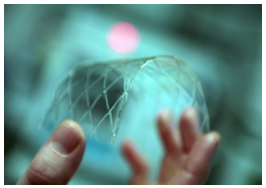




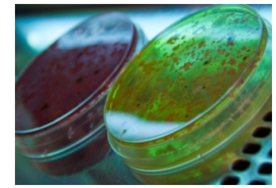


Energy Efficiency & Renewable Energies in Myanmar's Textile Industry Production

Workshop - Knowledge Sharing Activity
UMFCCI Building, Yangon
October 25th, 2017

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   Energy in Myanmar and Textiles Production
2. Energy Efficiency:
   Electricity and Thermal Energy
3. Renewable Energies

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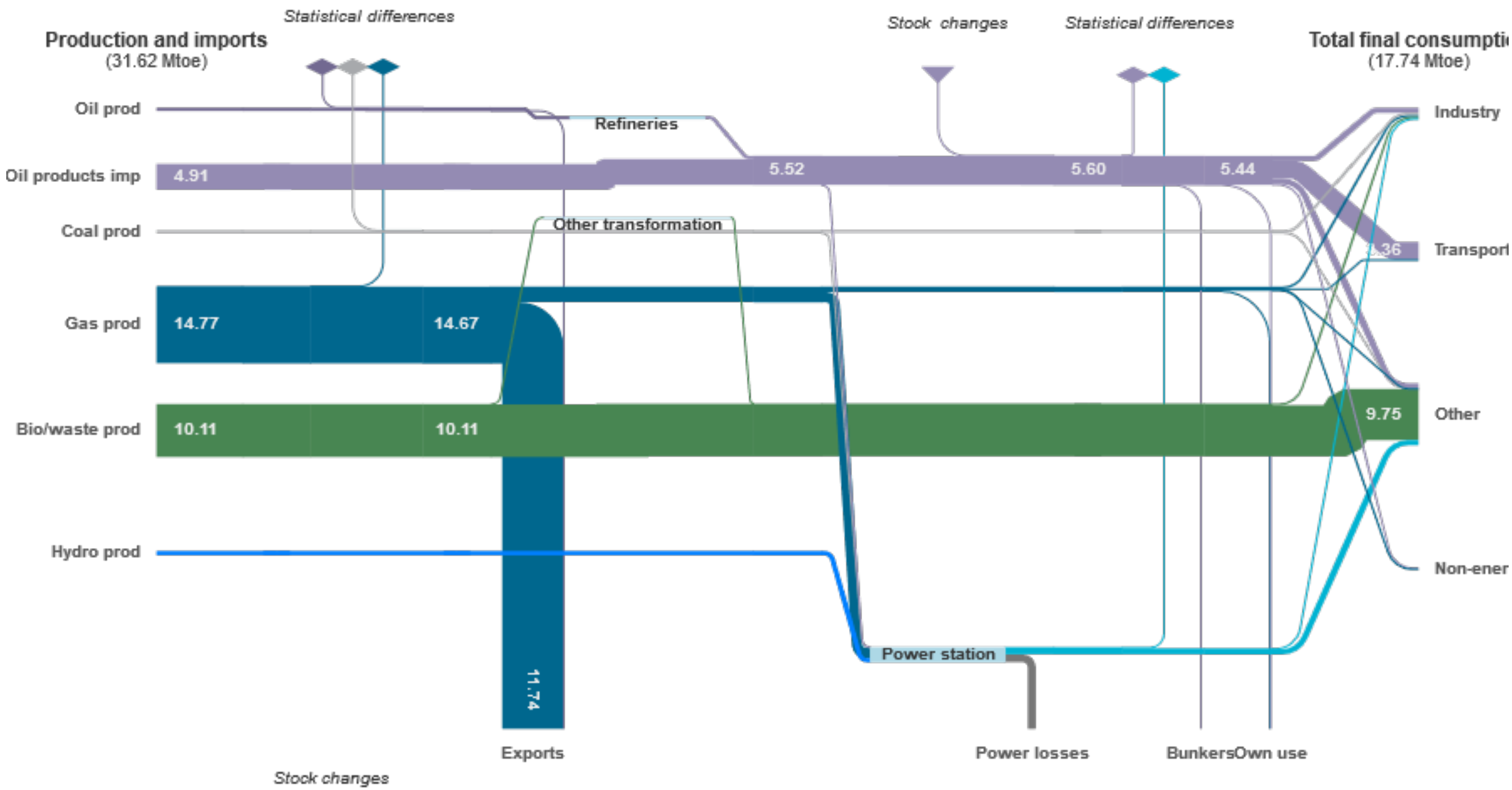
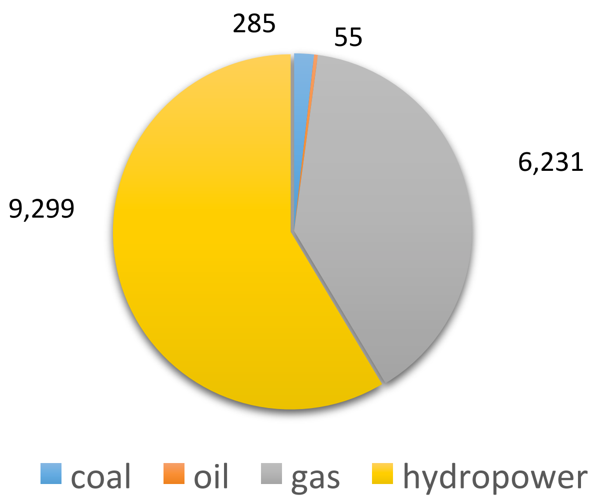
Introduction – Energy in Myanmar



