



# IEA Energy Efficiency In Emerging Economies Training Week

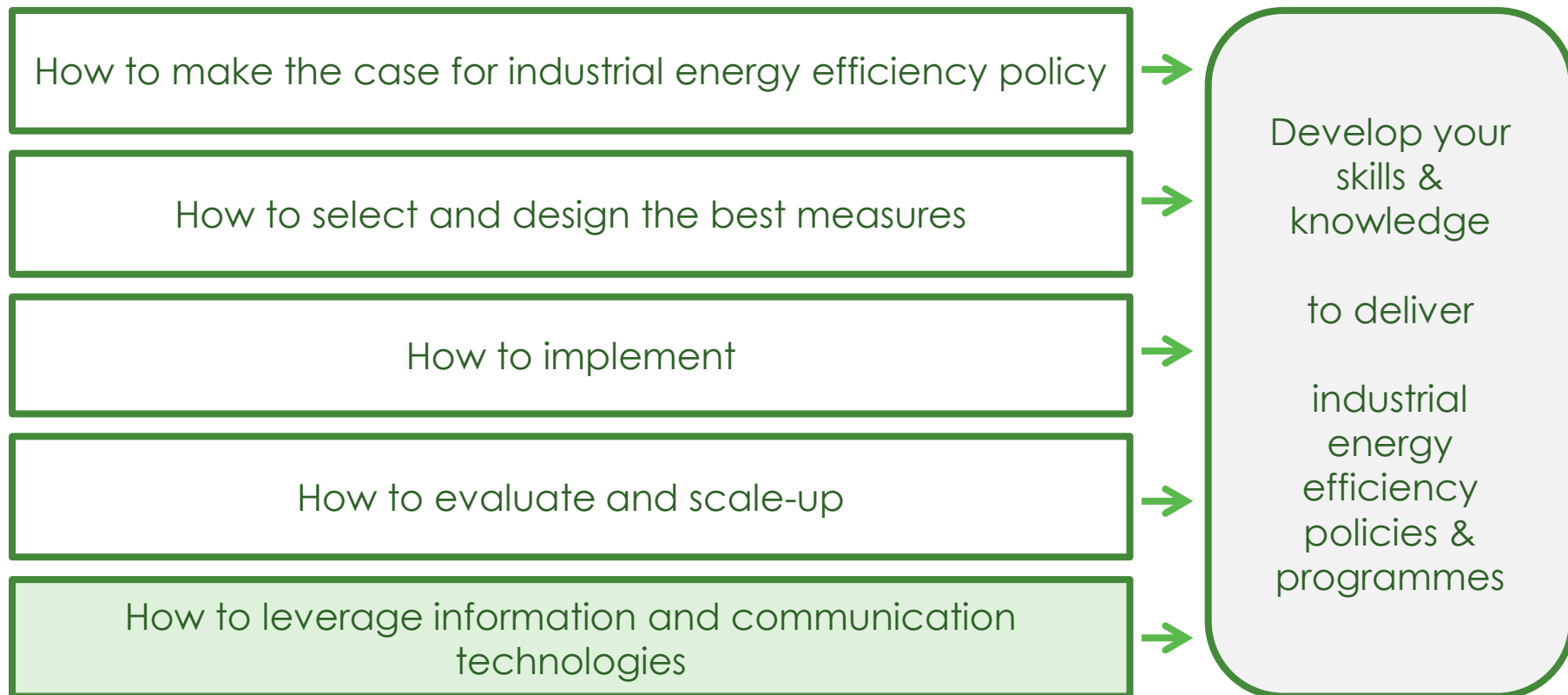
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Industry Stream: Looking forward – ICT and Circular Economy

