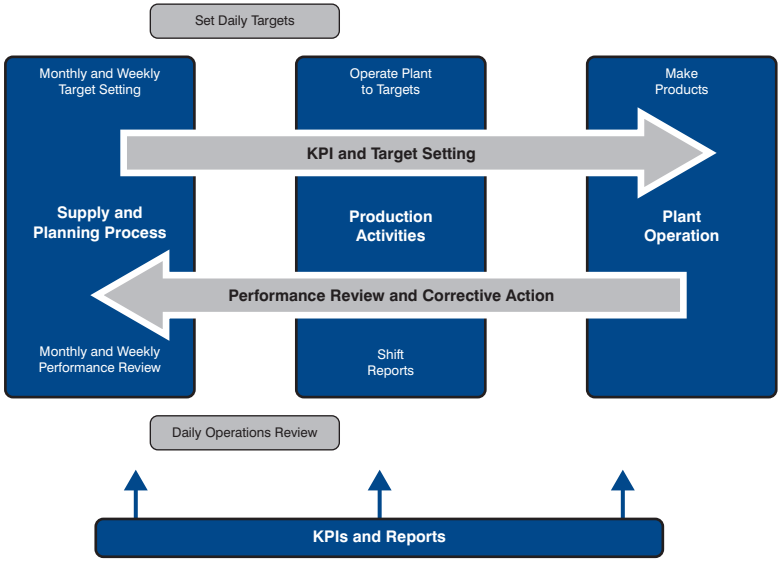
Energy efficiency

Energy target setting and performance review

7 Energy Target Setting and Performance Review

Given the varied nature of the factors influencing energy, target setting and performance review process becomes the key activity in driving efficient energy consumption. It is the opportunity to bring together the various energy-related strands into a single balanced process, at site, area or individual process unit level. In establishing such a concept the following important principles need to be adhered to.

- An integrated energy database is essential. Driven by process data and having easily accessed historical data that can be assembled in user-focussed reports
- Consistent targets, KPIs, reports and review process need to be established across and appropriate to different levels of the organisation
- KPIs and performance review should be appropriate to the span of managerial influence of the review level



Two fundamental and complementary processes are developed: the Energy Target Setting Process which develops from high level annual targets through to real-time process variables under the control of the operator, and the Energy Performance Review Process which in a similar manner builds up from real-time corrective action through to Management Appraisal of Energy Performance.

7.1 The Energy Target Setting Process

The core to performance monitoring is setting of appropriate performance targets. This process starts with high level annual site targets and develops, with increasing granularity and frequency, into daily operational targets for the energy-influencing drivers on the plant.

An important consideration is that the final elements of the target setting structure at the operational level, are the operational parameters **under the control of the operator,** which influence and ultimately determine the energy consumption of the unit in question. So the whole philosophy is predicated on the need to establish optimum targets for these variables and monitor for operation away from target. These are the so-called 'Energy Driver' variables. They will be typically flows temperatures, pressures, etc.

For example it is well known that the energy efficiency of a distillation column is improved as the column pressure is reduced. So a target for minimum column pressure is developed (consistent with product quality constraints) and the column monitored for operation at that pressure.

7.1.1 Site Energy Monitoring Targets and KPI Structure

Each site should maintain a dashboard of energy and emissions-related metrics. This will include both combined site-level KPIs and those pertaining to the principal units on Site.

A site owner of the metrics and the target-setting processes supporting them (e.g. agreed frequency for target setting/approval/sign off and up-dating) should be identified.

Targets for Key Performance Indicators (KPIs) should be determined as laid out in the following sections (annual/monthly/weekly targets setting) and performance against these KPIs reviewed as detailed in the subsequent section 7.1.2. Further details of Energy KPI structures for a site and the different metrics that can be employed are given in Chapter 6 covering Energy Management Information Systems. Typically it will encompass a yearly site Energy target (energy/feed) reaching down to unit energy and emissions targets (Unit Energy and/or Loss) for individual units calculated on a monthly basis.

Metrics calculated at higher frequencies (e.g. weekly/daily) will not be part of the site Dashboard although will be used as part of the overall performance monitoring process outlined in this manual. These metrics will need to be allocated targets consistent with the site Dashboard. This forms the cascaded target setting process which links high level annual targets for Site performance down to real-time plant variables directly under the operator's control.

7.1.2 Annual Target Setting

Targets for site performance are agreed and signed off each year as part of the Annual Planning and Budget process. This includes high level Site Energy Targets, typically some form of energy intensity or specific energy target. This value of this target shall be determined in line with the feedstock and production premises upon which the Annual Plan is based together with knowledge of any planned factors that will affect energy performance: shut-downs, changes in equipment and configuration, etc. Ideally a seasonal breakdown, for instance into quarterly planning targets, will provide a more realistic basis for the year ahead.

