



# IEA Energy Efficiency In Emerging Economies Training Week

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Industry Stream: Leverage information and communication technologies

Patrick Crittenden and Louise Vickery, Jakarta, 16-20 July 2018

 #energyefficientworld

- This session will focus on developing your capabilities to leverage developments in information and technology (ICT) to accelerate energy efficiency in industry
- We will:
  - Untangle some of the concepts and vocabulary
  - Zoom into what are the technologies and tools
  - Discuss what programmes could do to help companies access and utilise these tools
  - Discuss how ICT can help programme development and implementation

- Lack of technology to measure and track energy use
- No consolidation of data
- No real time data
- No granular data



- Difficult to identify energy efficiency opportunities
- Difficult to assess results of energy efficiency



- Factory of the future
- Smart factory
- Internet of Things enabled manufacturing
- Machine to machine communication
- Automation and robotics
- Big data
- Advanced data analytics
- Real-time granular data
- Integrated systems
- Interconnecting every step of the manufacturing process



Image: Jumpstart

**Basically:**

- Measure
- Analyse
- Use

Combining  
different types of  
data in new ways

Automate

# Factory of the future example

- Opened in Chemnitz as part of a German research and development project.
- The energy values of machines and equipment are captured in a production management system and linked to planning and operating data. This information flows into an energy-sensitive control system which is used by management personnel to optimise resource flows and material flows centrally through coordinated control.
- All data of resources needed, such as compressed air, water, electrical energy, and machines and process data come together at the factory level in the „Control Center“. Scientists can then visualize the information in real time on a dashboard and can thus design processes to save energy and raw materials.



Image: Fraunhofer



# How ICT can deliver energy efficiency

- 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  
100 or more  
energy  
managers



# What are the technologies?

- **Energy metering equipment**
  - Internal
  - External
- **Software**
  - Ready made solutions
  - Custom made
  - Home made

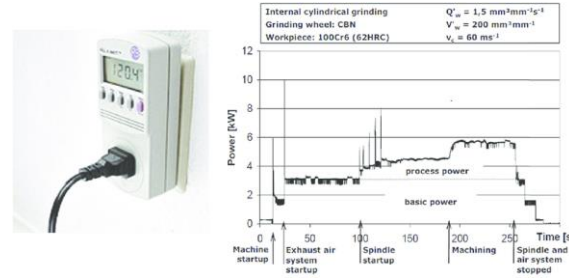


Image: ResearchGate



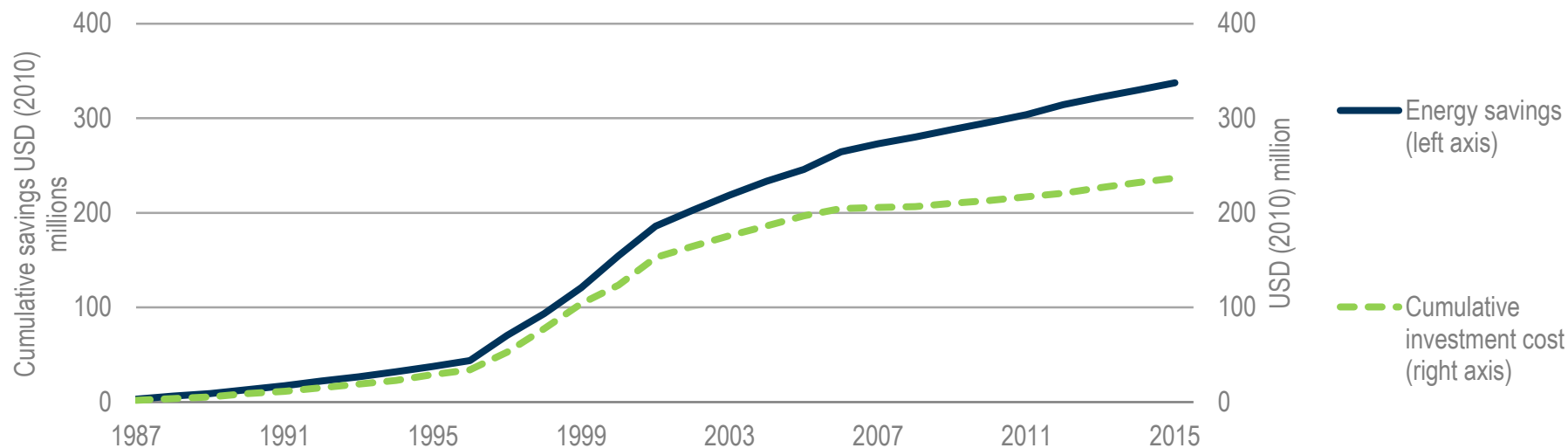
Image: PowerSolutions



Image: LightApp

# Digital technology improves industrial processes

Cumulative energy savings and investment cost from the digitally enhanced optimisation of process controls in the US, 1987 - 2015

