

***16th NATIONAL AWARD FOR
EXCELLENCE IN ENERGY
MANAGEMENT 2015***

***Most Innovative & Innovative
Energy Saving Products***



***Most Innovative Energy Saving
Products***

Award Winners





**Guaranteed Energy Savings for
your existing and new projects
with wireless sensors**

**PROUDLY
MADE IN 
india**

Every Switch is a Green Opportunity



**Switches
control
almost every
electrical
device**



**Switches need to be
AUTOMATICALLY controlled in
order to reduce Energy Bills**

Control the Switch for Savings

People forget to turn switches OFF resulting in energy wastage



DEVICE	 BULB	 T5 TUBELIGHT	 T8 TUBELIGHT	 CEILING FAN	 EXHAUST FAN	 SPLIT A/C UNIT
TYPICAL WATTAGE	60-100 WATTS	28 WATTS	36 WATTS	80-90 WATTS	35-60 WATTS	1100-1200 WATTS

This results in higher energy bills

The Solution

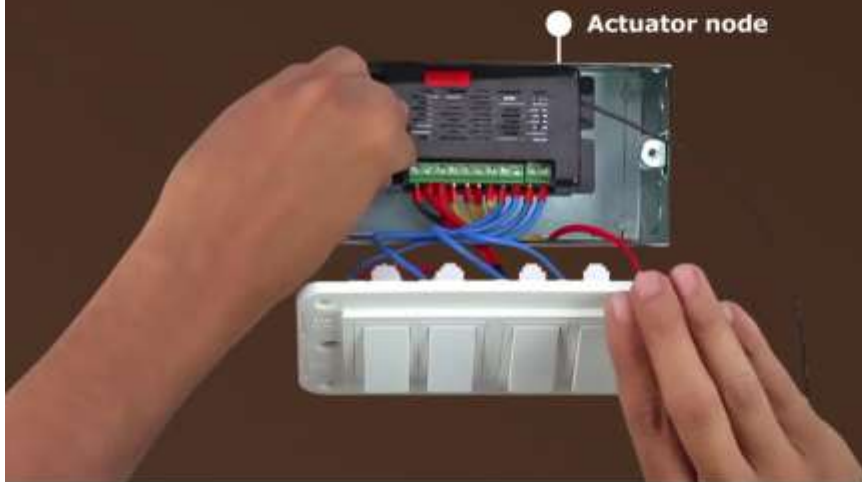


BuildTrack
WIRELESS SENSORS



How do they work?

Patented Actuator node with wireless RF receiver is installed behind switch, invisible to user



Each actuator node can control up to 4 switches. Multiple actuators can be used in a switch panel as needed

Occupancy And Daylight Sensors



Wireless RF signal from Sensor

Wireless Sensor: Benefits



❖ **No Wiring NEEDED**



❖ **Sensor can be freely placed where required**



❖ **Rapid deployment, often in under an hour**



❖ **Aesthetics of the room is maintained intact**



❖ **Single sensor can control multiple switches located in a single switch panel or even in multiple switch panels**



❖ **Switches will work, even if sensors fail or run out of battery !**



❖ **Users can still turn off individual devices with switches**



❖ **Variable delay timings for different devices**



❖ **GOOD PAYBACK**

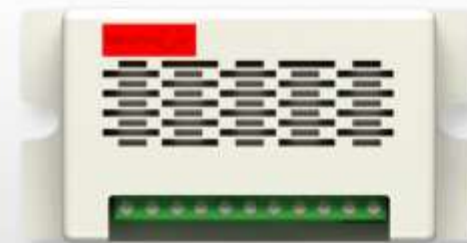


❖ **CONVENIENCE to users**

Components



**Occupancy &
Daylight Sensors**



Actuator Node

Payback in < 1 year !



There is a huge savings possible with the use of wireless sensors

Some estimated energy savings in a few cases are provided below



PRIVATE OFFICE
10%-50%



CONFERENCE ROOM
20%-50%



CLASSROOM
25%-40%



RESTROOMS
30%-70%



CORRIDORS
30%-70%



**STORE AREAS
(INCLUDING WAREHOUSES)**
30%-80%

Payback of the wireless sensors can be 1 year or under for daylight and intermittent use areas.



Useful Deployment Situations

❖ **High Value & Quick Payback is obtained in situations where intermittent occupancy happens and/or adequate daylight is available. such as**

- Private offices & cabins
- Conference Room
- Classrooms
- Kitchens/Pantries
- Restrooms
- Safe Deposit Box rooms (banks)
- Corridors
- Warehouse aisles
- Stairwells
- Elevators
- ATMs





INDIA'S FIRST SUPER
EFFICIENT CEILING
FAN



Category: Small Appliances



superfan

by



Coimbatore





Redefining Ceiling Fans

Key differentiators

- ❖ More than 50% energy savings
- ❖ No compromise on air delivery
- ❖ Remote control
- ❖ Low voltage operation (speed even at 140Vac)
- ❖ No speed change for wide voltage range (140Vac to 300Vac)
- ❖ Precise speeds
- ❖ No heating of motor

35W★
230CMM



140 - 300Vac



Electrical Performance

	Speed	Superfan	EE fan	Conventional fan
Active power (W)	Low	3.9	18	12.5
	Medium	13.3	45	36.7
	High	34	55	76.2
Power factor	Low	0.51	0.49	0.37
	Medium	0.88	0.82	0.64
	High	0.96	0.99	0.99
Total demand (VA)	Low	7.6	36.7	33.8
	Medium	15.1	54.9	57.3
	High	35.4	55	77
VAR demand for 500 fans (kVAR)	Low	3.3	16	15.7
	Medium	3.6	15.7	22
	High	5	5.2	5.4

Superfan has built-in power factor control and low power consumption helps in large installations.





Superfan Attributes	Innovation	Inclusive	Sustainability	Scalability	Energy & Environment	Mass Appeal	Originality	Safety
Energy saving, air delivery	✓	✓	✓	✓	✓	✓	✓	
Remote control , precise speeds	✓	✓				✓	✓	
Low voltage operation	✓	✓						
Colors & aesthetics		✓				✓	✓	
No speed change with wide supply variation	✓						✓	
Twice longer, quiet running on inverter						✓		
Material			✓		✓			✓
Green product			✓		✓		✓	
High/Low voltage & overload protection	✓							✓
Solar friendly		✓	✓		✓			
Technology, Construction, other uses				✓			✓	✓

WindStream Energy Technologies India Pvt. Ltd. Company Presentation – August 2015



The simple, efficient & cost effective way to utilize highly available Wind and Solar resources in "India"

The SolarMill®

An Efficient Way of
Combining the Power of Wind and Solar!

