



# Energy efficiency in textile industry

# Introduction

## ABB in the Textile Industry



ABB offers solutions for complete electrification systems including the integration of the automation and optimization systems. ABB combines local and global competence to satisfy your needs.

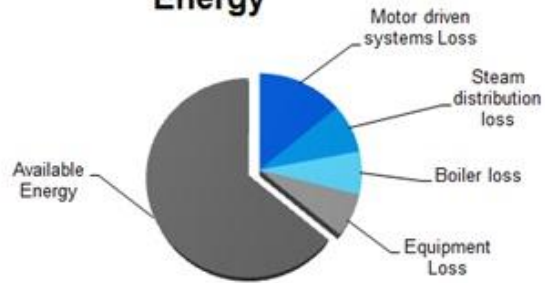
ABB delivers from small systems up to multi-million \$ turn-key contracts

- Identified and implemented numerous energy efficient motor solutions
- Many of these solutions have ABB drives
- Implemented control solutions in many textile plants
- Many ABB Analyzers (Flow, Pressure, Temperature) are currently being used in textile plants

# Energy Efficiency in the Indian Industry

## Significant Potential for improvement

**Onsite Energy Loss vs Available Energy**



· This graph is only indicative

· Source: Various studies

Textile industry is the third largest energy consuming industry after chemical and engineering sector. The estimated energy saving potential is 23% for textile industry.

