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SOUTH AFRICA

Energy interventions at the firm level

Case studies of the SA Industrial Efficiency Project

Julie Wells, NCPC-SA

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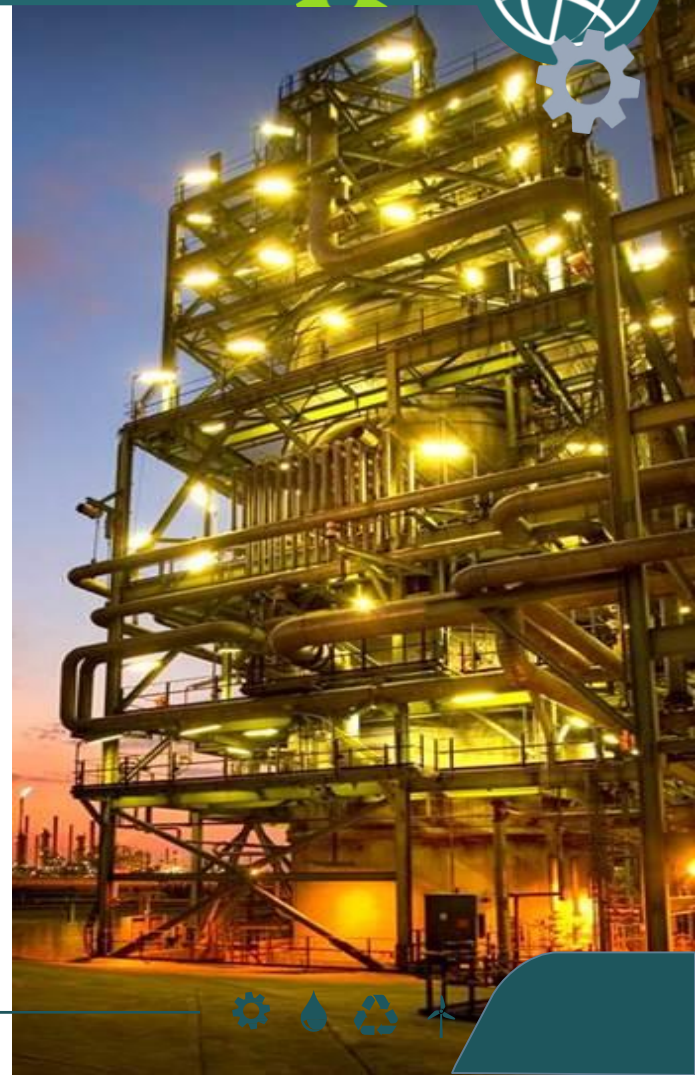
Presentation content

- Introduction to the National Cleaner Production Centre South Africa
- The case for energy efficiency – the Industrial Energy Efficiency Project
- Energy Management Systems approach
- Case studies – prosumer success stories
- SADC context for RE and



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The National Cleaner Production Centre of South Africa (NCPC-SA) supports South African industry to **improve competitiveness** and reduce **environmental footprint** through the implementation of **resource efficiency and cleaner production (RECP)** methodologies.

*A programme of **the dti** hosted by the **CSIR***

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Thematic approach – flagship projects

- The NCPC-SA applies RECP in three main thematic areas. Each of these is driven through a flagship project or programme:

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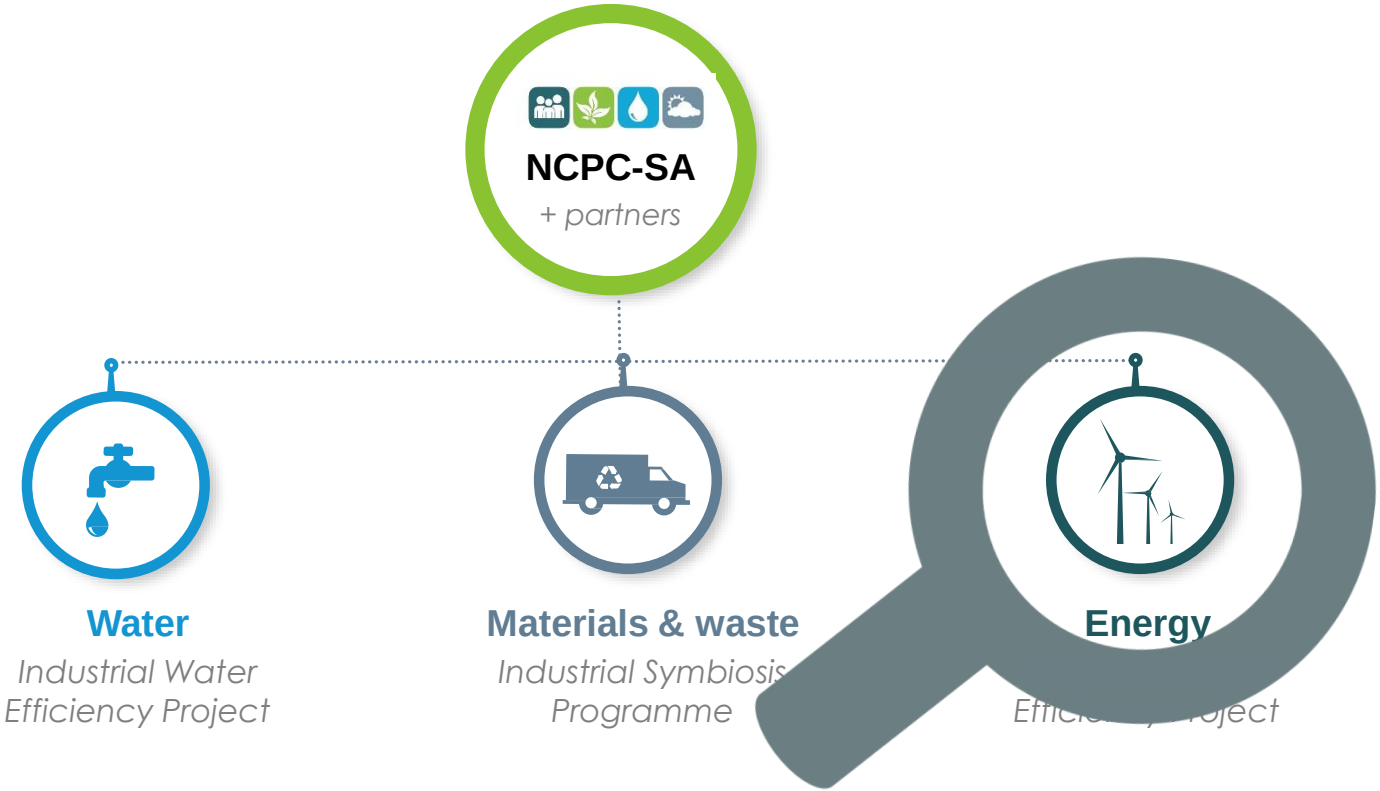
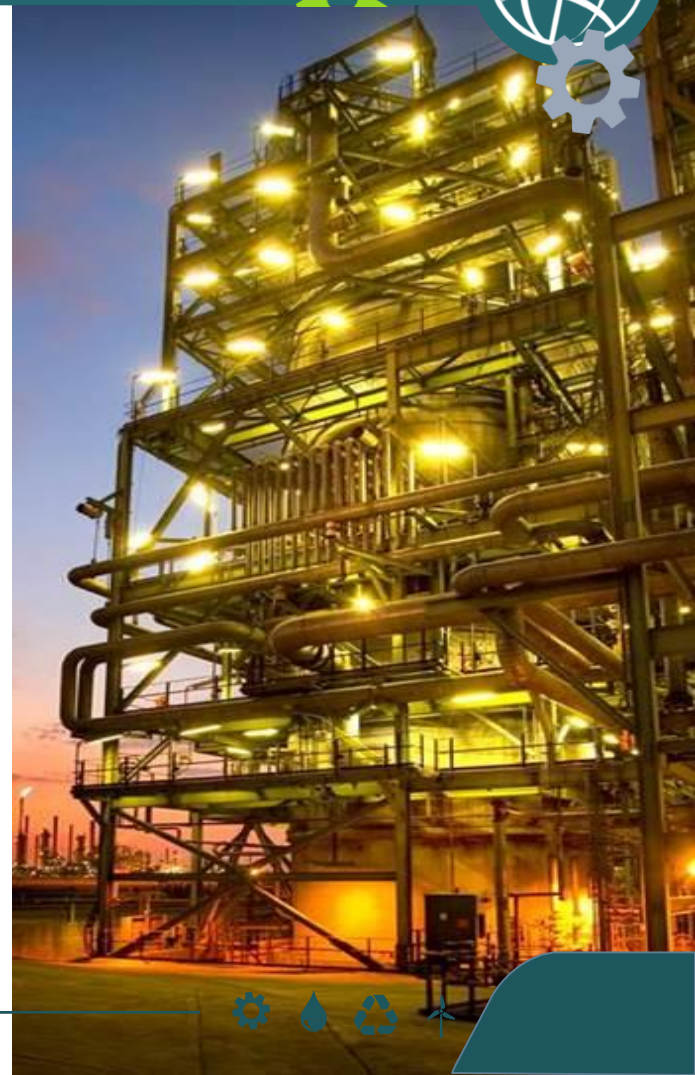


