

The 5th CSIR
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IDEAS THAT WORK

8-9 October 2015 | CSIR ICC

**Driving National
Energy Efficiency
Performance**

Alfred Hartzenburg

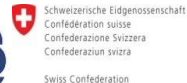
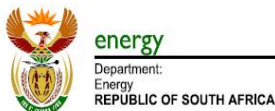
CSIR
our future through science

CELEBRATING
70 Years
Ideas that work

Presentation Points

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- Project baseline and focus
- Outcomes
- Socio-economic impacts
- Behavioural insights
- Sustainability failure
- A winning culture



Federal Department of Economic Affairs FDEA
State Secretariat for Economic Affairs SECO

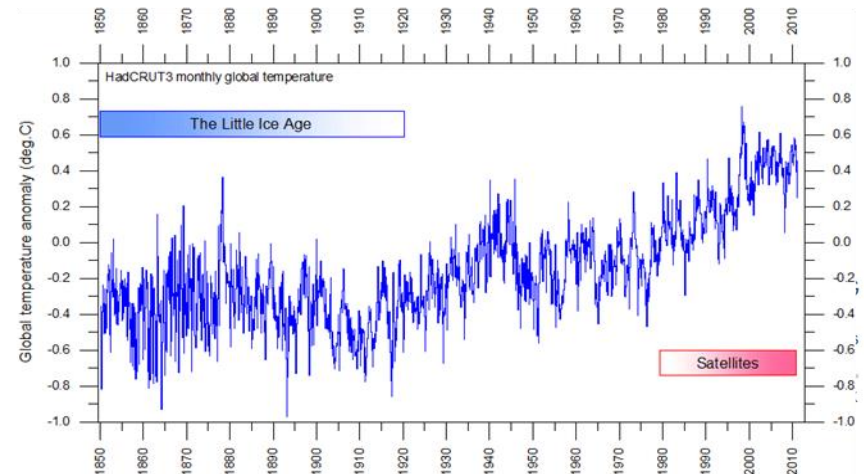
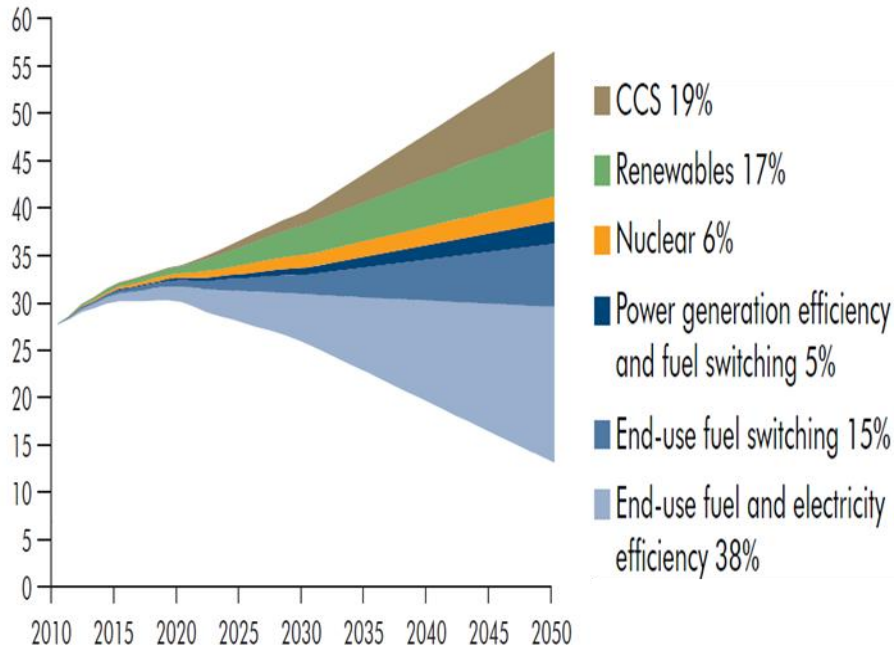


CELEBRATING
70 Years
Ideas that work

Global Context

Most emissions reductions are possible through the deployment of existing best available EE practices and technologies