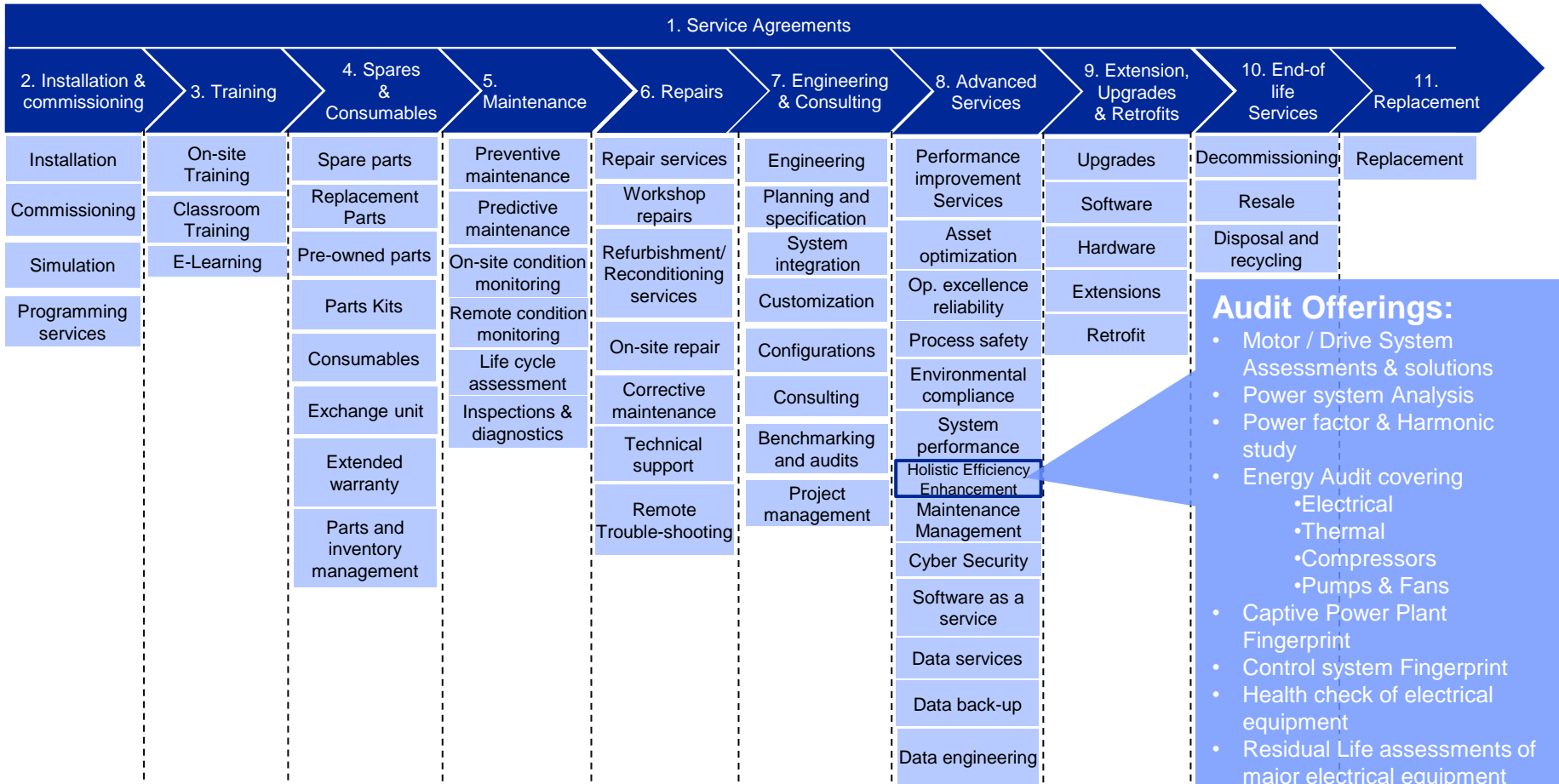
\* Source TERI report

Industry	Energy Saving Potential
Iron & Steel	10%
Fertilizers	15%
Textiles	25%
Cement	15%
Chlor-alkali	15%
Pulp & Paper	25%

Source: Report on Building a Low-Carbon Indian Economy, CII

# ABB Services

## Structured standard elements of service scope



# Offerings for textile industry

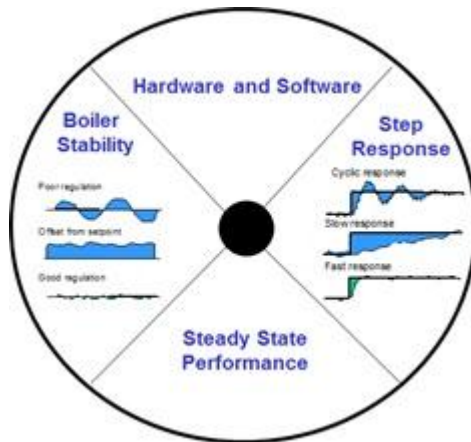
## ABB' Energy Efficiency Services

### Power System & Power Quality



- Motor/Drive system assessments & solutions
- Power system analysis
- Power factor & harmonic study
- Energy audit
  - Electrical
  - Thermal
  - Compressors
  - Pumps & Fans

### Boiler FingerPrint

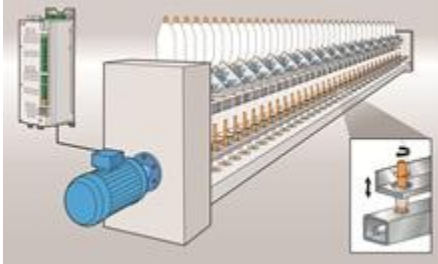


- Boiler FingerPrint
- Captive power plant FingerPrint
- Health check of electrical equipment
- Control system FingerPrint
- Residual Life Assessments (RLA) of major electrical equipment

