

Energy Intensity Reduction in the Mining Industry



Key Energy Challenges for the Mining Industry

- ✓ Deeper mines
- ✓ Increasing remoteness of operations
- ✓ Rising energy prices
- ✓ Changing energy source make up
- ✓ Ventilation for underground mines
- ✓ Potential carbon pricing effects

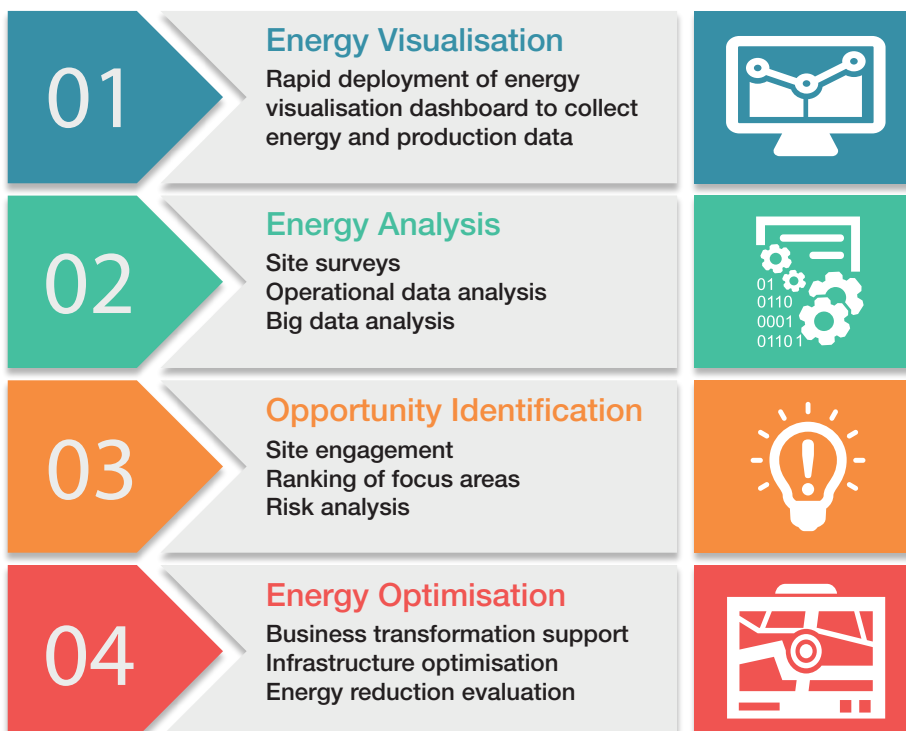
Energy related costs are increasing as a share of the total operating cost of a mine

Benefits of Energy Intensity Reduction

- ✓ OPEX reduction
- ✓ Deferment of CAPEX for energy-related assets
- ✓ Reduction in energy = reduction in run-hours



Energy Intensity Reduction Outline



Energy Visualisation Dashboard (EVD)

“You cannot manage what you do not measure”

What is EVD?
 Non-intrusive energy management software used to project total energy consumption and production throughput in dashboard form.

Why use EVD?
 For a small investment, it will enable consumers to identify:

- Areas of wastage,
- Facilities that have poor energy efficiency, and
- Correlation between energy usage and productivity.

