



Creating Innovative Solutions
for a Sustainable Future

Overview of activities: Scaling-up Energy Efficiency in Small Enterprises (EERE) TERI-SDC Partnership Project



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development
and Cooperation SDC

December 15, 2015

Outline



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- Different intervention approaches in MSMEs
- Major outcomes of EESE project
- Activities in Rajkot cluster under Outcome 3

Different intervention approaches in MSMEs

Areas/Levels of energy savings and investments in a plant



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	Area 1: Auxiliaries	Area 2: Process
Level 1: Operating practice improvement	Compressed air leakage	BOP
Level 2: Retrofit	VFD for screw compressor	Retrofit DBC
Level 3: New plant	Invertor compressor	New DBC

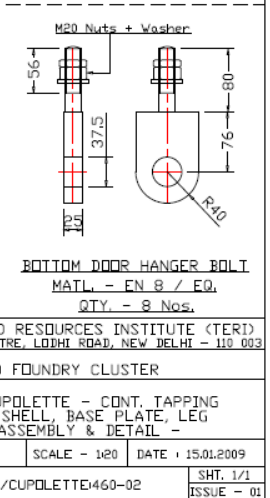
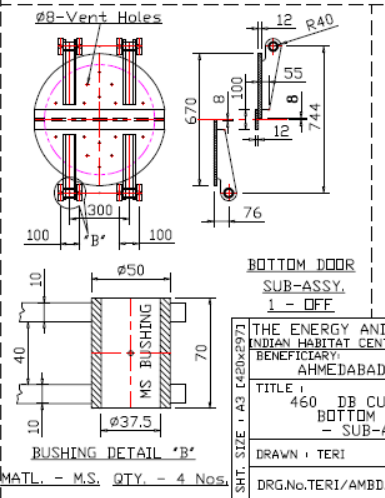
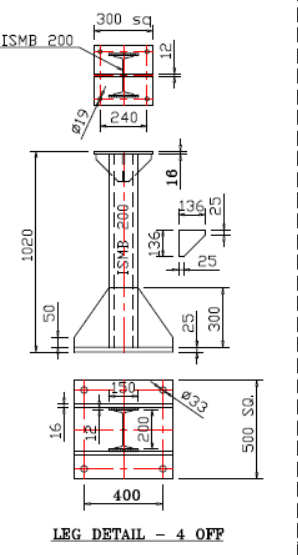
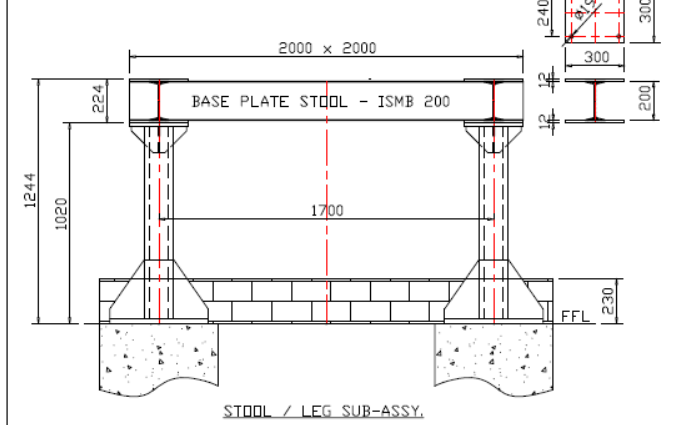
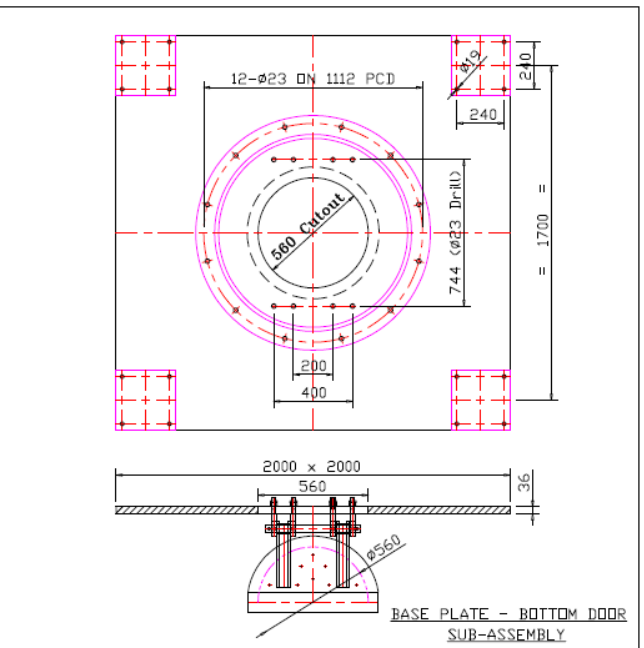
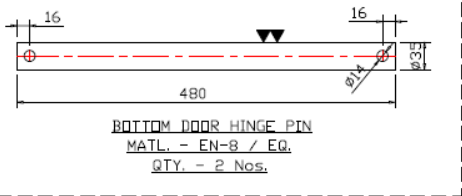
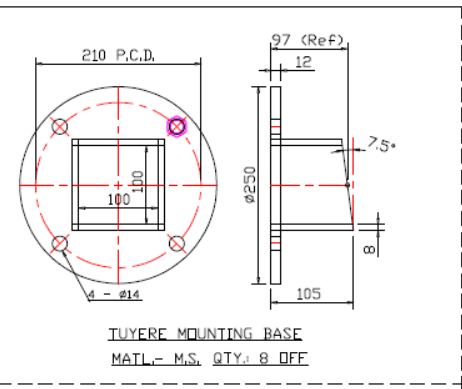
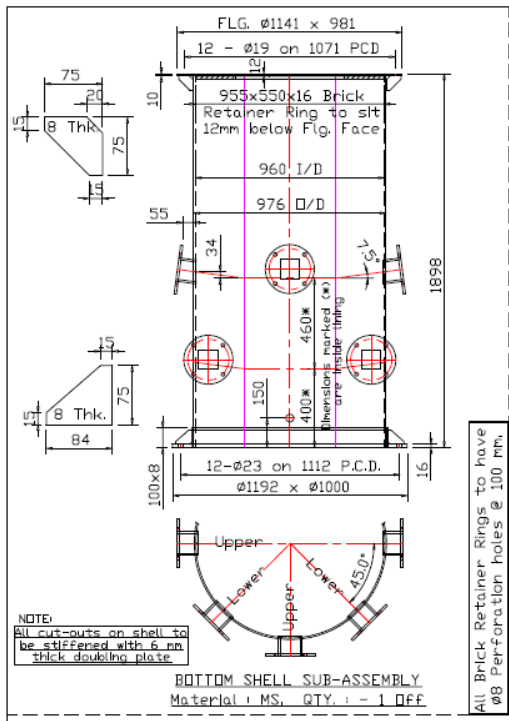
TERI-SDC partnership



