Vertical Guidance on an adapted Energy Management System (EnMS)

Managing Energy Efficiency in the Beverage Industry

(Fruit Juice)

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Energy Management - Beverage Sector Guidance

Executive Summary (December 2016)

The purpose of this guide is to help the Juice Industry – to better understand the concept of energy management in the beverage sector and how they can benefit from it and implement it. It is an overview of the more comprehensive information provided in the **Standards and general guides for Energy Management** adapted to this industry. We recommend that you read this guidance t first if you are new to energy management or if you represent a small organisation. Energy management must be tailored to the nature and size of the organisation. The effort expended on energy management should be proportionate to the need and the benefits gained. This guide describes a management journey:

• concentrating on delivering reductions

• reviewing the system

• promoting awareness

• identifying new opportunities.

Energy Management is the process of monitoring, regulating and conserving energy in a facility or across an enterprise. In the beverage sector, being more productive while using less energy has never been a greater priority given the following factors:

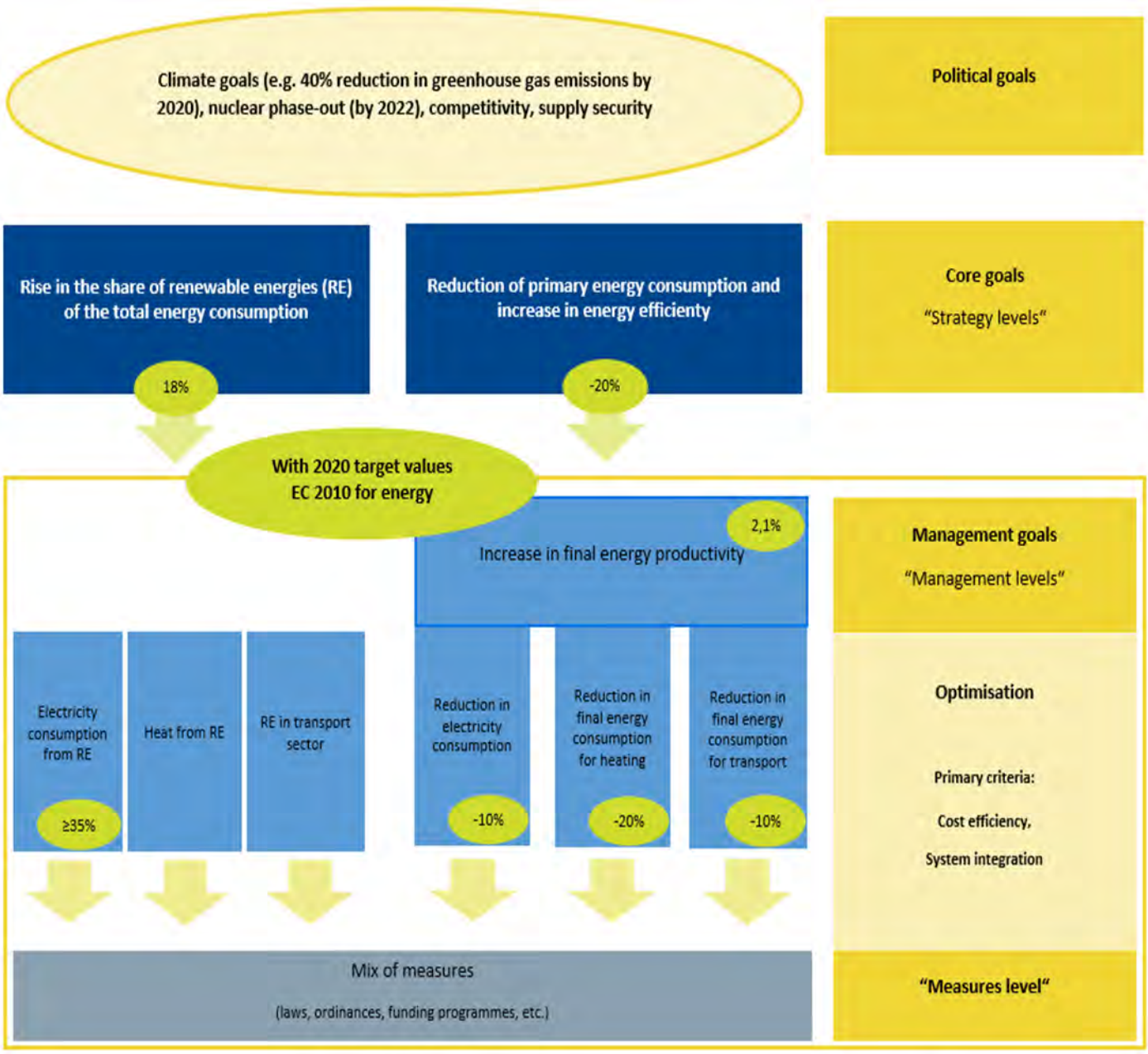
•Increasing expectations from retailers, distributors, consumers, and investors for more sustainable manufacturing;

•Cost pressure due to increasing energy, raw material, production, and compliance costs;

•Opportunities to use energy management to make a facility and company more resilient to rising energy costs, supply shortages, and potential disruptions;

•Acknowledgement of the shared responsibility to mitigate and adapt to climate change; and,

•Pursuit of aggressive sustainability targets and the opportunity to enhance a company's reputation through leadership in environmental sustainability



Structuring of goals of the energy concept (Source BMWI website)

Understand your energy use

Look at your organization and identify the major areas of energy consumption. Check the condition and operation of the controls and monitor the power consumption week to obtain a base figure against which energy improvements can be measured:

- Input Energy (ANALYSE ENERGY USE AND CONSUMPTION)
- Energy Consumers (IDENTIFY AREAS OF SIGNIFICANTENERGY USE AND CONSUMPTION)
- Energy Usage (IDENTIFY OPPORTUNITIES FOR IMPROVING ENERGY PERFORMANCE)

Review your energy bills over the last year in order to build a picture of past performance. Energy suppliers will have this information if it is not already available on-site. Take regular meter readings once a month and use these to track your progress against the previous year's energy usage. Meter

readings should also be checked against your energy invoices to ensure accurate billing. This simple monitoring and targeting system will help to track the benefits of energy saving measures implemented and enables any unusual changes in energy consumption to be quickly identified and followed up.

