NATIONAL MOTOR REPLACEMENT PROGRAM (NMRP)

Abhishek Dhupar
09th April 2021
Need for a National Program

- Around 90% of installed motors are of IE1 or IE0 base, which are typically energy in-efficient
- DPIIT’s Quality Control Order necessitates all new motors (imported or domestically produced) to be minimum IE2 compliant in India
- Accelerate the adoption of Premium Eff. Motors (IE3) by addressing higher/upfront cost barrier for motors procurement.
- The Perform, Achieve & Trade (PAT) program of BEE is a lever for the designated industries to adopt the same
Motor Market – Operating Model (BAU)

Manufacturers

Intermediaries

End users

LT motors
- Cement
- Iron and Steel
- Fertilizers
- Paper
- Textiles
- Chloral-alkali
- Aluminium
- Others

Electrical consultants

EPC contractors

Original Equipment Manufacturers

Dealers/Distributors
Motor Market – Operating Model (EESL)

Manufacturers

Program Administrator

Intermediaries

End users

LT motors
- Cement
- Iron and Steel
- Fertilizers
- Paper
- Textiles
- Chloral-alkali
- Aluminium
- Others

Demand Aggregators
(Channel Partners, Industry Associations etc.)
## Motor Eff. Values (as per IS 12615)

<table>
<thead>
<tr>
<th>kW</th>
<th>IE1 – Standard Efficiency</th>
<th>IE2 – High Efficiency</th>
<th>IE3 – Premium Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2-pole</td>
<td>4-pole</td>
<td>6-pole</td>
</tr>
<tr>
<td>0.75</td>
<td>72.1</td>
<td>72.1</td>
<td>70.0</td>
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<tr>
<td>1.1</td>
<td>75.0</td>
<td>75.0</td>
<td>72.9</td>
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<tr>
<td>1.5</td>
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<td>77.2</td>
<td>75.2</td>
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<td>79.7</td>
<td><strong>79.7</strong></td>
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<td>81.5</td>
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<td>87.6</td>
<td>87.6</td>
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<td>88.7</td>
<td><strong>88.7</strong></td>
<td>87.7</td>
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<td>18.5</td>
<td>89.3</td>
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<td>88.6</td>
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<td>89.9</td>
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<td>37</td>
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<td>91.2</td>
<td>90.8</td>
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<td>45</td>
<td>91.7</td>
<td>91.7</td>
<td>91.4</td>
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<tr>
<td>55</td>
<td><strong>92.1</strong></td>
<td><strong>92.1</strong></td>
<td>91.9</td>
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<tr>
<td>75</td>
<td>92.7</td>
<td>92.7</td>
<td>92.6</td>
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<tr>
<td>90</td>
<td>93.0</td>
<td>93.0</td>
<td>92.9</td>
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<tr>
<td>110</td>
<td>93.3</td>
<td>93.3</td>
<td>93.3</td>
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<tr>
<td>132</td>
<td>93.5</td>
<td>93.5</td>
<td>93.5</td>
</tr>
<tr>
<td>160</td>
<td>93.8</td>
<td>93.8</td>
<td>93.8</td>
</tr>
</tbody>
</table>
**Illustrative Example**

22 kW Motor  
7000 hrs of Operation  
100% Loading

**First Scenario**

- Motor: 173033 kWh
- Fan: 154000 kWh
- Overall Eff. = 44.5%

**Second Scenario**

- Motor: 165590 kWh
- Fan: 154000 kWh
- Overall Eff. = 46.5%

Savings:

- 7443 kWh
- 59544 INR

**Savings**
**Validation of Deemed Savings**

*EESL has conducted pilot studies for 40 nos. IE3 motors to understand the energy savings by replacing old motors (IE1 or below) in various industries.*

**Type of Industries**
- Automobile
- Textile
- Chemical
- Metal

**Type of Loads**
- Centrifugal Pumps
- Blowers
- Compressors
- Processing Machines

**Benefits**
- **4.9% to 16%** Energy Savings
- **8% to 17%** reduction in Bearing temp.
- **3% to 5.6%** reduction in vibration
TECHNICAL DETAILS

Other tech. features include:

- 50 deg. C Ambient Temperature suitability
- Insulation Class F/B
- Online greasing 160 Frame onwards
Operating Model