65 % of primary energy is biomass based, 97 % of it for residential purposes

Introduction – Energy in Myanmar

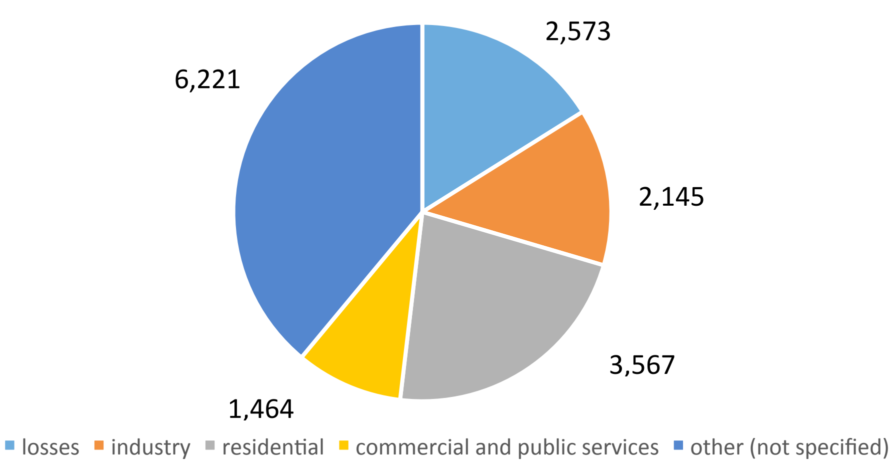
Electricity & Heat Production 2015 [GWh]



74,7 % of all electricity production is hydropower

Low electrification rate (27 %), especially in rural areas

Electricity & Heat Utilisation 2015 [GWh]



Introduction – Energy in Textiles Production

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According to the Asian Regional Research Program in Energy, Environment & Climate (ARRPEEC) survey, the energy consumption for a textile industry is given in the table below.

Section	Energy Consumption
Spinning	3.0 – 3.5 kWh/kg of yarn
Weaving	2.9 – 3.1 kWh /meter of fabric
Knitting	0.09 – 0.2 kWh/kg of fabric
Dyeing	0.04 – 0.15 kWh/kg of fabric
	3.0 – 7.0 kWh steam/kg of fabric

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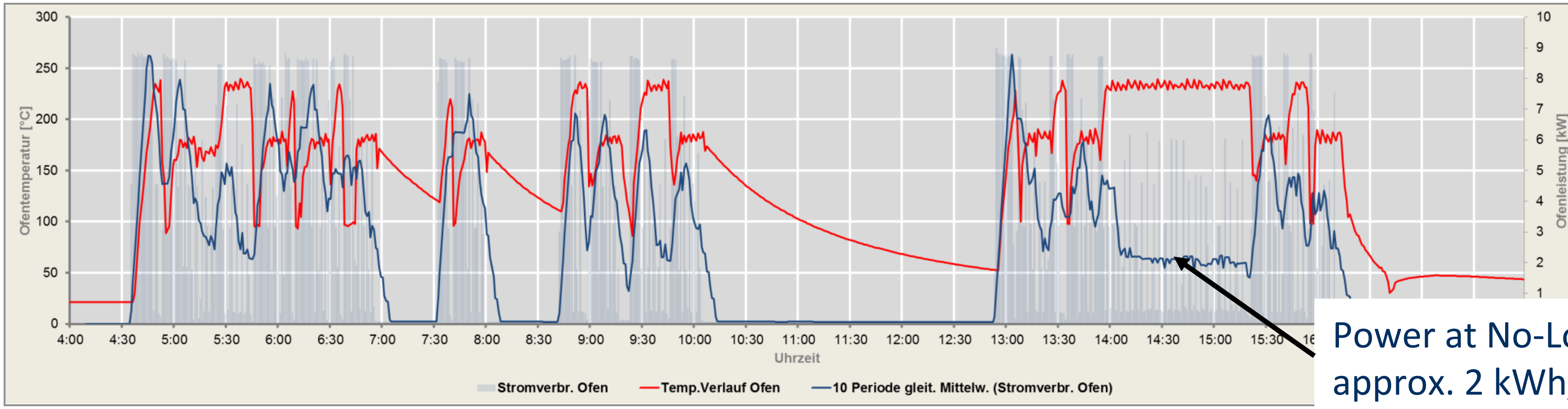
Introduction – Energy in Textiles Production