Energy Prosperity

The notion of "**energy-efficient prosperity**" is especially relevant for developing countries, which can most benefit from investing in energy efficiency improvements that provide affordable and reliable services, while supporting a strong economy and improved quality of life over the long term.

Energy efficiency policies are available to all, from factories in the Balkans to households in South Africa.

In fact, governments are looking at energy efficiency as the "first fuel" – a source of energy in its own right, in which they can invest ahead of other more complex or costly energy sources.



SA Industrial Energy Efficiency Project (2010 – 2020)

Now in its second phase (2016 - 2020) the IEE Project is an **integrated and multi-party project** aimed at promoting the expanded adoption of **energy management systems** (EnMS) and **industrial energy systems optimization** (ESO) in South African industrial and selected commercial sectors.

IEE Project partners

Project funders

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gef

International implementing partner

UNIDO

Project implementers

energy
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sonedi
South African National Energy Development Institute

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SA Industrial Energy Efficiency Project

Main focus areas and objectives:

- strengthen energy planning, including emissions reduction target setting, through improved data and energy reporting
- support strengthened policy and regulatory frameworks, and promote the uptake of standards for energy efficiency
- expand the capacity of the South African industrial sector to implement EnMS and ESO through skills development
- promote increased investment in EnMS and ESO through the demonstration of energy savings in industrial plants
- raise awareness of the benefits and opportunities through EnMS and ESO

And ultimately reduced energy consumption, GHG emissions and energy costs in industry.

Highlights summary 2011 - 2017

A national partnership towards a sustainable industry

ENERGY SAVED
3 800 GWh

CO_2e MITIGATED
3.7million tonnes

COST SAVINGS
R3.1 billion

EXPERTS TRAINED
120

PROFESSIONALS TRAINED
>3 500

TRAINING COURSES IN EnMS AND ESO
10

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Case studies

Implementation by firms with the support of the NCPC-SA through the IEE Project

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Industrial Energy Efficiency

Case Study

Amalgamated Beverage Industries (ABI) Premier Place
Food and Beverage
KwaZulu-Natal

ISO 50006

ABI, the soft drinks division of SAB (Pty) Ltd, is the leading soft drinks business in the international SABMiller group of companies.With a customer base of more than 95 000 in South Africa, ABI have 91% of the market share, and are also the biggest bottler for Coca-Cola in Africa. ABI Premier Place, based in Phoenix Industrial Park, in the province of KwaZulu-Natal, is one of five state-of-the-art manufacturing and distribution plants in South Africa, all five distributing a total of more than 300 million cases every year.

Summary of Savings

Intervention Period
2014 – 2015

Payback period
0.45 years

Intervention implemented
Compressed air

Energy Saved (ZAR)
R 501 000

No. projects undertaken
2

Energy Saved (KWh)
336,846 kWh

Total investment
R120,000

GHG emission reduction (ton CO_2)
323.4 tons

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Industrial Energy Efficiency

Case Study

Vito Ice-Cream
Food and Beverage
Cape Town

Vito Ice Cream experienced significant competition in the frozen desert market and had to aggressively drive costs down to maintain cost competitive.
By implementing energy saving interventions relating to the refrigeration systems, compressed air systems, lighting and hot water systems Vito Ice-Cream achieved:

Steam Optimisation interventions implemented in phases.

- Boiler lagging & cladding
- Upgrade of boiler control panel
- Water and steam distribution improvements

Summary of Savings

Implementation Period
2016 – 2017

Energy savings in KWh
350 717 KWh

Total investment made ZAR
R250 000

Payback time period in years
0.6

Monetary savings in ZAR
R436 839

GHG Emission Reduction (ton CO_2)
335 CO_2

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Industrial Energy Efficiency

Case Study

Fry's Metals - A Division Of Zimco Group (Pty) Ltd
Metals
Gauteng

ISO 50006

ZIMALCO is the largest manufacturer of secondary aluminium products in sub-Saharan Africa. The company is also South Africa's only manufacturer of primary aluminium-based master alloys, hardeners and grain refiners. The Zimalco plant has a capacity in excess of 30 000 ton per year and employs more than 160 people. Raw materials are obtained from many of the South African aluminium converters, scrap metal recyclers and when required from the primary aluminium smelters.