1. Demand Aggregation
2. Procurement Through Tender
3. Supply of Motors
4. Payment to Vendor
5. Payment to ESSL
6. 3 Years Warranty (EESL / Manufacturer Toll Free Customer Care)

Manufacturers

Channel Partners & Outreach Agencies

Outreach program

Industries

- Payments to ESSL
- Payments to Vendor
- Supply of Motors
- Demand Aggregation
- Procurement Through Tender
- Manufacturers
Business Models

PMC MODEL
(Upfront Investment done by Client)

Inventory Collection → Procurement Facilitation → Material Supply → Warranty Obligation

Total Project Cost: Motor Cost + EESL PMC Fees

ESCO MODEL
(Upfront Investment done by EESL)

Inventory Collection → Procurement Facilitation → Supply & Warranty Obligation → Investment by EESL → Project Monitoring

Total Project Cost: Motor Cost + EESL PMC Fees + Financing Cost
### Unique Features of NMRP

- Lower prices as compared to market retail price
- IE3 Motors of leading brands with extended 3 years warranty
- Entire investment to be made by EESL (under ESCO mode)
- Pre despatch inspection conducted by EESL for all orders
- Prices are F.O.R basis
- Hassle free repayment options
- Value addition support like M&V of motors on sample basis, technical training for maintenance teams
**ESCO Mode - NMRP**

- **Baseline (kWh)**
- **Estimated (kWh)**

Savings

**Deemed Saving** is estimated based on the reduction in wattage due to retrofits and operating hours.

**PAY AS YOU SAVE MODEL (PAYS)**

- **Annual Monetized Saving (INR)**
- **Annual Repayment to EESL (INR)**
- **Annual Retain of Savings by Client (INR)**

- **Zero Upfront Investment by Industry**
- **Project Period: 3 Years**
- **EQUATED Quarterly Repayment: 12 Quarters**
- **Warranty Period: 3 Years**

- **B**
- **A**

70 – 90% + 30 – 10%

EESL
## Case Situation

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Output Power (kW)</th>
<th>Pole</th>
<th>IE1 Efficiency (%)</th>
<th>Loading (%)</th>
<th>Quantity (Nos.)</th>
<th>Avg. Annual Operating Hour</th>
<th>Annual Energy Consumption - Baseline (kWh)</th>
<th>IE3 Efficiency (%)</th>
<th>Annual Energy Consumption - Post Replacement (kWh)</th>
<th>Annual Energy Savings (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.75</td>
<td>6</td>
<td>70.00%</td>
<td>80%</td>
<td>1</td>
<td>7000</td>
<td>6,000</td>
<td>78.09%</td>
<td>5,323</td>
<td>677</td>
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<tr>
<td>2</td>
<td>1.1</td>
<td>6</td>
<td>72.90%</td>
<td>80%</td>
<td>1</td>
<td>7000</td>
<td>8,450</td>
<td>81.00%</td>
<td>7,605</td>
<td>845</td>
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<tr>
<td>3</td>
<td>2.2</td>
<td>2</td>
<td>79.70%</td>
<td>80%</td>
<td>2</td>
<td>7000</td>
<td>30,916</td>
<td>85.90%</td>
<td>28,685</td>
<td>2,231</td>
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<tr>
<td>4</td>
<td>3.7</td>
<td>2</td>
<td>82.70%</td>
<td>80%</td>
<td>2</td>
<td>7000</td>
<td>50,109</td>
<td>87.80%</td>
<td>47,198</td>
<td>2,911</td>
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<tr>
<td>5</td>
<td>5.5</td>
<td>2</td>
<td>84.70%</td>
<td>80%</td>
<td>5</td>
<td>7000</td>
<td>1,81,818</td>
<td>89.20%</td>
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<tr>
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<td>4</td>
<td>86.00%</td>
<td>80%</td>
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<td>1,95,349</td>
<td>90.40%</td>
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<td>87.60%</td>
<td>80%</td>
<td>2</td>
<td>7000</td>
<td>1,40,639</td>
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<td>88.70%</td>
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<td>7000</td>
<td>2,84,104</td>
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<td>9</td>
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<td>7000</td>
<td>4,11,123</td>
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<td>91.70%</td>
<td>80%</td>
<td>3</td>
<td>7000</td>
<td>5,49,618</td>
<td>94.20%</td>
<td>5,35,032</td>
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<td><strong>TOTAL</strong></td>
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<td><strong>25</strong></td>
<td></td>
<td><strong>18,58,127</strong></td>
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<td><strong>17,88,452</strong></td>
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<td>S. No.</td>
<td>Particular(s)</td>
<td>Unit</td>
<td>Value</td>
<td>Value</td>
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<td></td>
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<tr>
<td>1</td>
<td>Total Quantity of Motors across 10 ratings</td>
<td>Nos.</td>
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<td>Estimated Annual Energy Savings</td>
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<td>Grid Power Cost</td>
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<td>Annual Cost Savings</td>
<td>INR</td>
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<td>Capital Cost of Motors</td>
<td>INR</td>
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<td>7,72,171</td>
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<td>6</td>
<td>EESL PMC</td>
<td>INR</td>
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<td>77,217</td>
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<tr>
<td>7</td>
<td>Project Cost</td>
<td>INR</td>
<td><strong>8,49,388</strong></td>
<td><strong>8,49,388</strong></td>
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<td>8</td>
<td>Finance Cost</td>
<td>INR</td>
<td>NIL</td>
<td>2,00,199</td>
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<td>9</td>
<td>Estimated Total Project Cost</td>
<td>INR</td>
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<td><strong>10,49,587</strong></td>
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<td>10</td>
<td>Contract Period</td>
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<td></td>
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<tr>
<td>11</td>
<td>Annual Repayment to EESL</td>
<td>INR</td>
<td>NA</td>
<td>3,49,862</td>
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<tr>
<td>12</td>
<td>% Share of cost savings to EESL</td>
<td>%</td>
<td>NA</td>
<td><strong>71.73</strong></td>
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<td>Quarterly Repayment to EESL</td>
<td>INR</td>
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<td>87,466</td>
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<td>Payback Period</td>
<td>Years</td>
<td>1.78</td>
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<td>Number of Quarters</td>
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</table>