Own findings:

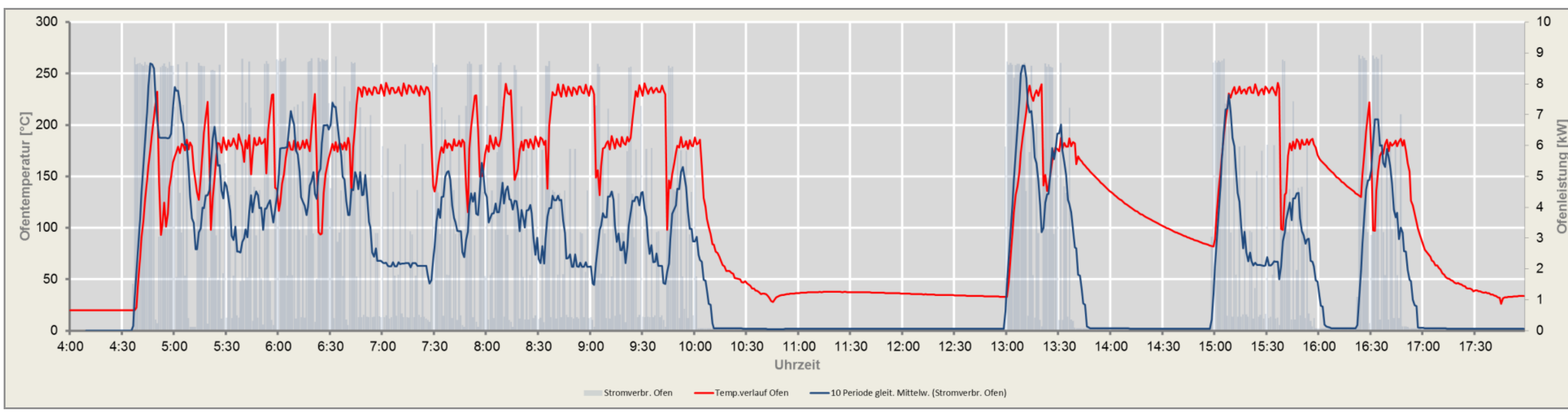
Section	Energy Consumption
Spinning	2,5 kWh/m
Weaving	2.9 – 3.1 kWh /meter of fabric
Knitting	0,02 – 0,35 kWh/m (0,11 kWh/kg)
Dyeing	0,3 - 1,1 kg/m
	0,15 t steam/kg of fabric

Energy Measurement - Process

Oven - Power consumption and temperatur: no-load losses



Power at No-Load: approx. 2 kWh/h



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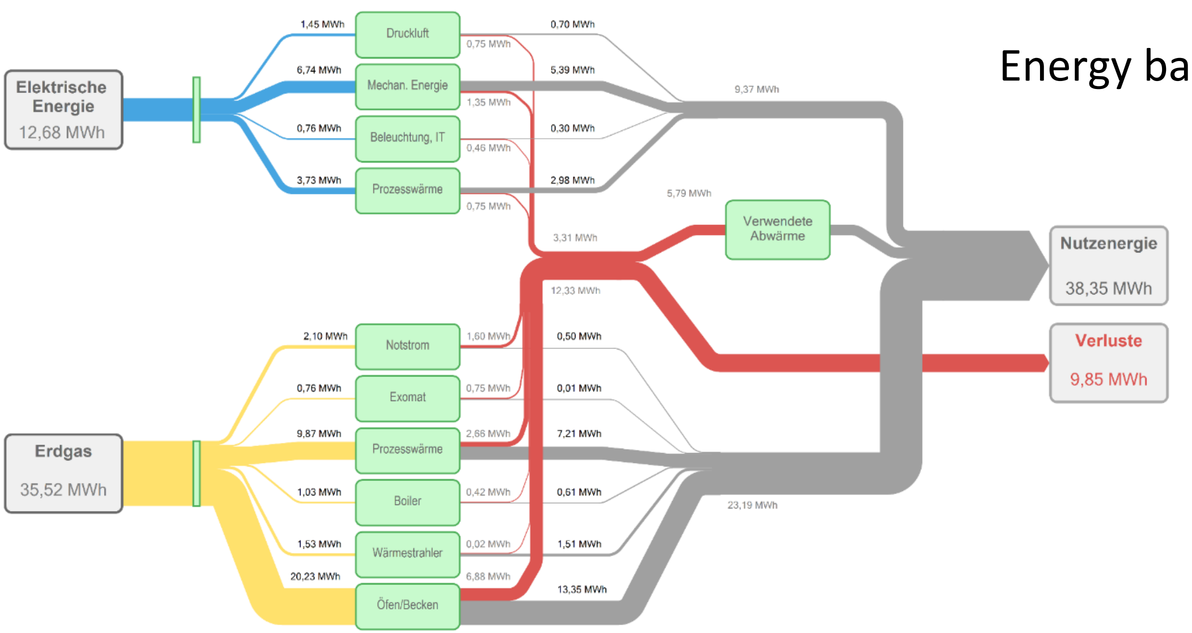
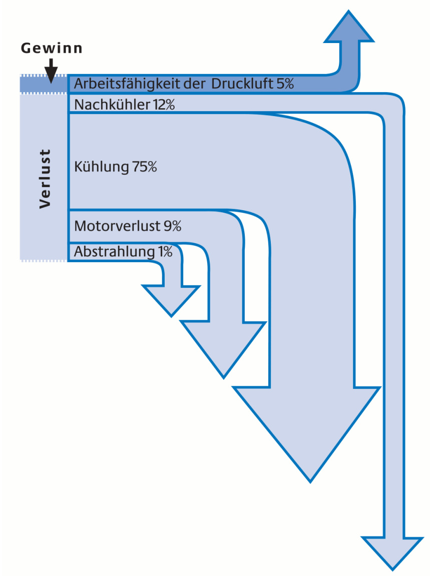
Energy Measurement - Devices