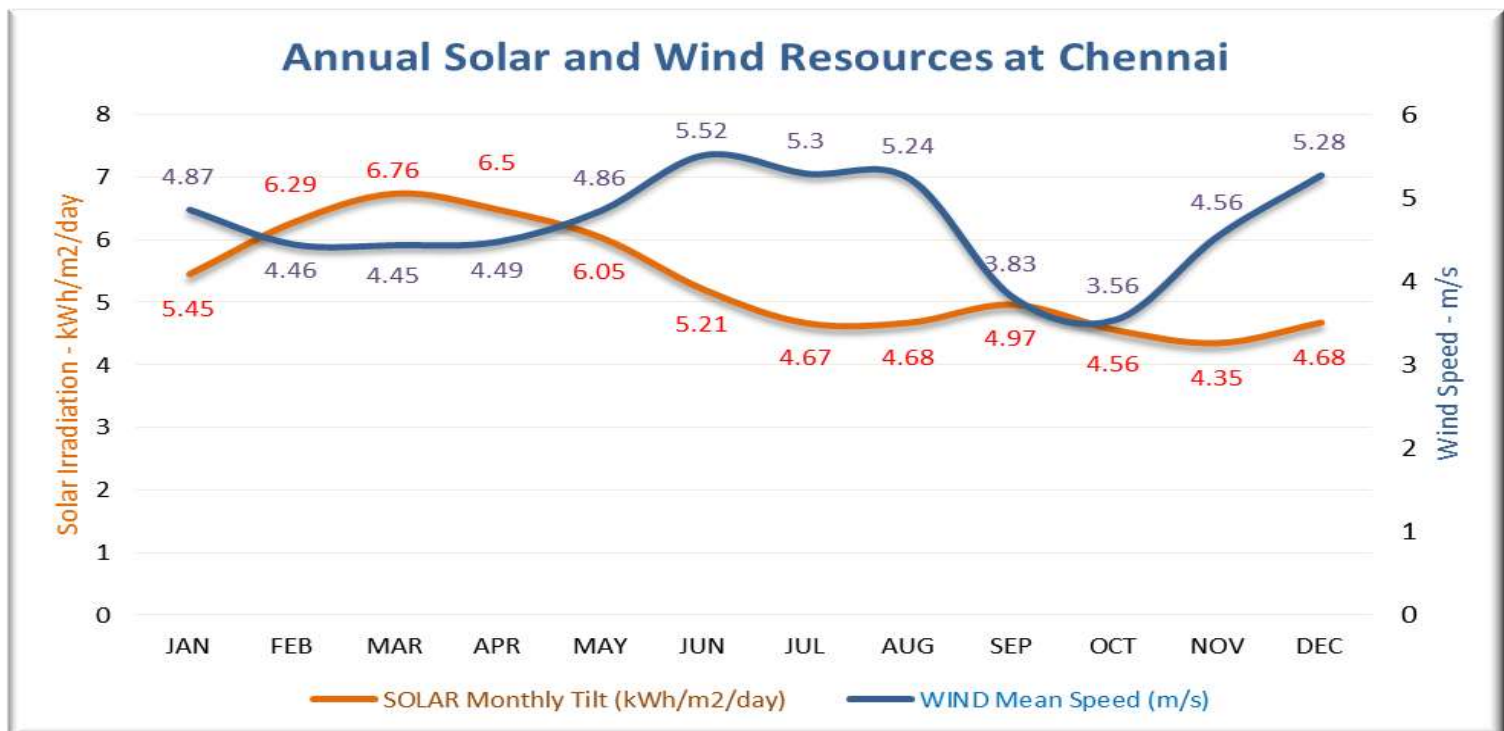
The SolarMill Generates:

- Daytime energy from the sun and wind
- Day & Night energy from the wind
- Energy even on cloudy days
- More energy on hot sunny days due to cooling effect on solar panels by wind
- Standing about 1 meter tall, SolarMills meet most permitting building code requirements.
- SolarMills harvest energy from the sun and wind simultaneously and also independently.



Why SolarMill?

- The SolarMill technology smooth's out the highs and lows of energy generation periods due to seasonality as **solar irradiation and wind speeds change** throughout the course of the year.
- The hybrid solution will compensate for seasonal losses of power generation while depending on any one type of renewable energy system.



Product overview-SolarMill

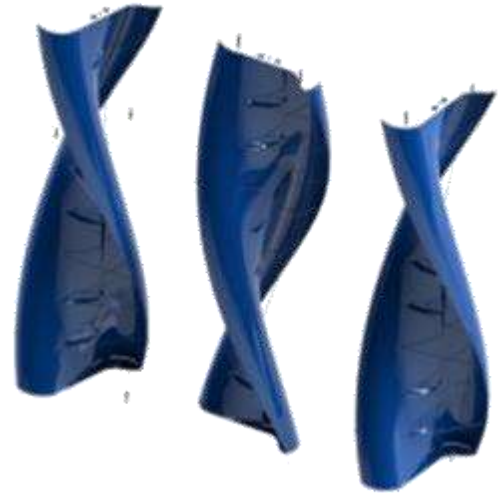
- SolarMill is a Hybrid energy system which deals with both **Solar and wind energy**.
- Hybrid system is based on a modular, scalable, distributed renewable energy system designed and optimized for both **on and off grid installations**.



- Wind energy device, utilizing **three low-profile vertical axis wind turbines (VAWT)** mounted on a single base.
- Incorporates **P.V. technology**, creating the greatest energy generation.

The Technology:

- **Savonius Turbines** accept wind from any direction and accommodate changes in wind direction.
- SM1 is capable of producing **576 kWh/ Year** (@ 6kWh/m²/day and 5m/sec average yearly wind speed)
- WindStream's **Maximum Power Point Tracking (MPPT)** is applied to each turbine independently.
- Onboard "**Smart**" **electronics** designed to control 3 turbines connected in series running the length of the tower, outputting power to the equipment locker.
- Current production technology and configuring for this unique application, the turbines, generators, and electronics will allow for the addition of wind generating power with a minimal amount of added weight.



Construction

SolarMill Assembly:

- 3 Vertical Axis Turbines mounted on a single base
- Turbines (Savonius) produce energy by accepting winds coming from any direction
- Cut-in wind speed – 2 m/s & Cut-out wind speed – 18 m/s
- Silent operation
- Designed for both On-Grid and Off-Grid applications



Construction contd..



Reliable

- Corrosion Resistant Material: all steel parts are pre-galvanized. Aluminum or stainless components are used where appropriate.
- Circuit Protection: Electronics provide protection for over-voltage and over-current by monitoring the current and voltage in each system.
- Mechanical Braking: The unit is equipped with a failsafe centrifugal braking system designed to protect the turbines and generators at high wind speeds (beyond 18.5 m/s).
- Able to withstand temperature ranges from **-30°C to 50°C**.



Advantages of SolarMill

- Easy to mount on any rooftop; no complicated masts, guy wires, or towers.
- Simple ballasted installation that avoids roof penetration.
- Environment-friendly, silent operation.
- Higher power density per square foot.
- Scalable power generation.
- Mechanical braking at high-speed winds beyond 18 m/s.
- Increases the battery life & minimizes the battery storage capacity.