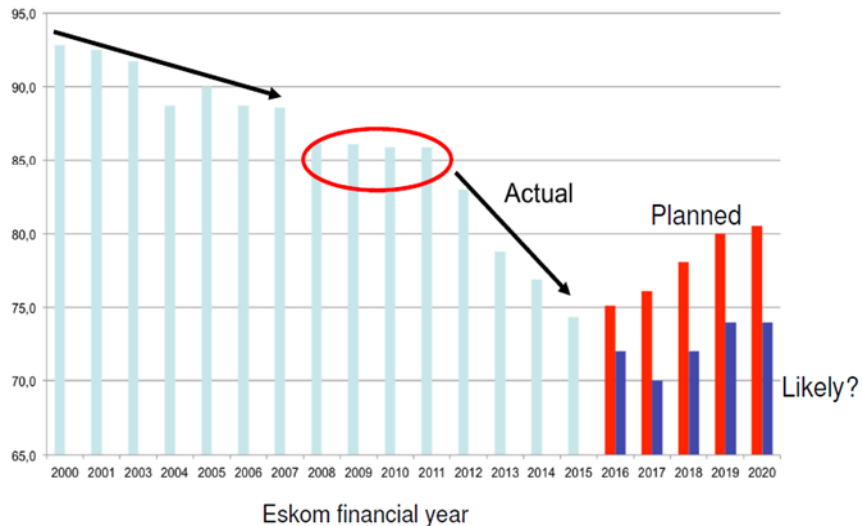
Energy Efficiency remains the most effective GHG emission mitigation strategy.



National Dilemma

Commissioning of new Eskom plants are likely to be delayed further

Eskom Generation Plant Availability %



- South Africa faces the worst power crisis in 40 years.
- Power deficits are likely to persist for at least another 5 years.
- There are backlogs in maintenance of the country's distribution networks
- Over the last 3 years, Eskom has lost the equivalent of an entire coal power station through deteriorating plant availability.
- Of the country's 87 coal generating units, "32 require major surgery and 3 are in a critical condition".
- Of Eskom's 41,000MW in total generating capacity, currently only around 30,000 MW is being pushed out of the system.
- Eskom's generation plant availability has been in decline since the early 2000's.
- The risk is that Eskom's plant availability falls to 70% by 2017.

Industry Challenges

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- Focus was production and revenue targets, not energy efficiency
- Lack of information and understanding of financial and qualitative benefits of energy efficiency
- Lack of adequate technical skills to develop and implement energy efficiency measures and projects
- Inadequate monitoring systems and poor data quality
- Belief that first cost is more important than recurring costs
- Where energy efficiency knowledge exists it very often resides with individuals rather than with the organization → sustainability risk
- Defensiveness – “I’m already doing a good job!”
- ...

IEE: A Global Programme

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GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