Behaviour Change

Energy efficiency in the Hospitality sector is depending essentially on the working force behaviour. In the first step of implementing a Mini – EnMS the management may relay exclusively of improvement driven by the hotel staff. To obtain this objective you need to address:

1. **Find out where energy is being consumed**

The greatest potential for savings may not always be where you think – look at energy consumption across your organisation and where behaviour is a factor before taking

2. **Prioritise the behaviours you want to change**

Look at where you can realistically have the greatest impact – balance potential savings against the probability of achieving change.

3. **Communicate the outcomes that you want to achieve**

Communicate what goals you are actually trying to achieve, so that you can actively monitor performance and feedback on results.

4. **Analyse what motivates or blocks good behaviour in your organisations**

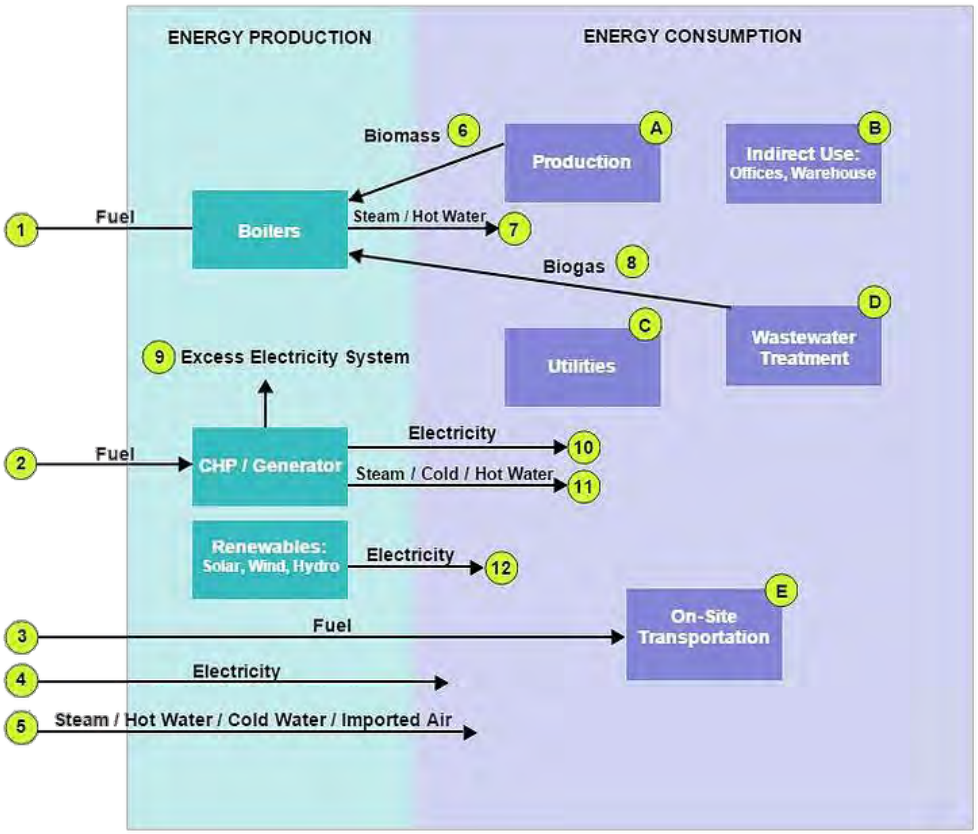
Find out what is important to your staff and how they think, behave and interact with the building, technology and others around them. Build your campaigns around this understanding. Secure senior support to unlock necessary resources

Scope & Boundaries

Boundaries help distinguish what operations (energy systems, processes, equipment, people/functions) will be included when tracking energy production and energy consumption. Proper boundary determination ensures efforts remain focused, data is accurate, and performance can be properly measured or accounted for.

For the purposes of the Beverage Sector, the scope includes all processes under company operational and financial control. In determining boundaries, the following are useful questions to consider:

- Do you have a building or location that are not including?
- Process or product line?
- Equipment?
- Activities or specific areas of operations?
- Can you isolate or subtract out the energy use from all excluded operations?
- What is the reasoning for excluding operations:
  -Insufficient energy information and data
  -Ability to engage employees and secure manager commitment?
  -Resource allocation?
  -Other reasoning?



Source: Beverage Industry environmental Round Table Energy Management - Beverage Sector Guidance

Baseline

In order to track performance and demonstrate improvements, you have to know where you started from. Defining an Energy Baseline is the foundation for benchmarking performance and measuring improvements over time. The ideal baseline is to determine a 'normal year' for the organization from an energy consumption perspective (e.g., not abnormally high or low) by which changes can be measured from. It is understood that there usually is no "Normal Year" in the juice industry so the baseline will always are a more theoretical calculation from the data of various years at least for those who processes direct juice from fruit or vegetables. The objective of a proper baseline is to

provide a ‘control’ by which to distinguish efficiency and performance gains from other influences such as weather, production mix and output, customer preferences and other variables affecting significant energy uses. Adjustments to the baseline year data may become necessary under certain scenarios to ensure that comparisons are consistent. The following scenarios or cumulative combination of one or more scenarios are examples of situations that may necessitate baseline adjustment:

- Mergers, acquisitions, and divestments
- Insourcing or outsourcing activities if those activities were not included in the base year
- Changes in calculation methodologies or improvements in emissions factors/activity data
- Errors or omissions of metrics data from the base year
- Equipment or process changes, including expanded production and/or changes in major energy consuming equipment
- Energy source changes (e.g., change source fuels, installing a micro turbine or a CHP)
- Climate Change
- Customer demand

Measuring Energy Use

There are several data collection methodologies for energy metrics including:

Source: Beverage Industry environmental Round Table Energy Management - Beverage Sector Guidance

With different methodologies, come varying levels of accuracy. Sites must collect data using reasonably available methods that produce the most accurate results using available resources. **The smaller the improvements anticipated in energy efficiency the more accurate measurements need to be to track them.** The preferred source of primary data is directly from utility meters combined with other direct measurements, such as sub or temporary meters. Engineering judgment and estimates should not be considered an acceptable long-term methodology for data collection especially for the advanced user who already has implemented an effective energy saving programme. Maintaining or improving data quality is an important consideration in the continuous improvement process. Data collection methods for each data element must be documented and include a description of the measurement technique and the margin of error, if applicable (e.g., meter calibrated in accordance with manufacturer specification designed to be accurate ±10 %). While following manufacturer specifications for calibrating and maintaining meters is recommended, best practice is to validate metering at least annually to ensure data integrity. The continuous

measurement, monitoring and collection of energy data is what informs and supports energy management and drives Key Performance Indicators (KPIs), Benchmarking, and Goal & Target Development.