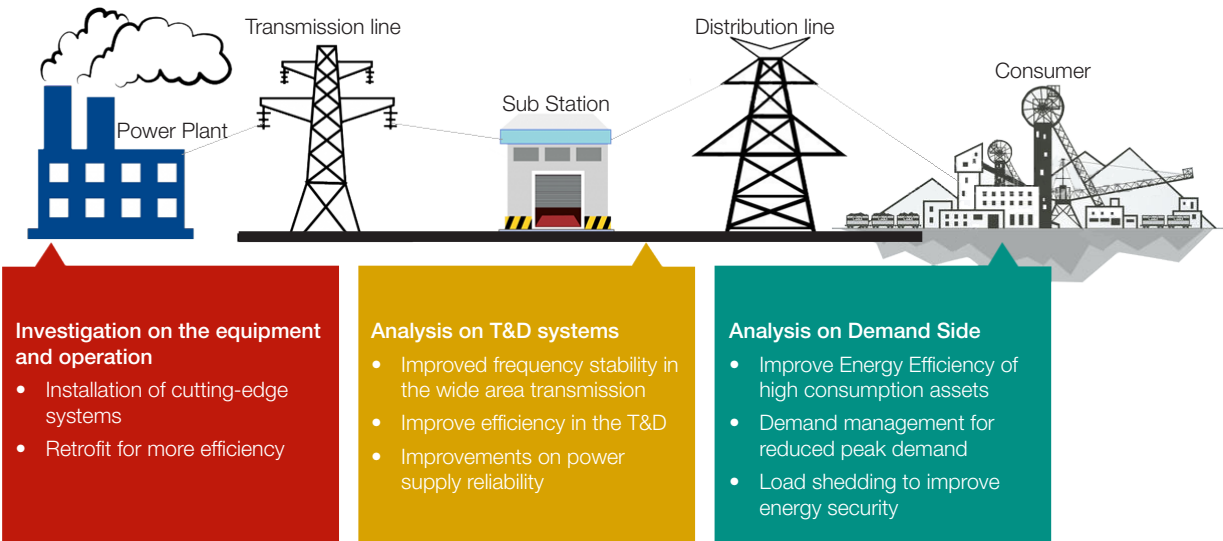
The dashboard will:

- Build awareness of energy costs, usage & efficiency,
- Drive behavioural change and process improvements, and
- Report on organization performance

Energy Intensity Analysis and Optimization

Overall Electricity Energy Efficiency and Stability can be improved by utilising Hitachi’s Technology, Operation, maintenance & planning expertise, covering both supply and demand side

Electric Power master plan - Planning for power and T&D system



EVD key features

Estimating energy saving opportunity.

- Calculating machine efficiency
- Categorizing machine items
- Identifying best efficiency machine
- Estimating energy saving opportunity by adopting best efficiency machine
- User can grasp energy saving opportunity overview.

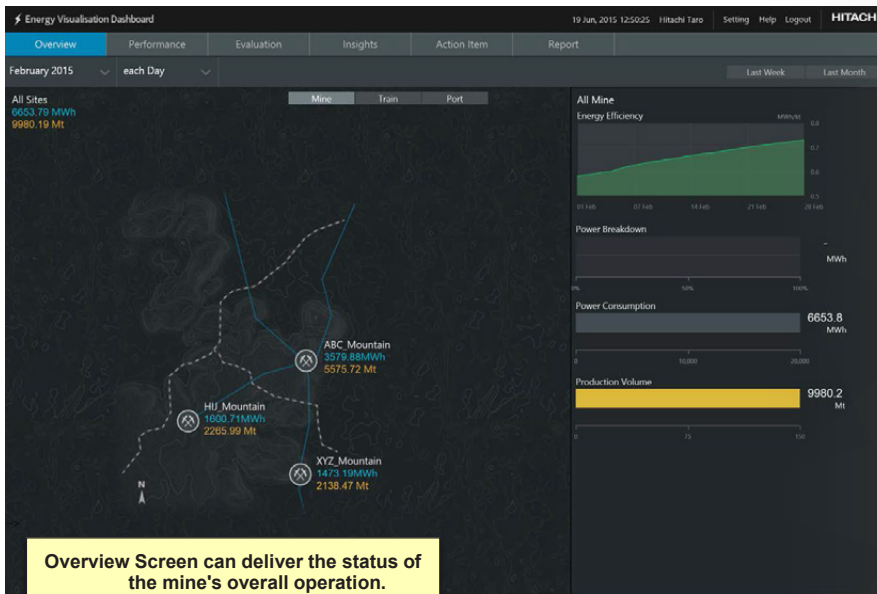
1. Visualizing and Comparing

- with each hour, day, week and
- with different duration, machine, process, site.g User can grasp each machine condition.

