User manual for
ABMI Sustainability Templates

Media Template
and
Packaging Template

INDEX

ABMI

Association of Beverage Machinery Industry

The Association is composed of European manufacturers of beverage machinery active in Europe. The purpose of this Association is to provide an exchange point for communication and cooperation within the manufacturing industry in the areas of quality, security, elaboration of recommendations etc. This will benefit the whole industry and the end consumers.

www.abm-industry.org/

1. Purpose of the ABMI Sustainability Templates

The Topic of sustainability becomes more and more important to the Beverage industry. More precisely, environmental performance of lines and equipments are regarded more and more as a criteria of choice, among more conventional ones such as Cost (capital expenditure & operational cost…), and total cost of ownership (tco), service….
Therefore the ABMI decided to work out recommendations for the communication of packaging lines environmental performances between machinery suppliers and operating or beverage companies.

The results are Sustainability Templates for:

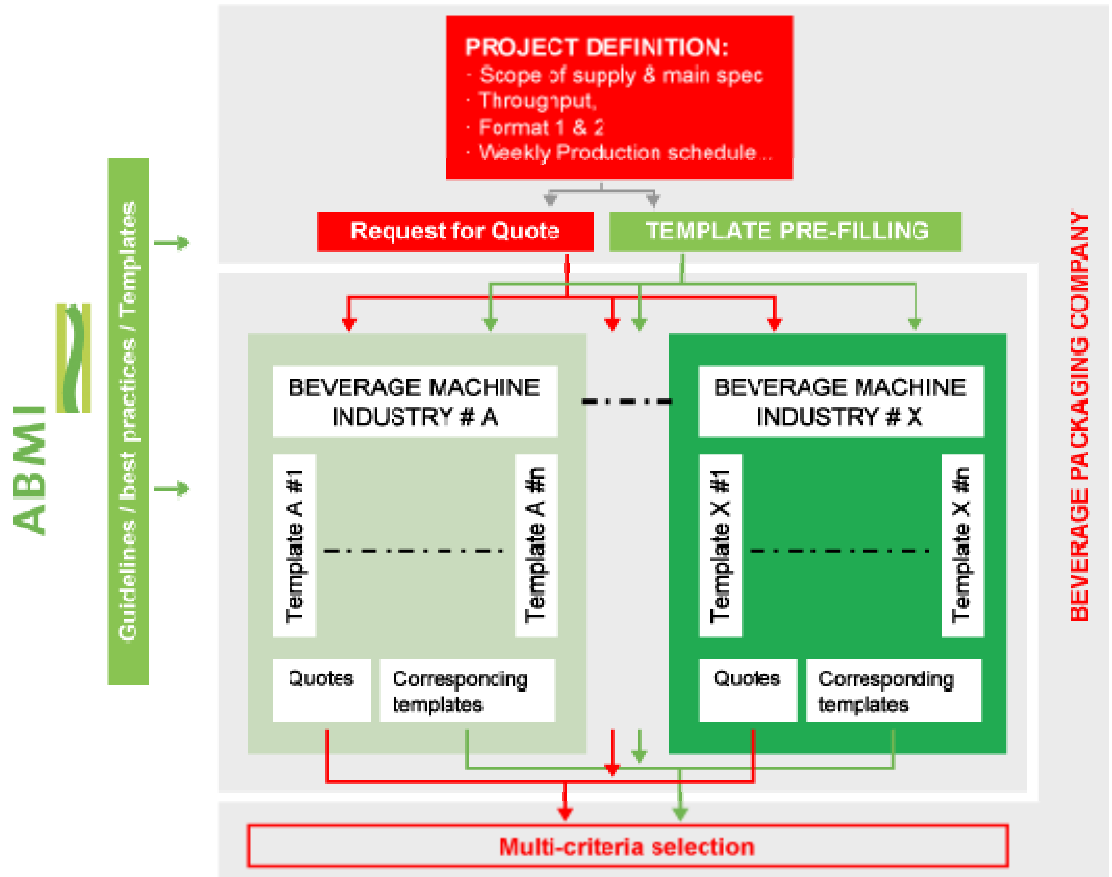
Media/Utility consumption:

ABMI Media Template

Packaging information:

ABMI Packaging Template

The ABMI sustainability Templates shall be used to transfer sustainability information between beverage machinery industry and its customers, the operating companies. The process tree below is an illustration of the intended use of the templates:



The primary goal of the template is helping to select the packaging line solution with the minimum environmental impact. Compliance of such calculation to standards such as ISO 140XX family is not guaranteed by ABMI.

With the ABMI Media Template different plant configurations from one or more suppliers can easily be compared.