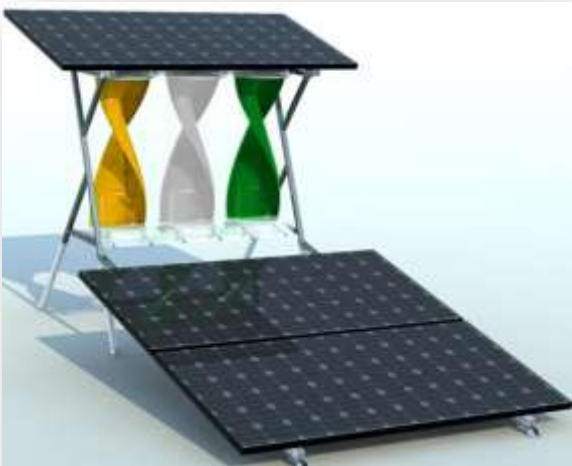
SolarMill Models



**SM1-1P
(750W)**



SM1-2P (1kW)



SM1-3P (1.25kW)



SM2-3P (1.75kW)



**SM2-6P
(2.5kW)**



SM2-9P (3.25kW)

Few of the installations in India



Baraut, Railway Station



CTARA, Ministry Of Railways, Hyderabad



Delhi



Nagpur

Innovative Energy Saving Products

Award Winners



COPELAND® CRK8M Recip Platform

Compressors

CII Energy Efficiency Summit

2nd -3rd September 2015, Hyderabad



Residential AC Regulations - BEE v/s M.E.

Table 2.3: Star level valid Split type air conditioners
From 01-01-2014 to 31-12-2015
BEE

Star level	Energy Efficiency Ratio (Watt/Watt)	
	Minimum	Maximum
1 Star *	2.70	2.89
2 Star **	2.90	3.09
3 Star ***	3.10	3.29
4 Star ****	3.30	3.49
5 Star *****	3.50	

Table 2.4: Star level valid for unitary type air conditioners
(From 01-01-2014 to 31-12-2015)

Star level	Energy Efficiency Ratio (Watt/Watt)	
	Minimum	Maximum
1 Star *	2.50	2.69
2 Star **	2.70	2.89
3 Star ***	2.90	3.09
4 Star ****	3.10	3.29
5 Star *****	3.30	

Middle East Air Conditioner appliance type	Cooling Capacity limit (CC) (Btu/h) At test condition (T1)	(EER) Value (Btu/h)/watt To be applied mandatory starting from the beginning of		(EER) Value (Btu/h)/watt To be applied mandatory starting from the beginning of	
		Sept 2013		Jan 2015	
Window Type		T1	T3	T1	T3
Window Type	18000 > CC	8.5	6.12	9.8	7.06
	18000 ≤ CC < 24000	8.5	6.12	9.7	6.98
	CC ≥ 24000	8.5	6.12	8.5	6.12
Split Type and the other types	All Capacities	9.5	6.84	11.5	8.28

- Middle East Energy Labels Are Stringent Than India Label
 - India Lower By One Level
 - Example For WRAC 2015
 - India Star Is 8.5 Till Dec 2015 (Calculated T 3 = 5.95)
 - Saudi Star 1 Is 9.8 From Jan 2015 (T 3 = 6.7)
- India Is Only T1, No Mention About T3; M.E. Is T1 & T3
 - T 3 Difficult To Achieve Than Only T1
- India Launched Energy Label In Jan 2009; Saudi Sept 2013
 - India Proposed 8.5 In 2015; Saudi With 9.8 In Jan 2015

New CRK8M Ultra High EER Compressors

- 11.5% Higher Efficiency Than Equivalent Compressors
- Better Efficiency At Same Sound Levels
- Better Performance Than Rotary At High Ambient Applications
- Suitable For Both Window AC Applications
- 6 Star Rating Under SASO
 - Only Recip Compressor Qualifies



CRK8M Series Highlights

- Innovativeness In Design Ensuring
 - Low Cost Product With Higher Efficiency
 - Made Suitable For Domestic And Export Markets
 - Primary Supplier For Window Application In Middle East
 - Optimization Of Recip Technology To Achieve Higher EER
- Product Acceptance In Domestic And Export Market
 - Over 0.4Mn Pieces Sold In FY15
 - Over 1.0Mn Plan For FY16

Energy Saving Work Out : CR19K8M

UHEER savings wrt competition

Average Energy Savings From CR19K8M w.r.t. Competition Models Under Same Conditions	11.5%
Average Annual Savings Per AC using CR19K8M (In Terms Of Energy Units)	300 KWh / Year
Annual savings per household due to higher efficiency	~ INR 1500 per AC

Total CRK8M Series UHEER Pcs Sold In FY15	0.4 Mn Units
Total Potential Energy Savings for FY15	120 Million Units
Total CRK8M Series UHEER Pcs Planned In FY16	1 Million Units
Total Potential Energy Savings for FY15	300 Million Units
Global 1.5 - 2 Ton AC Market With Recip Technology	8 Million pcs

Energy Saved is Energy Generated

A Power plant with capacity of 14 MW is required to generate 120 Million KWh of energy in a year