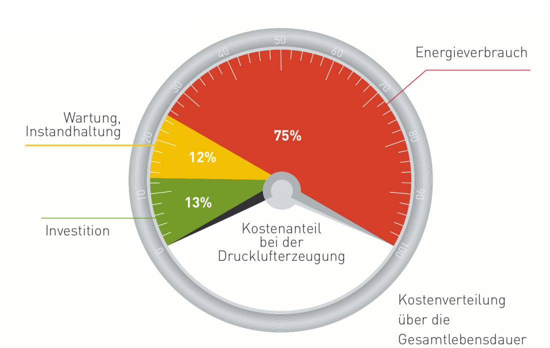
Energy balance



Energy Efficiency Measures

Energy Efficency Solutions for Compressed Air Systems





1.: Measure actual consumption! (evaluation)
How much money is spend by the system
No Load - & Leakage Losses

2.: Pressure level
-1 bar = 6 – 8 % less Energy consumption

3.: Losses in the Compressed Air System
Leakage, Design, Fittings

4.: Waste Heat Recovery?
40 – 50°C can be achieved

5.: Maintenance of filter etc.
Also the temperature of the inlet-air

6.: Reduce operation time
Shut down the compressor when not neded!

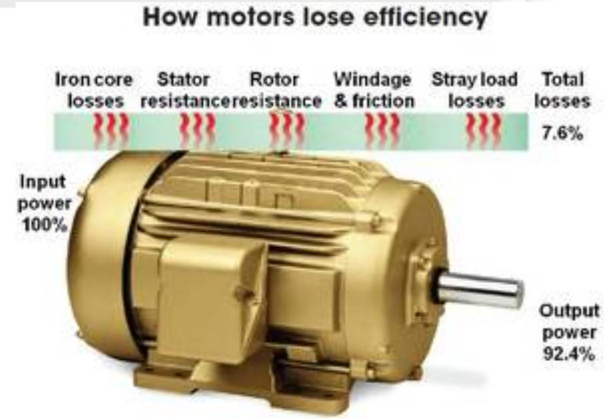
7.: Check the machines where the compressed air is used

Energy Efficiency Measures

Motor Efficiency

When buying new motors: Buy efficient ones (servo drives)! Old motors have an efficiency of approx. 85 % - new motors up to 95 %
for 7,000 h/a and a 5,5 kW-motor: -3,850 kWh/a

Manual in-house re-winding of burnt motors is a common practice, but decreases the efficiency



Soft Starters

Soft starter temporarily reduce the load and torque during a motor's startup. High starting torque can cause damage to the mechanical system, high starting current can cause problems in the electrical system
E.g. starting current can be reduced by 50%, motor torque is reduced by 75%