# Offerings for textile industry

## ABB's Energy Efficiency Products and Solutions

High Efficiency Motors & Drives



Active Filters



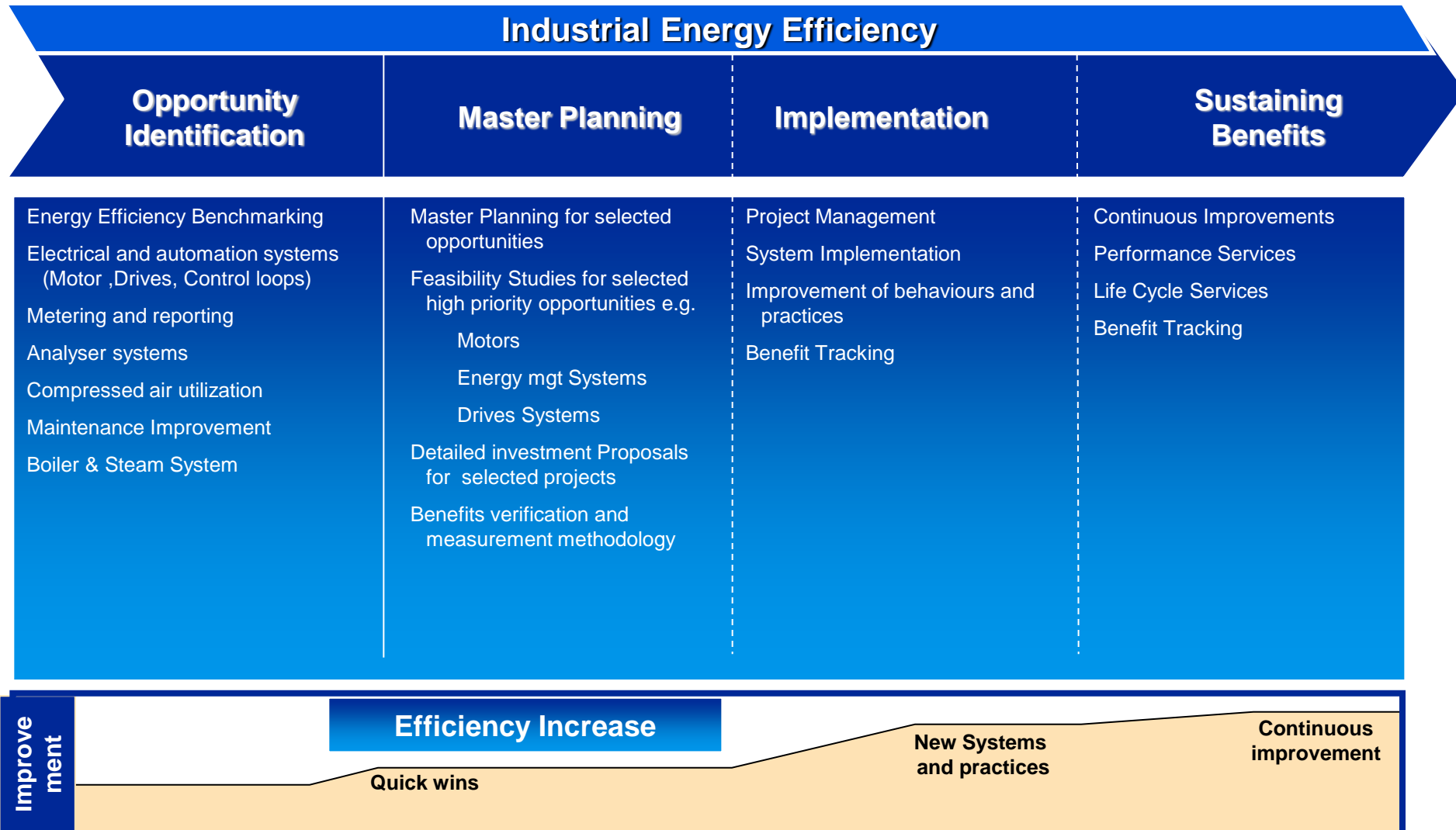
Solar PV solutions



- High-efficiency motors (IE1, IE2, IE3, IE3+)
- Variable speed drives (VSDs)
- Power quality solutions (APFC panels, active filters)
- Control systems and optimization software (Compact HMI, 800xA, Freelance 800F, open control system)
- Instrumentation and Measurement (COMMANDER 1900R for temperature control of slasher dryer cans, pressure transmitter 600T)
- Energy management software (CPM-plus)
- Renewable energy offerings (solar Photovoltaic)

**One stop shop for all your PAT commitments and RPO obligations**

# Industrial Energy Efficiency for Textile Program Overview



# ABB's full product & service portfolio



Power

- Switchyard
- HV, MV, LV systems & equipment
- Protection systems
- PF improvement & harmonic filters



Energy Efficiency

- Machines & Motors
- VVVF Drives
- Soft-starters
- Energy savings and audits



Intelligent Operation

- SCADA systems
- DCS / PLC solutions
- Optimization tools
- Asset management
- Remote monitoring & diagnostic



Measurements

- Flow meters
- Quality analyzers
- Pressure, level & temperature meters
- Indicators, recorders & controllers



# ABB's full product & service portfolio



- Health checks & condition monitoring
  - RLA & LEAP for electrical Static equipment
  - Machines & Motors
  - Control systems for boiler
- Retrofit, Upgrades and expansions
  - HT breakers, transformers, CT/CVT, PT & LA
  - Protection systems
  - MV / LV Switchgear
  - Machines & Motors
- Measurement, monitoring & optimization
  - Flow, pH, water quality
  - SCADA and DCS
  - Asset monitoring & management (leak detection, filters, pumps)
  - Smart distribution & metering



# ABB's full product & service portfolio



## Energy management & Efficiency solutions

- Power & process consultancy
- PF improvement
- Harmonic analysis & filters
- Maximum demand control
- Power availability & tariff driven operations
- Demand forecasting, planning & scheduling
- VVVF drives
- High efficiency machines & motors



# References:

## Energy efficient Baldor motors in textile industry

# ABB saves energy for textile industries

## Optimizing energy consumption at Century Enka, Pune

Project year: 2011

### **Customer need:**

- Old DC motor drive installed at the Century Enka unit in Pune with old PLC had frequent breakdowns. The customer wanted highly reliable and energy efficient motors for draw twisting applications.