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- TERI-SDC partnership started in 1994
- Approach (RDD&D): Develop and disseminate innovative solutions for energy-intensive MSMEs
 - 'Innovation': RD & D
 - 'Up-scaling' : Deployment
- Improved Divided Blast Cupola (DBC)
 - 104 nos. design and commissioning support
- Energy savings 54,900 toe (199,800 tonne CO₂)





THE ENERGY AND RESOURCES INSTITUTE (TERI) INDIAN HABITAT CENTRE, LODHI ROAD, NEW DELHI - 110 033		
BENEFICIARY: AHMEDABAD FOUNDRY CLUSTER		
TITLE: 460 DB CUPOLETTE - CONT. TAPPING BOTTOM SHELL, BASE PLATE, LEG - SUB-ASSEMBLY & DETAIL -		
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DRAWN: TERI		SHT. 1/1
DRG.No:TERI/AMBD/CUPOLETTE460-02		ISSUE - 01

Other approaches



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Approach # 1: World Bank-GEF project

- Energy audits and implementation support to a large number of units in a cluster

Approach # 2: Switch-Asia project

- Diagnostic studies
- Association strengthening
- Energy improvement
 - **DBC retrofits/ BOP**

EESE project



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➤ Goal

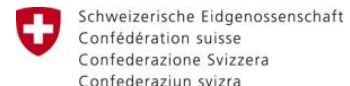
- Energy efficiency of MSME sector is enhanced. Energy consumption and GHG emissions of MSME sector is reduced sustainably

➤ Implementation period

- Dec 2014 – Dec 2017

➤ Focus areas

- Facilitate enabling policy environment and programs through knowledge sharing (SAMEEEKSHA)
- Promote energy efficient technologies/practices in foundry sector
- Explore energy efficient technologies/ practices in new MSME sectors



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Outcome-2



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Focus foundry clusters under EESE:

- Rajkot (Energy audits + Improved DBC)
- Howrah and Ahmedabad (BOP + Improved DBC)

Collaborate with other programs

- Coimbatore, Belgaum and Kolhapur

EESE approach in Rajkot cluster



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Energy audits planned in Rajkot foundry cluster
~110 foundry units

Cluster office established with Rajkot at the
premises of Rajkot Engineering Association

Provides technical support to foundries for
implementation of energy saving measures
through cluster office



Energy audits conducted in Year 1



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Particular	Unit	Value
Number of units		27
Number of ECMs	No's.	229
Investments	Rs lakh	375
Energy cost savings	Rs lakh/ year	318
Annual energy savings	toe/ year	523
Lifetime CO ₂ reduction	tonne CO ₂	48,562

Examples of energy conservation measures (ECM) identified through energy audits



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L1: Operating practices

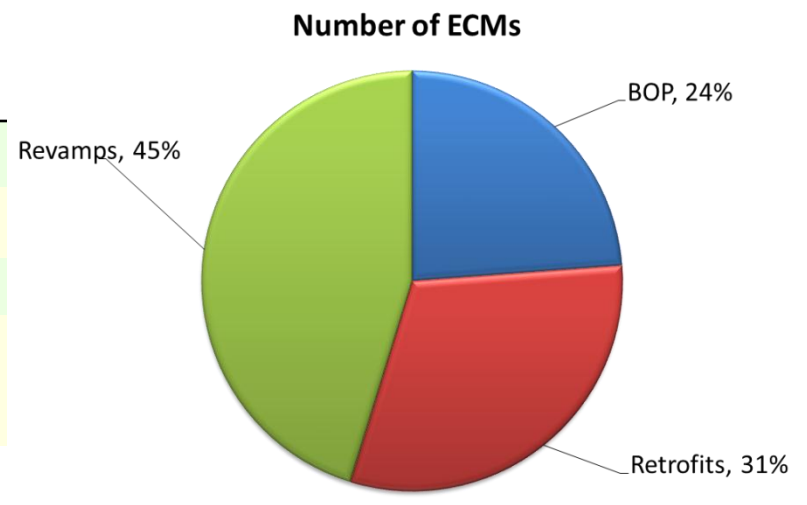
- Optimization of compressed air utilization
- Analysis of rejection level
- Melting process optimization