Operational in 17 countries
Planned activities in 10 countries

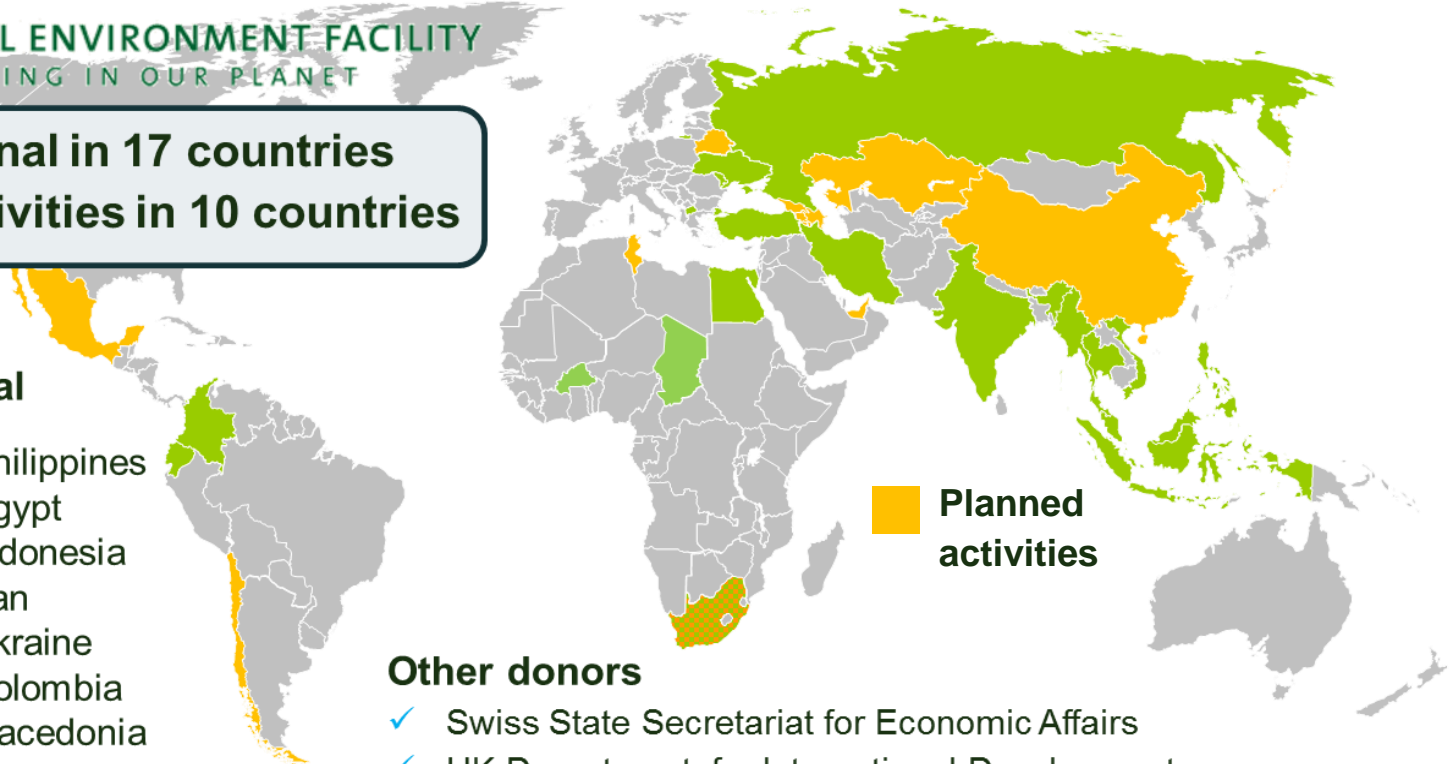
 **Operational**

South Africa	Philippines
Moldova	Egypt
Russia	Indonesia
Turkey	Iran
Ecuador	Ukraine
Malaysia	Colombia
Thailand	Macedonia
Viet Nam	Myanmar
India	

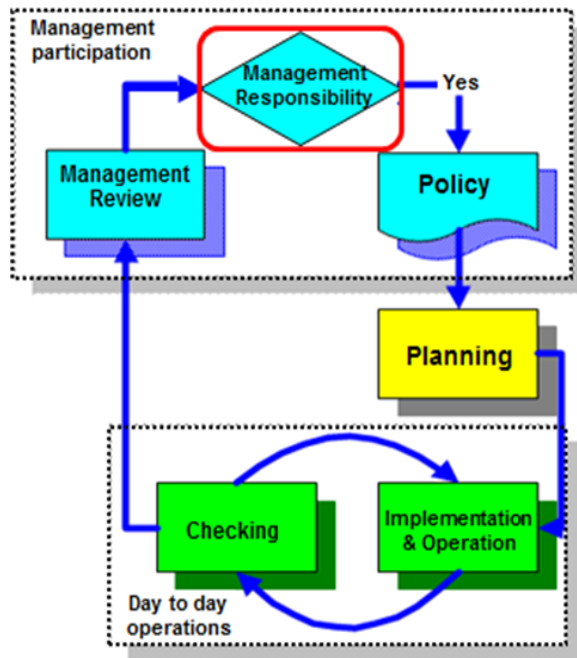
 **Planned activities**

Other donors

- ✓ Swiss State Secretariat for Economic Affairs
- ✓ UK Department for International Development
- ✓ Government of South Africa
- ✓ Government of Italy