2. ABMI Media Template

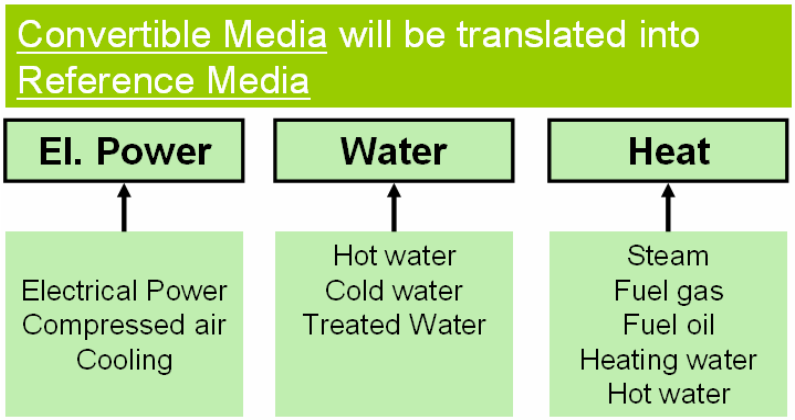
2.1. Purpose of the ABMI Media Template

Media/Utility consumption is a major parameter in the Sustainability Report of the operating companies.

Ecological Sustainability means especially the consumption of

- Electrical Energy (Power)
- Thermal Energy (Heat)
- Water consumption

Fortunately many media can be translated into these Reference Media in order to get comparable data for different plant scenarios.



These three Media describe the environmental impact of the plant.

If required the operating companies may calculate the **Carbon Footprint** based on the values for heat and electrical energy of the line together with the individual values of each site for generation of electrical power and heat.

2.2. Structure of the ABMI Media Template

The ABMI Media Template consists of four parts:

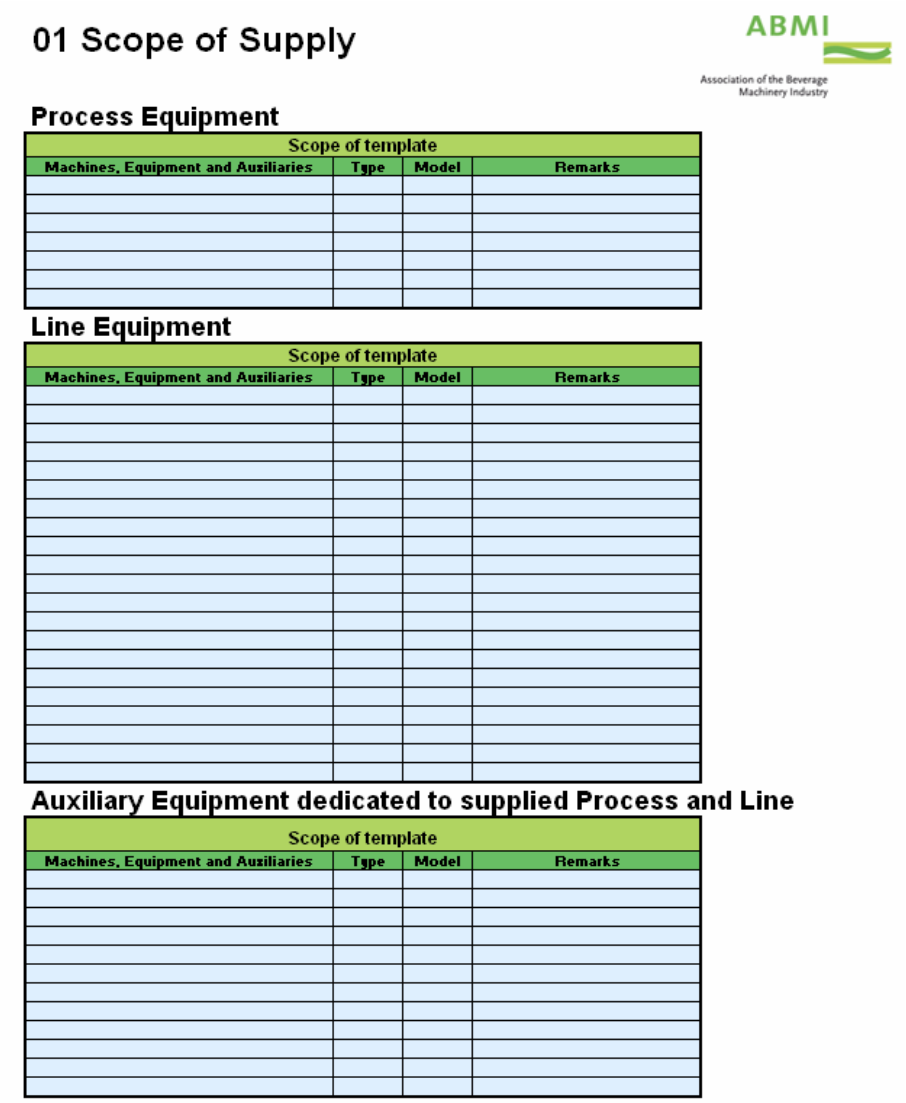
- **Sheet 01: Scope of Supply**
- **Sheet 02: General Conditions and Boundary Conditions**
- **Sheet 03: Data Input and Calculation**
- **Sheet 04: Ecological Summary**

In order to have transparent and traceable calculations the ABMI Media Template is an Excel Sheet.