L2: Retrofit

- Lid for induction furnace crucible
- Inverter for air compressor
- Insulation improvement and WHR in heat treatment furnaces

L3: New plants

- Replacement of inefficient equipment with efficient ones
- Melting and heat treatment furnace
- Air compressor
- Pump and cooling tower

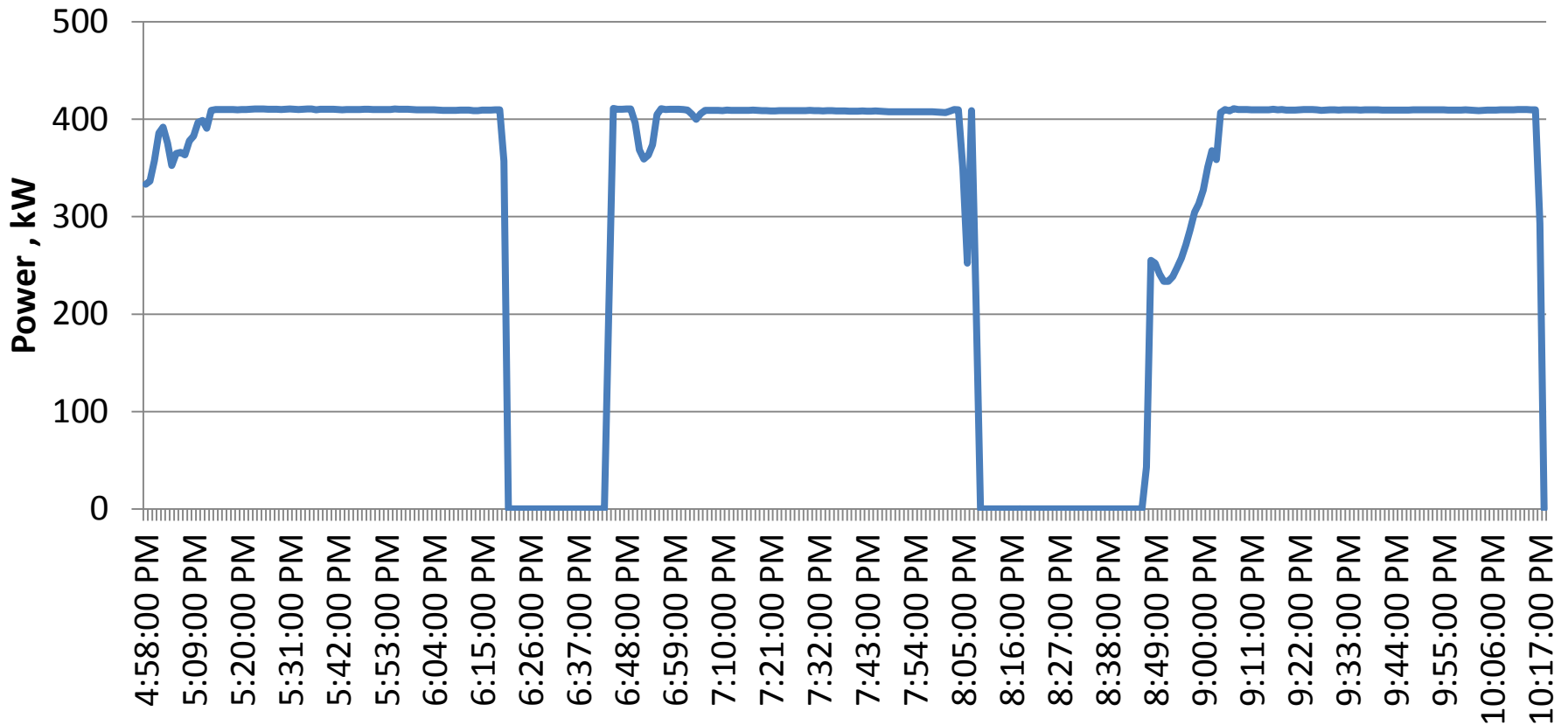


Case Study : Replacement of inefficient furnace