### **ABB solution:**

- ABB supplied super efficiency Baldor motors 22kw 4pole and 18.5kw 4 pole for total 6 machines

### **Customer value:**

- Energy savings: 18 % as compared with old motors
- Payback time: 1.5 years
- Breakdowns reduced from 5% to nil

# ABB saves energy for textile industries

## Optimizing energy consumption at SRF, Malanpur

Project year: 2010 **Customer need**

- High efficiency and reliable motors for old twisting machines

### **ABB solution**

- Supplied 40 nos. of Baldor Super Efficiency 45kw motors with 95.4% efficiency and flat curve

### **Customer value**

- Energy savings: 4.5% energy savings
- Payback time: 18 months
- Bearing life increased from 40,000 hours to 1,00,000 hours
- Greasing interval increased from 4 months to 6 months

# ABB saves energy for textile industries

## Optimizing energy consumption at Abhishek Yarn, Barnala

Project year: 2009 **Customer need:**

- High efficiency and reliable motors for ring frames

### **ABB solution:**

- Supplied 21 nos. of 40kw 4 pole Baldor super efficiency motors with 95% efficiency and flat curve

### **Customer value:**

- Energy savings: 7% energy savings
- Payback time: 24 months
- Bearing life increased from 40,000 hours to 1,00,000 hours

# ABB saves energy for textile industries

## Optimizing energy consumption at Raymond, Thane

Project year: 2009 **Customer need:**

- High efficiency and reliable motors for chilled water pump application

**ABB solution:**

- Supplied 11 kw 4 pole Baldor standard efficiency motors with 91%

**Customer value:**

- Energy savings: 12.3% energy savings
- Payback time: 18 months
- Bearing life increased from 40,000 hours to 1,00,000 hours

# ABB saves energy for textile industries

## Optimizing energy consumption at Alok Textiles, Silvassa

Project year: 2009

### **Customer need:**

- Existing 60kw motors supplied with LMW (Lakshmi Machine Works) ring frame machine was getting overheated resulting in reduced production when machine RPM was taken to rated 24000. The customer was suffering a production loss of almost 15%.

### **ABB solution:**

- ABB supplied super efficiency Baldor Motors 75kw in same frame of 60kw with 95.4% efficiency and flat curve. ABB also changed the variable frequency drives.

### **Customer value:**

- Machine attained 24000 spindle RPM and production increased by @ 15%
- Energy savings: Units per kilogram was maintained
- Payback time: 30 days



# ABB saves energy for textile industries

## Optimizing energy consumption at Eurotex, Kolhapur

Project year: 2008 **Customer need:**

- High efficiency and reliable motors for E-Spin Drive in Sussein Asia ring frame machine. The existing 11kw was under loaded.

### **ABB solution:**

- Supplied 7.5kw 4 pole Baldor super efficiency motors with 92.5% efficiency and flat curve

### **Customer value:**

- Energy savings: 5% energy savings
- Payback time: 30 months
- Bearing life increased from 40,000 hours to 1,00,000 hours

# ABB saves energy for textile industries

## Optimizing energy consumption at Century Rayon Shahad, Kalyan

Project year: 2008 **Customer need:**

- High reliability energy savings replacement motors 1HP 4 pole B3 for autoconing application.

### **ABB solution:**

- ABB supplied Baldor super efficiency motors for autoconing application. 348 motors were replaced with 87.6% IEEE112B (Institute of Electrical and Electronics Engineers 112B standard) efficiency as compared with 77% (as per Indian Standards 8789) of working motors.