2.3. Explanation of the four different sheets

2.3.1. Sheet 01: Scope of Supply

In Sheet 01 the scope of supply considered for the calculations of the Media consumptions shall be stated clearly. It is structured in three parts:



01 Scope of Supply

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Process Equipment

Scope of template			
Machines, Equipment and Auxiliaries	Type	Model	Remarks

Line Equipment

Scope of template			
Machines, Equipment and Auxiliaries	Type	Model	Remarks

Auxiliary Equipment dedicated to supplied Process and Line

Scope of template			
Machines, Equipment and Auxiliaries	Type	Model	Remarks

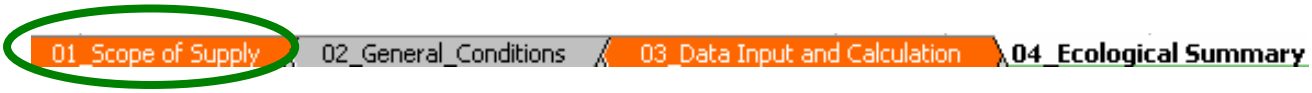
a) Process Equipment
Examples for Process Equipment are Sugar dissolver Mixer, Flash Pasteurizer, CIP-Plants, and so forth.

b) Line Equipment
This List contains all Equipment within the beverage line itself, like Bottle Washer, Filler, Conveyers, Packer, Labeller and Palletizer

c) Auxiliary Equipment dedicated to supplied process and line

Also the quoted auxiliary equipment can be included in the calculation and if it is listed here. Examples are Air Compressors, steam Generators,Chillers, water de-aeration plant…

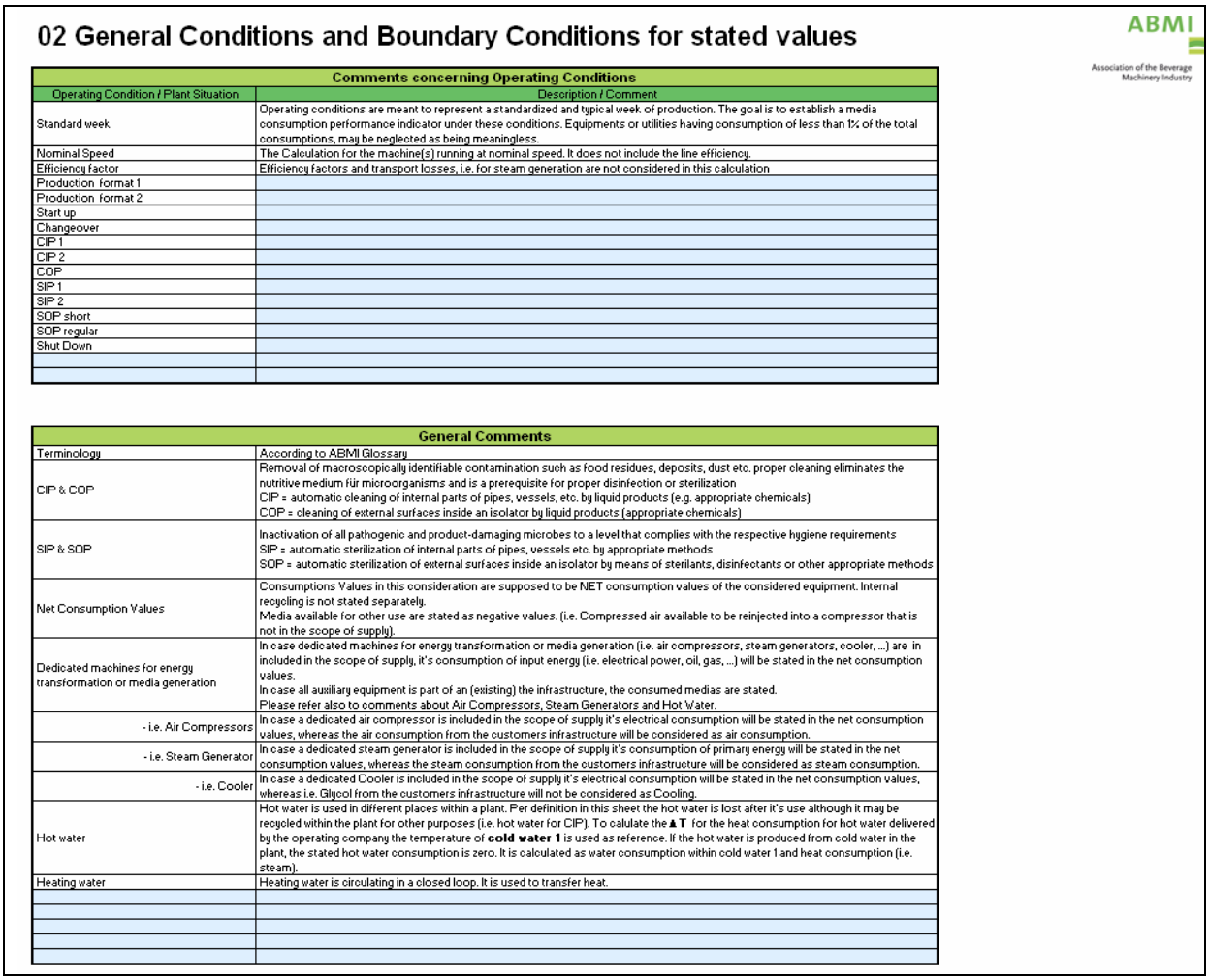
Please list only the machinery which is dedicated to the supplied process / line.
For example the steam generator can be included in the calculation if it is only for the supplied equipment, the efficiency is known and it is dedicated to the line. Energy consumption of a shared steam generator can not be considered in the calculation (see also Sheet02 general conditions.