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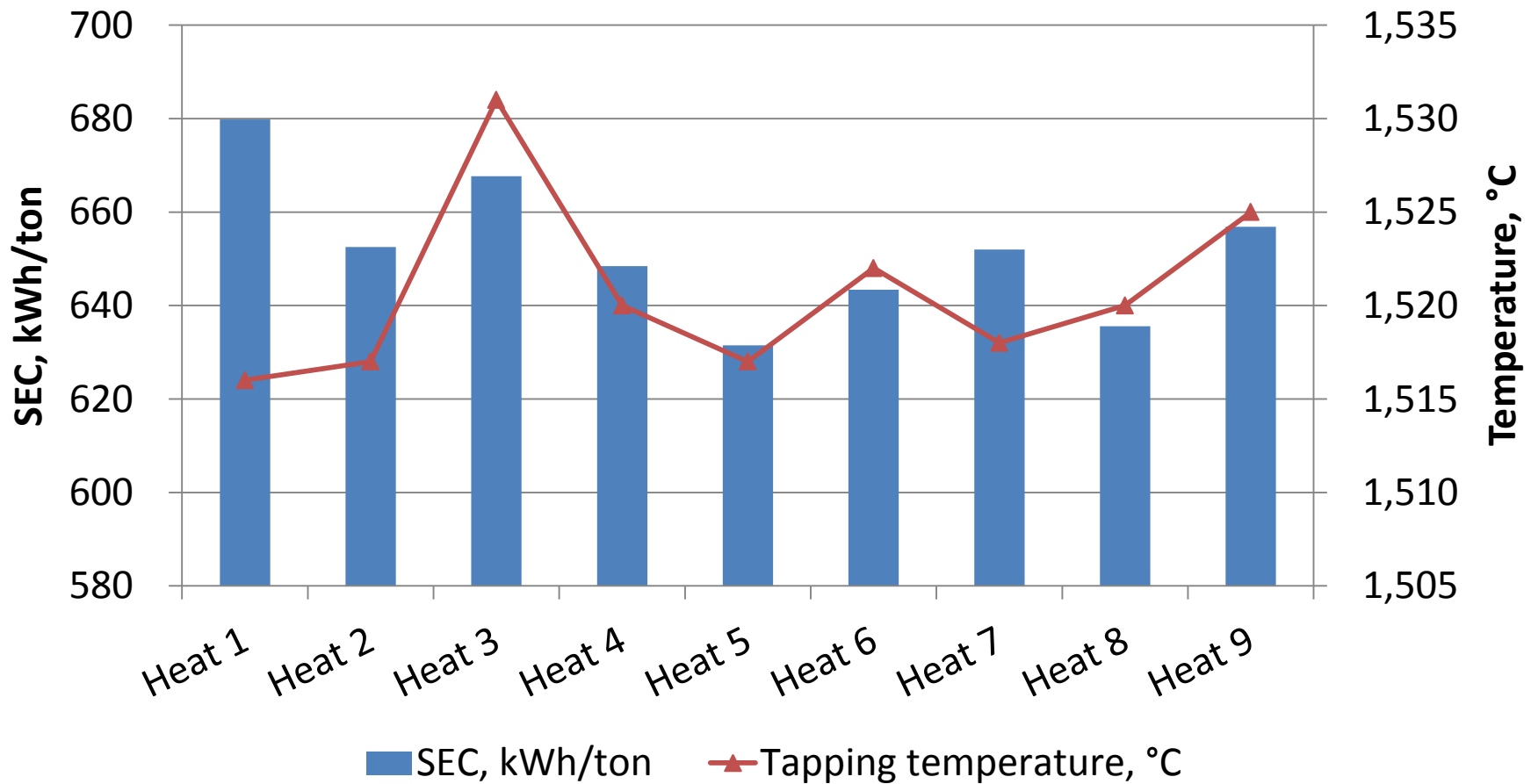
Power curve of 450 kW / 750 kg induction furnace



Case Study : Replacement of inefficient furnace...contd.



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Case Study : Replacement of inefficient furnace....contd.



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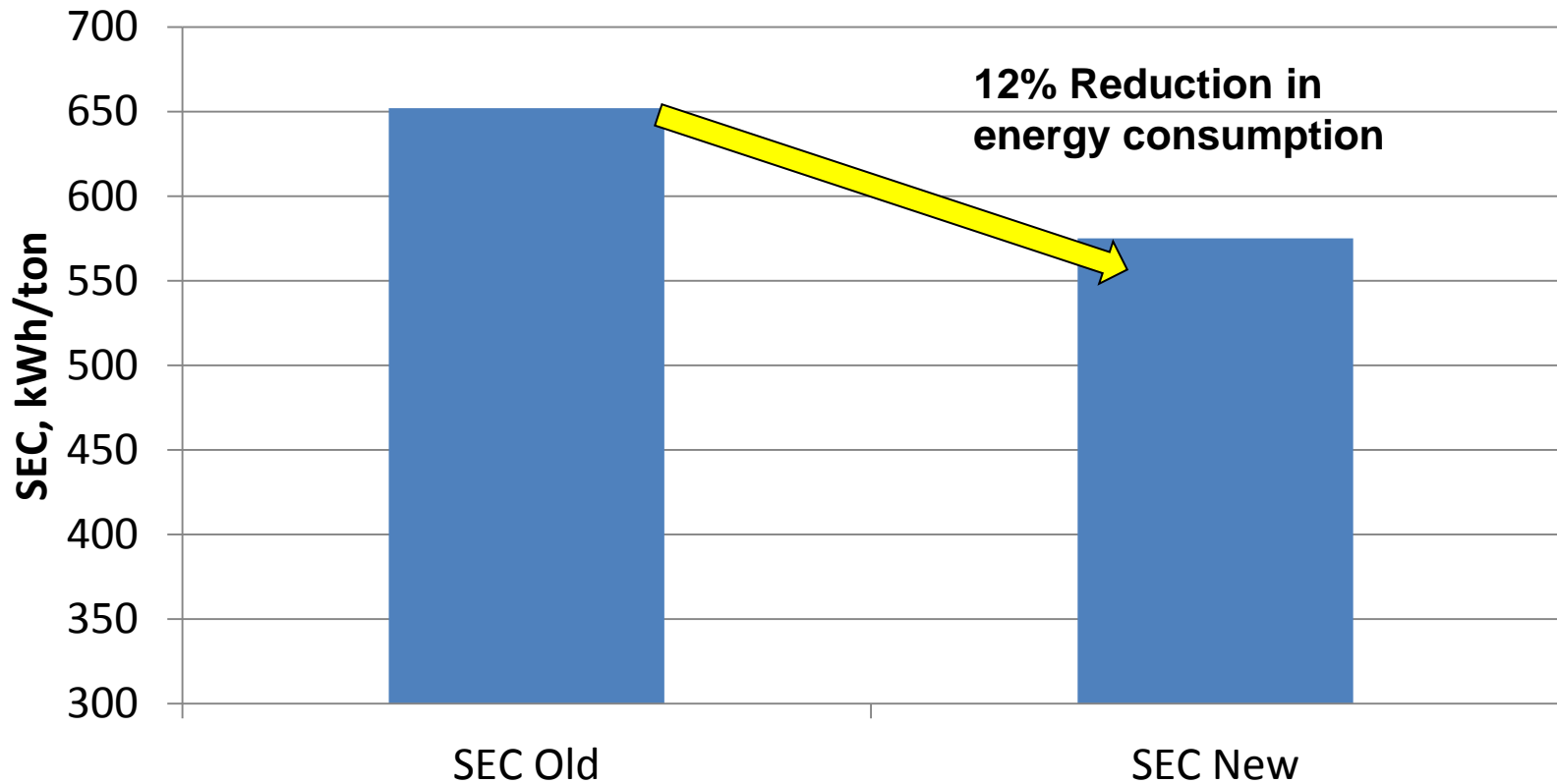
- Specific energy consumption (SEC): 652 kWh per tonne