FLASH JET PUMP



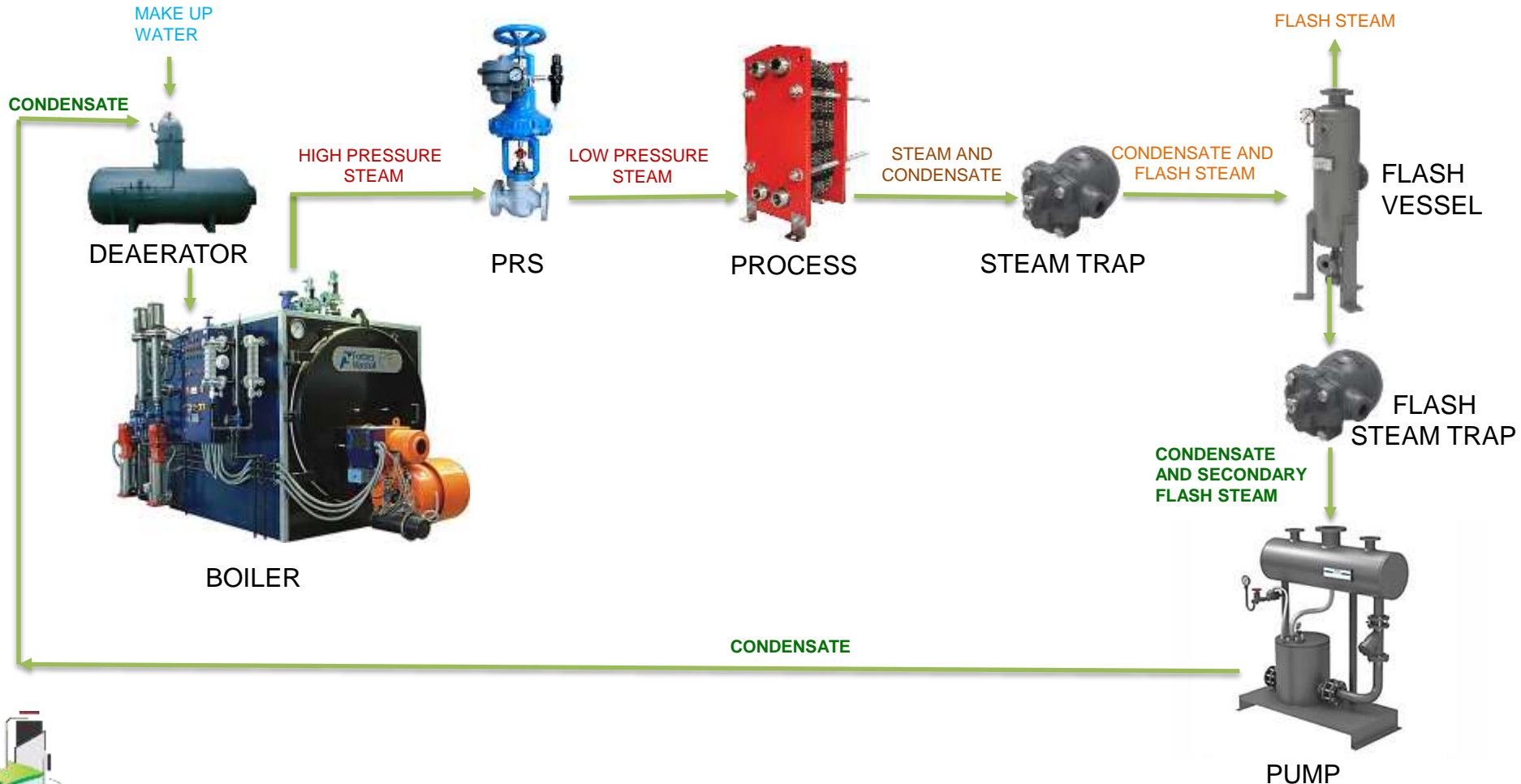
Energy Conservation | Environment | Process Efficiency

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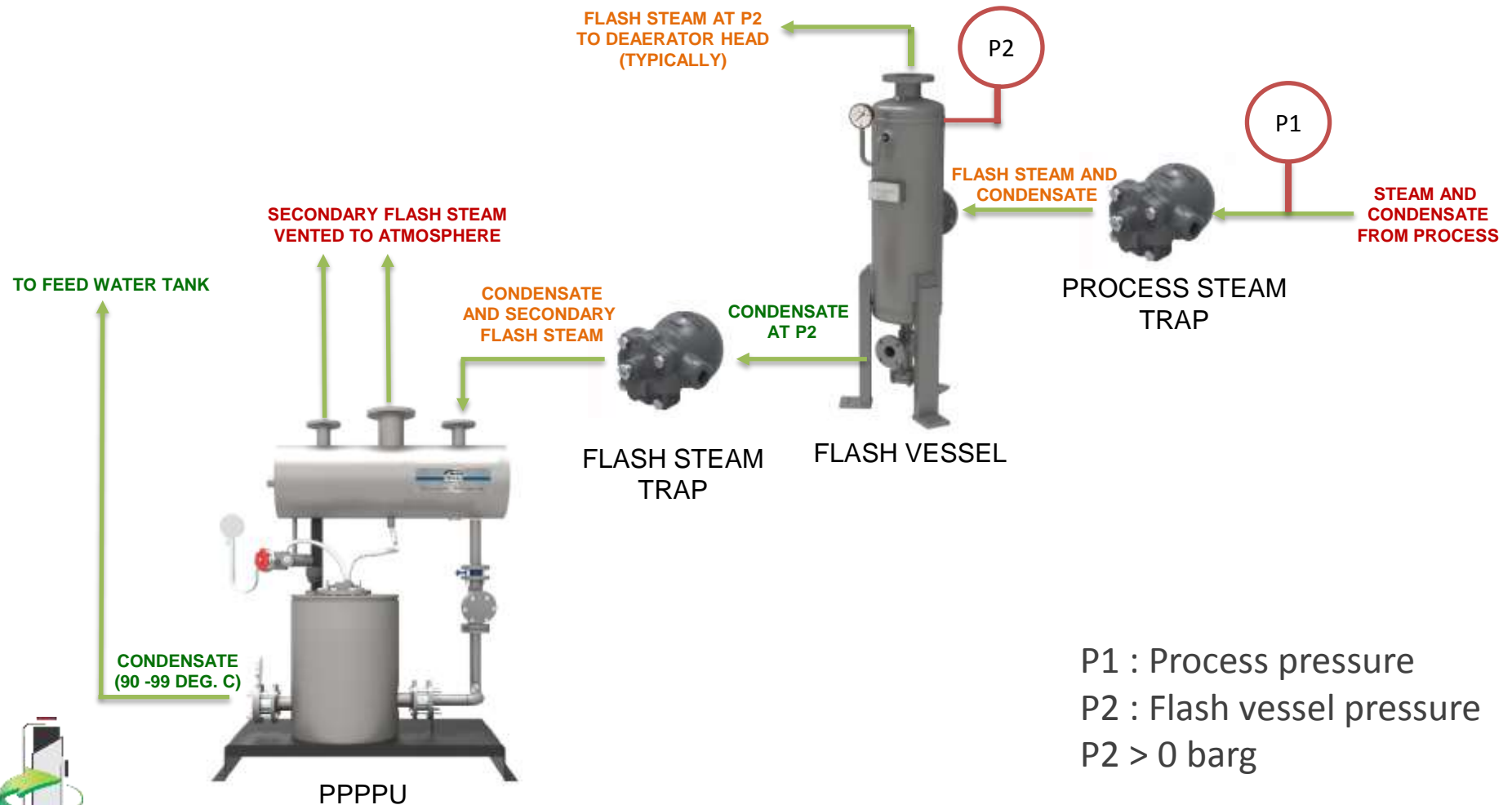
CONDENSATE RECOVERY