Utility bills usually do not include enough granularity or frequency of data to understand where usage is occurring and inform timely decision-making. Metering or estimating , whether simple or advanced, allows the beverage industry to 'take control' of real time consumption, pattern of energy use and the relationship to production demands. Such control allows greater ability to identify, explore (e.g., evaluate spikes or trends), and act on energy efficiency opportunities.

Measuring within an organization is broken down into 6 levels:

- **Enterprise** – A grouping of production sites within the same corporate structure
- **Site** – A physical production plant producing a homogenous suite of goods
- **Area** – A logical group of production cells that work together to produce a product(s) (Packaging, Liquid production, Utilities)
- **Process Cells** - represent a logical grouping of equipment that includes the equipment required for the production of one or more batches. Individual lines within a department (brewing, fermentation, Can line, boiler house)
- **Unit** – a collection of process equipment that carries out major processing activities
- **Equipment** - a functional group of equipment that can carry out a finite number of specific processing activities, (pasteurizer, kettle, boiler)

Estimating Energy Data

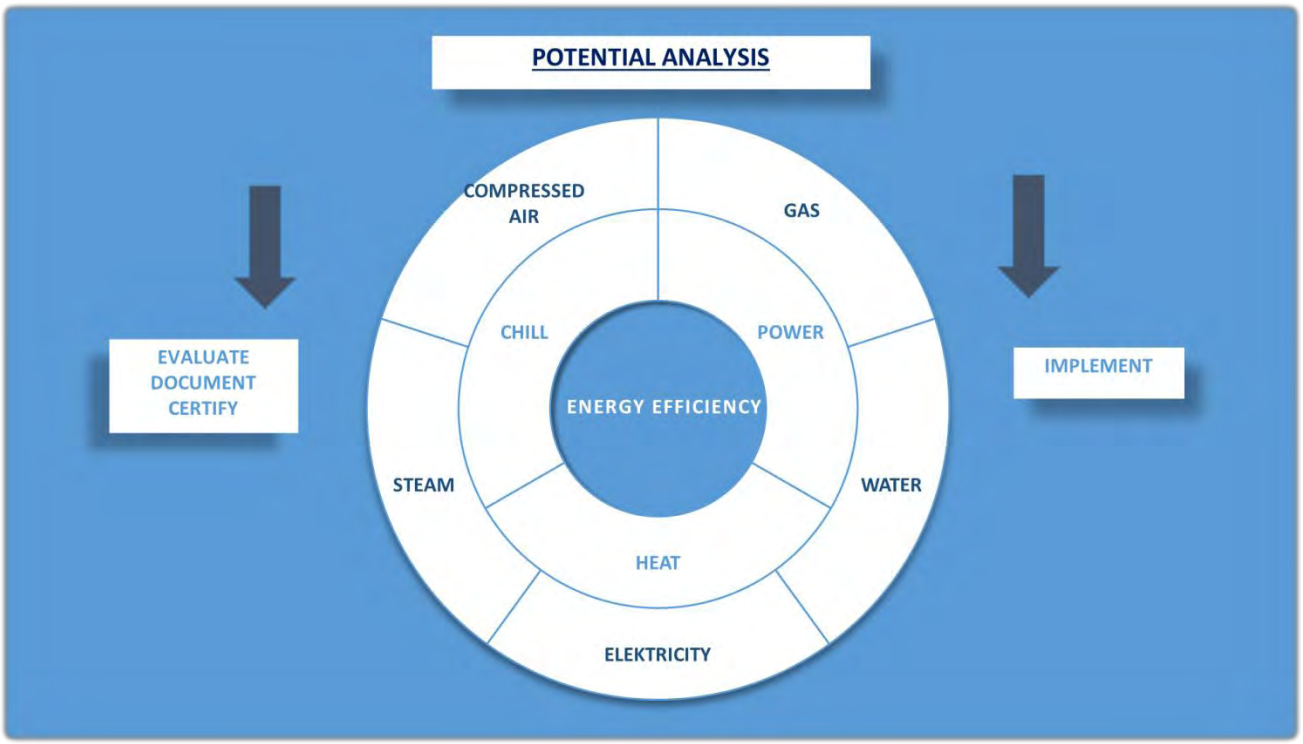
A meter malfunction, not existing meters, and a variety of other factors can result in the loss of data. In the event this occurs, best practice is to estimate the data and document the methodology used to perform the estimate (e.g., assumptions, calculations, known vs. estimated data). The best practical methodology should be used which yields a reasonable result, can be documented, and allows for reporting with full transparency.

The following are common and widely accepted data estimation methods:

- Engineering estimates
- Obtaining backup data in the form of utility invoices, purchase records, or back-up metering
- Normalizing prior months' or years' data on a per unit basis, and using that information combined with production output for the missing period to estimate the information
- Using regression analysis for one or more metrics over an extended time period where data is available to estimate the missing information
- Using generally accepted estimation techniques (e.g., online calculators or industry-specific default values)

Assessment of Energy use und Losses

An energy assessment is an essential component of a successful energy management. This will help to identify the present energy use situation and flag energy costs. Energy saving opportunities can be identified based on the assessment report. The assessment will also help you develop a baseline for future comparisons of program success by comparing energy use action implementation and after. The Juice Industry can conduct either a basic screening list action plan or a more detailed energy audit. The Industry has the option of carrying out the assessment as a first step to identify existing energy saving opportunities and implement the results followed by a more detailed analysis audit to derive more detailed measures for savings including capital intensive energy saving opportunities. Auditing the significant area of energy use (SEU) can show a lot of opportunities to improve energy efficiency by a potential analysis:



Points to consider improving the key

Energy Performance Indicators (ENPIs)

To improve energy reduction efforts, best practice is to develop a facility culture that manages energy usage to Key Performance Indicators (KPIs). Proper KPIs help a facility keep a continuous pulse on ‘what is most important’ for achieving desired performance. The reason they are called ‘key’

performance indicators is that these should be a relatively small sub-set of the broader indicators and metrics utilized across operations.

