



energy

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Energy
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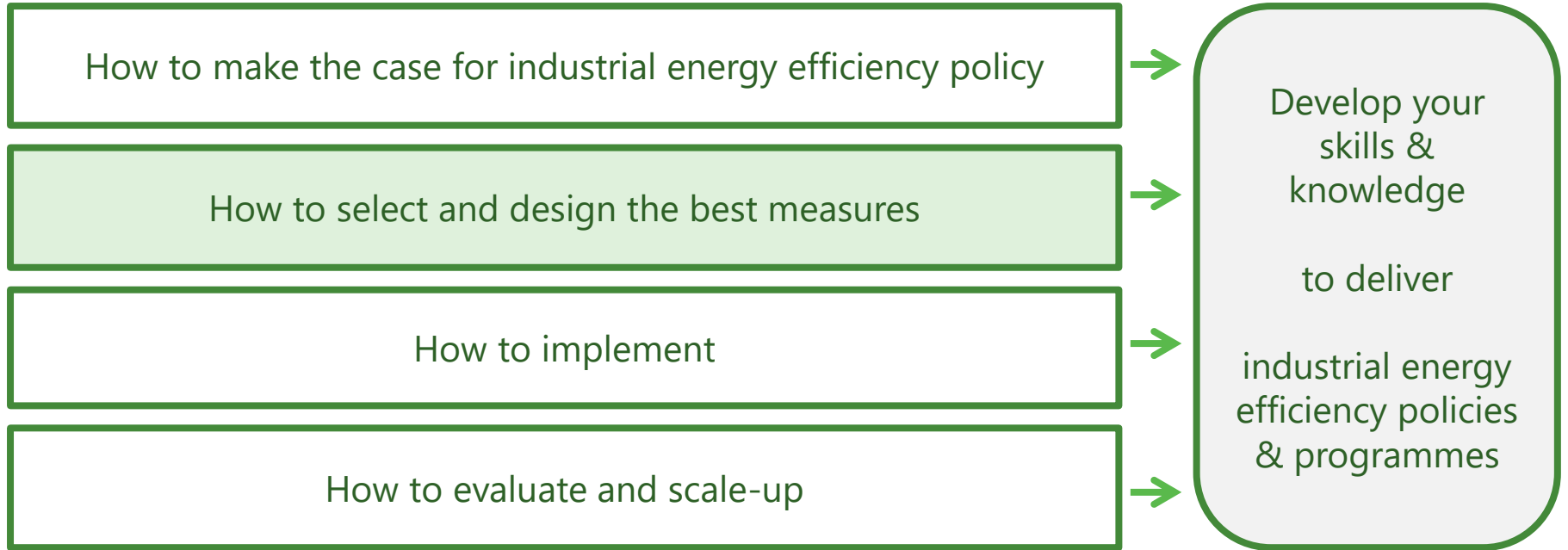


Digital technologies

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Energy Efficiency Training Week, Industry Stream, Pretoria, South Africa, October 2019

Link between training content and objectives

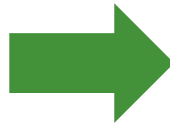


Learning objectives

- This session will focus on developing your capabilities to leverage developments in digitisation to accelerate energy efficiency in industry when designing energy efficiency policies and programmes

In the past ...

- Lack of technology to measure and track energy use
- Limited consolidation of data
- Limited real time data
- Limited granular data