Please complete these lists carefully, as they are the basis for the evaluation of the following.

2.3.2. Sheet 02: General Conditions and Boundary Conditions

Any calculation of consumption values can only be valid under well defined conditions. Different conditions will result in different values. This is why this sheet is very important. Some items are fixed and cannot be changed. Some items need further description. There is also space for other detailing comments



02 General Conditions and Boundary Conditions for stated values

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Comments concerning Operating Conditions	
Operating Condition / Plant Situation	Description / Comment
Standard week	Operating conditions are meant to represent a standardized and typical week of production. The goal is to establish a media consumption performance indicator under these conditions. Equipments or utilities having consumption of less than 1% of the total consumptions, may be neglected as being meaningless.
Nominal Speed	The Calculation for the machine(s) running at nominal speed. It does not include the line efficiency.
Efficiency factor	Efficiency factors and transport losses, i.e. for steam generation are not considered in this calculation
Production format 1	
Production format 2	
Start up	
Changeover	
CIP 1	
CIP 2	
COP	
SIP 1	
SIP 2	
SOP short	
SOP regular	
Shut Down	

General Comments	
Terminology	According to ABMI Glossary
CIP & COP	Removal of macroscopically identifiable contamination such as food residues, deposits, dust etc. proper cleaning eliminates the nutritive medium für microorganisms and is a prerequisite for proper disinfection or sterilization CIP = automatic cleaning of internal parts of pipes, vessels, etc. by liquid products (e.g. appropriate chemicals) COP = cleaning of external surfaces inside an isolator by liquid products (appropriate chemicals)
SIP & SOP	Inactivation of all pathogenic and product-damaging microbes to a level that complies with the respective hygiene requirements SIP = automatic sterilization of internal parts of pipes, vessels etc. by appropriate methods SOP = automatic sterilization of external surfaces inside an isolator by means of sterilants, disinfectants or other appropriate methods
Net Consumption Values	Consumptions Values in this consideration are supposed to be NET consumption values of the considered equipment. Internal recycling is not stated separately. Media available for other use are stated as negative values. (i.e. Compressed air available to be reinjected into a compressor that is not in the scope of supply).
Dedicated machines for energy transformation or media generation	In case dedicated machines for energy transformation or media generation (i.e. air compressors, steam generators, cooler, ...) are in included in the scope of supply, it's consumption of input energy (i.e. electrical power, oil, gas, ...) will be stated in the net consumption values. In case all auxiliary equipment is part of an (existing) the infrastructure, the consumed medias are stated. Please refer also to comments about Air Compressors, Steam Generators and Hot Water.
- i.e. Air Compressors	In case a dedicated air compressor is included in the scope of supply it's electrical consumption will be stated in the net consumption values, whereas the air consumption from the customers infrastructure will be considered as air consumption.
- i.e. Steam Generator	In case a dedicated steam generator is included in the scope of supply it's consumption of primary energy will be stated in the net consumption values, whereas the steam consumption from the customers infrastructure will be considered as steam consumption.
- i.e. Cooler	In case a dedicated Cooler is included in the scope of supply it's electrical consumption will be stated in the net consumption values, whereas i.e. Glycol from the customers infrastructure will not be considered as Cooling.
Hot water	Hot water is used in different places within a plant. Per definition in this sheet the hot water is lost after it's use although it may be recycled within the plant for other purposes (i.e. hot water for CIP). To calulate the **▲T** for the heat consumption for hot water delivered by the operating company the temperature of **cold water 1** is used as reference. If the hot water is produced from cold water in the plant, the stated hot water consumption is zero. It is calculated as water consumption within cold water 1 and heat consumption (i.e. steam).
Heating water	Heating water is circulating in a closed loop. It is used to transfer heat.

01_Scope of Supply | 02_General_Conditions | 03_Data Input and Calculation | 04_Ecological Summary

The sheet 02 is split in two tables:

- **Operating Conditions**
  The calculations have been made for certain Operating Conditions and Plant Situations. These Conditions need to be stated in this sheet. i.e. Bottle type, CIP procedure and so on.

- **General Comments**
  Some definitions of the ABMI are already entered in the table.
  Be careful about the fact that only "NET consumptions" are considered.
  Note also that line & or equipements efficiency are not taken into account in the calculations.
  .

Please complete these lists carefully, as they will prevent misunderstandings between the partners.