Interesting fact: Fry's Metals has assisted in the development of national regulations on lead and is committed to recycling.

Summary of Savings

Intervention Period
2014 – 2015

Monetary Savings (ZAR)
R 2 687 452

Intervention implemented
EnMS

Energy Saved (ZAR)
R 501 000

No. projects undertaken
7

Energy Saved (KWh)
136 743 kWh (Elect) & 6 387 028 kWh (Natural gas)
Total 6 523 771 kWh

Total investment
R 4 288 200

GHG emission reduction (ton CO_2)
1 408 tonnes CO_2e

Payback period
1.7 years

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Industrial Energy Efficiency

Case Study

Zimalco Aluminium Company (ZIMALCO)
Automotive
Gauteng

ZIMALCO is the largest manufacturer of secondary aluminium products in sub-Saharan Africa. The company is also South Africa's only manufacturer of primary aluminium-based master alloys, hardeners and grain refiners. The Zimalco plant has a capacity in excess of 30 000 ton per year and employs more than 160 people. Raw materials are obtained from many of the South African aluminium converters, scrap metal recyclers and when required from the primary aluminium smelters.

Intervention Phases

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Capacity building through NCPC-SA training.	Energy review of main energy sources: gas & electricity. Identify performance improvement opportunities.	Implement & quantify energy savings, inform management & promote systematic energy performance management.	Integrate EnMS into existing SHEQ/IMS within 5 months.	Internal EnMS audit and management review.

Summary of Savings

- Intervention Period: **2015**
- Payback period: **Less than a year**
- Intervention implemented: **EnMS and ISO 5001 standard**
- Energy Saved (ZAR): **R 501 000**
- No. projects undertaken: **3**
- Energy Saved (KWh): **1 479 444 kWh**
- Total investment: **R335 000**
- GHG emission reduction (ton CO_2): **299 tonnes CO_2e**

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Beyond efficiency

opportunities for (and in) SADC countries

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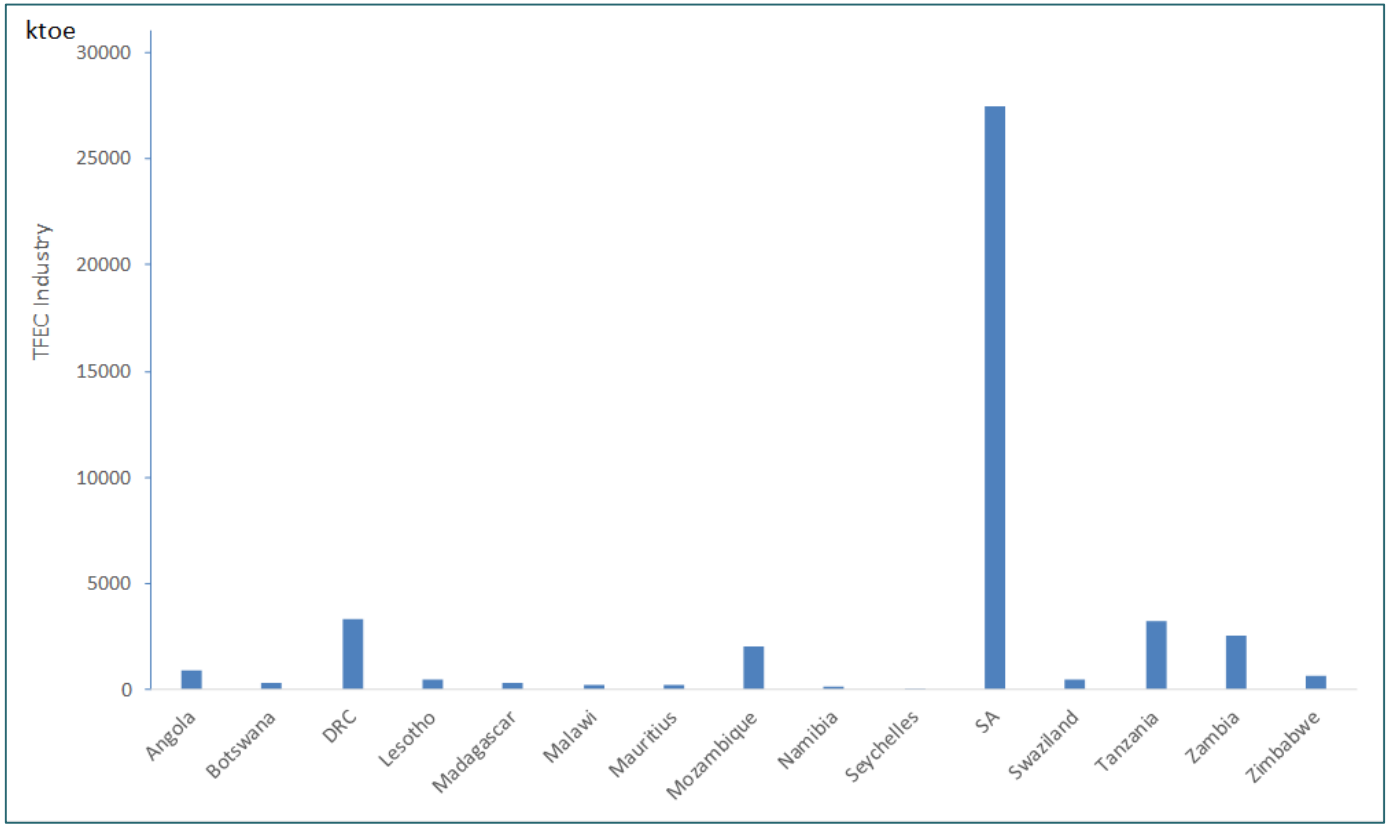
Industrial energy consumption by SADC Member States - 2014