Energy Efficiency Measures

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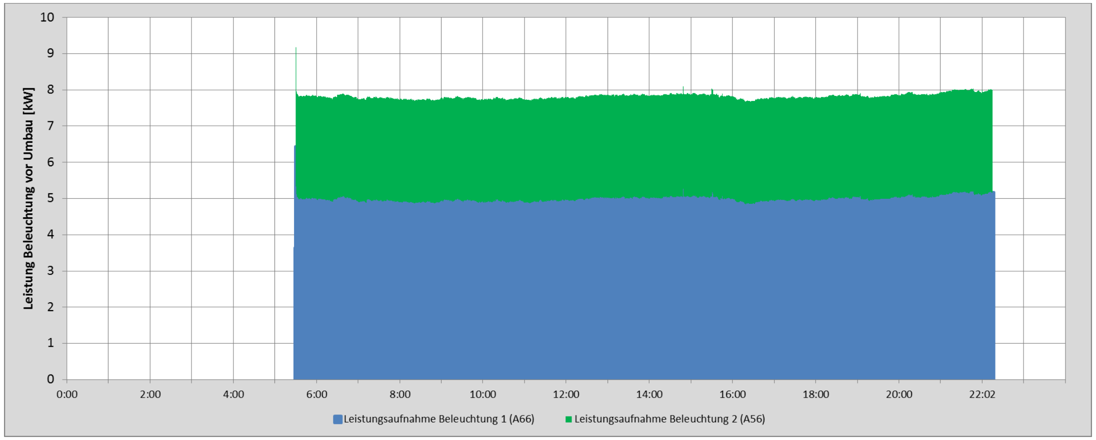
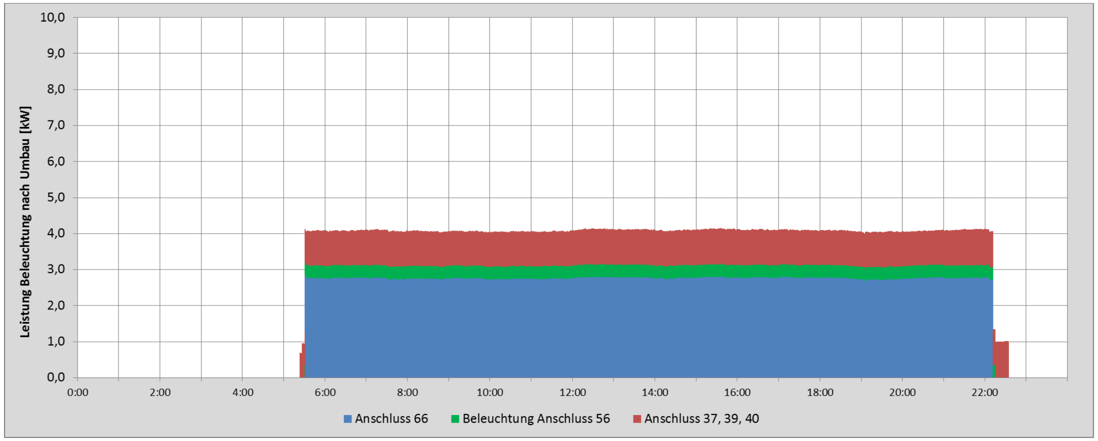
LED instead of conventional bulbs (sales store)





Energy consumption before and after changing conventional bulbs to LED:

Result:

46 % less energy consumption

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Energy Efficiency Measures

Thermal Energy

First: Check your system! Is the maximum steam pressure / temperature really needed?

Exhaust gas from 500 kW-Burner (bakery)
ca. 55 $m^3_{nat.\ gas}$ per hour; Required air: approx. 10 m^3_{air} per $m^3_{nat.\ Gas}$
approx. 50 kWh/h can be used from the exhaust gas
approx. 10 % of installed thermal power (rule of thumb)