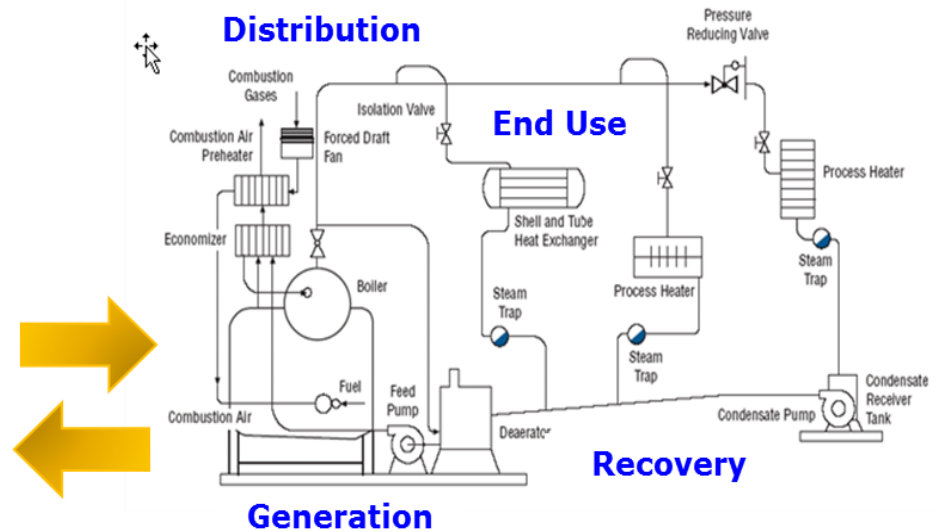
Energy Management Systems (EnMS)



EE INTEGRATED

ENERGY SAVINGS & INVESTMENTS

Energy System Optimization (ESO)



- || ✓ Auxiliary energy systems account for over 50% of final manufacturing energy consumption
- "
- ||
- " ✓ System optimization average efficiency gains range between 15-30% against 4-5 % of individual components
- ||
- ..

Actual Savings Reported (2011 – June 2015)

System	kWh	Tonnes CO _{2e}	Rand Value
EnMS	901 098 200	857 000	889 608 000
ESO	440 524 800	394 000	237 538 000
Total	1 341 622 000	1 251 000	1 127 146 000

Direct Jobs Retained / Created



Solomon Coatings:
Implementing energy assessment findings saved electricity and increased production output by 40%.

SA IEE Project Outcomes

1
4
5



Sockit Manufacturing:
A steam boiler fuel switch and 4 energy optimisation projects reduced kVA enabling 30% additional machines.

SA IEE Project Outcomes

0
20
20



Willard Batteries:
Implemented EnMS, saved R3M in 2013 and as a result the plant expanded production capacity by 20%.

SA IEE Project Outcomes

416
66
482



Mittal Saldanha:
Implemented EnMS in 2010 and saved R60M in the first year. Sustained energy performance and saved R272M to date.

SA IEE Project Outcomes

1 237 Retained
0 Created
1 237 Total

Total Direct Jobs Retained / Created = 1744

Local Employment Created



- Induced employment
- Indirect employment
- Direct employment

% of Direct jobs retained in the local area for the enterprise

80%

Local Employment*: 4 170
ArcelorMittal Saldanha Works

100%

Local Employment*: 19
Solomon Coatings

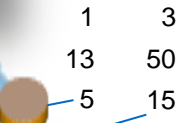
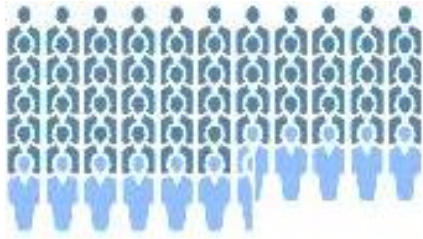
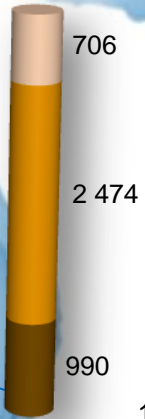
75%

Local Employment*: 68
Sokit Manufacturing

78%

Local Employment*: 1 456
Willard Batteries

Number of jobs preserved and/or created within the **local community**



Local Employment Created = 5 713

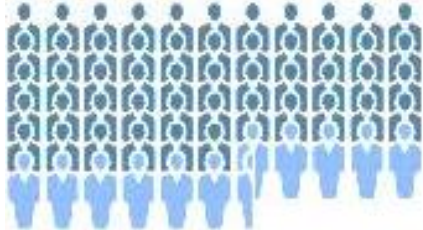


Local Livelihoods Supported



Livelihoods supported in the local community through IEEP generated direct local employment