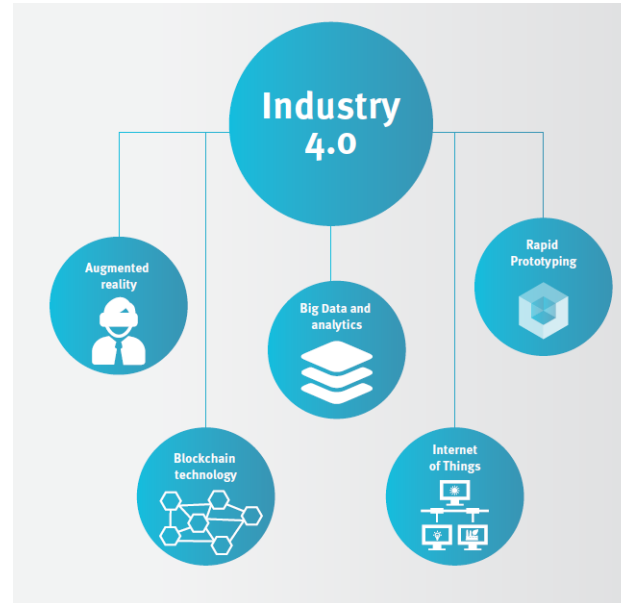


- Difficult to identify energy efficiency opportunities
- Difficult to assess results of energy efficiency
- Managing energy 'in the dark'

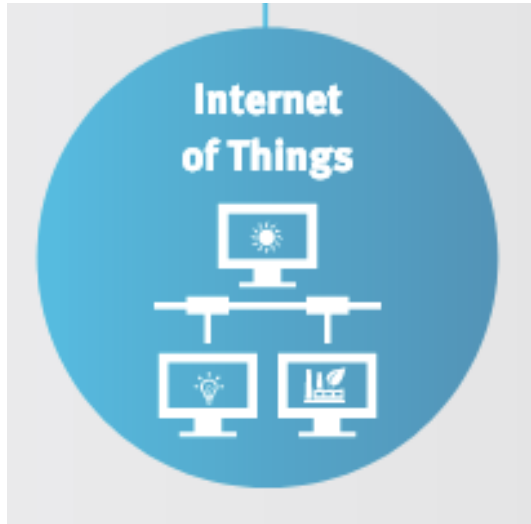


Today

- Technologies that have the potential to revolutionise industry and deliver significantly better energy efficiency



Internet of Things (IoT)



What is it?

- IoT is the interconnection via the Internet of computing devices embedded in everyday objects. This enables them to send and receive data.

Leverage for energy efficiency

- Cheap, easy and fast sensors
- More targeted data and information to support decision making
- Opportunity to automate decision making

IoT in Manufacturing



MANUFACTURING PLANT

GLOBAL FACILITY INSIGHT



Monitor production flow in near-real time to eliminate waste and unnecessary work in process inventory.

Manage equipment remotely, using temperature limits and other settings to conserve energy and reduce costs.



Leveraging Technologies



- US ice cream cake producer installed CCP Technologies (ASX:CT1) wireless LPWAN automated IoT monitoring and analytics solution.
- Case study: a small walk-in freezer was shown to be sub-optimal due to high frequency and high temperature defrost cycling (8 cycles per 24 hours up to -11°C). The running cost of the freezer was \$372.30 per month.
- The defrost cycle frequency was reduced to three cycles per 24 hours and the peak defrost temperature was reduced to -14°C .



- This adjustment reduced the power cost from \$372.30 per month to \$244.13 per month, a saving of \$128.17/month (52%).

Big Data and Analytics



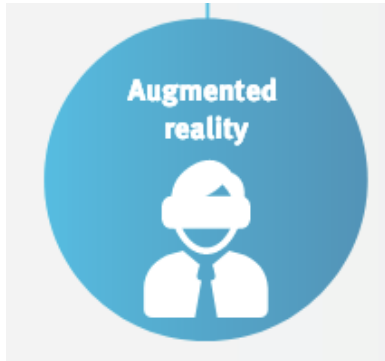
What is it?

- Sets of data characterized by high volume, high velocity and high variety

Leverage for energy efficiency

- Identify complex energy use trends in operational sites, across industry sectors and across supply chains

Augmented reality



What is it?