### **Customer value:**

- Energy savings: 14.5% as compared with old motors
- Payback time: 2 years

# ABB saves energy for textile industries

## Optimizing energy consumption at Sree Narsimha Mills, Coimbatore

Project year: 2007 **Customer need:**

- High efficiency and reliable motors for ring frames with 75kw in same size as 55kw to increase machine productivity

### **ABB solution:**

- Supplied 3 nos. 75kw 4 pole Baldor super efficiency motors with 95% and flat curve in frame size 225M

### **Customer value:**

- Productivity improved by 10%
- Energy savings: 3% energy savings
- Payback time: 4 months
- Bearing life increased from 40,000 hours to 1,00,000 hours

# References:

## Power system analysis in textile industry

# ABB saves energy for textile industries

## Industrial power system study at Alok Industries, Vapi

Project year: 2012  
(Ongoing)

### **Customer need:**

- 66/11kV sub-station design and engineering.
- Power system studies of the updated network.

### **ABB solution:**

- Vendor neutral design engineering for 66/11kV sub station.
- Load Flow, Short circuit study.
- Relay Co-ordination study.
- Transient stability studies.
- Grid islanding study.
- Load shedding scheme.

# ABB saves energy for textile industries

## Industrial power system study at Grasim Industries, Harihar

Project year: 2012  
(Ongoing)

### **Customer need:**

- Power system studies for the updated network and to be commissioned loads.
- Re-verification of the unit protection settings.

### **ABB solution:**

- Load Flow, Short circuit study.
- Relay Co-ordination study.
- Transient stability studies.

# ABB saves energy for textile industries

## Industrial power system study at Aditya Birla Nuvo (Indian Rayon), Verawal

Project year: 2011

### **Customer need:**

- Power system studies for the proposed network.
- Voltage level selection for grid interconnection.
- Re-verification of 11kV distribution network.

### **ABB solution:**

- Load Flow, Short circuit study.
- Reactive power compensation study.
- Transient stability studies.
- Load shedding scheme & islanding study.

### **Customer value:**

- Recommendations for installation of capacitors to improve power quality.
- Adequacy of switchgear checked and recommendations provided to withstand the fault condition to improve the reliability.
- Recommendations to improve the system stability and adequacy

# ABB saves energy for textile industries

## Industrial power system study at Vardhaman fabrics, Budhni

Project year: 2010

### **Customer need:**

- Power system studies for existing network.
- Protection co-ordination study.

### **ABB solution:**

- Load Flow, Short circuit Study
- Transient and largest motor starting analysis
- Relay Coordination
- Islanding and load shedding

### **Customer value:**

- Adequacy of switchgear checked and recommendations provided to withstand the fault condition to improve the reliability.
- Relay settings modified to ensure proper co-ordination and grid islanding to improve availability.
- Motor starting analysis conducted under various scenarios to ensure proper starting.



# ABB saves energy for textile industries

## Industrial power system study at Indian Rayon, Verawal

Project year: 2009 **Customer need:**

- Power system studies for existing network.
- Protection co-ordination study.

### **ABB solution:**

- Load Flow, Short circuit Study
- Transient analysis
- Relay Coordination
- Harmonic analysis.
- Network re configuration.

### **Customer value:**

- Recommendations for retrofit of breakers and relays to strengthen the network to avoid nuisance tripping's to improve the availability and reliability of power system.
- Recommendations for re-configuring the network with merits and demerits in each scheme and sequence of operation to improve system stability and adequacy.

# ABB saves energy for textile industries

## Industrial power system study at Grasim Industries, Nagda

Project year: 2007 **Customer need**

- Power system studies for existing and planned network
- System adequacy checks for planned network.

### **ABB solution**

- Load Flow, Short circuit Study
- Transient and motor starting analysis
- Relay Coordination
- Load shedding logic

### **Customer value**

- Strengthened electrical network and changed relay pickup settings to improve the availability and reliability of power system.
- Recommendations to implement load shedding logic to improve the system stability and system operation.

# Some customer testimonials – Energy Efficient Motors

# Performance certificate by Century Enka Limited

## CENTURY ENKA LIMITED

(Factory : Bhosari, Pune 411026)

Phone : 27120423  
Gram : CENENKA  
Telefax : (91) 020-27120113



Communicate at :  
Post Box No. 17,  
Bhosari,  
Pune - 411 026.