Number of livelihoods supported in local community



ArcelorMittal Saldanha Works



Solomon Coatings



Socket Manufacturing



Willard Batteries

Livelihoods Supported = 3 378



Disposable Earnings Generated

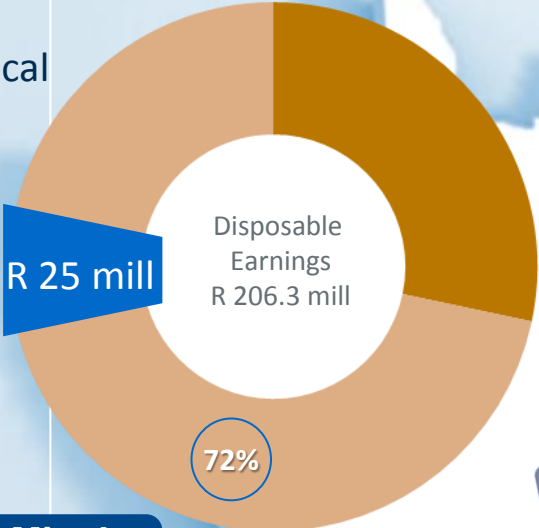


Disposable annual income earned by workers living in the local community

Percentage earnings within local community

Annual income retained local community

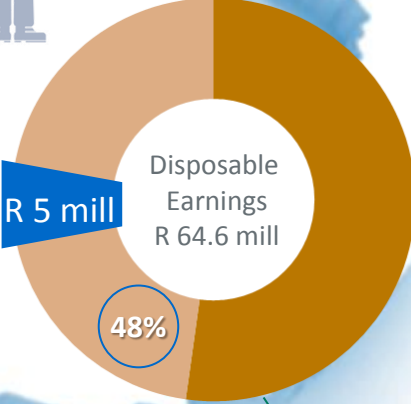
- 1 R 42 000
- 2 R 90 000



ArcelorMittal Saldanha

Solomon Coatings

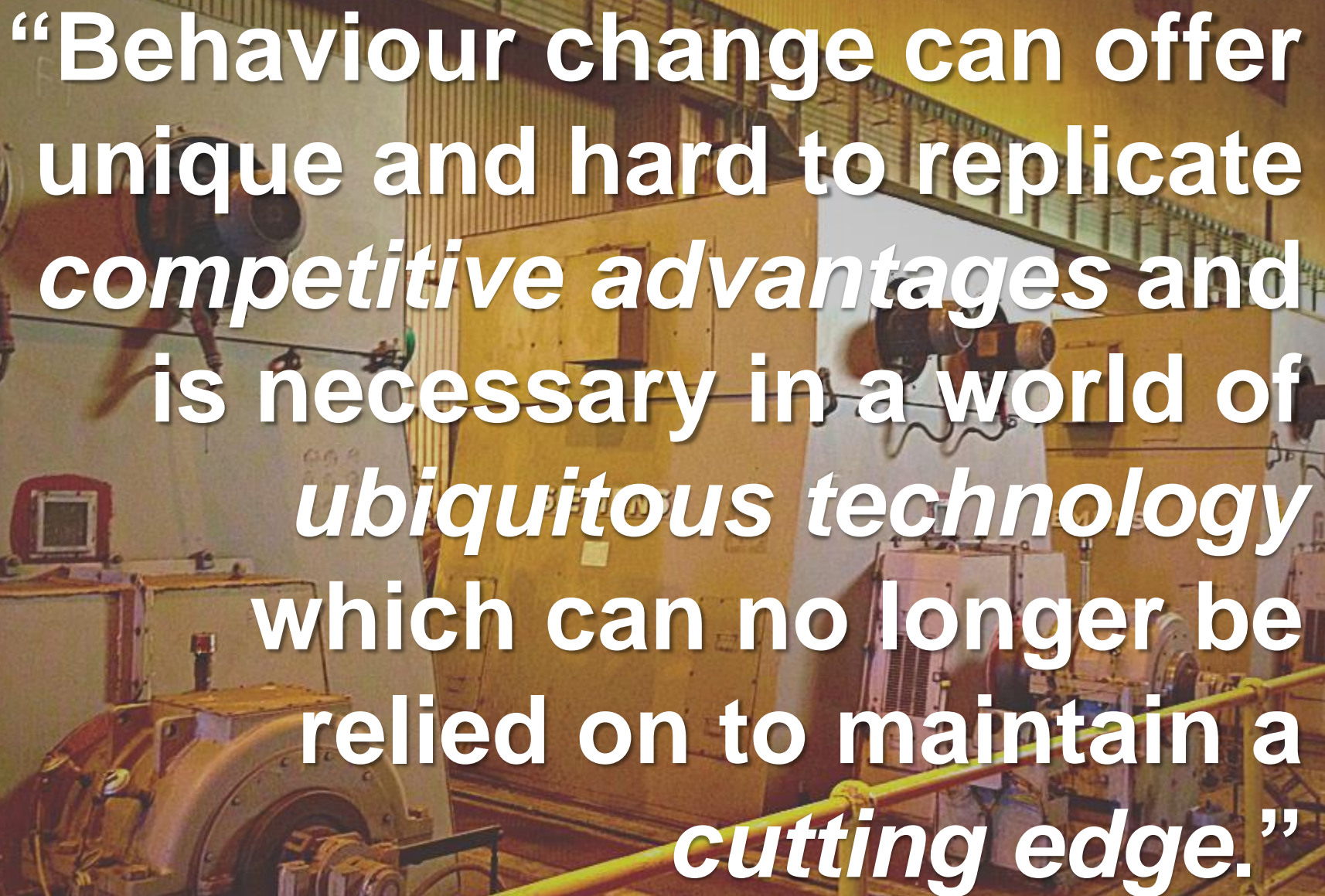
Socket Manufacturing



Willard Batteries

Disposable Annual Earnings = R271 M



The background of the image shows a large industrial facility, likely a power plant or manufacturing plant. It features several large, tan-colored metal cabinets or enclosures, possibly electrical control panels. In the foreground, there are various pieces of machinery, including what appears to be a large motor or generator with a circular opening. A yellow safety railing runs across the lower part of the image. The lighting is somewhat dim, with a warm, yellowish tint, suggesting an indoor industrial environment.

“Behaviour change can offer unique and hard to replicate *competitive advantages* and is necessary in a world of *ubiquitous technology* which can no longer be relied on to maintain a *cutting edge.*”