7.1.3 Monthly Target Setting

Each month the Site should set targets for the Energy Dashboard for the forthcoming period. (Site KPIs and unit-level KPIs). These targets will be based on the Annual Targets updated with the latest 30 day Production Plan (feedstock slate, product pattern, plant expected availability). These unit level targets will then be used for assessing the Units' performance during the coming month and act as the foundation for more detailed energy targets within the respective units.

Energy Constraints – the Production Plan should be checked against energy/emissions constraints (e.g. operation at CO_2 cap levels). In addition, based on the latest Production Plan, the Site KPIs and month-by-month projection to year-end should be updated to reflect the latest production and availability picture for the full year.

7.1.4 Weekly Operational Targets and the setting of Operating Instructions

Based on the Production Schedule for the forthcoming week (produced by the Site Planning and Scheduling Department) a detailed set of energy targets for the sub-units and equipment in the particular Production Area should be prepared. This will allow the effect of scheduling decisions (yields, operating modes etc) to be reflected in realistic energy targets at a plant level. Typically these targets will be the operational driver variables such as flows, temperatures, column reflux rates etc. These targets will then be finally validated and embedded as part of the Daily Operating Instructions.
(Refer to section 6.6.7 for target setting techniques).

Daily and weekly performance will be assessed on the basis of actual performance against these targets.

7.1.5 Daily and Real-time activities

Energy targets are included in the Unit Operating Instructions that are passed to the Operator. The Plant Operators are tasked with maintaining operation at the target values and noting causes for variance.

7.2 The Energy Performance Review Process

Energy performance should be reviewed in a structured manner, assessing energy consumption against metrics that are appropriate to the frequency, control and span of operations for the review process in question. Corrective and improvement actions shall be identified, documented and close-out should be tracked. Issues that require action beyond the control or scope of the particular review shall be passed on to the next higher-level review for resolution.

7.2.1 Daily Energy Performance Review

As part of the Daily Operations/Maintenance Meeting the energy performance of the previous 24 hour period in that Area shall be reviewed. The prime aim is to keep the plant running to targets.

Inputs will include:

- The overnight Shift Reports
- The Energy Management 24 hour performance report containing details of actual performance against the energy targets for that period

Identified actions will include:

- Suggested modifications to the Operating Instructions for the forthcoming period
- Short term maintenance and repair actions that need attention by day staff
- Issues that need escalating to a Site or Production Team level for further development

Where appropriate, issues should be logged into the Maintenance and/or non-conformance reporting systems (if used).

7.2.2 Weekly Energy Performance Review

Within a Production Area the 7-day unit Energy Performance will be reviewed in the weekly Production Team meeting (or monthly if that is the meeting frequency). The intent here is to identify issues and related corrective actions for the energy performance beyond the immediate previous 24 hours. In particular topics requiring more detailed investigation and follow-up.

Inputs will include:

- EMIS performance report for the previous period with actual performance against target
- Issues escalated from the Daily Area meeting
- Actions cascaded from the Monthly Site Energy Performance Review meeting

Ideally, the Site Energy Performance for the previous (7-day) period is reviewed at the Site-Wide Production meeting (if held) with a particular perspective on cross-site energy considerations (e.g. Utility and Fuel supply issues).

Inputs can include:

- Issues escalated from the various Daily Area meetings
- Weekly/month-to-date Site Energy Performance data
- Extraordinary energy issues arising from the forthcoming production plan. (e.g. special runs, abnormal feedstocks)

Identified outputs could include:

- Common energy-related instruction to all units
- Suggested modifications to the Operating Instructions for the forthcoming period
- Specific instructions to a particular unit as a result of the Site debate
- Utilities constraints and implications on plants for the forthcoming period

7.2.3 Monthly Site Energy Performance Review

The overall Site Energy performance should be reviewed on a monthly basis at the Monthly Site Energy Performance Review meeting. This is an essential component in the management of energy on site and should be attended by the nominated Senior Manager with energy responsibilities and ideally also by the Site Manager. The metrics to be examined will include Site-wide energy calculations and the top level KPI for each unit based on the previous month's performance. The meeting will review the previous month's performance and also performance in the context of the yearly targets and year-to-date performance.

Inputs will include:

- Monthly performance metrics (actual) for site and main units
- The Annual plan and updated targets (site and units)

Identified outputs will include:

- Identified longer term items (special studies) to be taken up through the Corporate business improvement process, perhaps leading to eventual capital investment
- Energy Issues for consolidation at the monthly site non-conformance meeting. (Training, skills, energy responsibilities, work processes)
- Improvement and corrective action issues to be cascaded (via the Production Unit Manager) to the Area Production Team meetings
- Updated energy plans for the rest of the year

Whatever the Company incident and improvement procedures that are adopted the key point is that Energy Performance Monitoring should generate corrective and improvement actions. For many years such meetings became an 'explain away the difference' process when targets were not met rather than a true improvement process.