Combustion air pre-heating at 500 kW-boiler

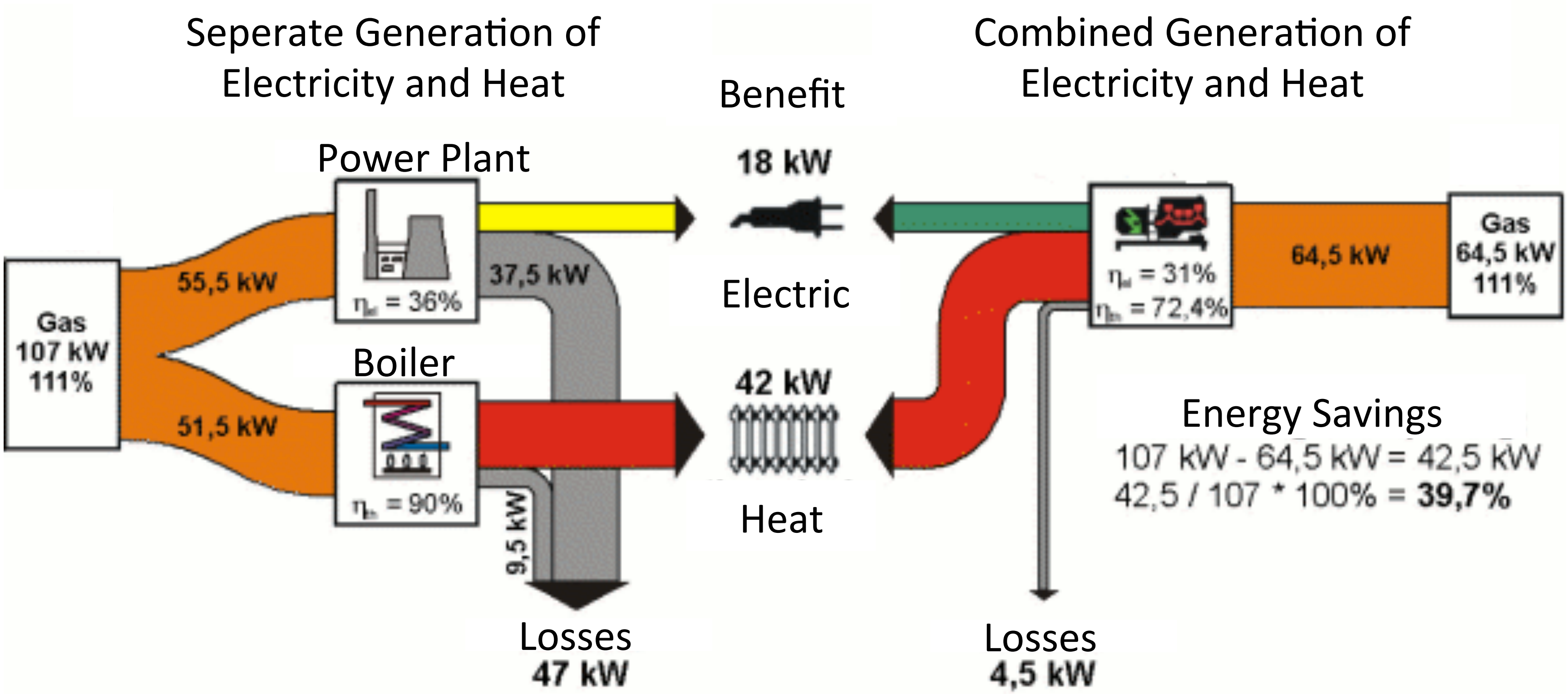
Exhaustgas: 300°C -> 120°C => Combustion air -> ca. 200°C
Savings: approx. 27 kWh/h (5,5 %)

Condensate recovery
Whenever possible: recover the condensate!
Heat in condensate represents 20% of the fuel consumed in the boiler.
+ 6°C in feed water temperature => - 1% in energy consumption

Energy Efficiency Measures

Combined Heat an Power Generation

CHP-Process: up to 40 % lower Natural Gas consumption



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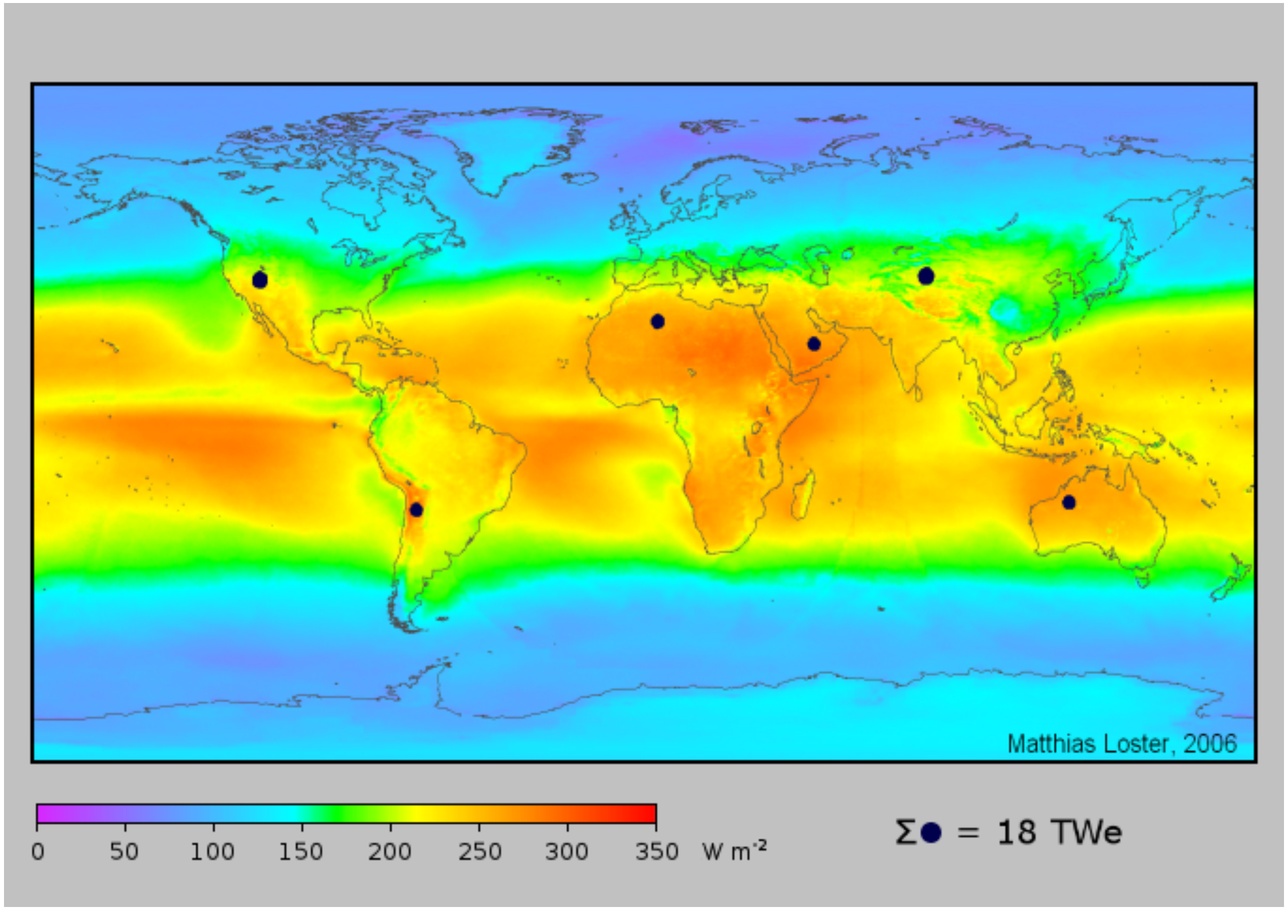
Renewable Energies