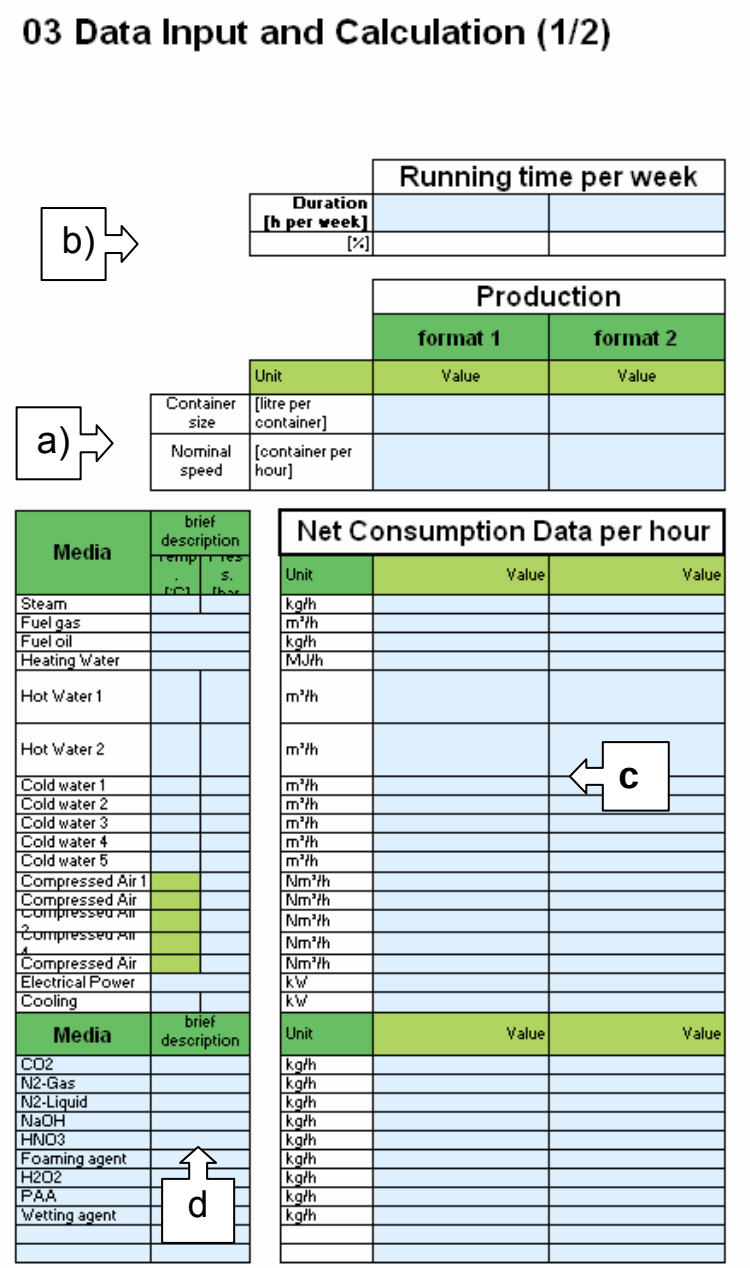
2.3.3. Sheet 03: Data Input and Calculation (1/2)

The Sheet 03 is the main calculation sheet. Here all the media consumption data shall be listed the overall sum is calculated automatically.

For the calculation a reference week is defined. The arbitrary choice of one week was made in order to reflect in a meaningful way, productive and non sequence in the normal working of a line. This includes the time for production of maximum two different formats and the time for non productive sequences like CIP, changeover or start-up. The two main formats should reflect the main formats that will be used in the line.

1.1.1.1 Production

Please list the Media consumption during production in the following table.



a) Format(s)
Two reference formats are defined to characterize the sustainability of the plant. The nominal speed for each container is the speed at 100% production without the line efficiency.
Please enter container size and nominal speed for which the calculation has been made.

b) Duration per week
Please enter how many hours of production shall be part of a "reference week" for the sustainability calculation. This information will be used to calculate the media consumption per week. The "%-line" gives the weekly time slice for the relevant format.

c) Media Consumption values
Please enter the calculated media consumption values
The net consumption during the production time is expressed ***per hour***.

d) Media description
For each media please fill the column "brief description" to define the boundary condition more clearly and more transparent. Keep in mind the boundary condition (Sheet02).

