achieving their targets was highest in this sector.
- The DCs indicated that the sector is yet to figure out a breakthrough technology which will lead to a significant reduction in its specific energy consumption. Most projects in future would remain incremental in nature.



- Retrofit and optimization project dominated the textile sector in PAT phase 1 with installation of variable frequency drives (VFDs) having a significant share in the mix.
- Long term projects are not found to have been taken up in spite of the size of investment required being relatively lower than other sectors.

M&V process was transparent but there was insufficient time

- Survey response obtained from DCs indicated that the M&V design and process was transparent



- Given that 478 DCs had to be audited by 53 M&V agencies, the time of 3 months allotted for carrying out M&V was largely regarded as insufficient across all the industrial sectors
- The survey indicates that a significant proportion of the DCs were lacking in terms of benchmarkable and quality data related to their energy performance which is not only beneficial from a compliance standpoint but also drives idea generation and in-house innovation within an organization.

Availability of benchmarkable data can be improved through automated data management systems

Process innovation, Availability of low cost Finance and ESCerts trading hold the key to success of second cycle of PAT

- In some of the PAT sectors process innovation is the only way to avoid being penalized in the second cycle of PAT, as the performance as well as technology aspects are already best in the world
- High quality R&D leading to disruptive process innovations and their quick mainstreaming is the need of the hour going in to the second cycle of PAT
- Non-availability of low interest loans being stated as a key hindering factor for undertaking high capex projects. This makes the case for exploring green bonds as an alternate route (as suggested by a few DCs and financial institutions)
- Risk Analysis of Energy Performance Contracting projects needed to improve the take-up of ESCO model
 - Lack of clarity about revenue sharing and credibility as the key issues facing ESCO model
 - Lack of knowledge on project risk, mismatch between ESCO size and project size and lengthy dispute resolution process as the aspects highlighted by financial Institutions which need to be worked on collectively by the stakeholders to improve the climate for ESCO model in the second cycle of PAT
- Accounting of PAT benefits in second cycle contingent on the smoothness of ESCerts' trading process in Phase-I
 - Clarity required on ESCert allocation in case of plant expansion, allocation for new entrants in phase-II, status of ESCerts in case of Mergers and Acquisitions, tax and accounting treatment of ESCerts, netting and bubble provisions and cost basis of sold Escerts

Innovation lens



Online cleaning of condenser/ shell & tube heat exchanger tubes; it uses the principle of periodic injection and collection of cleaning sponge balls at a predefined interval. It replaces the conventional method of offline acidic chemical descaling of the condenser tubes. The innovation helps to keep the condenser tubes clean always without any chemical usage and improves the heat transfer resulting into improved efficiency.



IoT driven energy analytics product that helps commercial consumers of electricity save at least 10% energy using intelligence from the energy data. The hardware includes sensors (smart energy meters, temperature/humidity sensors) and Zenatix controllers that acquire data in real time from these sensors. Zenatix software delivers actions or insights in form of automatic control or sms/email alerts.



Wireless occupancy sensor that "talks" to existing switches to operate electrical devices connected to them. The complementary device that enables the switch to "listen" to the sensor "talking" is a node that can fit behind most existing switches and it controls the switches. Sensor "talking" when it senses occupancy to inform the switch to "turn ON" and similarly to turn OFF once it senses that the occupant has left the space.



Unique waste heat recovery (WHR) products for industrial and commercial purposes to help reduce heating costs by upto 75%. They recover waste energy from utilities like chillers and air compressors, convert it to zero-cost hot water and give it back to the industry. This offsets the fuel requirement for generating this hot water.

Upcoming issues of PAT Pulse

Understanding the Investment Opportunity for Industrial Energy Efficiency

- Assessing Investment landscape -market size of industrial efficiency market in India
- Financing products needed to cater to Energy Efficiency segment
- Key influencers for EE financing : ESCerts, REC etc

Smart and Efficient Production/Manufacturing

- Identifying potential gaps, challenges and opportunities in adoption of smart technologies in achieving process efficiency
- Assessing process control and production management systems that can have a substantial impact on energy savings and efficiency.
- Capturing market interest in implementing smart technologies in process operations

ESCO Financing: Learnings and Way Forward

- Focus on the assessment of the majorly applied business models – ESCO financing
- Identifying the existing models of financing ESCOs
- Analyzing international practices/models for ESCO 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
- Participate in exploring the extent of cross-sectoral learnings that can be explored for industrial energy efficiency
- 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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