NEED FOR CONDENSATE AND FLASH RECOVERY



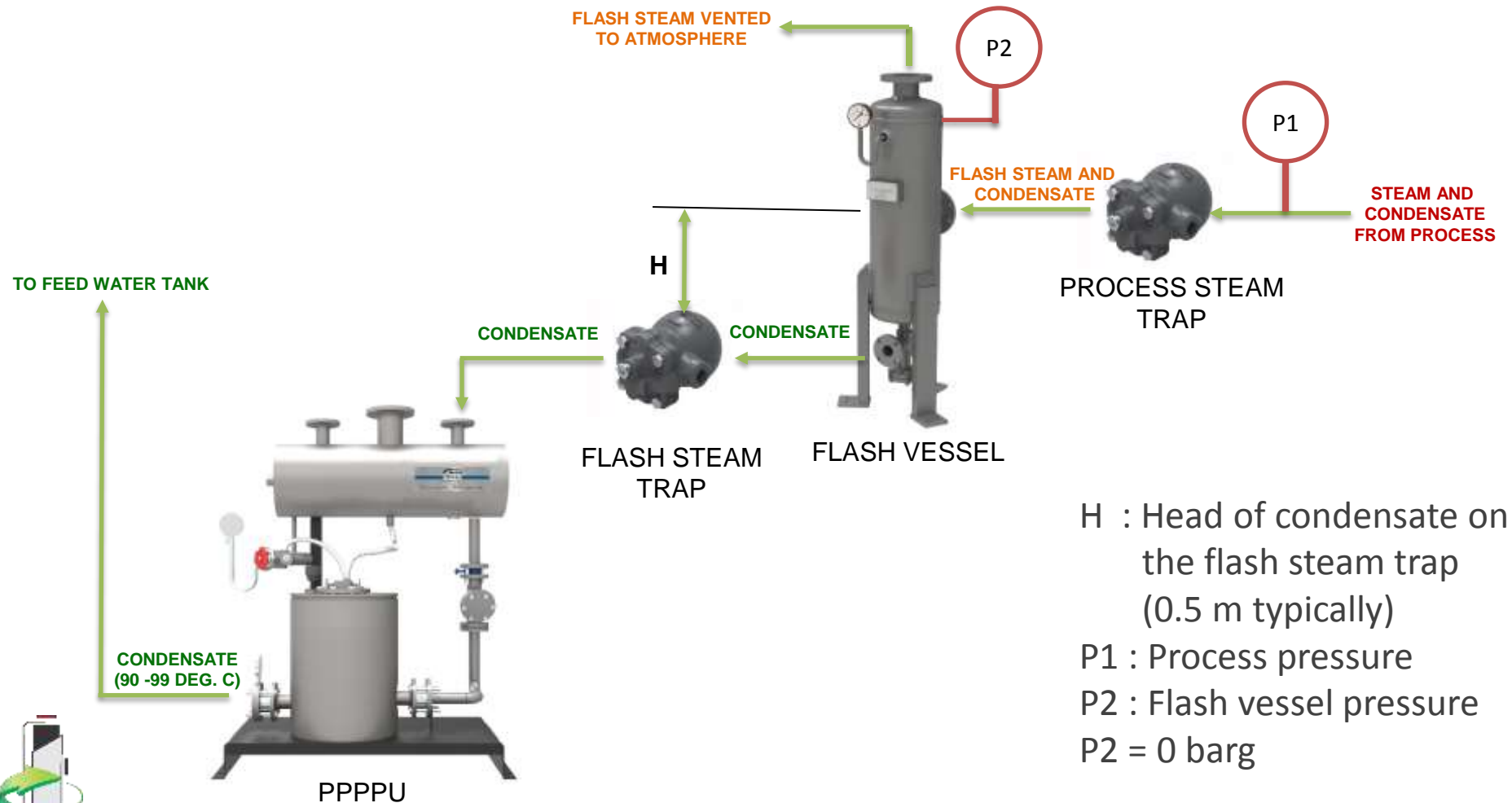
CONVENTIONAL SYSTEMS

FLASH PRESSURE > ATMOSPHERIC PRESSURE



CONVENTIONAL SYSTEMS

FLASH PRESSURE = ATMOSPHERIC PRESSURE



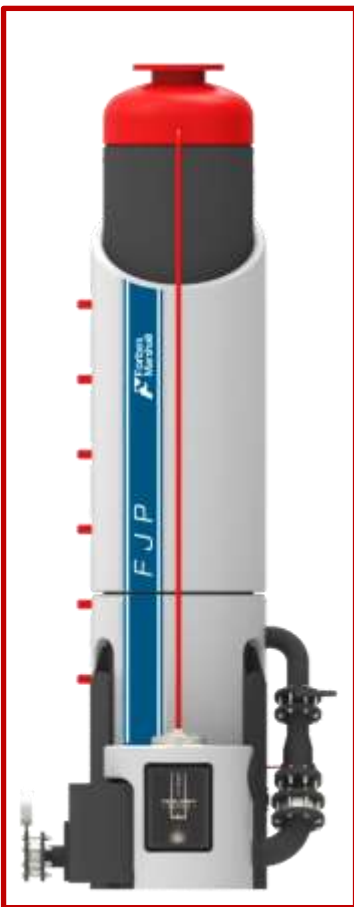
H : Head of condensate on the flash steam trap (0.5 m typically)

P1 : Process pressure

P2 : Flash vessel pressure

P2 = 0 barg

FLASH JET PUMP



Integration of a PPPU and a flash vessel ,
complete recovery of flash steam and
condensate.

Pressure balancing prevents secondary
flashing.

Condensate is pumped at temperatures
above 100 Deg. C

PRODUCT SPECIFICATIONS



Trusted Partners.
Innovative Solutions.



Specification & Capacities:

FJP4500 -->4.5
TPH

FJP3000-->3.0
TPH

FJP1500-->1.5
TPH

Limiting Conditions :