- New SEC: 575 kWh per tonne
- Investment cost: Rs 20 lakh
- Annual monetary saving: Rs 10 lakh
- Payback period: 2 years

Case Study : Replacement of inefficient furnace...contd.



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Annual energy saving: 195,272 kWh per year

Case Study : Retrofit Sequence controller for air compressors

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Three number of screw air compressor installed to
meet compressed air demand of the unit

Particulars	Unit	#1	#2	#3
Motor rating	kW	45	30	22
Pressure rating	kg/ cm ²	8.5	8.5	8.5
Rated capacity	m ³ / min	8.16	5.52	3.91
	cfm	288	195	138

Case Study : Retrofit Sequence controller for air compressors

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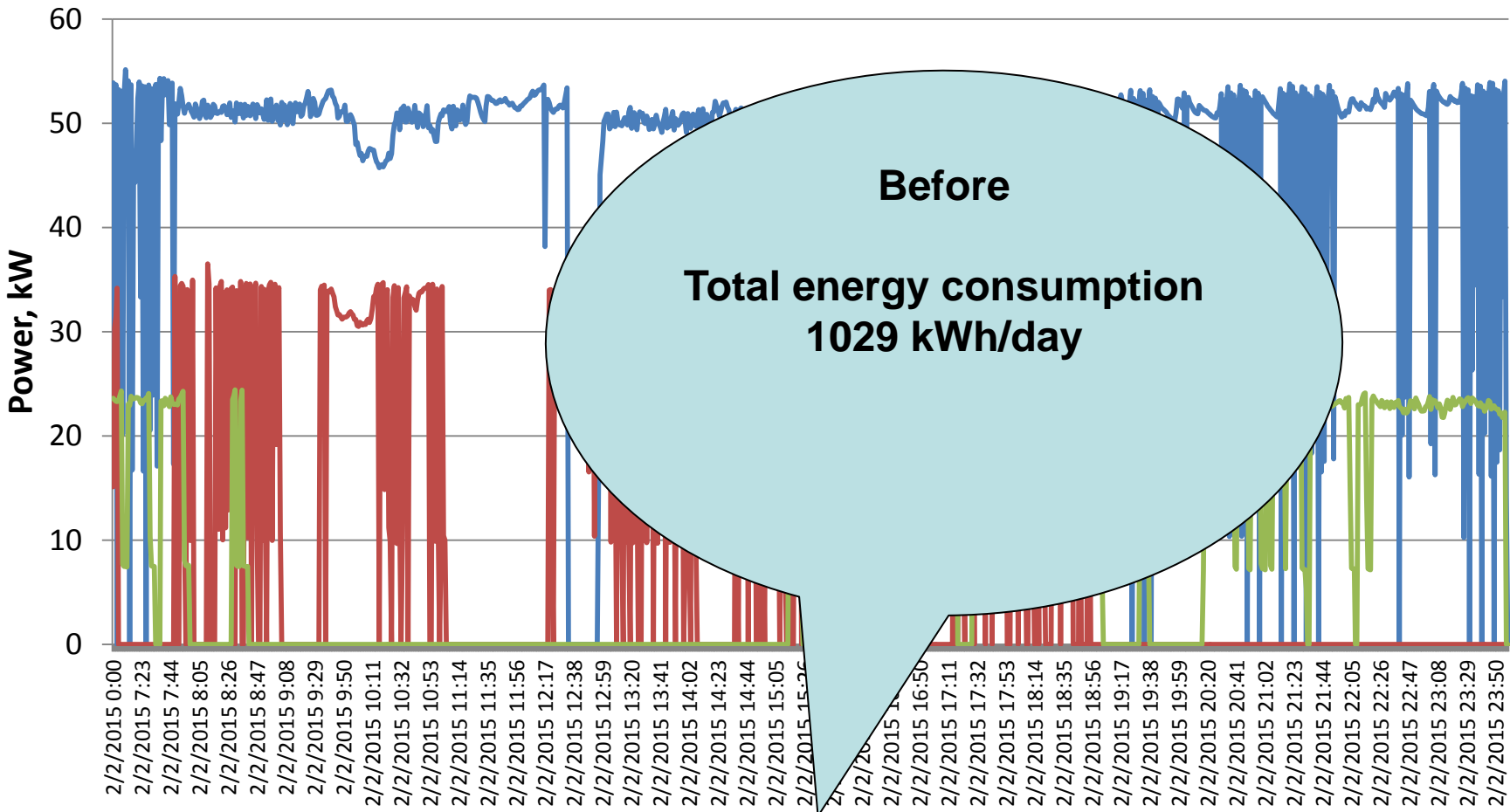
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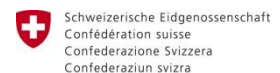
Case Study : Retrofit Sequence controller for air compressors