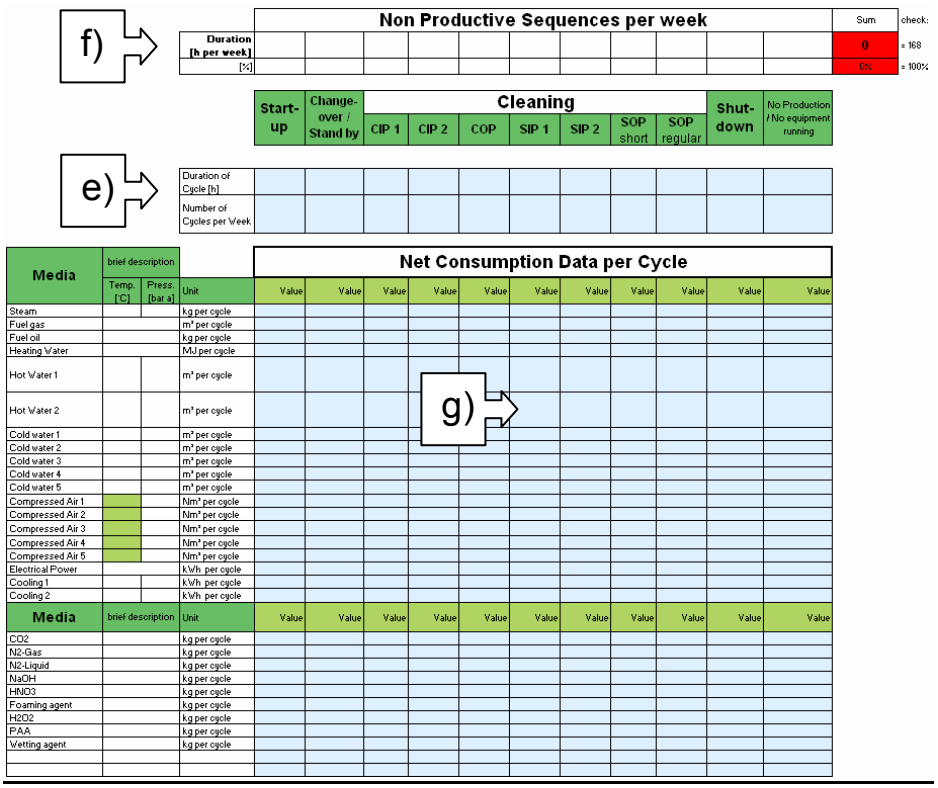
1.1.1.2 Non Productive sequences

Please list the Media consumption during production in this table.

e) Frequency and time
Number per week and time for non Productive sequences are stated. The details of a special cycle can be described in Sheet 02.

f) Duration per week
Duration per week and "%-line" are calculated automatically.

g) Media Consumption values
Please enter the calculated media consumption values
The net consumption during the non productive sequences is expressed ***per cycle.***



Remark concerning the Consumption Values:
If there is an internal recycling of any kind of media (compressed air, heating water, …) only the net consumption is stated. That means a 100 % recycling has zero consumption! The recycling systems should be described in Sheet 02.
If the air compressor is in the scope of supply, only the electrical energy should be considered – not the amount of compressed air.

2.3.4. Sheet 03: Data Input and Calculation (2/2)

On page two of the Data Input and Calculation sheet the consumption values are converted into the Reference Media and summarized .

1.1.1.3 Conversion

For the conversion of the consumptions values into the Reference Media:

- **Electrical Energy (Power)**
- **Thermal Energy (Heat)**
- **Net Water consumption**

a small calculation with conversion factors need to be done. The conversions factors take into account different Fuel gas qualities, different efficiencies of steam production or air compressors and so forth.

The ABMI Media Template delivers ABMI range of default factors for the conversion.
In the next column you can adopt these factors to the specific line conditions or adopt your own conversion factors.
For “hot water” ABMI describes the formula depending on the real ΔT [K] between the supplied cold water and the hot water required.

Media	brief description				total consumption					
	Temp. [°C]	Press. [bar a]	Sum	Unit	ABMI default factors	adopted factor	Unit	converted value	Unit	
Steam				kg / week	2.1 0- 3.05		MJ/kg		MJ / week	Heat
Fuel gas				m³ / week	36 - 41		MJ/m³			
Fuel oil				kg / week	36 - 42		MJ/kg			
Heating Water				MJ / week	1		MJ / MJ			
Hot Water 1				m³ / week		ΔT [°K] *	**q [GJ/week]** = v [m³/week] * ΔT [°K] * 4.2 [kJ/(l°K)] * 0,001 (GJ*l)/(kJ/m³)			
Hot Water 2				m³ / week		ΔT [°K] *				
Cold water 1				m³ / week						Water incl. Hot water
Cold water 2				m³ / week						
Cold water 3				m³ / week						
Cold water 4				m³ / week						
Cold water 5				m³ / week						
Compressed Air 1				Nm³ / week	0.10 - 0.20		KWh / Nm³		kWh / week	Electricity
Compressed Air 2				Nm³ / week	for 8 bar (abs)		KWh / Nm³			
Compressed Air 3				Nm³ / week			KWh / Nm³			
Compressed Air 4				Nm³ / week	0.19 - 0.40		KWh / Nm³			
Compressed Air 5				Nm³ / week	for 40 bar (abs)		KWh / Nm³			
Electrical Power				kWh / week	1		kWh / kWh			
Cooling 1				kWh / week	3.6 - 4.0		kWh / MJ			
Cooling 2				kWh / week	3.6 - 4.0		kWh / MJ			