Adoption of RE in SADC Member States to offset rising electricity tariffs

- Regulatory frameworks for self-generation of energy is lacking in the majority of MS. Industries are, therefore, not able to reduce their energy bills (e.g. electricity and heat) by investing in RE.
- The low tariffs present in a significant number of countries increase the payback of this type of investments to more than 2-3 years which is usually the main deciding criteria for companies to invest.
- The opportunities to deploy RE for self-generation and selling to the grid will require cost reflective tariffs and net metering regulations to make investments worthwhile for the industries. Biomass, solar PV and solar thermal for cooling and heating are promising areas.

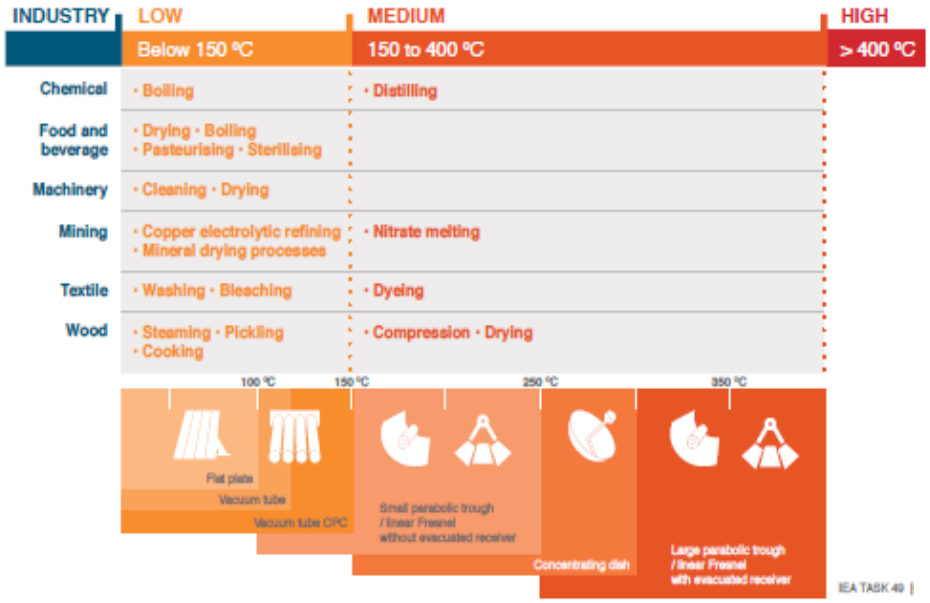
Findings of SADC Member States Assessments

- Lack of complete national strategies and actions plans to promote EE
- Need for the improvement of cooperation between the governmental and industrial sectors
- Low electricity tariffs that do not incentivise EE investments
- Lack of understanding by governments on the use of energy by the industrial sector and where opportunities for EE exist.
- Limited expertise to conduct energy audits
- Low involvement of the private sector in EE activities
- Limited financing infrastructure for EE
- Lack of regulatory frameworks allowing for self-generation of energy
- Lack of awareness for the benefits of Energy Management Systems