Important issues concerning KPI are:

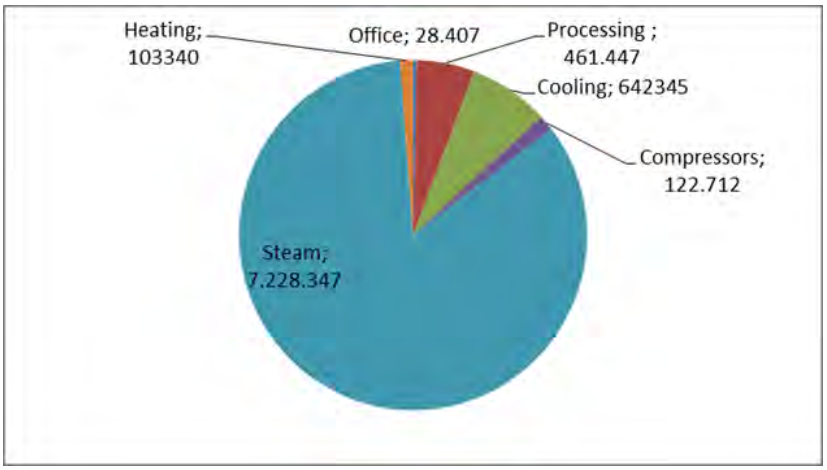
- Can be measured frequently (e.g., hourly, daily, weekly);
- Resonate with Plant Management and are connected to high-level strategic objectives for the facility and/or company;
- Are easily understood and able to be acted upon; and
- Associated accountabilities are team based.

Evaluate Data Availability

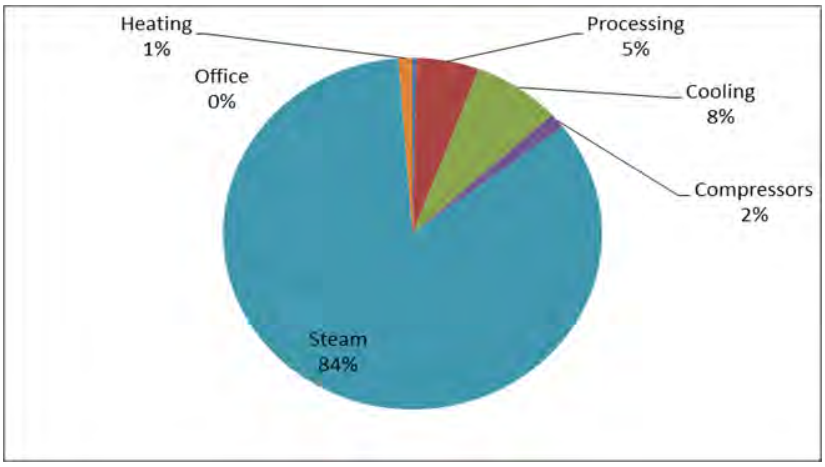
The first step in defining KPIs is to consolidate and evaluate the data available from the baseline, utility billing data, metering, and other data collection processes. Metered data, as previously described, is preferred as the input into KPIs given the higher data integrity and opportunity to move towards automated analysis. For each meter, the following information is valuable to consolidate:

- Name and type of meter (e.g., flow, kWh, pressure, etc…)
- Is the data electronically or manually retrieved
- What added value does the meter provide
- Can this data point be used for a KPI

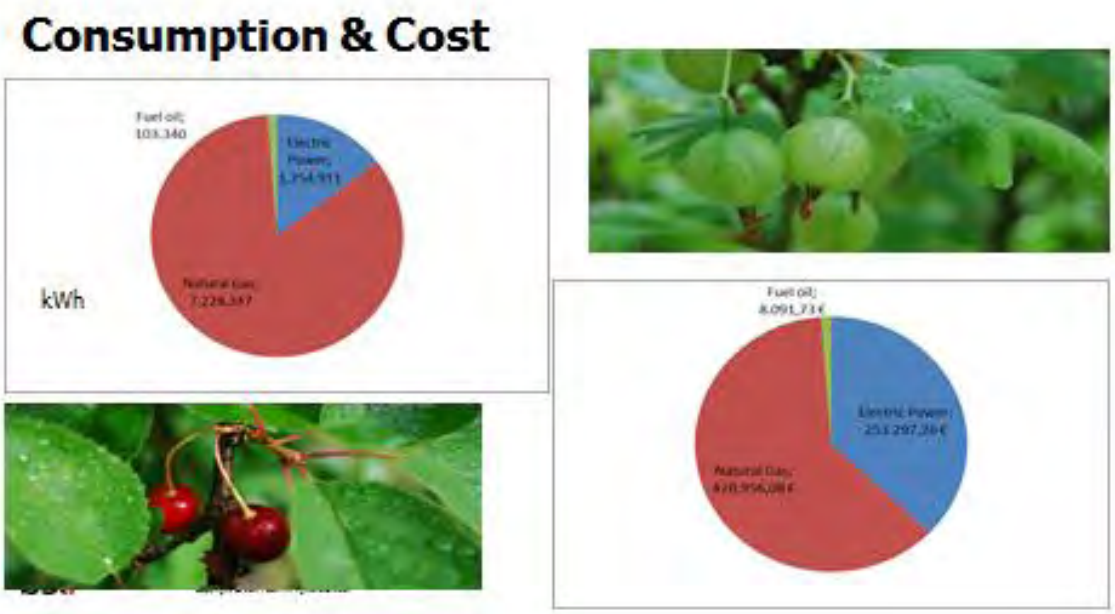
Evaluating the above data will allow for short-listing potential data points that can be transitioned into KPIs. The next step is to utilize this data to prepare a baseline energy pie diagram(s) for the facility which provides (and visualizes) energy consumption by area, process, and/or users. Energy consumption for no production and full production conditions should be a consideration