Patrick Crittenden, New Delhi, 10-13 December 2018

 #EnergyEfficientWorld

# Link between training content and objectives



- 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



# Now (advanced) & tomorrow (all)

- 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

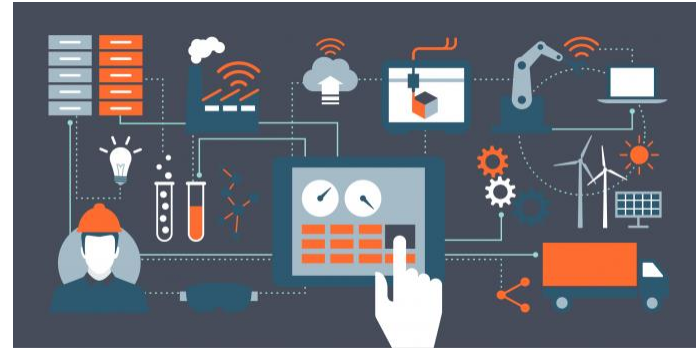


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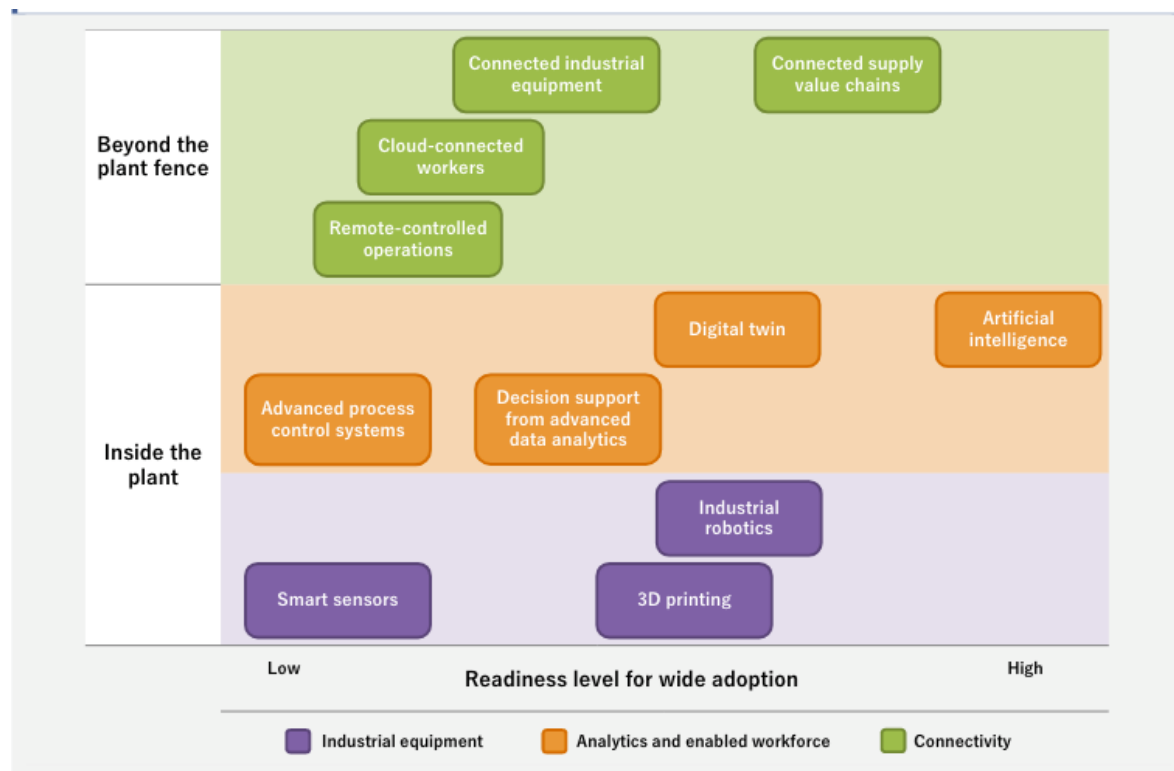
## Basically:

- Measure
- Analyse
- Use

Combining  
different types of  
data in new ways

Automate

# 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 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

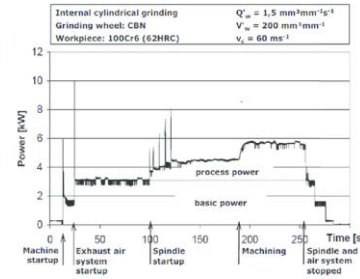


Image: ResearchGate



Image: PowerSolutions

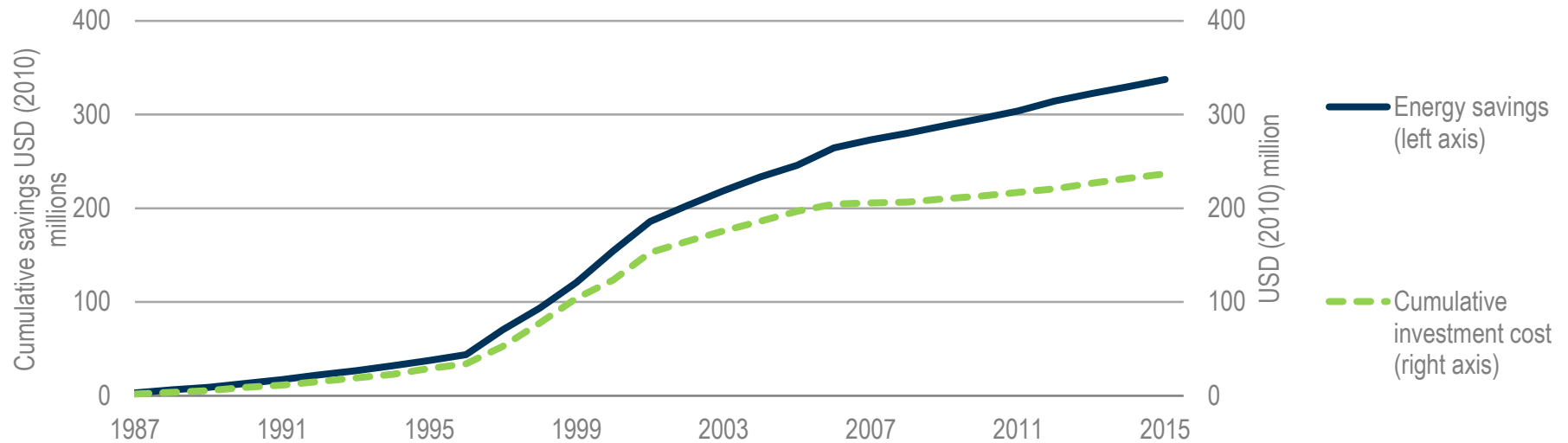


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# Digital technology improves industrial processes