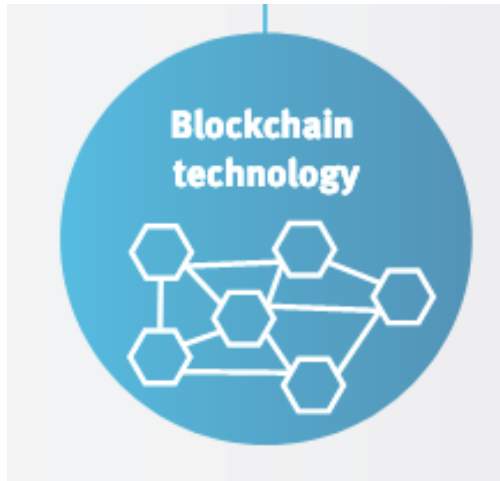
- A technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view.

Leverage for energy efficiency

- Connect with service experts to develop feasible maintenance solutions without requiring experts to physically travel to the customer
- Train local workforces in different regionals
- Visualise where energy wastage occurs across a site



Blockchain



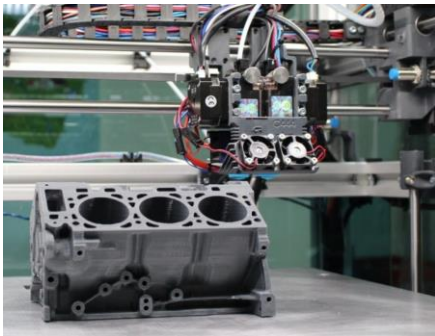
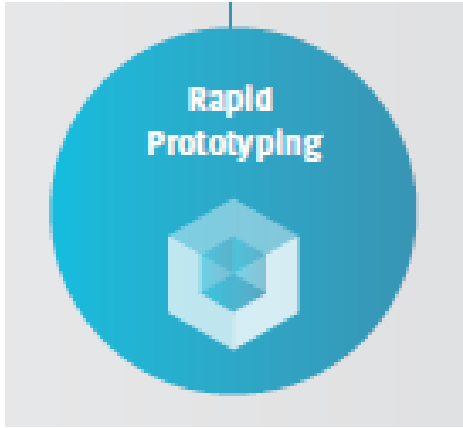
What is it?

- a system in which a record of transactions made in bitcoin or another cryptocurrency are maintained across several computers that are linked in a peer-to-peer network.

Leverage for energy efficiency

- Could support 'trading' in energy efficiency
- Build confidence in energy efficiency achieved across a supply chain

Rapid prototyping



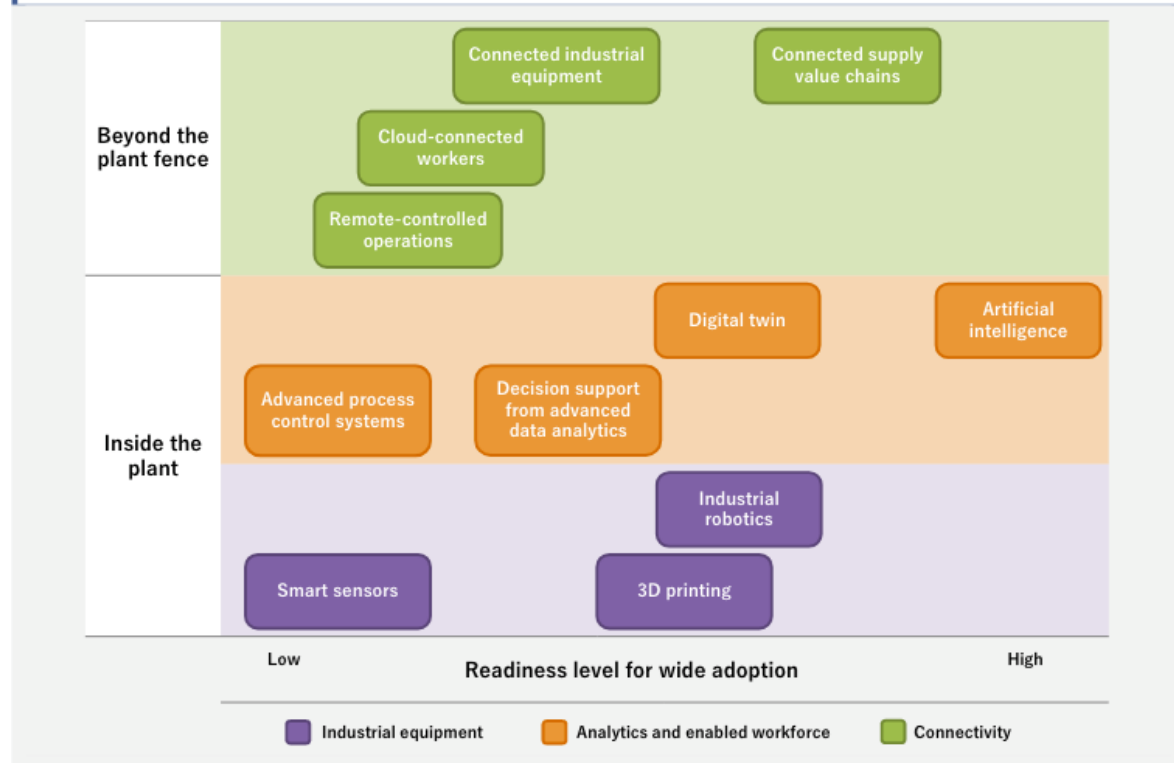
What is it?