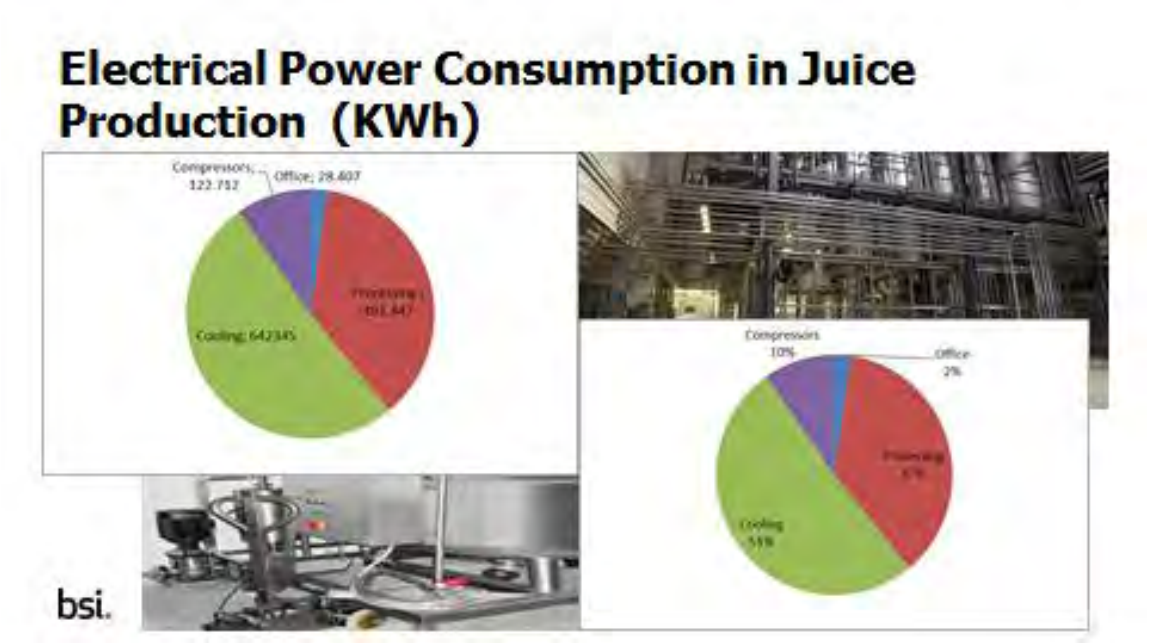


Typical Energy Use in the Fruit Juice Industry (kWh)



Typical Energy Use in the Fruit Juice Industry (%)





Examples for presenting Energy KPIs

After reviewing the consolidated data and energy pie diagrams or profiles are available and the next steps are to define specific KPIs. The most important part of developing a KPI is determining its variables. The denominator is the variable that is intended to be reduced, while the numerator is expected to grow.

For energy management in beverage operations, the denominator is commonly kWh and bottles or hectolitre produced. For example, a KPI of kWh per bottle of beverage produced could be used to demonstrate a company's success at lowering its energy consumption while at the same time growing their business.

It is important to point out that KPIs might vary in granularity as 'what is important' could be at the macro/facility level all the way down to specific operations, processes or equipment.

While there are a large range of potential KPIs that a facility or company can select from, the following provide a list of considerations and focus areas:

- Energy consumption: How much energy is consumed in a given period (e.g., x kWh)
- Energy efficiency: Ratio of useful work delivered to energy consumed to accomplish a certain task (e.g., x units of work/kWh or kWh per employee)
- Energy intensity index: Ratio of actual energy consumed to what would have been expected in the absence of efficiency measures (e.g., 0.92 representing 8% savings)
- Avoided energy use: Cumulative energy saved over a period (e.g., x kWh in a year)
- Peak energy demand: The maximum energy usage in a given time frame (e.g., x KW)
- Total energy cost
- Amount of renewable energy sources used
- Ability to meet energy performance forecasts
- Achievement of energy efficiency improvement opportunities

- Performance of significant energy uses or users

Energy Used in Year 2

Fuel	Unit	Accounting from	to (date)	Fuel Use	Unit/Duration	total Cost	Specific Cost		Fuel uses kWh	Anual Cost	Database/ Measurement	Accuracy/ calibration
Electric power		01.01.2013	31.12.2013	1.299.663	/364 Tage	257.068 €	0,20	€/	1.299.663	257.774,62 €		
Natural gas		01.05.2013	31.12.2013	4.298.964	/244 Tage	252.280 €	0,06	€/	4.298.964	377.385,56 €		
Fuel oil		01.01.2013	31.12.2013	2.536.710	/364 Tage	205.765 €	0,08	€/	2.536.710	206.330,76 €		

Energy Used in Year 1

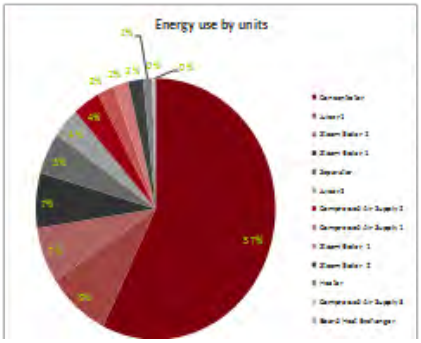
Fuel	Unit	Accounting from	to (date)	Fuel Use	Unit/Duration	total Cost	Specific Cost		Fuel uses kWh	Anual Cost	Database/ Measurement	Accuracy/ calibration
Electric power		01.01.2012	31.12.2012	1.400.000	/365 Tage	300.000 €	0,21	€/	1.400.000	300.000,00 €		
Natural gas		01.05.2012	31.12.2012	4.400.000	/244 Tage	252.280 €	0,06	€/	4.400.000	377.385,56 €		
Fuel oil		01.01.2012	31.12.2012	2.500.000	/365 Tage	205.765 €	0,08	€/	2.500.000	205.765,47 €		