Industrial Energy Project Manager

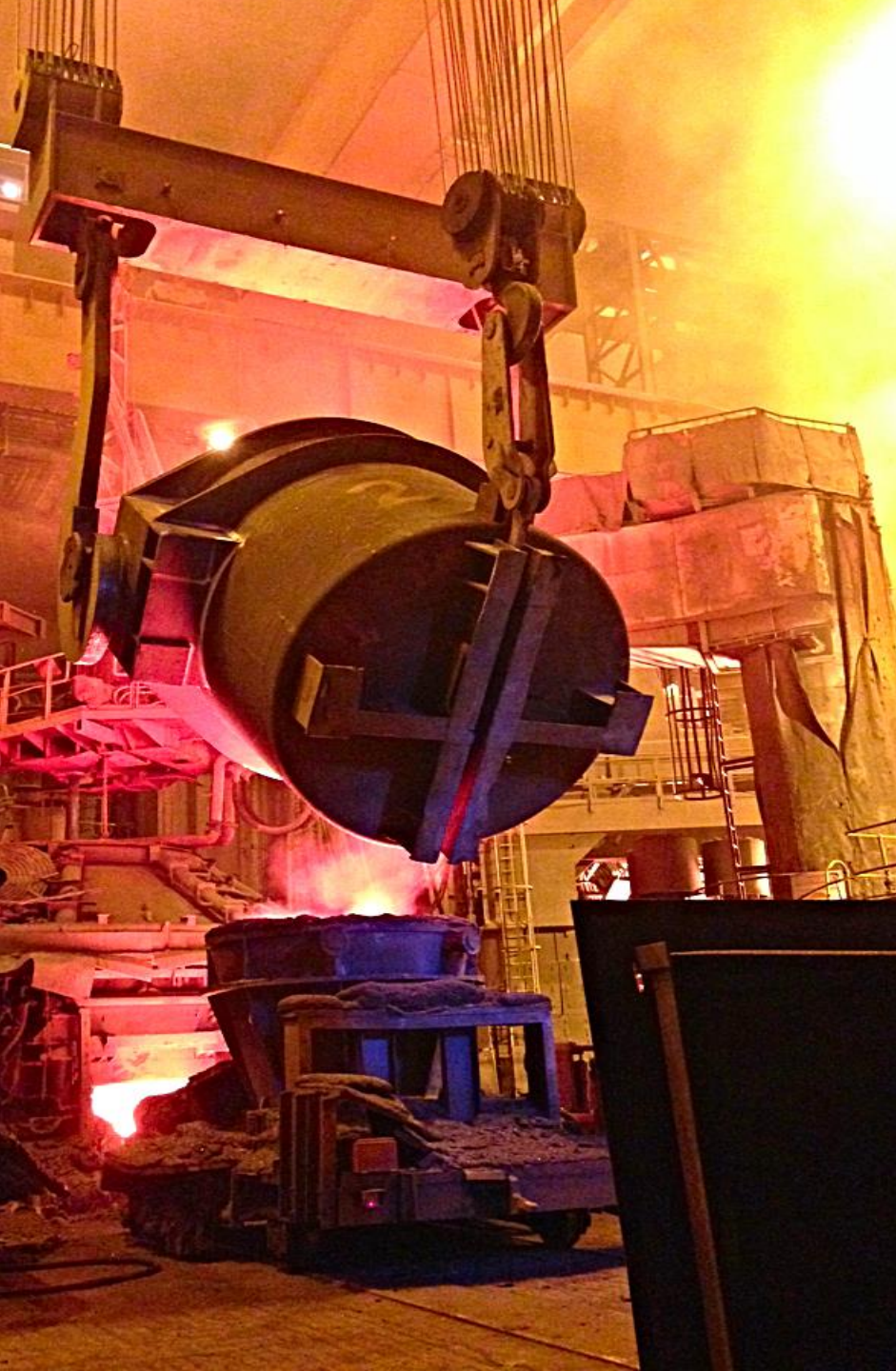
Behavioural Insights

- Behavioural insights identify **extra-logical means of economic actor decision making**, such as:
 - Bounded rationality, dynamic inconsistencies, prospect theory and reference points, pro-social behaviour / fairness
- **Necessary and potentially low-cost** component of energy management systems (EnMS) and efficiency interventions
- **Key platform** upon which to build for energy savings
- Can be pursued **independently or in tandem** with technology upgrading efforts

Dr Aurelia Figueroa

(Simon 1954, Gillingham *et al.* 2009, Kahneman/Tversky 1979, UNEP 2012, IEA 2010)

<http://bit.ly/1InhUmE>



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Case Study: ArcelorMittal Saldanha Works

Dr Aurelia Figueroa

<http://bit.ly/1InhUmE>

Barriers and Catalysts of Change

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Barriers

- Lack of urgency
- Status quo processes
- Low awareness, skills
- “No Mans Land”
 - Lack of dedicated time and financial resources, oversight
- Finance

Catalysts

- Burning platform
- Energy Management System
- Awareness building, training
- Employee engagement
 - Management involvement
 - Energy champions & coordinators
- Proof of concept

Dr Aurelia Figueroa
<http://bit.ly/1InhUmE>

Handwritten signatures and scribbles on the left side of the poster, including names like 'Chris', 'John', 'R. Basson', and '8-8-8'.

I GIVE
ENERGY
SAVING
A HELPING
HAND
BECAUSE:
It's in MY hands!

Handwritten signatures and scribbles on the right side of the poster, including names like 'Steve Mayer', 'Doodler', and 'Moodler'.

ENERGY Focus (WEEK)

ENERGY: GENERAL

Behavioural Imperatives

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- *Necessity and potentially low cost* of behavioural interventions; a valuable first and ongoing step
- Value of UNIDO-IEEP collaboration
- Beyond technology: Better integrate behaviour into incentive programmes and training
- Behavioural insights as a strong basis for an EnMS
- Catalyse bottom up and top down engagement, establish and build upon social norms
- Delegate time and financial resources, avoid “time poverty”
- Provide feedback, foster top-of-mind focus
- Seize windows of opportunity

Dr Aurelia Figueroa
<http://bit.ly/1InhUmE>

Sustainability Failure

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”...energy efficiency initiatives that are not monitored and maintained typically have a **six-month half-life of their benefits.** That is, they lose half of their economic benefits every six months if left largely untouched.”

Emerson's James Beall, a principal process control consultant who helps manufacturers optimize their processes



A Winning Culture

- Demonstrable and visible top management commitment
- An ISO / WCM environment promotes a culture conducive to sustainability
- After exhausting no cost improvements a willingness to spend in order to save
- Plant stability and reliability
- Adequate sub-metering and a measurement plan
- Allocation of resources

Beneficiaries...

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Thank You

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