- Group of complementary technologies such as computer aided design and 3D printing used to rapidly product parts and prototypes

Leverage for energy efficiency

- Mass customization of energy efficient technologies
- Improve the energy efficiency of production elements in various ways such as reducing weight, increasing durability and increasing strength

Application of digital technologies and strategies in industry



Digitalization in industry can take diverse forms, ranging from automated equipment to connecting industrial operations based in different locations.

How digitization can deliver energy efficiency at the plant level

- Real time data
- Device – equipment level data
- System level data
 - Production line
 - Whole site
- Sensors tracking and alerting for leaks or subpar operation
- Automated adaptation to conditions (e.g. weather)
- Software that audits equipment and systems
- Condition monitoring library

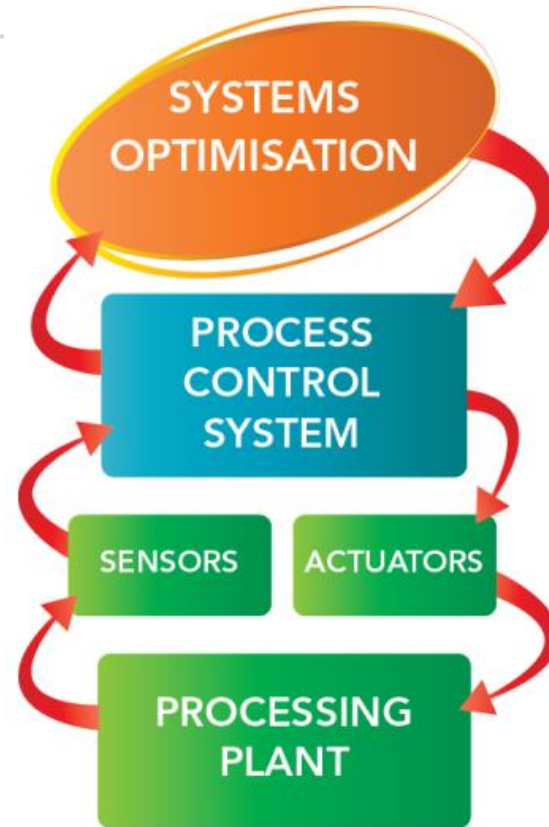


Equivalent to
many energy
managers!