KPI – Used energies per year

Energy use by units

Electical consumer

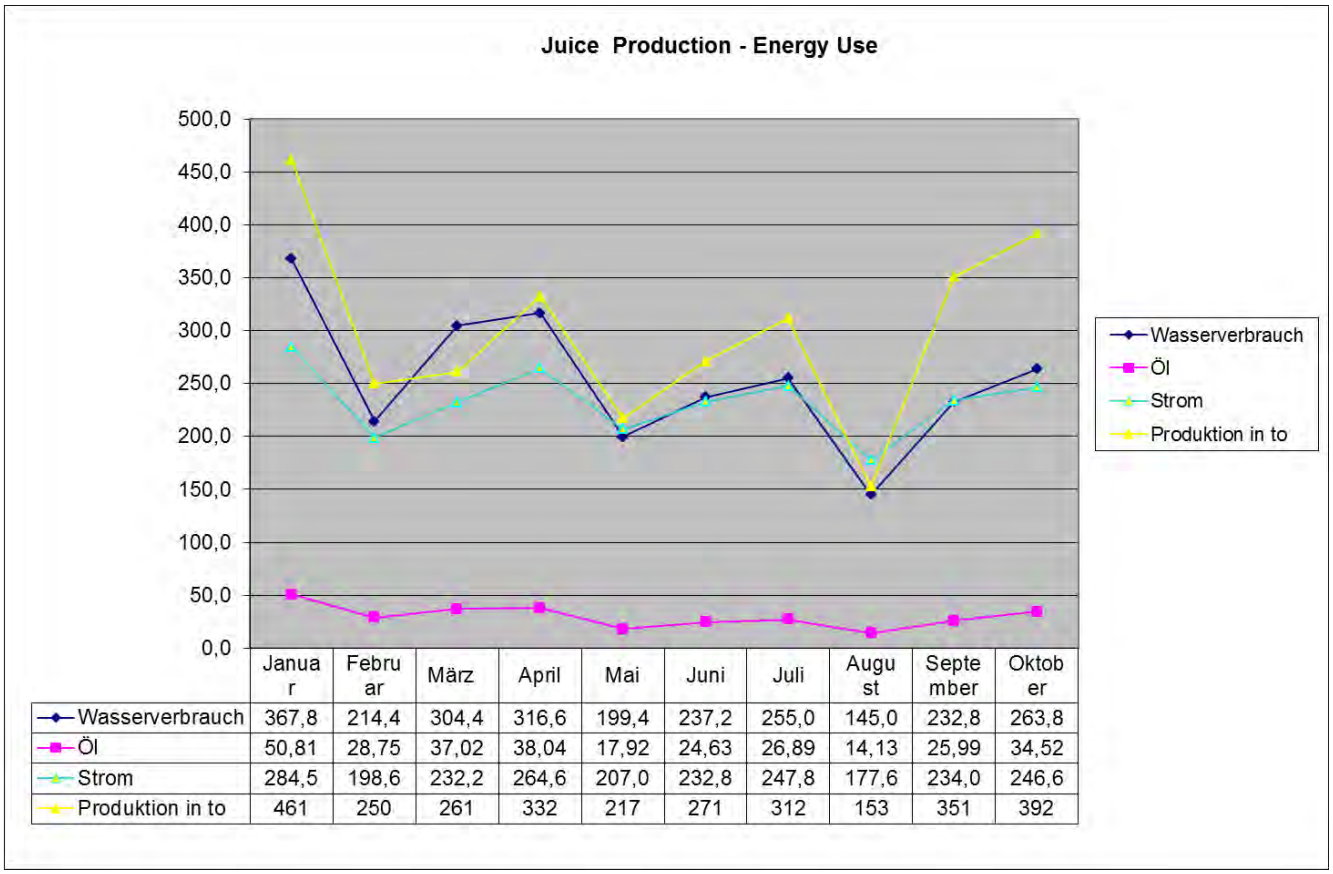
	Energieverbrauch in kWh_el/a	Installierte Leistung kW_el
Concentrator	642.345	-
Juicer 1	96.092	-
Steam Boiler 2	77.412	-
Steam Boiler 1	76.874	-
Separator	57.655	-
Juicer 2	41.862	-
Compressed Air Supply 2	41.182	-
Compressed Air Supply 1	25.739	-
Steam Boiler 1	22.650	-
Steam Boiler 2	22.650	-
Heater	13.727	-
Compressed Air Supply 3	3.260	-
Board Heat Exchanger	1.716	-
Gesamtergebnis	1.123.164	-



Thermal consumer

	Summe von Thermische Nz Sum
Steam Boiler 1	-
Juicer 2	-
Concentrator	-
Aseptic Facility	-
Steam Boiler 1	-
Board Heat Exchanger	-
Heater	-
Cold Store 1	-
Juicer 1	-
Cold Store 2	-
Mash Tanks	-
Cold Store 3	-
Steam Boiler 2	-
Compressed Air Supply 1	-
Steam Boiler 2	-
Compressed Air Supply 2	-

KPI energy use per unit



	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober
Wasserverbrauch	367,8	214,4	304,4	316,6	199,4	237,2	255,0	145,0	232,8	263,8
Öl	50,81	28,75	37,02	38,04	17,92	24,63	26,89	14,13	25,99	34,52
Strom	284,5	198,6	232,2	264,6	207,0	232,8	247,8	177,6	234,0	246,6
Produktion in to	461	250	261	332	217	271	312	153	351	392

KPIs Monthly production and energy use

Upon defining a short-list of proposed KPIs, the next step is to frame the specifics for each indicator (e.g., Who, What, How, etc…) in the form of KPI protocols. The purpose of this is to clarify and document:

- Review criteria and how the KPI will be collected, tracked and reported (roles and responsibilities).
- Identifying and 'mapping' the requisite KPI metering data for the KPI.
- Defining how the KPI will add value to sustainable and efficient use of energy at the facility.
- Communicating to appropriate personnel as to how the KPI was established, the value of tracking the data and how to use the KPI to improve energy usage within the facility or enterprise.
- Processes and control points for regularly evaluating and interpreting the KPI, including defining specific set points, targets and alarm points for inventoried meters**.**
- Recommended corrective actions for "out of spec" conditions.

Upon determining the KPIs to be utilized, the next step is to define processes to collect, analyse, report, and most importantly act upon KPI results. As mentioned earlier in this section, the objective is to develop a facility culture that manages energy usage to KPIs. Best practice is to:

- Develop easy to maintain methods and procedures for energy data collection, trending and monitoring to ensure that data are accurate and consistent.