Date : 10/08/2007

### To Whomsoever It May Concern

#### **SUBJECT : Performance Comparison of Electric Motors**

We have replaced over 10 -12 years old rewound motors of reputed make with **Baldor Motors** and got the savings as under,

SR NO	TYPE OF EQUIPMENT	MOTOR DETAILS	POWER CONSUMPTION BEFORE IN KW	POWER CONSUMPTION AFTER IN KW	SAVINGS KW	% SAVINGS
1	PUMP	110 kw 4 POLE	104	99	5	4.76
2	PUMP	55 KW 4 POLE	48	44	4	8.33
3	PUMP	45 KW 4 POLE	36	33	3	8.33
4	PUMP	45 KW 4 POLE	44	42	2	4.54
5	AGITATOR	18.5 KW 4 POLE	14	12	2	14.28
6	SCRUBBER	7.5KW 2POLE	6.5	6	0.5	7.69
	<b>TOTAL</b>		<b>252.5</b>	<b>236</b>	<b>16.5</b>	<b>6.53</b>

Thanking you

Yours sincerely

for Century Enka Ltd

**N.L. Singh**  
General Manager Power & Automation

# Performance certificate by KPR Mills Limited

## K.P.R MILLS LTD

### RINGFRAME POWER STUDY REPORT

Date of study : 19.10.07&23,10.07

Description of study : - Specific power consumption (UKG) with LEDL / BALDOR motors

Machine Model & Mill No : LR6/S & 30

#### Production Parameters

Count : 34 's HY  
 TPI : 21.59  
 Machine speed :  
 Min. : 10,000 rpm  
 Max : 18,800 rpm  
 Avg : 17556 rpm

#### Machinery Details

Ring Dia : 38mm  
 Lift : 180mm  
 Spl. Wharve : 18.5mm  
 No of spindles : 1008

#### Electrical Details

Meter Used : FLUKE 1735  
 Motor details : BALDOR LEDL  
 KW 45 45  
 V/A 415 /78 415 /72  
 RPM 1480 1483  
 EFFICIENCY 95.4% 94.7

SPEED PATTERN	
length	speed
0	10000
100	11800
200	13800
300	15800
600	17800
900	18500
2950	18800
3000	17800

Sl.No	Description	BALDOR MOTOR				LEDL MOTOR			
		Ist doff	IInd doff	IIIrd doff	Average	Ist doff	IInd doff	IIIrd doff	Average
1	Run time in minutes	145			145	145	145		145
2	Doff Length	-			-	-	-		-
3	Avg Spl.Speed	17556			17556	17556	17556		17556
4	Power consumption(Kwh)	60.875			60.875	61.094	61.775		61.435
5	Production in Kgs.	53.08			53.08	44.54	49.42		46.98
6	Waste weight (Kgs)	0.84			0.84	0.84	0.68		0.76
7	Units per hour	25.19			25.19	25.28	25.56		25.420
8	Kgs per hour	21.96			21.96	18.43	20.45		19.440
9	UKG YP	1.147			1.147	1.372	1.250		1.308
	TP	1.129			1.129	1.346	1.233		1.287

#### Notes :

YP : yarn production

TP : total production ( yarn +waste)

Study conducted without capacitor and without Inverter.

#### Comments and Conclusions :

1. Production is varying between Baldor and LEDL.
2. As such there is a saving of 12.3% in BALDOR over LEDL
3. When the production in LEDL goes up to equal to BALDOR power may also goes up.

  
 K.N CONSULTANTS

# Performance certificate by Ramalinga Mills Limited

## RAMALINGA MILLS LTD 'B' UNIT

### RINGFRAME POWER STUDY REPORT

Date of study : 26.10.07 to 31.10.07

Description of study : - Specific power consumption (UKG) with LEDL and BALDOR motors

Machine Model & Mill No : LR G5 /1 & 44

#### Production Parameters

Count : 80 's w  
 TPI : 30.3  
 Machine speed :  
 Min. : 18,400 rpm  
 Max : 22,080 rpm  
 Avg : 21,125 rpm

#### Machinery Details

Ring Dia : 38mm  
 Lift : 155mm  
 Spl. Wharve : 19.0mm  
 No of spindles : 1008

#### Electrical Details

Meter Used : FLUKE 1735  
 Motor details : BALDOR LEDL  
 KW 55 55  
 V/A 415/98 400/91  
 RPM 1475 1480  
 EFFI. 95.4% 93.50%

### SPEED PATTERN

length/step	speed
65	18400
68	18880
71	19360
74	19840
77	20320
80	20800
83	21280
85	21600
88	22080
84	21440
78	20480