1.1.1.4 Sum

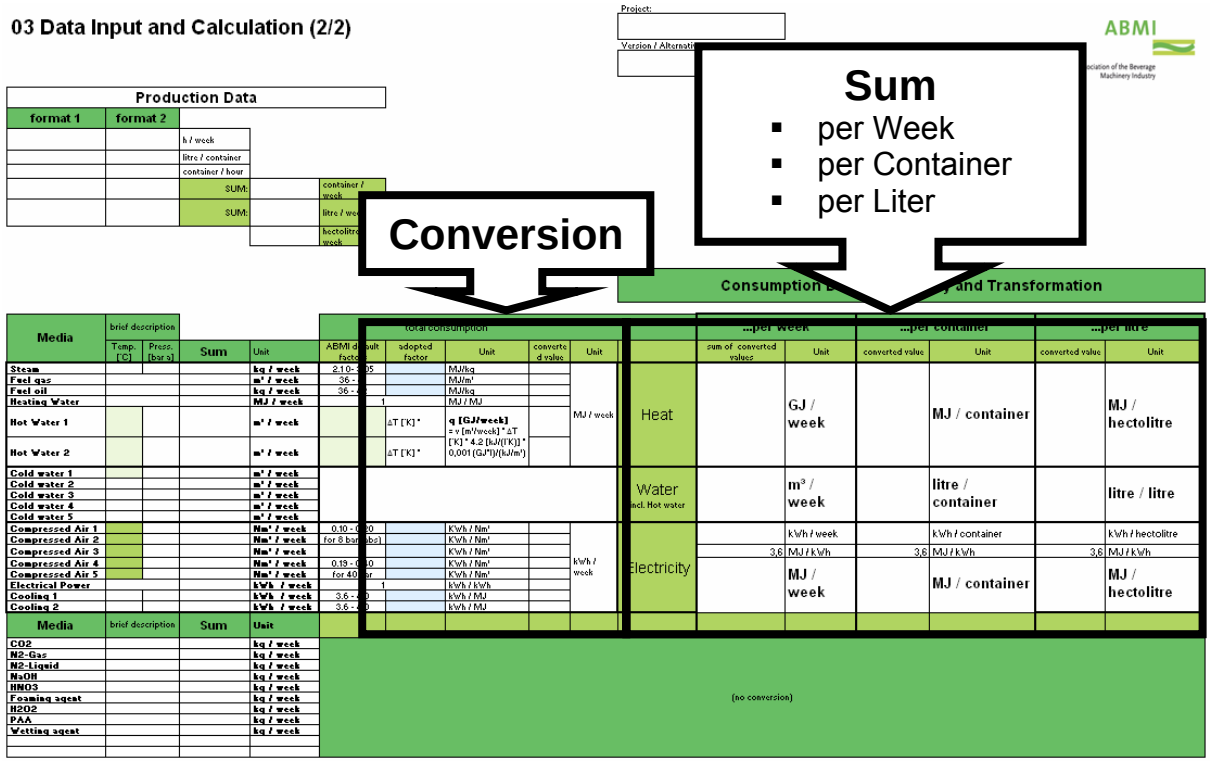
Then the values are summarized for the following reference parameters:

a) per week
b) per container
c) per Liter of beverage

Consumption Data - Summary and Transformation

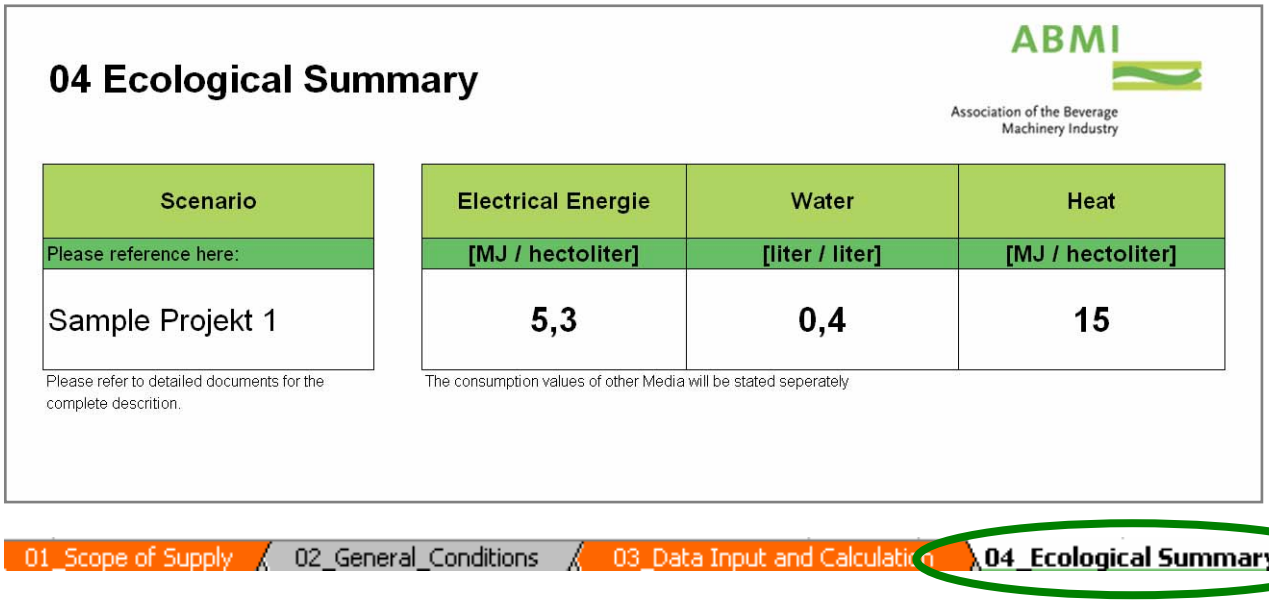
	...per week		...per container		...per litre	
	sum of converted values	Unit	converted value	Unit	converted value	Unit
Heat	0	GJ / week	0,000	MJ / container	0,0	MJ / hectolitre
Water incl. Hot water	0	m³ / week	0,0	litre / container	0,00	litre / litre
Electricity	0	kWh / week	0,0000	kWh / container	0,00	kWh / hectolitre
	3,6	MJ / kWh	3,6	MJ / kWh	3,6	MJ / kWh
	0	MJ / week	0,0000	MJ / container	0,00	MJ / hectolitre