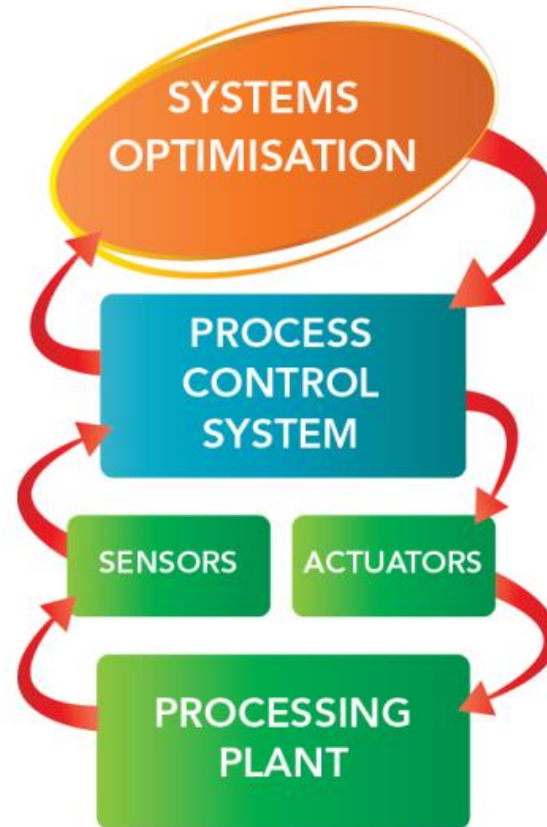


Source: IAC database

**Improved industrial process controls enhanced by digitalisation, can deliver substantial energy and cost benefits, with short or no payback time**



- 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

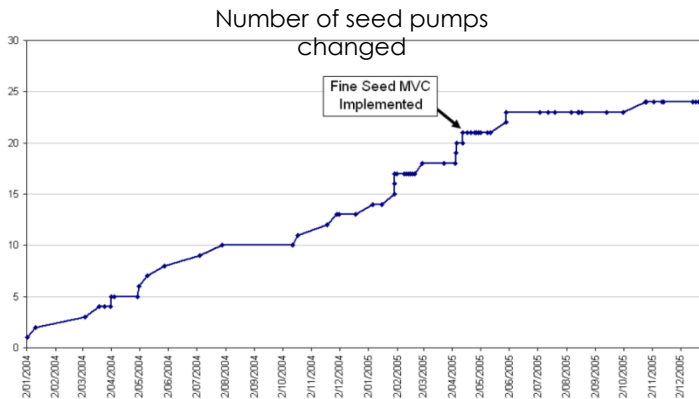
Source: DRET 2013



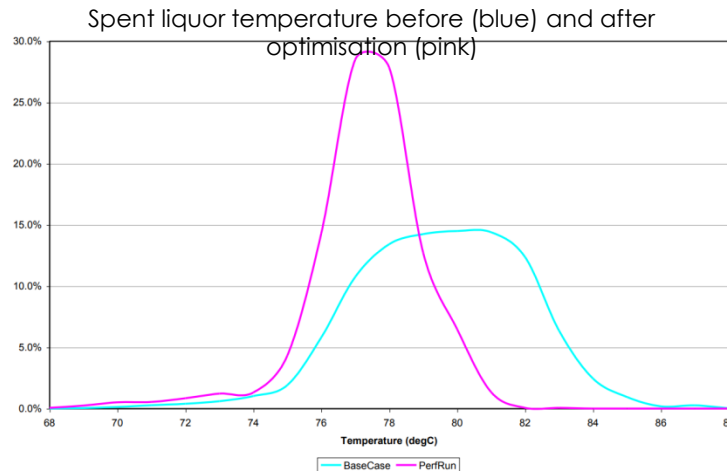
# Case study: Worsley Alumina (resource processing)

- 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

Source: DREYER 2015



Australia



## What can we do?

- Convey information on opportunities
- Training energy managers in plants
- Training external energy managers/consultants
- Pilot plants

## What are the benefits for us?

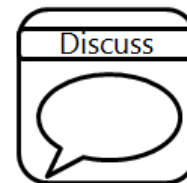
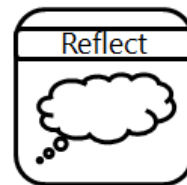
- Energy savings
- Multiple benefits
- Help leapfrog
- Long term commitment to energy efficiency
- Stimulate local tech and service market
- Access to data

## How can ICT help us?

- Enhanced monitoring
- Better evaluations
- Data analysis
- Online application and reporting systems
- Provide participants and other stakeholders with better information about benefits of projects

# What do you think?

- How can you stimulate local innovation and solutions?
- What are your experiences?
- What do you see as the key opportunities?
- What do you see to be the key challenges?
- How could challenges be addressed?





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