- Develop KPI report templates that are appropriate for each level of management or operations function. It is recommended that report templates include visual indicators.
- Appropriate personnel have been assigned and given responsibilities for ensuring that the KPI data are collected, trended, and communicated in accordance with established procedures or protocols.
- Conduct KPI reviews on a regular basis and as frequently as possible (daily or weekly). Ideally, energy KPI reviews are integrated into existing or standard operation reviews (e.g., same frequency and priority). Furthermore, it is best practice to present energy performance data in a similar format as other operation information. For example, facilities may consider the following types of reports:
  -Weekly Management Report focused on energy KPI's (Usage and Cost)
  -Utilities Weekly Report (includes raw data, KPI data, operational issue that may impact reduction targets, weather conditions etc.)
  -Direct Production Weekly Report (Focused on Production energy usage with a attention focused on KPI impacts)
  -Monthly Key Performance Indicators for Energy Usage and Cost (to be shared with plant stakeholders not directly involved with the Energy Management Program)
- All KPI's are readily accessible to appropriate personnel that need to employ the KPI information to efficiently manage the use of energy across the facility or enterprise.
- Implement corrective action protocols to ensure that out of spec and nonconforming KPI data is reviewed, and solutions found to bring operational parameters back into specification in a timely manner.
- KPI's are reviewed on a regular basis (at least twice a year) to verify that the KPI is still relevant for Energy Management Program objectives and to adjust the KPI parameters if necessary. Reviews should include gaps in metering capabilities and data collection to ensure that KPIs are accurate and of high integrity. Actions to resolve gaps are implemented in a timely manner so as not to disrupt KPI reviews and trending analysis.
- Historical records of data collection information are stored and maintained for a minimum of three year

Identify opportunities

There are generic opportunities to improve energy performance in in the beverage industry. You should consider how they will be applicable to your organisation.

Employee energy management training:

Developing an energy management training will help encourage energy management as a hotel - wide value and teach employees how to use energy more efficiently in their work areas. Reinforcing this orientation training with regular energy management seminars, brochures, or other visibility will ensure that the training stays with employees throughout their tenure at the hotel**.**

Maintenance

Maintenance of build environment, production lines and other energy using equipment prevents energy losses and significantly increases energy efficiency. The industry needs to Identify where lack

of maintenance can affect energy performance such as malfunctioning and loud air conditioning, defect ovens and cookers, leaking steam lines and defect structure. A maintenance action plan helps to better manage those activities.

Replacement

The replacement of outdated equipment will significantly increase energy efficiency. When replacing existing apparatus the business should keep in mind the live cycle energy consumption. A delay of replacing a well working tool may result in an overall better energy performance. These two effects should be leveraged. Refurbishing the production line will be must for staying in business e.g. for hygiene and food safety requirements – this is also a good opportunity to reduce energy consumption despite a relatively long payback period.

Investment in new equipment or other important energy saving measures

Investments are opportunities to improve energy performance through the use of more efficient installations. You should not only consider the initial investment costs but also the actual energy savings and live time energy performance. By planning a new production facility consider the long term cost effect of energy savings.

Evaluate and Prioritize actions

Before prioritizing actions make sure that all actions are taken that rise energy efficiency and result in cost savings that can be implemented without investments – these actions should be taken regardless of their classification unless adverse effects could be expected.

Actions are prioritized according to the technical evaluation and the economic evaluation. It is essential for a successful energy management that significant energy use is taken into account with the saving to be obtained considering the uncertainty of the evaluation.

1.) Technical evaluation - considering Significant Energy Uses (SEU)

Significant Energy Uses (SEUs) should be determined for the purpose of establishing priorities for energy management and resource allocation. In identifying areas of SEU in production the manufacturer of juice should have a holistic view of its uses and consumption of energy. Examples for determining current energy performance of the SEUs include comparisons such as:

— Normalization of:

—electricity consumption against production indicators such as hectolitres of juice produced, bottles of beverages produced and ambient air temperature;

— Refrigeration electricity consumption against cooling load, supply temperature and ambient temperature;

— building energy consumption against productivity and degree days;

— Energy consumption per production indicator and other simple ratio such as energy efficiency and coefficient of performance;

— Coefficient of performance of refrigeration systems at their operating loads and environmental conditions compared to energy efficient systems;

— Comparison of current energy consumption with historical consumption if consumption is not affected by a relevant variable.

2.) Economic evaluation

The first economic evaluation should be performed by a simple payback method. This method comprises of a basic calculation and is utilized primarily for low investment measures. It doesn't take into account the time value of money, energy cost changes, tax effects if any, nor the expected life of the equipment or production line as well as the product life cycle. To make the ratio as accurate as possible any rebates from the initial cost of the measure should be subtracted and any required operating cost should be deducted from the annual energy savings.

Return of Investment (ROI)

(ROI) = Cost of Measure - any rebates/ Annual Energy Savings - any operating expenses

It is important when evaluating the economic benefits of energy performance improvement opportunities that all the benefits (and costs) – or at least those within the organization's boundaries – be properly included in the analysis. Very often the focus is just on the energy savings and the other economic benefits are ignored. The critical issue is that the energy performance improvement opportunity should be evaluated and presented in a way that meets the investor's needs, whether the investor is internal or external to the firm. The first essential task for anyone seeking to secure financing for energy performance improvement projects is to understand the investment criteria and assessment methods of the investor, be they internal or external. A major issue in the funding of energy performance improvement projects, either internally or externally is uncertainty over the assessment. The perception among non-technical personnel (such as management, accounts, finance directors and other disciplines) is that the savings numbers being presented have a high degree of uncertainty. Systematically reduce the uncertainty of their investment case can be done by better numerical and statistical analysis including:

- identifying critical assumptions;
- carrying out a sensitivity analysis to determine the effect of a variation on any of the assumptions;
- assigning probabilities to the variations;
- working to reduce the uncertainty of those variables that will have the biggest impact on investment returns;
  Producing a risk-adjusted return.

Investor uncertainty can also be reduced by the application a standardized protocol. Projects aimed at increasing energy efficiency go through the following phases:

- The analytical phase, the existing circumstances are analysed and optimisation projects and measures are developed. The investments and the energetic and economic impact are ascertained and consolidated in a business plan.
- The design phase, following a positive evaluation of the business case and the securing of financing, the delineated projects and measures are planned and specified in detail. These specifications form the basis for the procurement of technological systems.
- During the implementation phase, all required plant engineering, organisational and energy-related projects and measures are implemented. Contracting ensures the quality of the project in both financial and technical aspects.
- The materialisation phase generates the desired optimisation results. The reduction in energy consumption and the optimisation of economic efficiency lead to a decline in energy costs and thus ensure the refinancing of the investment.