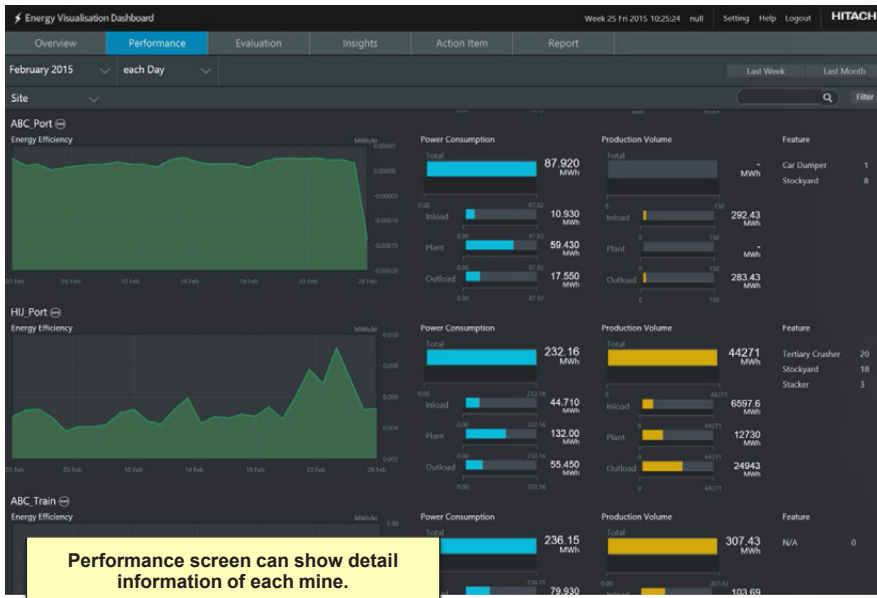
2. Sharing energy saving activity

- User can search earlier activity of energy saving.
- identify energy wastage point,
- estimate energy saving opportunity,
- sharing successful knowledge to overall site.

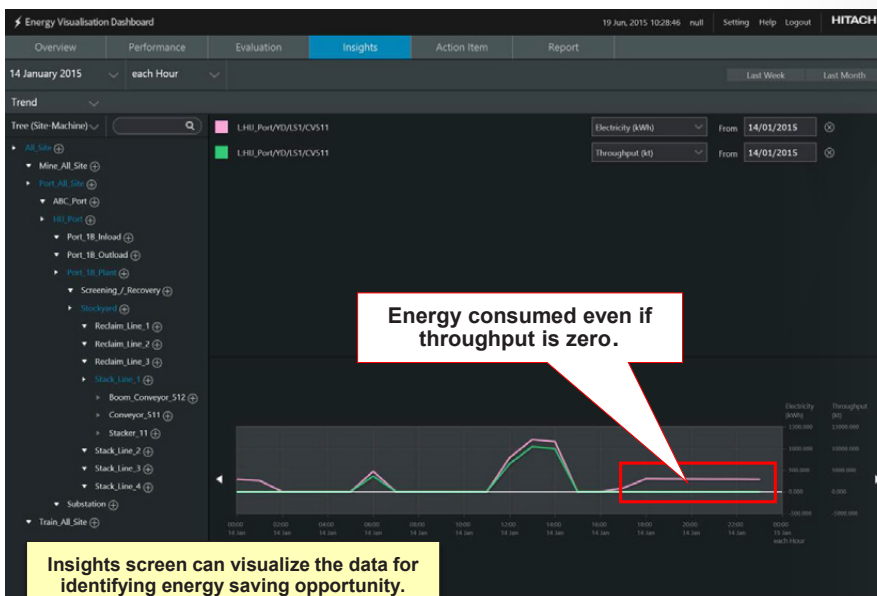
EVD Overview Screen



EVD Performance Screen



EVD Analysis Screen



Use case: Energy Management in Hitachi Group

Hitachi leads by example

- Visualization of electric power consumption: for major 238 sites in Hitachi Group
- More than **1,100 use cases** in three years (2009-2011)

Awareness + Identify the opportunities

- Process at the same time increasing a peak of power demand
- Unnecessary working facilities
- Inefficient facilities for energy consumption