FJP4500 FJP
Motive :-
3.5-7.5 bar g

FJP1500 / 3000
Motive :-
3.5-8.7 bar g

Back Pressure
all sizes :-
0-2 bar g

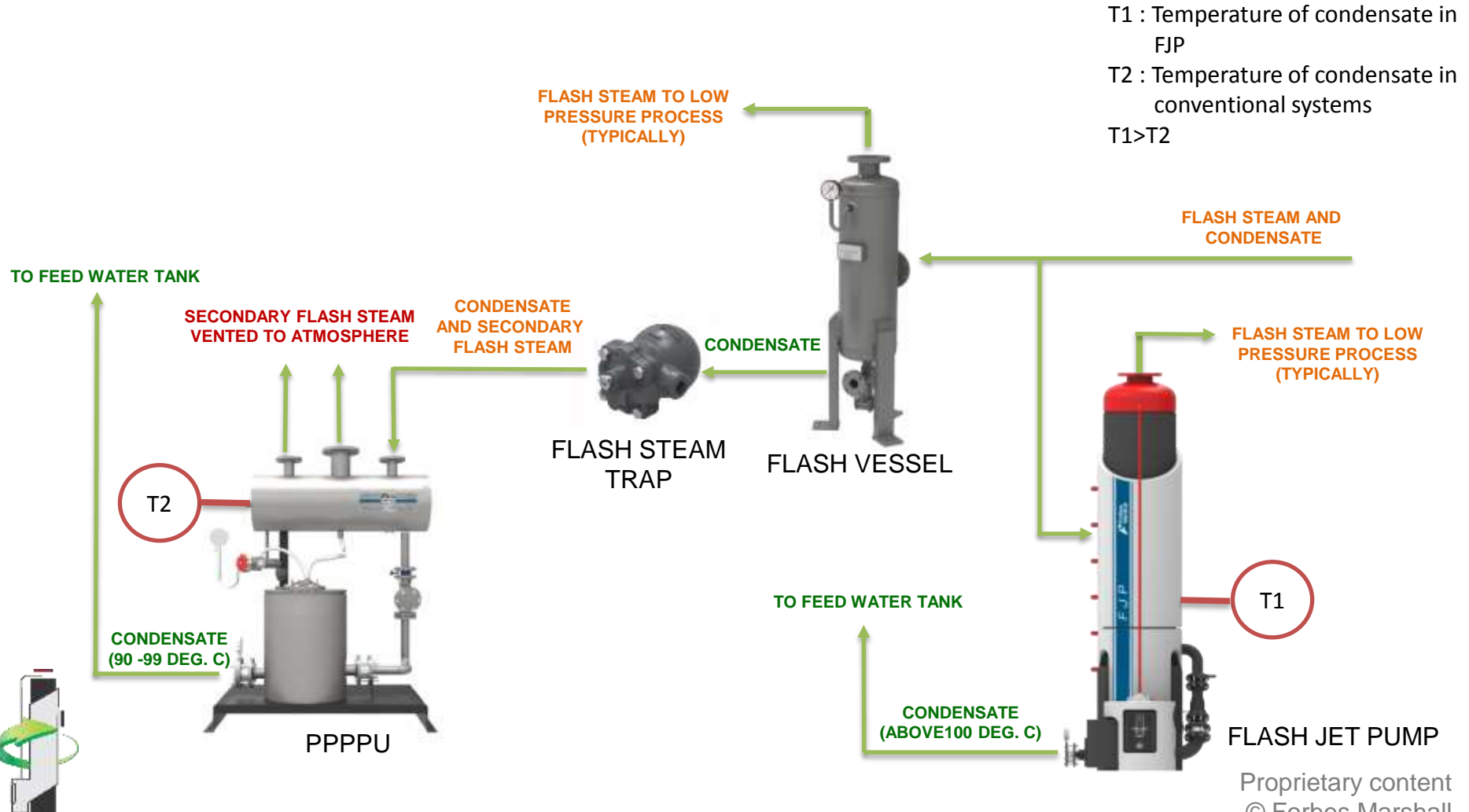
Body Design Conditions :

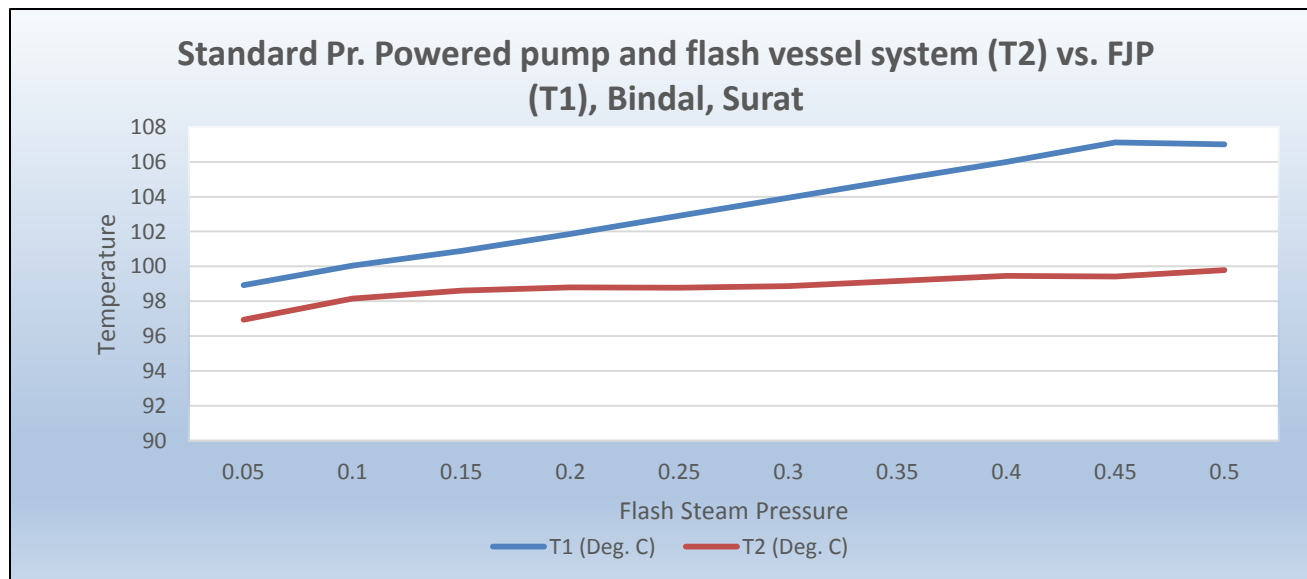
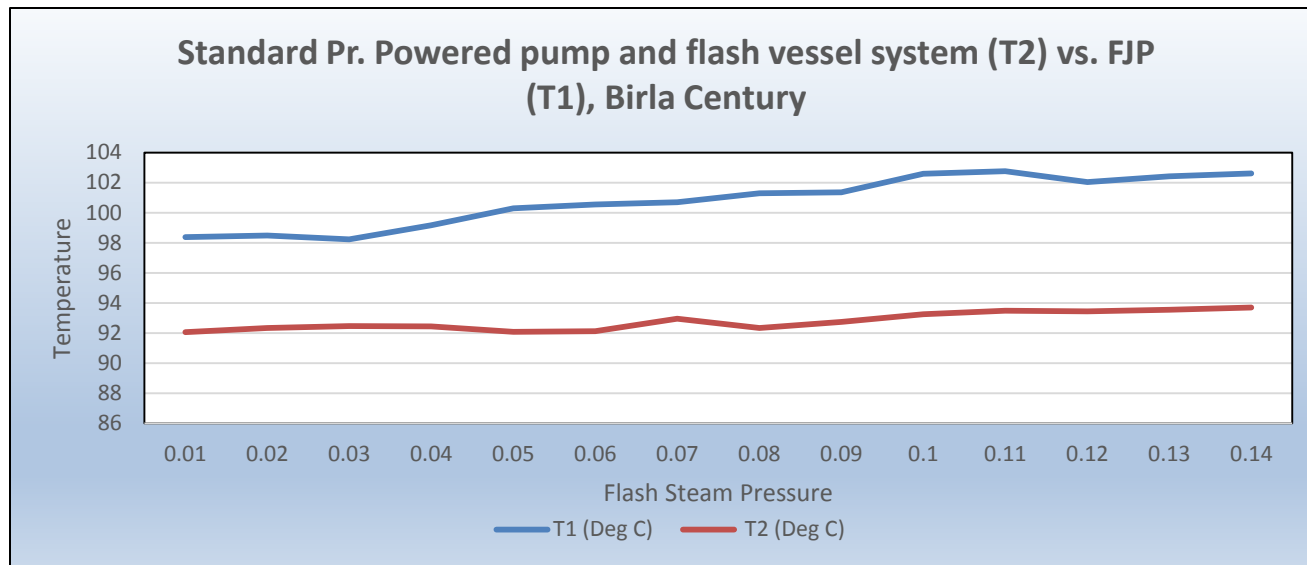
FJP4500 FJP :
10 barg @
180 deg. C