Sl.No	Description	BALDOR MOTOR					LEDL MOTOR						
		Ist doff	IIInd doff	IIIrd doff	IV th doff	V doff	Average	Ist doff	IIInd doff	IIIrd doff	IV th doff	V th doff	Average
1	Run time in minutes	377	372	377	376		<b>375.5</b>	370	371		373	371	<b>371.3</b>
2	Doff Length	---	---	---	---		---	---	---		---	---	---
3	Avg.Spl.Speed	21,125	21,125	21,125	21,125		<b>21,125</b>	21,125	21,125		21,125	21,125	<b>21,125</b>
4	Power consumption(kwh)	167.27	161.95	167.53	166.09		<b>165.710</b>	169.05	172.99		174.47	170.8	<b>171.8275</b>
5	Production in Kgs.	47.12	46.10	47.36	46.06		<b>46.66</b>	45.6	46.02		46.33	45.32	<b>45.82</b>
6	Waste weight (Kgs)	0.56	0.58	0.52	0.498		<b>0.540</b>	0.42	0.61		0.31	1.03	<b>0.593</b>
7	Units per hour	26.62	26.12	26.66	26.50		<b>26.48</b>	27.41	27.98		28.065	27.623	<b>27.77</b>
8	Kgs per hour	7.50	7.44	7.54	7.35		<b>7.46</b>	7.39	7.44		7.45	7.33	<b>7.40</b>
9	UKG YP	3.550	3.513	3.537	3.606		<b>3.551</b>	3.707	3.759		3.766	3.769	<b>3.750</b>
	TP	3.508	3.469	3.499	3.567		<b>3.511</b>	3.673	3.710		3.741	3.685	<b>3.702</b>

YP : yarn production

TP ; total production (yarn +waste)

Note : Study conducted with Inverter.

#### Comments and Conclusions :

1. There is a clear saving both on UKG and Units /hour in BALDOR
2. There is a saving of 5.3 % on UKG in BALDOR motor
3. The saving will be 35.63 units /day /frame
4. Max.loading on the motor for the count and speed is 34.8 KW on BALDOR and 36.7 KW on LEDL

  
 K.N CONSULTANTS

# Performance certificate by Raymond Limited

**raymond**  
LIMITED

Monday, May 11, 2009

To Whomsoever It May Concern

**SUBJECT: Performance Comparison of existing Electric Motors of Ring Frame with Baldor make motor**

We have carried out tests on the following motors to compare the energy savings on Textool **Ring Frame with Inverter Drive** and the results are given below:

Machine- Textool, RPM- 9000, Count- 1/60,

Sr No	Baldor Motor Details, A	Average Energy Consumed per Hour KW	CGL Motor details,	Average Energy Consumed per Hour KW	Savings A over B %
1	11 kw 4 Pole, 1460 rpm Super E	6.40	11 Kw 4 Pole, 1440 rpm Eff2 4 years old motor	6.768	4.41

The trial was carried out for 55 hrs for each of the motors.

Thanking you

Yours sincerely  
For RAYMOND LTD

  
Vishnu B Singh  
Manager- Engineering & Energy Conservation

M.O.B. +91 9 8 3324 2110

**ABB**

# Some customer testimonials – PS Analysis



# Performance certificate by Grasim



Date: 10.05.2008

## TO WHOMSOEVER IT MAY CONCERN

This is to certify that M/s ABB Ltd, Vadodara India has undertaken and executed Power System Studies for GRAISM, Nagda plant right from the 22 kV network up to 0.415 kV level within the contractual period. M/s ABB has successfully completed the job within the stipulated time frame and the services rendered are to our entire satisfaction.

Work Order: EPSC/SC/RC/34/RD

Dated: 27/06/2007

The following analysis was carried out successfully in their study within contact period:


### Phase-1: Engineering

1. Verification & approval of CT, PT, LA and surge capacitor
2. Earthing system design for new 30 MW CPP

### Phase-2: System Studies

1. Data Collection & Network Modeling
2. Load flow studies for intact and contingency condition
3. Short circuit studies
4. Motor Starting Analysis
5. Transient stability Analysis
6. Load Shedding Logic
7. Relay Coordination Studies

The study was conducted in 2007-2008. The study report submitted by M/s ABB is as per our requirement and satisfactory.