Renewable energy sources relevant for Myanmar:

- Hydropower
- Biomass (mainly for residential purposes)
- Solar energy (thermal energy and photovoltaic)
- Wind?

Renewable Energies (Solar Energy)

Solar energy for production of (process) heat and electrical power



- Average sunshine duration per day in Myanmar: 5 h
- Solar air heaters may be used in the drying of yarn, processing, and finished clothes.
- Solar energy potential in Myanmar: 51,973.8 TWh/a
- Decentralised solutions

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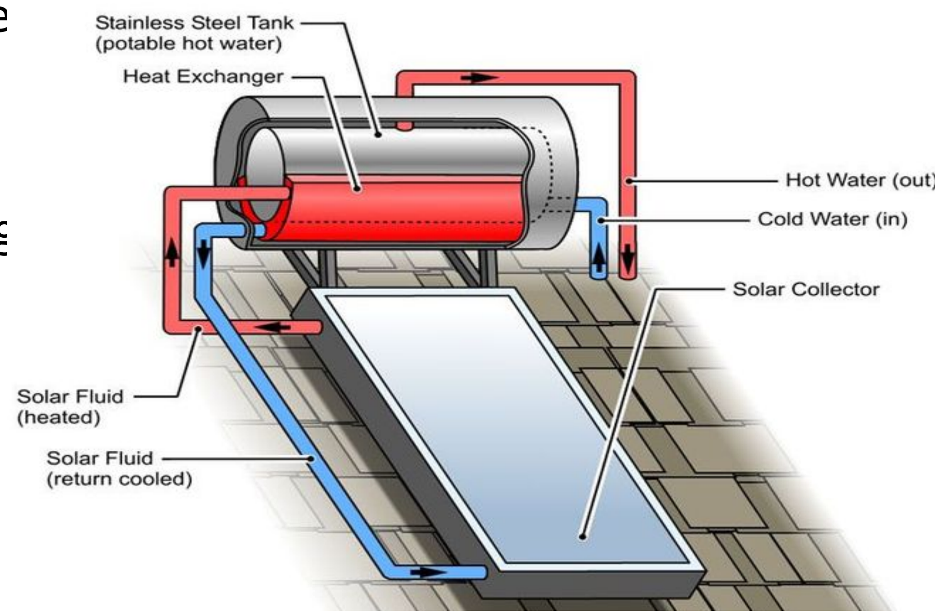
Renewable Energies (Solar Thermal)

The hot water requirement for soaping, washing, boiler feed, dyeing machines, and low-temperature processes can be provided by selectively coated systems.