FJP3000/1500:
8.7 barg @ 198
deg. C

SITE INSTALLATIONS

- Birla Century, Gujarat
- Bindal Silk Mills Pvt. Ltd., Surat





SAVINGS – BIRLA CENTURY

$$E = E_{fjp} - E_{fvp} = m * C_{pav} * (T_2 - T_1)$$
$$= 810 * 4.22 * (375 - 367) = \mathbf{27345 \text{ KJ/hr}}$$

- E = the energy savings of Flash Jet pump over existing systems (KJ/hr)
- $C_{pav} = 4.22 \text{ KJ/kg} \cdot \text{K}$
- $T_1 = 375 \text{ K}$
- $T_2 = 367 \text{ K}$
- $m = \text{mass flow rate of condensate (kg/hr)} = 810 \text{ kg/hr}$

GCV of coal = 15072 KJ/kg

Boiler efficiency = 70 %

Mass of fuel saved = $E / (\text{G.C.V} * \text{boiler efficiency}) = 2.6 \text{ kgs/hr}$

Cost of coal = 5.5 Rs/kg

No. of hours the boiler operates in a year = 8000 / year

Savings in a year = savings in an hour * boiler operation hours

$$= 8000 * 2.6 * 5.5$$

$$= \mathbf{Rs. 1,15,000/-}$$

Payback period = investment / savings = 385000/115000

$$= \mathbf{3.3 \text{ years} = 3 \text{ years } 4 \text{ months}}$$

SAVINGS – BINDAL SILK MILLS

$$E = E_{fjp} - E_{fvp} = m * C_{pav} * (T_2 - T_1)$$
$$= 1667 * 4.22 * (380 - 372.8) = \mathbf{50650 \text{ KJ/hr}}$$

- E = the energy savings of Flash Jet pump over existing systems (KJ/hr)
- $C_{pav} = 4.22 \text{ KJ/kg} \cdot \text{K}$
- $T_1 = 380 \text{ K}$
- $T_2 = 372.8 \text{ K}$
- $m = \text{mass flow rate of condensate (kg/hr)} = 1667 \text{ kg/hr}$

GCV of coal = 15072 KJ/kg

Boiler efficiency = 65 %

Mass of fuel saved = $E / (\text{G.C.V} * \text{boiler efficiency}) = 5.2 \text{ kgs/hr}$

Cost of coal = 5.5 Rs/kg

No. of hours the boiler operates in a year = 8000 / year

Savings in a year = savings in an hour * boiler operation hours

$$= 8000 * 5.2 * 5.5$$

$$= \mathbf{Rs. 2,27,500/-}$$

Payback period = investment / savings = 315000/227500

$$= \mathbf{1.4 \text{ years} = 1 \text{ year } 4 \text{ months}}$$

Ecogenie...

The LED based Cogeneration magic

Innovation from INDIA



GTCS with its **18 years of Consulting expertise** has been continually initiating changes to improve the water and environment scenario.

Green Building
Consultant

Energy Audits by BEE Certified
Engineers

Waste water
treatment plants:
Design and Build

MEP Designs

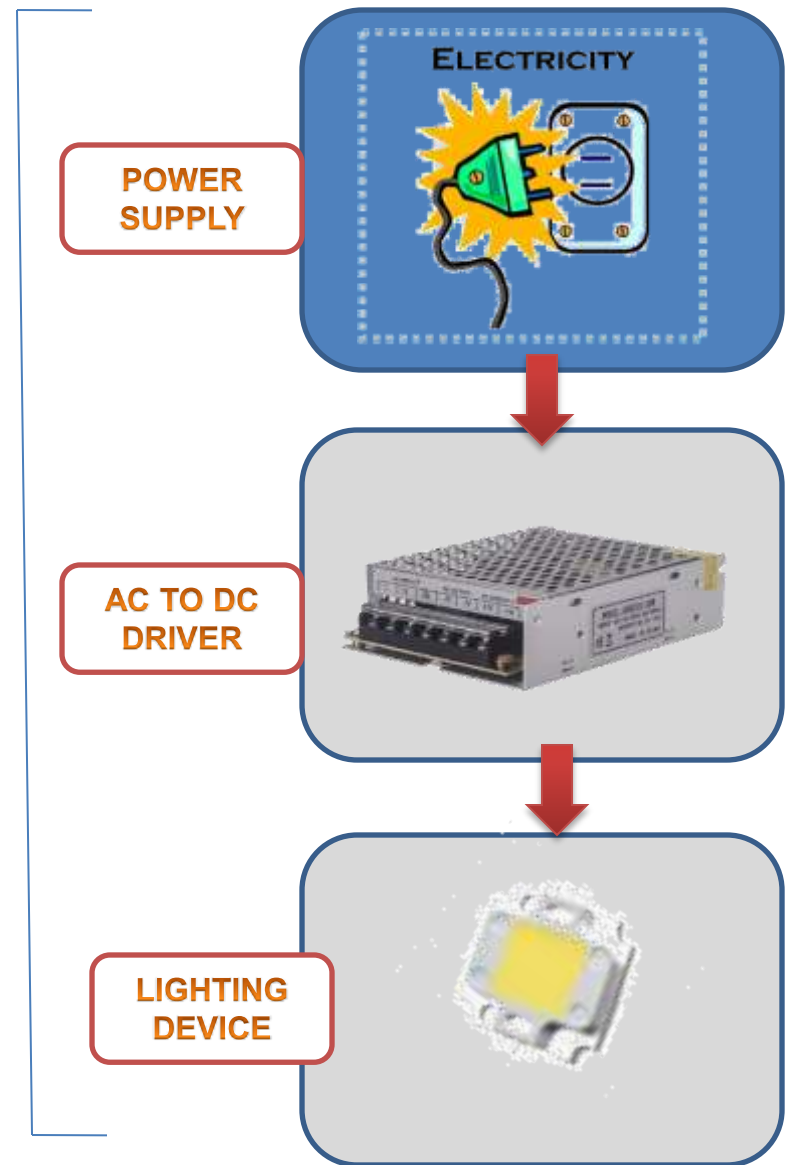
Chilled Water Re Balancing

Equipment
Efficiency
Audits



LED

Light emitting DIODE
Is currently used as



LED

The lighting Industry worldwide has lapped up the LED as a replacement for lighting systems made till date.