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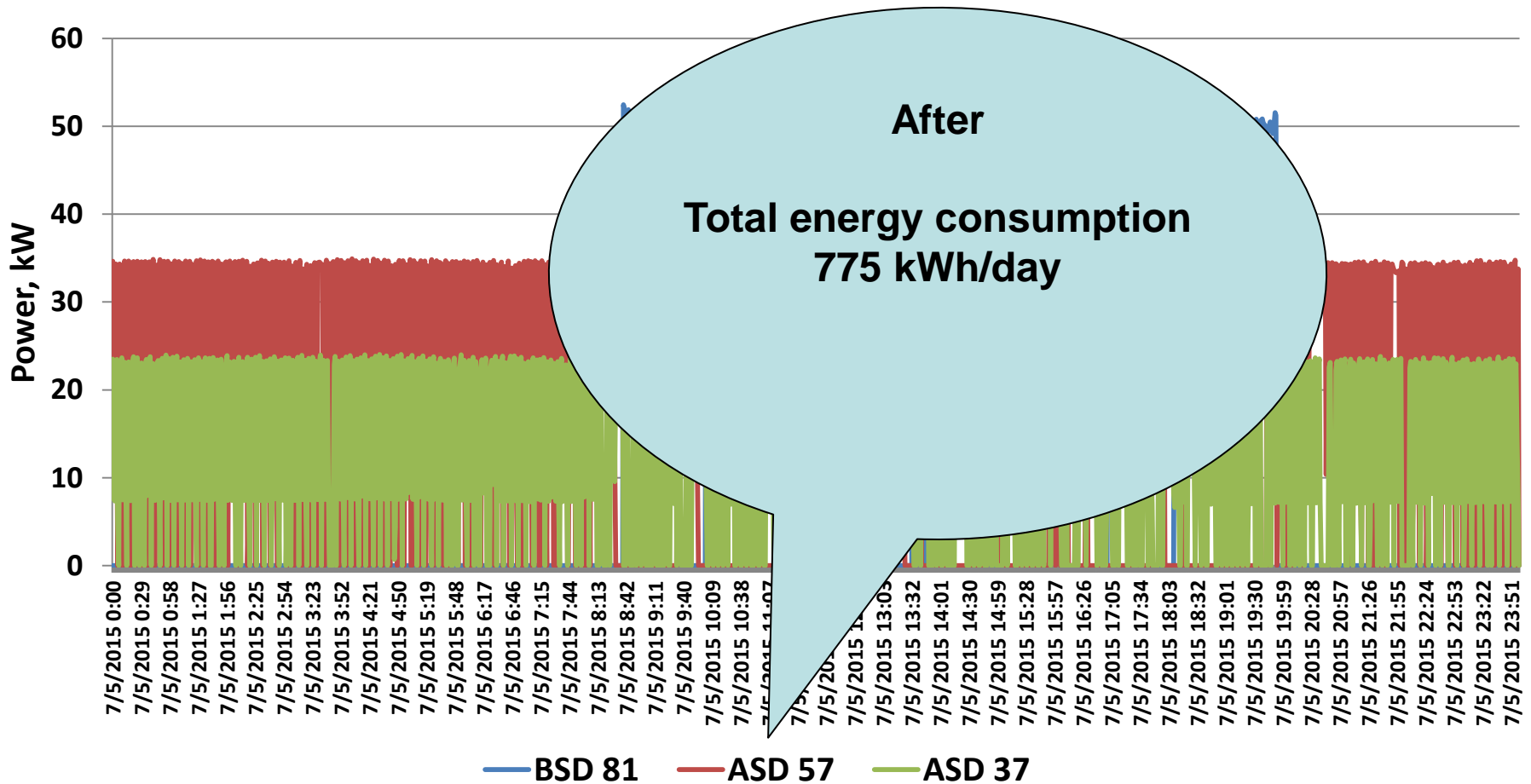


