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

01 Energy Visualisation
- Rapid deployment of energy visualisation dashboard to collect energy and production data

02 Energy Analysis
- Site surveys
- Operational data analysis
- Big data analysis

03 Opportunity Identification
- Site engagement
- Ranking of focus areas
- Risk analysis

04 Energy Optimisation
- Business transformation support
- Infrastructure optimisation
- Energy reduction evaluation
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

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**

Investigation on the equipment and operation
- Installation of cutting-edge systems
- Retrofit for more efficiency

Analysis on T&D systems
- Improved frequency stability in the wide area transmission
- Improve efficiency in the T&D
- Improvements on power supply reliability

Analysis on Demand Side
- Improve Energy Efficiency of high consumption assets
- Demand management for reduced peak demand
- Load shedding to improve energy security

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, 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

Overview Screen can deliver the status of the mine’s overall operation.

EVD Performance Screen

Performance screen can show detail information of each mine.

EVD Analysis Screen

Energy consumed even if throughput is zero.

Insights screen can visualize the data for identifying energy saving opportunity.
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 gained 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.

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**

**Project Overview**