BUT

DRIVER INEFFICIENCIES ACCOUNT FOR **CONSIDERABLE AMOUNT** OF POWER ACTUALLY CONSUMED

70% TO 80% OF POWER PROVIDED BY THE DRIVER IS USED BY THE LED TO GENERATE HEAT

TECHNICALLY, **LIGHTING** ACTUALLY CONSUMES **ONLY 15% TO 25%** OF THE POWER SUPPLIED

** Exact % distribution data is not very clear to scientists. This is data from LED related information available in public domain*

10 WATTS SHOWN ON
POWER METER AS
CONNECTED LOAD

2 TO 3 * WATTS
USED IN
LIGHTING ???

7 TO 8
WATTS
DC
OUTPUT
FROM
DRIVER

LED

5 TO 6 * WATTS
USED IN
HEATING ???

** Exact % distribution data is not very clear to scientists. This is data from LED related information available in public domain*

WHILE ALL THE CLAMOUR IN THE WORLD IS
FOR MANAGING **THE HEAT** FROM LEDs.....

USING VARIOUS TYPES OF **HEAT** SINKS

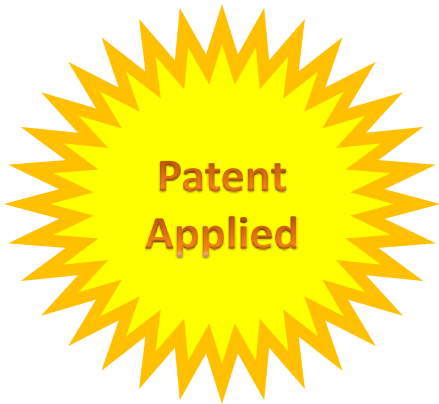


Ecogenie....

The LED based Cogeneration magic

HEAT IS GOOD.....USE IT !!





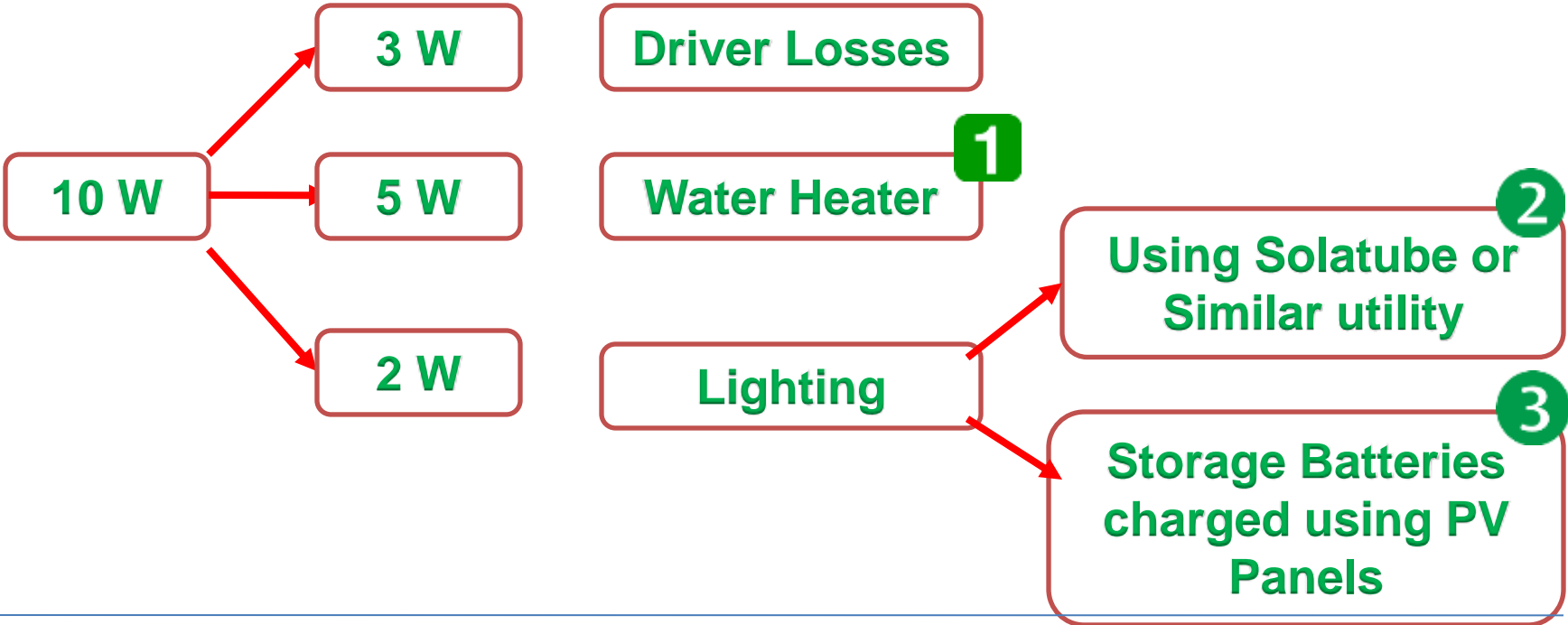
Ecogenie....

The LED based Cogeneration magic



MADE IN INDIA

ONE INPUT THREE OUTPUTS





Patent
Applied

Ecogenie....

The LED based Cogeneration magic

MADE IN INDIA



Potential
to SAVE
1500 MW
in INDIA

1.1 kW Connected System can produce upto 2 deg C rise in temperature of water flowing @ 6 lpm in 5 minutes

1.1 kW Connected System can produce upto 4 deg C rise in temperature of water flowing @ 3 lpm in 5 minutes

1.1 kW Connected System can produce upto 9 deg C rise in temperature of 2 ltrs stored water in 2 minutes



 GTCS



Patent
Applied

Ecogenie....

The LED based Cogeneration magic

MADE IN INDIA



Potential
to SAVE
1500 MW
in INDIA

Ecogenie can give

1. heated water PLUS
2. Light PLUS
3. Enough electricity to charge a battery

CAN BE USED with

- SOLAR Water heater
- SOLATUBES
- SOLAR PV Power Generation Systems
- PREHEATING for BOILERS
- PREHEATING of Thermic Fluids in process and Industry



Patent
Applied

Ecogenie....

The LED based Cogeneration magic

MADE IN INDIA



Potential
to SAVE
1500 MW
in INDIA

Ecogenie can give

1. heated water PLUS
2. Light PLUS
3. Enough electricity to charge a battery

PROPOSED REDUCTION IN

- Water Usage
- Demand for Mixers, Divertors
- Heat Energy lost in Geysers due to usage, sudden heating and scalding issues
- PLUMBING COSTS
- CONNECTED LOAD BY 30%
- ELECTRICITY USAGE BY 45%



 **GTCS**



"Green is Competitive"