RE/EE Opportunities in SADC

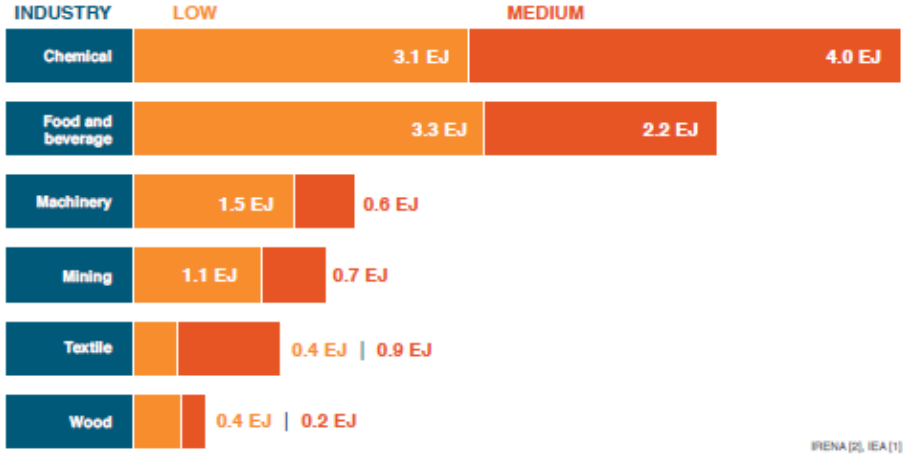
- Formulation of appropriate policy, regulatory, institutional frameworks
- Awareness Raising, Capacity Building and Skills Development
- Demonstration/flagship programmes/projects
- Financing of EE/RE interventions
- Application of RE in industries
- Domestication of RE/EE technologies in the SADC region

Thermal market segments and heat demand



HEAT DEMAND

The total heat demand for low and medium temperature applications accounts for **44 EJ** (exajoule) globally (≈12,222 TWh). The chart below shows this heat demand in selected industries.

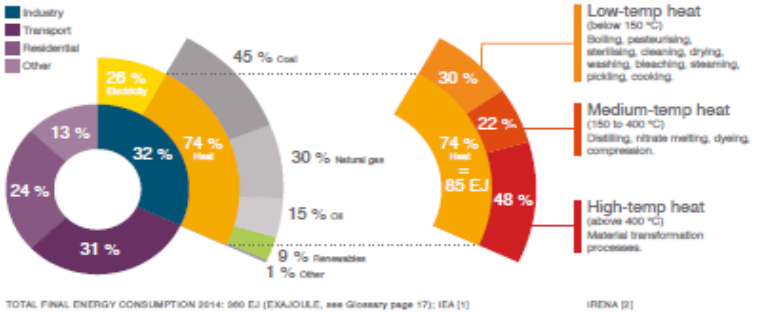


IRENA [2], IEA [1]

Solar heat for industry – Industrial Solar Heat pay off

There is more final energy consumption of heat in the industrial sector than there is electricity consumed worldwide. Electricity, however, is talked about more.

ENORMOUS GLOBAL HEAT DEMAND IN INDUSTRY



TOTAL FINAL ENERGY CONSUMPTION 2014: 560 EJ (EXAJOULE, see Glossary page 17); IEA [1] IRENA [2]

POWERFUL RESOURCE

INDUSTRIAL HEAT DEMAND ON THE RISE

1.7 %

Average annual growth of industrial heat demand until 2030 [4]

90 %

Met by coal, oil and gas

23.7 %

Renewable energy share (including hydropower) in final global **electricity** consumption across all sectors

9 %

Renewable energy share in final **heat** consumption of global industrial sector

0.001 %

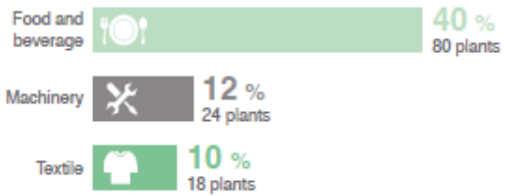
Solar share in final heat consumption of global **industrial** sector

More than **500** industrial manufacturers trust solar heat worldwide.

More than **400,000 m²** of collector and mirror area (≈ 280 MW_{th}) produce **Solar Heat for Industrial Processes** around the globe.

MAJOR INDUSTRIES

Industry segments with highest number of realised SHIP plants



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THANK YOU

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