  
Ritash Pandey

Manager (Technical Cell – Projects)

Project coordinator  
Power Plant

TECHNICAL CELL ENERGY



Birta Cellulose

# Performance certificate by Indian Rayon



Date: 26<sup>th</sup> August , 2009

## TO WHOMSOEVER IT MAY CONCERN

This is to certify that M/s ABB Ltd, Vadodara has undertaken and executed Electrical Power System Studies for Indian Rayon (A Unit of Aditya Birla Nuvo Ltd.) Veraval from 11 kV generation to PCC incomer level, within the contractual period.

P.O.No.: 4550016461

Dated: Jan 24, 2009.

The following analysis was carried out successfully in their study within contract period:

1. Data Compilation & Network Modeling.
2. Load flow studies for intact and contingency condition.
3. Short circuit studies.
4. Protection Relay Coordination Studies.
5. Transient stability Analysis.
6. Largest load Starting Analysis.
  - Rectifier Starting Analysis.
  - Largest Motor Starting Analysis.
7. Harmonic measurement & analysis.
8. Network Reconfiguration.
9. Review of Unit Protection Settings.

The study was conducted in 2009. M/s ABB has successfully completed the job within the stipulated time frame and the services rendered are to our entire satisfaction.

For Indian Rayon Limited  
Veraval

Mr. Anupam Gupta  
Sr. GM-(VFY-Engineering & WCM)



**RAY ONE**

QUALITY THE WORLD PAPER

**INDIAN RAYON : A Unit of Aditya Birla Nuvo Ltd.**

REGD. OFFICE & WORKS : Veraval - 362 266, Gujarat (INDIA)

Phone : EPABX (02876) 248401 / 245711 Fax : (02876) 243220 Gram : INDIARAYON Email : iriverval@atiyabirla.com



# Some customer testimonials – VFDs

# Performance certificate by Tharani Engg. Services

## THARANI ENGINEERING SERVICES

196, Velan Complex, Nethaji Road, Pappanaickenpalayam, Coimbatore - 641 037.  
Phone : 0422 - 2214655 Cell : 98429 - 31207



Date:07.09.2005

### To Whom It May Concern

This is to certified that M/s S2B Power System & Controls,188-D,Salvy Buildings, Chinnasamy Naidu Road, Coimbatore – 044 has supplied ABB make AC drive ACS 800 series to us for implementing our Energy conservation measures to one of our Textile customer located in Karur for their Air Compressor.

#### Equipment Details

##### Air Compressor

Make : ELGI  
Model : TANDEM(Screw)  
Capacity : 490 CFM  
Rated Pressure : 9.0 Kgf/cm<sup>2</sup>  
Motor KW : 90 KW

##### Motor

Make : Siemens  
Model : ILAO 283-4YA 76  
Frame size: 280 M KW : 90  
Voltage : 415V Delta  
Frequency: 50 HZ RPM : 1480

#### Observation

##### With out Drive

Power consumption : 78 Units per Hours  
Power Factor : 0.81  
Voltage : 407 V  
Current Drawn : 135 A  
Frequency : 49.5 HZ


##### With Drive

67 Units per Hour  
0.91  
407 V  
103 A  
39 HZ

#### Conclusion

For the fast 60 days we observed 260 units saved per day consistency and drive working satisfactory.

For THARANI ENGINEERING SERVICES

  
Proprietor

# Performance certificate by Grasim




Date:30/01/2009

To Whom So ever It May Concern:

This is to certify that **ABB Make ACS800 VFD** is working smoothly without any problem on our Ring frame machine, since last 2 years. We are satisfied with the performance of ACS800 Variable Frequency Drive.

For Vikram Woollens:

  
**VIKRAM WOOLLENS**  
(A Unit of Grasim Industries Limited)  
Plot No. GH I to IV  
Ghirongi (Malanpur)- 477117  
Distt. Bhind (M.P.) INDIA

**Hitesh Fendol**  
Head (Engg)  
9826429344

**VIKRAM WOOLLENS (A Unit of Grasim Industries Limited)**  
(ISO - 9001:2000 & ISO - 14001:1996 Certified Company)  
GH I to IV, Malanpur - 477 117, Distt. Bhind (M.P.) INDIA

Tel : 91-7539-283602, 283603; Fax : 91-7539-283339 E-mail : vikramwoollens@adityabirla.com



# Contact us

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Bangalore – 560001

India

Toll free no : 1800 420 0707

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Website: <http://www.abb.com/energyefficiency>

Power and productivity  
for a better world™