In order to ensure the successful implementation of the energy efficiency project, the energy management has to include all four project phases, which shall incorporate and give equal consideration to both technical-energetic and financial-economic challenges and controlling procedures. The currently established regulations standards, procedures and rules are to be applied in each of the different areas and to be symbiotically interlinked with one another and should not agree to the past and present but also for the future.

Measures to obtain Energy Savings

	General				Interest	Amortisation
No	Action / Investment	Investment	Saving	Technical usage	Return of investment	Cash return
			$ per a	a	%/a	a
1	Micoturbine Steam and power Generation	412000	78000	10	19%	5,28
2	Change of steam generator controll	5100	2400	5	47%	2,13
3	Replacement of compressors	48500	7000	8	14%	6,93
4	Heat recovery from compressors	4100	850	8	21%	4,82
5	Replacement of lighting by LEDs	8790	178	50	2%	49,38
6	Insoloation of cool-house	12800	2180	10	17%	5,87
7	Replacements of windows	37500	2900	15	8%	12,93
8	Isolation of walls	52000	3400	15	7%	15,29
9	insoloation of pipes	8000	18980	15	237%	0,42
10	replacement of Juicer	47000	2000	12	4%	23,50
	Total Costs	**635790**				
	Sum of energy savings		**117888**			
	Total Energy Cost per Year		**715113,52**			
	Percentage of ernergy costs		**16%**			
	Internal interst rate	**19%**				
	Overall return of investment	**5,4**				

Prioritise

Actions to take could be prioritized considering the significance and economic criteria with the following method:

- **Priority A**: Significant energy use – important cost savings – ROI < 1 year
- **Priority B**: Significant energy use – important cost savings – ROI < 3 year
- **Priority C**: Significant cost savings – ROI < 3 year
- **Priority D** Significant energy use – expected cost savings that improve cash flow

When setting the priority of actions the uncertainty of both the technical and the economic evaluation should be taken into account.

No	Action / Investment	Priority
1	Micoturbine Steam and power Generation	D
2	Change of steam generator controll	B
3	Replacement of compressors	D
4	Heat recovery from compressors	C
5	Replacement of lighting by LEDs	
6	Insoloation of cool-house	D
7	Replacements of windows	
8	Isolation of walls	
9	insoloation of pipes	A
10	replacement of Juicer	

Managing your Energy Efficiency Project

The energy efficiency project can be implemented in the beverage industry by a stepwise approach:

Step 1. Understand your energy use and set your energy policy. Look at your factory and identify the major areas of energy consumption. Check the condition and operation of the controls and monitor the power consumption over a fixed typical period (e.g. a month/ a year) to obtain a base figure against which energy improvements can be measured. Your energy policy will make your approach transparent to customers, staff, suppliers as well as local residents.

Step 2. Identify opportunities Walk round and complete an action checklist at different times of the year to identify where control-related savings can be made.

Step 3. Prioritise actions Draw up an action plan detailing a schedule of improvements that need to be made and when, nominating the person who will be responsible for them.

Step 4. Seek specialist help It may be possible to implement some control-related energy saving measures using well trained in-house experts but many will require specialist help. Discuss the more complex or expensive options with a qualified expert.

Step 5. Make the changes then measure the savings Implement energy saving actions and measure against original consumption figures. This will assist future management decisions regarding energy priorities.

Step 6. Continue managing the business for energy efficiency Enforce policies, systems and procedures to ensure that your organisation operates efficiently and that savings are maintained in the future.

In an adapted energy management this concept will be supported by the EMDT - energy management documenting tool used to protocol and compute energy consumption, costs and energy performance indicators.

Set targets

Setting targets provides the means for transforming your energy management into action. This ensures that the business systematically can improve energy performance. Your targets provide the direction for energy performance improvement initiatives of the staff, including the clear allocation of resources. Energy targets are used to improve any facet of the hotel's or restaurant´s energy performance, consistent with the commitments your energy policy. You can typically use targets for improving the efficiency of SEUs. Just as SEUs and other opportunities are taken into account in setting and reviewing objectives and targets, there are other items that need consideration. These items aim to reflect the realities of the situations, conditions and environment under which an organization operates (e.g. management plans, maintenance plans, shutdown and refurbishment schedules). Targets are specific, measurable, achievable, relevant, and time based. Since targets have measurable results, there should be a sufficient number of specific action plans associated with them to achieve the planned results. Targets are often expressed in terms of

- the percentage improvement in energy performance,
- improvement in the energy consumption,
- other energy performance indicators (EnPIs).

Energy targets are associated with production lines, build environment specific equipment, systems or processes.

Standards and general Guidance for Energy Management

The following standards can be used for further details

BS ISO 50004:2014 Energy management systems — Guidance for the implementation, maintenance and improvement of an energy management system

BS ISO 50006:2014 Energy management systems— Measuring energyperformance using energy baselines (EnB) and energy performance indicators (EnPI)— General principles and guidance

BS ISO 50015:2014 Energy management systems — Measurement and verification of energy performance of organizations — General principles and guidance Publication

BS EN ISO 50001:2011 Energy management systems— Requirements with guidance for use

BIP 2187:2011 Energy management principles and practice (second edition**)**

PAS 2030:2014 Improving the energy efficiency of existing buildings. Specification for installation process, process management and service provision

BS EN 15232:2012 Energy performance of buildings. Impact of Building Automation, Controls and Building Management View details

15/30294743 DC BS ISO 17747. Determination of energy savings in organizations (Draft for public comment)

BS 8536-1:2015 Briefing for design and construction. Code of practice for facilities management (Buildings infrastructure)

BIP 2230:2014 Energy Audits. The key to delivering real energy reductions

ANNEX Examples for energy efficiency measures in the Beverage Industry

Detailed understanding for an adapted ENMS in the Fruit Juice Industry are taken from

http://www.bieroundtable.com/energy-management