**NOTE:** GST applicable as extra
Web Portal (www.motor.eeslindia.org)

IE3 MOTORS AT LOWER THAN MARKET PRICE

**BENEFITS**

Due to the higher domestic demand, the Indian motor industry's design and manufacturing capabilities will advance towards the global best practice level of IE3 at an accelerated pace, and provide economies of scale for higher exports. The replacement program will create additional skilled employment in technical.

MOTOR ENERGY SAVINGS CALCULATOR
## Existing installed motors details for replacement

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>Sector</th>
<th>Year of Establishment</th>
<th>Electricity Tariff Rate (Rs.)</th>
<th>Contact Details</th>
</tr>
</thead>
</table>

### Motors with following details only to be considered for replacement

- 3 Phase Squirrel Cage Induction Motors
  - 415 V, 50 Hz, S1 Duty, IP 55

### Existing Motor Name Plate Details

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Application (Pumps/Compressors/Fans/Blowers)</th>
<th>Quantity (Nos.)</th>
<th>Existing Motor Name Plate Details</th>
<th>Annual Operating hours</th>
<th>Loading (%)</th>
<th>Year of Installation</th>
<th>No. of times motor rewinded</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>Rating (kW / HP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>Frame size</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>Pole (2,4,6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>Motor Efficiency (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>Mounting (Foot/Flange)</td>
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</tr>
<tr>
<td>6</td>
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<td>10</td>
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</tr>
</tbody>
</table>
Program Engagement

1. Inventory Collection from Industry
2. Proposal Submission by EESL to industry
3. Proposal acceptance by industry
4. Signing of Agreement (ESCO mode)
5. Release of formal PO (PMC or ESCO mode)
6. Supply of motors at Site
7. Confirmation of Material receipt by supplier and industry
8. EQI Repayment by Industry to EESL
9. Project Closure
FEW MAJOR CUSTOMERS

- Mahindra Rise
- Arvind Fashioning Possibilities
- Adani
- Shriram
- Tata Steel
- Seshasayee Paper and Boards Limited
- CDB
- ACC
- ITC Limited
- Fact Pioneers in Progress
- Banswara Syntex Limited
- Kribhco
NMRP PMU

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N K Jha
EESL

Abhishek Dhupar
ICA India

Amit Singh
ISC
THANK YOU

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