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

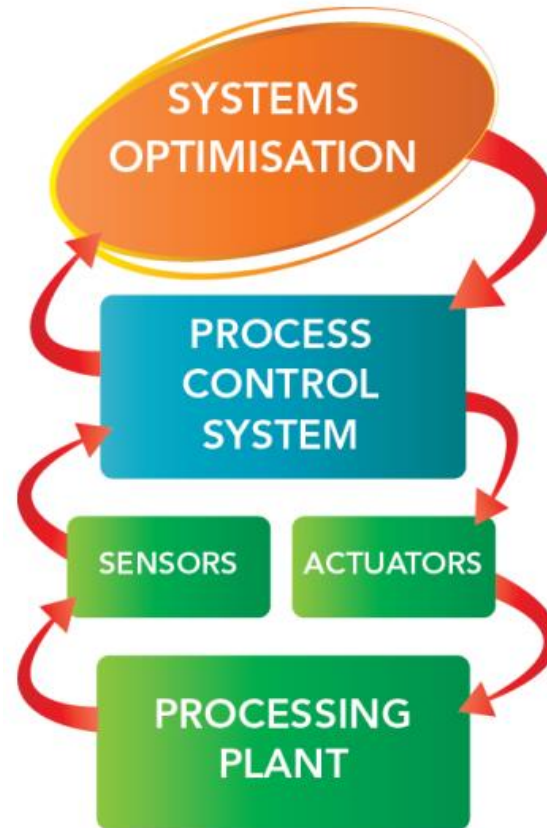


Source: IAC database

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

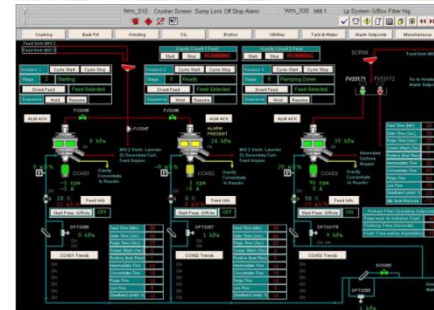
# Systems optimisation improves efficiency

- 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



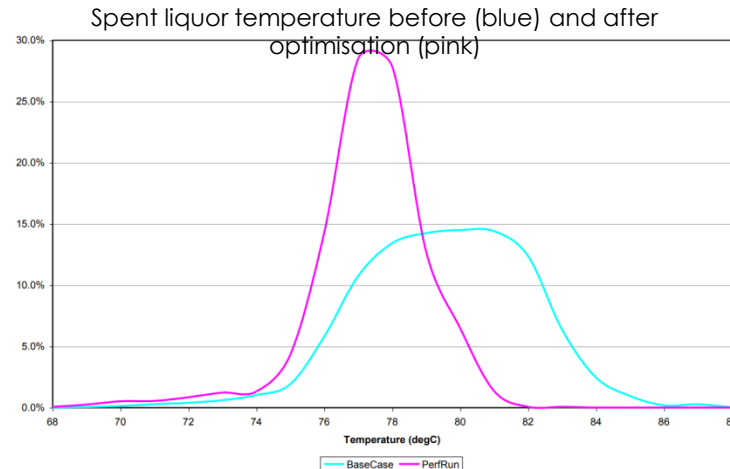
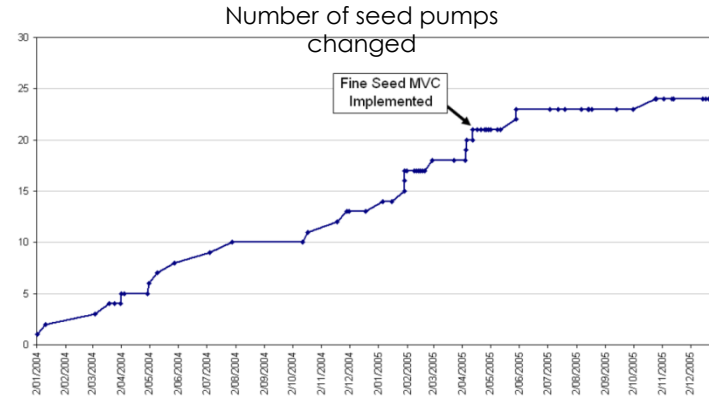
# Case Study: Anglo Gold Ashanti (mining)

- 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 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?

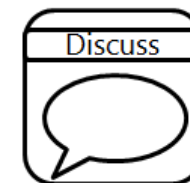
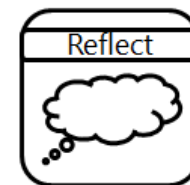
- Energy savings
- Multiple benefits
- Help leapfrog
- Long term commitment to energy efficiency
- Stimulate local tech and service market
- Access to data

## 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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