1.1.1.5 Overview of Sheet 03 Data Input and Calculation (2/2)



2.3.5. Sheet 04: Ecological Summary

On sheet 04 the Utility per Liter of packed beverage are stated. This is the main data in the sustainability report of the operating company. It is a copy from sheet 03.



04 Ecological Summary

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Scenario	Electrical Energie	Water	Heat
Please reference here:	[MJ / hectoliter]	[liter / liter]	[MJ / hectoliter]
Sample Projekt 1	5,3	0,4	15

Please refer to detailed documents for the complete descrition.

The consumption values of other Media will be stated seperately

01_Scope of Supply | 02_General_Conditions | 03_Data Input and Calculati | 04_Ecological Summary

If required the operating companies may calculate the **Carbon Footprint** based on the values for heat and electrical energy of the line together with the individual values of each site for generation of electrical power and heat.

3. ABMI Packaging Template

3.1. Purpose of the ABMI Packaging Template

Another important factor for the **carbon footprint** of a beverage is the energy required for transportation.
Certainly the machinery supplier can not influence the logistics of the operating company. However the machinery supplier has information necessary to do the calculation. Therefore the ABMI decided to create a template to improve communication.

The most important **Packaging information** are:

- Weight
- Dimension

3.2. Structure of the ABMI Packaging Template

The ABMI Packaging Template consists of two parts:

- **Sheet 01: Packaging information: Weight**
- **Sheet 02: Packaging information: Dimensions**

In order to have transparent and traceable calculations the ABMI Packaging Template is an Excel Sheet.

3.3. Explanation of the two different sheets

3.3.1. Sheet 01: Packaging information: Weight

For external logistics the **total weight** of the packed beverage is important. To compare the environmental impact of different solutions, the contribution of each element might be relevant.
In Sheet 01 the weight for primary, secondary and tertiary **packaging is itemized**. As "short description" anything clear definition to identify the format is good: i.e. bottle type and/or beverage.

01 Packaging information: Weight

				format 1	format 2	format 3
		Short description of format:				
	Beverage	**Volume per container**	[liter]			
		Beverage	[g]			
1	Primary packaging	Bottle / can	[g]			
		Closure	[g]			
		Label (incl. glue) / Sleeve	[g]			
		Aluminium foil	[g]			
		SUM of primary packaging only	[g]			
		SUM of primary packaging including beverage	**[kg]**			
2	Secondary packaging	Number of primary packs per secondary pack	#			
		SUM for primary packs in seconday pack	[kg]			
		Cardboard tray	[g]			
		Shrinkpack LDPE	[g]			
		Crate	[g]			
		SUM for seconday packaging only	[g]			
		SUM for seconday pack including primary packs and beverage	**[kg]**			
3	Tertiary packaging	Number of secondary packs per tertiary pack	#			
		SUM for secondary packs in tertiary pack	[kg]			
		Wood pallet weight	[g]			
		Pallet stabilising LDPE film weight	[g]			
		Cardboard slipsheet weight	[g]			
		SUM for tertiary packaging only	[g]			
		SUM for tertiary pack including primary packs, secondary packs and beverage	**[kg]**			
		SUM for Primary, Secondary and Tertiary Packaging only	**[kg]**			
		Weight of total packaging per beverage	**[kg / kg]**			

01_Weight | 02_Dimensions

3.3.2. Sheet 02: Packaging information: Dimensions

For external logistics the **truck filling rate** is important.
To compare the environmental impact of different solutions, the exact size of each package is relevant.
In Sheet 02 the dimensions for primary, secondary and tertiary packaging is itemized:

02 Packaging information: Dimensions

				format 1	format 2	format 3
		Short description of format:				
	Beverage	Volume per container	[liter]			
		Beverage	[g]			
1	Primary packaging	Maximum diameter	[mm]			
		Maximum Height	[mm]			
		Cylindrical Volume	[liter]			
2	Secondary packaging	Number of primary packs per secondary pack	#			
		Maximum height	[mm]			
		Maximum width	[mm]			
		Maximum length	[mm]			
		Cubic Volume	[liter]			
3	Tertiary packaging	Number of secondary packs per tertiary pack	#			
		Maximum height	[mm]			
		Maximum width	[mm]			
		Maximum length	[mm]			
		Cubic Volume	[m^3]			
		Volume of beverage per tertiary pack	[m^3 / m^3]			

01_Weight | 02_Dimensions