Activity

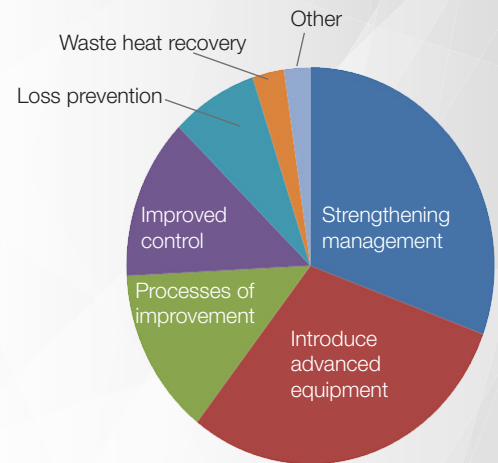
- Control of energy demand/supply by changing time process of works
- Predicting return on investment before installing new advanced equipment
- Utilization of waste heat
- Utilization of new energy including renewable energy

The total 1,116 activities has been completed

Results

- Hitachi successfully **reduced energy consumption by 19%** compared to 1990.
- Furthermore, the peak of energy has **cut by 16.8%** compared to 2009.

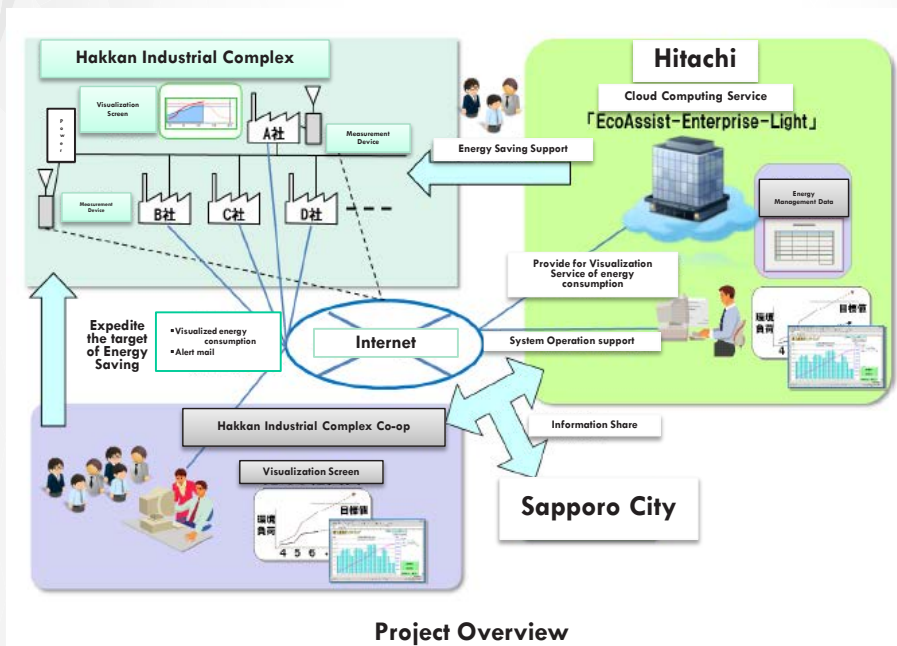
Hitachi has gain a great advantage of efficient energy consumption thanks to EMS: not only Managers but also operation people are able to be aware of necessary of reducing energy consumptions.



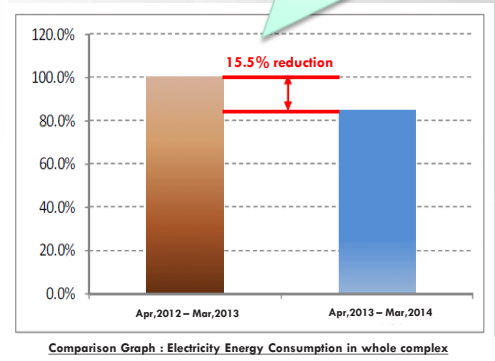
Analysis about Hitachi's 1,116 energy consumption activities

Use case: Hakkan Industrial Complex

- Energy saving promotion for Sapporo city Hakkan Industrial Complex.
- Hitachi provided Energy Visualization Dashboard as 1st step from 2013
- Visualization of energy data of electricity, data analyzing service, advice of saving energy and making the system for continuous energy saving.



15% reduction of Electricity consumption By Hitachi EVD



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