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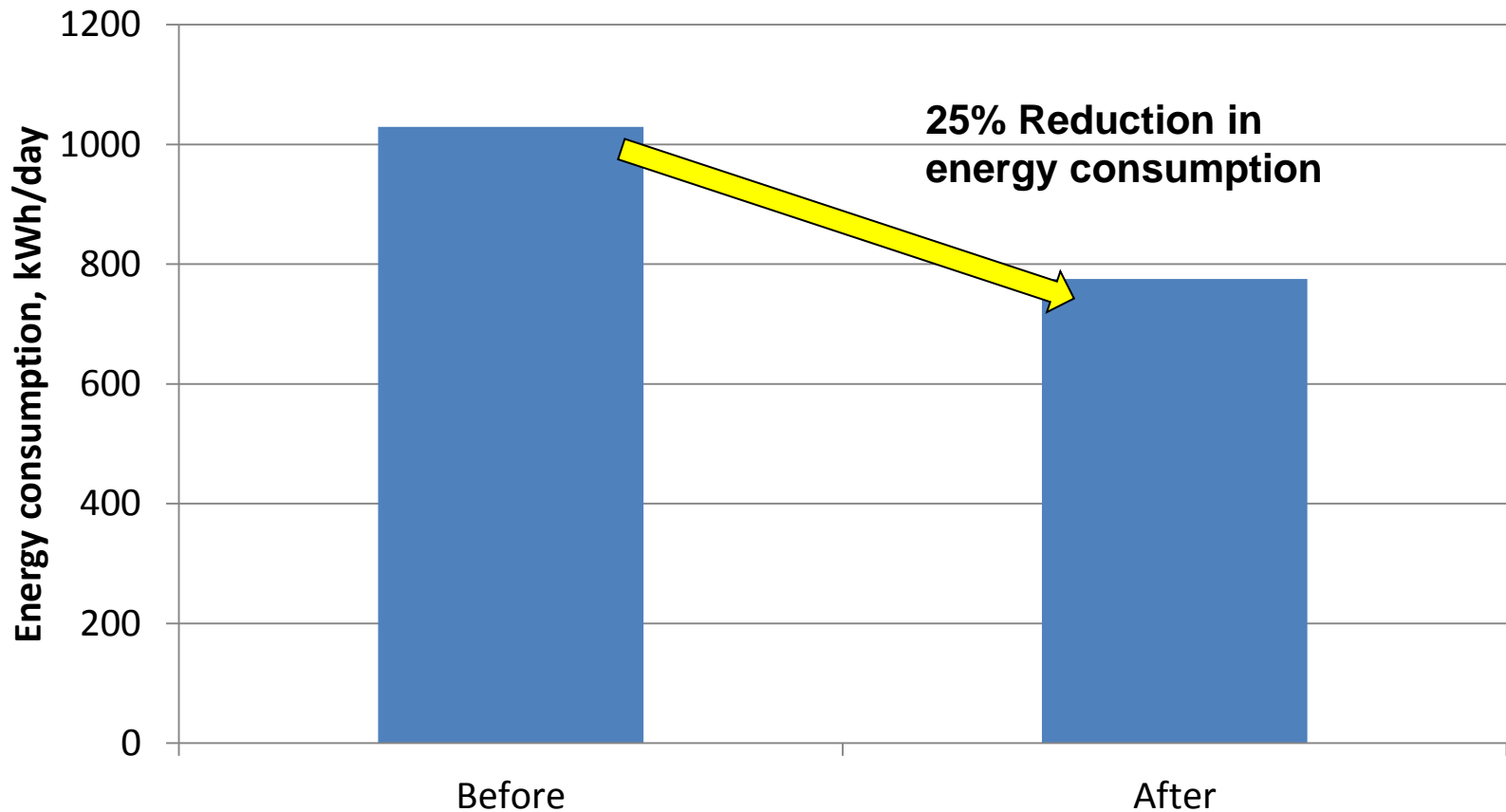
Case Study : Retrofit Sequence controller for air compressors



Case Study : Retrofit Sequence controller for air compressors



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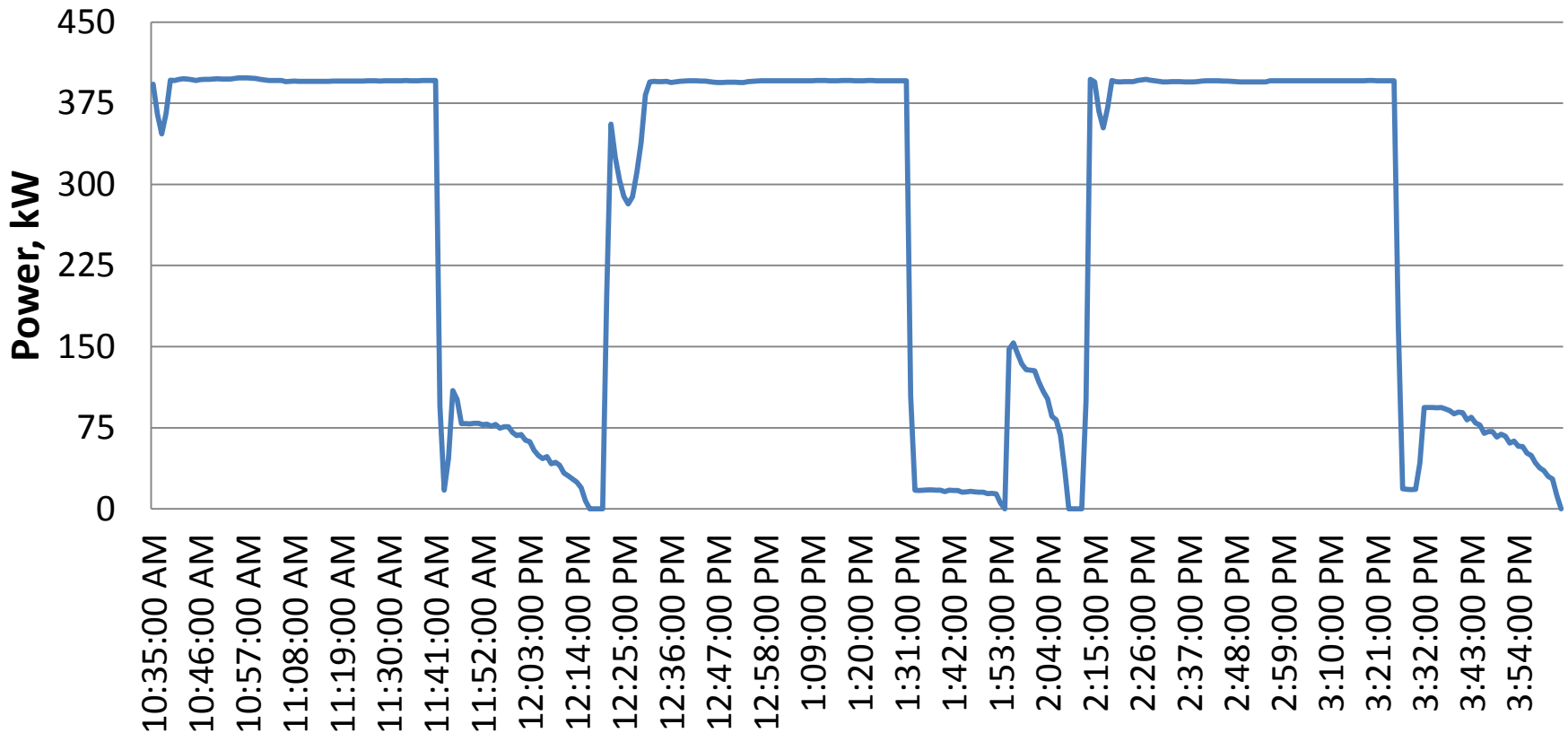