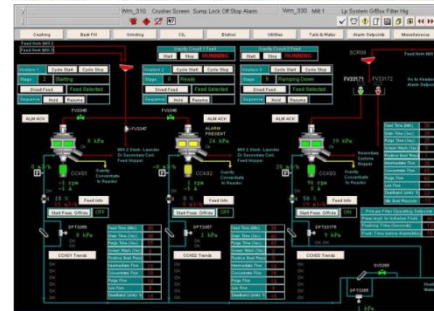
Systems optimisation examples

- Energy use and process data in real time
- Data used to manage and optimise productivity and quality
- Multiple benefits
 - ✓ Increased output
 - ✓ Increased energy efficiency
 - ✓ Reduced energy cost
 - ✓ Increased product quality
 - ✓ Emissions reduction
 - ✓ Reduced environmental impact
 - ✓ Improved occupational health and safety



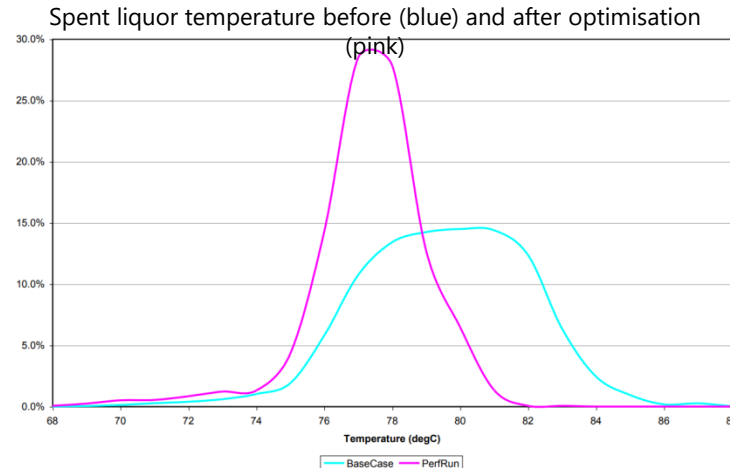
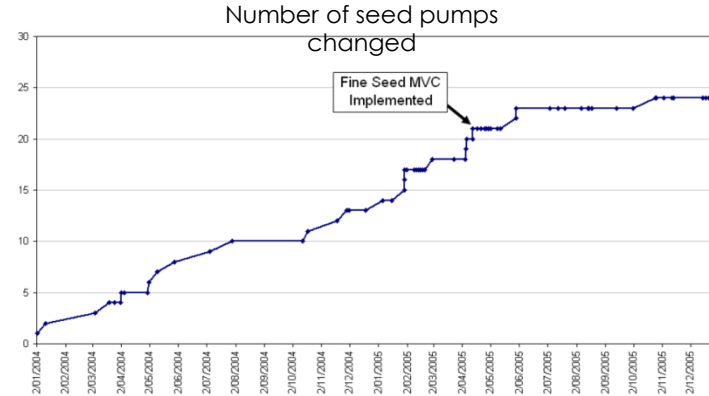
Case Study: Anglo Gold Ashanti (mining)

- Systems optimisation project implemented to improve productivity and reduce downtime
- Had systems to collect data, but it had never been analysed
- Multi-step process:
 - ✓ Understand systems in place
 - ✓ Identify opportunities for improvement
 - ✓ Train operators about how to use existing equipment



Case study: Worsley Alumina (resource processing)

- Implementation of advanced control systems (multi-variable control)
- Multi-step process:
 - ✓ Mandate from senior management
 - ✓ Front-end study
 - ✓ Progressive roll-out across plant to improve confidence
- Benefits:
 - ✓ Reduced operator intervention in process
 - ✓ Reduced maintenance costs and improved reliability
 - ✓ Increased productivity and efficiency
 - ✓ 3,000 more tonnes alumina per year from the same energy use
 - ✓ 7 month payback



What do you think?

- What are the emerging technologies that are likely to have an impact in your country context?
- What do you see as the key opportunities to promote these and other technologies?
- What do you see to be the key challenges?





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