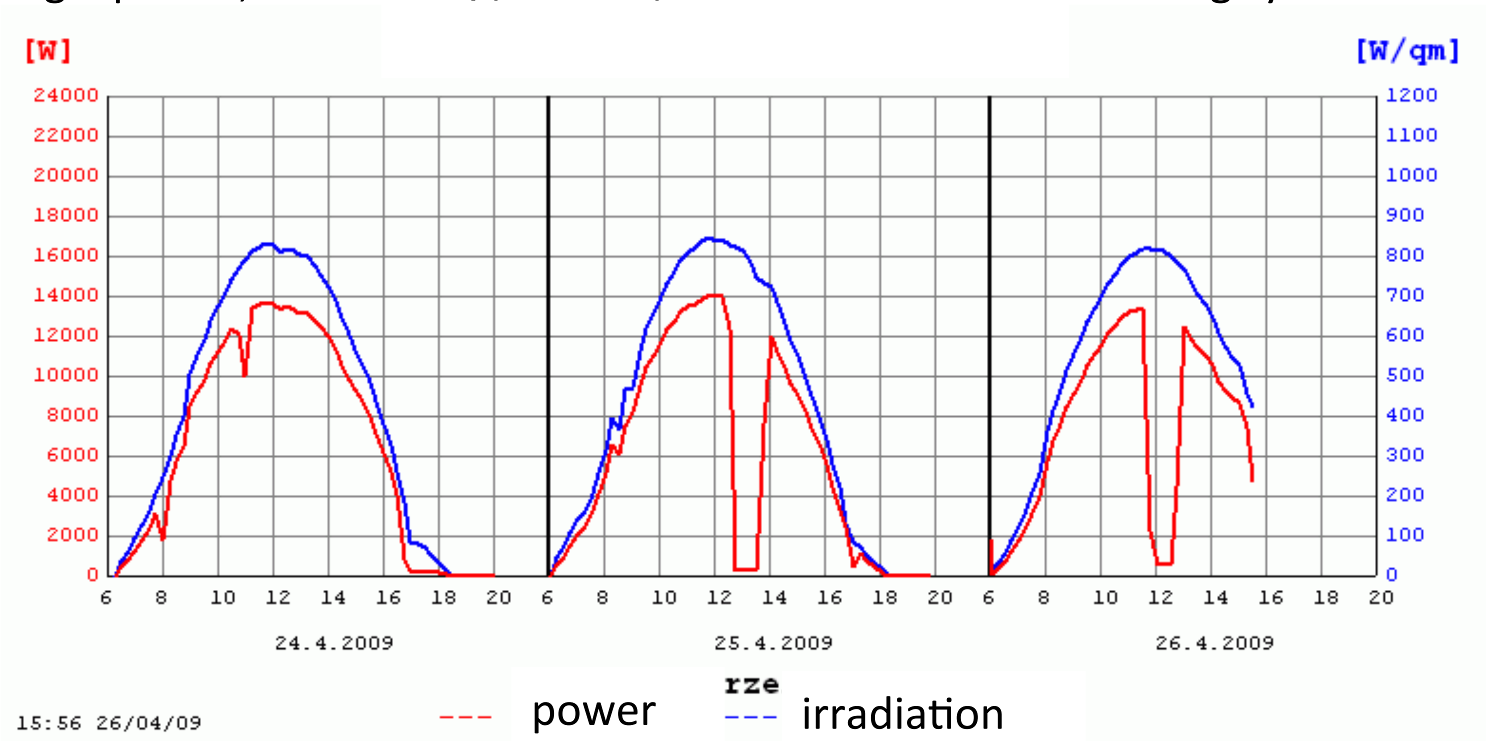
Solar concentrators such as parabolic trough collectors could be used to provide low-pressure steam for bleaching, starch preparation, drying and curing of processe or printed cloth.

Solar air heaters may be used in the drying of yarn, processing, and finished clothes.



Renewable Energies (Photovoltaics)

Promotion of **R**enewable **E**nergy (PRE): introduction / presentation of photovoltaic energy generation in Bangladesh: Training-Center with PV system
220 single panels, each 90 Wp, 230 m², measurement and recording system



<u>Approx. 17 MWh/a</u>
48 kWh/d (0,22 kWh/d·m²)

Renewable Energies (Photovoltaics)

Murugan Textiles (India) now runs nearly 100% of its machinery on renewable energy

- Produces 25% of the electricity requirement through solar, and the rest though wind energy.
- Projected Cost Saving of INR 11 Crores in 25 years
- Estimated Energy Generation: 3 million kWh/a
- CO2 displacement: 2,567 t/a
- 10 acres of land space saved
- Accelerated deprecation
- Low break-even period of 6 years
- Fixed energy cost for 25 years

Specifications:

- System Size: 2,000 kWp
- Roof Area: 18,850 m²
- Solar Power Plant Setup: 700kW on 1 rooftop; 650 kW each on 2 rooftops
- Modules: Crystalline; 245 Wp & 250 Wp
- Inverter: 30 kW; 57 nos. 11

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Renewable Energies

Questions:

- Security of energy supply (power cuts)?
- Energy consumption monitoring?
- Under which conditions measures for increased energy efficiency would be implemented (legal requirements, costs, demand from buyers, etc.)?
- Financing conditions for investments (loans available, interest rate)?
- Other obstacles?

      

Thanks for your attention!

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