Annual energy saving: 76,215 kWh per year

Case Study : Best Operating Practices

Size of former used in induction furnace

Power curve of 400 kW / 750 kg induction furnace



Case Study : Best Operating Practices

Size of former used in induction furnace

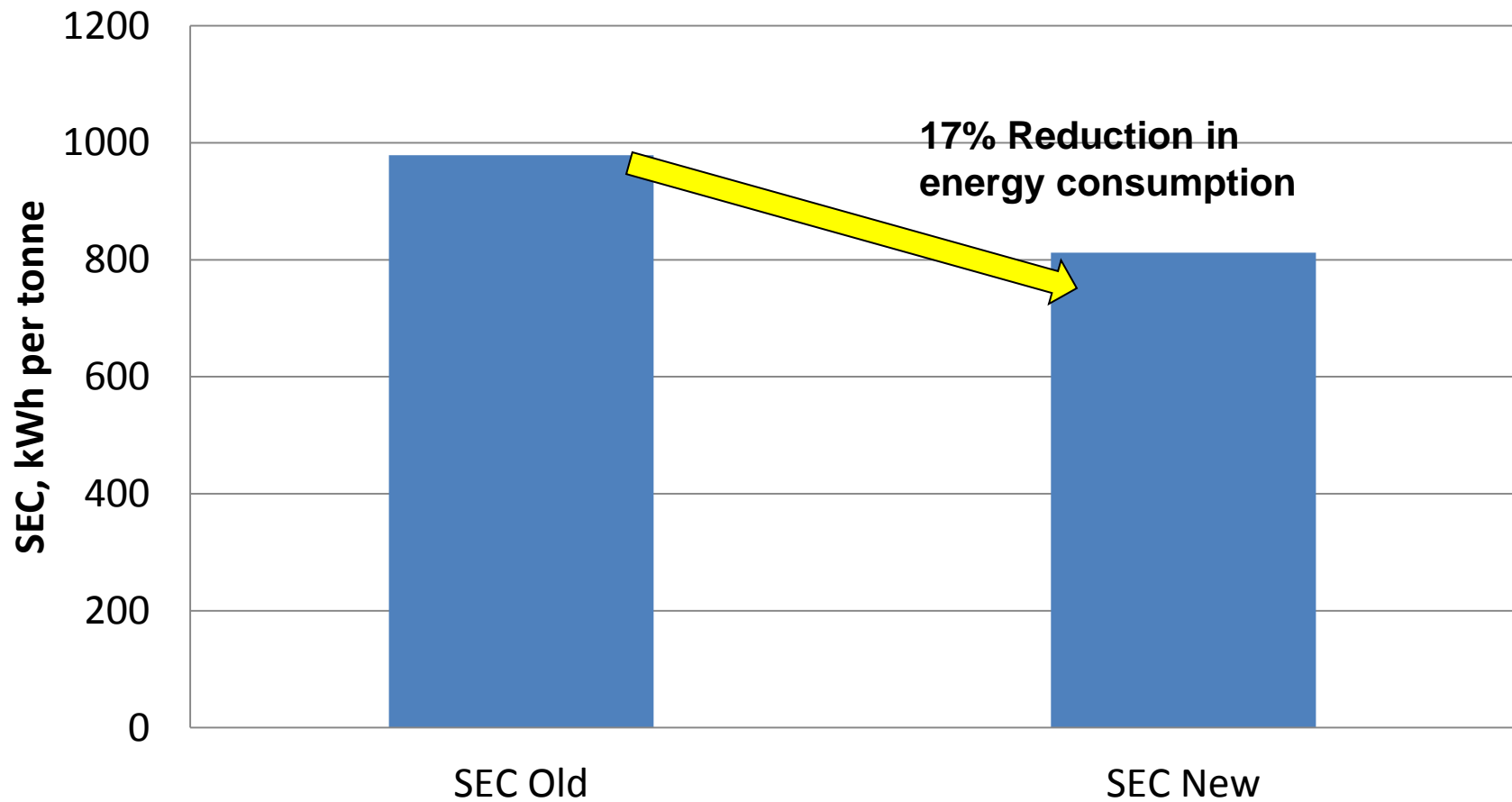


• Specific energy consumption (SEC):
979 kWh per tonne

- Former size increased:
360 mm to 410 mm
- New SEC: 812 kWh per tonne
- Annual savings: Rs 9.1 lakh

Case Study : L1-Best Operating Practices

Size of former used in induction furnace



Annual energy saving: 134,021 kWh per year

Implementation support: Effect



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Particular	Unit	Implemented
Number of units		17
Number of ECMs	No's.	49
Investments	Rs lakh	54
Energy cost savings	Rs lakh/ year	66
Annual energy savings	toe/ year	60
Lifetime CO ₂ reduction	tonne CO ₂	10,019



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Thank You



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