

JAC Supply Chain Sustainability Guidelines

The Joint Audit Cooperation (JAC) is a collective of telecommunication companies aiming to promote safe and fair working conditions as well as responsible, social and environmental management by verifying, assessing and promoting sustainability standards and transfer of best practice across its supply chain.

These JAC Sustainability Guidelines have been established to complement the respective supplier codes of JAC member companies. Suppliers are encouraged to implement the requirements contained in these Guidelines and go further in implementing key performance indicators (KPI's) in this document to achieve compliance.

Suppliers are encouraged to take all reasonable endeavours to promote and secure compliance to these Guidelines to their suppliers and sub-contractors and employees. All references to employees shall also mean any temporary, migrant, student, contract, direct employees, and any other type of employees.

Suppliers applying the Guidelines are expected to comply with all relevant laws, regulations and standards in all of the countries in which they operate and to go beyond compliance to applicable laws, drawing upon internationally recognised standards, taking responsibility to continually improve social and environmental conditions and ethical behaviour.

JAC will work collaboratively with its suppliers on the implementation of these Guidelines which may include joint audits and site visits to assess and periodically review performance.

JAC will strive for continuous improvement of these Guidelines developed in line with internationally recognised standards and through dialogue with its stakeholders.

Suppliers shall abide by the following requirements to achieve and maintain safe and fair working conditions and the responsible management of social and environmental issues.

## **A – Labour Requirements**

### **1. Contract of Employment**

All employees shall have an employment contract signed by both parties that defines the terms and conditions of employment. A copy of such a contract shall be issued to the employee.

A Contract of Employment shall at least contain but not be limited to the following items:

- a) Working hours showing at least a guaranteed wage
- b) Overtime pay rates and compensation for working out of normal working hours
- c) Payment and frequency of payment
- d) Notice period

### **2. Child Labour**

Child Labour (1) is strictly prohibited. No person is employed who is below the legal minimum age for employment.

Where no local legislation exists to define the minimum legal age, no person is employed below the minimum age which is the age of completion of compulsory schooling, or not less than 15 years (or not less than 14 years, in countries where educational facilities are insufficiently developed) in accordance with international conventions.

Children under the age of 18 shall not be employed for any hazardous work (2) or work that is inconsistent with their individual development (3).

Where no local law exists to define working hours and working conditions for children under the age of 18, the Supplier should not employ them for work that is hazardous, unsafe or unhealthy such as among others: work with dangerous machinery, equipment and tools, or work which involves the manual handling or transport of heavy loads, work in an unhealthy environment that may, for example, expose children to hazardous substances, agents or processes, or to temperatures, noise levels or vibrations damaging to their health; work under particularly difficult conditions such as work for long hours (more than 8 hours per

day) or during the night, or work where the child is unreasonably confined to the premises of the employer.

(1) "Child Labor" means the definition of ILO-IPEC (<http://www.ilo.org/ipec/facts/lang--en/index.htm>) and Article 32 of the United Nations Convention on the Rights of the Child (UNCRC).

(2) "hazardous work" means as defined by ILO Convention 182 article 3d and ILO Recommendation 190 article 3

(3) "individual development" means as described in the United Nations Convention on the Rights of the Child.

### **3. Forced Labour**

Supplier shall strictly prohibit any form of forced, bonded, compulsory labour, slavery or human trafficking.

Employees shall be free to leave work or terminate their employment with reasonable notice and all employment shall be voluntary.

Suppliers shall not require employees to lodge deposits of money or withhold payment or place debt upon employees or require employees to surrender any government-issued identification, passports, or work permits as a condition of employment.

### **4. Working Hours**

The Supplier shall ensure that normal working hours and overtime of individual employees do not exceed the maximum of limits set by local law.

Where no local law defines a working week and/or overtime, the Supplier is expected to adopt the following;

- a) a normal working week in line with ILO Convention in respect of applying the principle of the 8-hours day or of the 48-hours week and;
- b) overtime in line with limits as specified in SA8000:2008 Section IV (Social Accountability Requirements) Article 7 in respect of 12 hours overtime per week and one day off following every six consecutive working days.

Overtime shall be compensated at a premium rate.

Suppliers shall grant their employees the right to paid vacation at least according to the national/regional law.

## **5. Fair Remuneration**

Suppliers shall pay a fair and reasonable wage to employees which is high enough to maintain a fair standard of living and which shall comply with at least legal and industry minimum standards. Overtime pay rates shall be above regular wages.

The supplier shall not use deductions from wages as disciplinary measure. Employees must be paid in a timely manner, and the basis on which employees are paid must be clearly conveyed. Suppliers shall give a payslip detailing payment due and to be made to the employee in line with the frequency shown in the Contract of Employment.

## **6. Disciplinary Practices**

Suppliers will treat all employees with respect and will not use corporal punishment, mental or physical coercion, or any form of abuse or harassment and threat of such treatment.

## **7. Discrimination**

The Supplier shall not engage in or support any form of discrimination in hiring, employment terms, remuneration, access to training, promotion, termination, retirement procedures or decisions including but not limited to:

race, colour, age, veteran status, gender identification, sexual orientation, pregnancy, ethnicity, disability, religion, political affiliation, trade union membership, nationality, indigenous status, medical condition, HIV status, social origin, social or marital status and union membership .

Supplier shall promote equal opportunities treatment and diversity of all employees and hired resources (e.g. temporary and outsourced).

## **8. Freedom of Association & Right to Collective Bargaining**

All personnel shall have the right to form, join, and organise trade unions of their choice and to bargain collectively on their behalf with the company. The company shall respect this right, and shall effectively inform personnel that they are free to join an organisation of their choosing and that their doing so will

not result in any negative consequences to them, or retaliation, from the company. The company shall not in any way interfere with the establishment, functioning, or administration of such workers' organisations or collective bargaining.

In situations where the right to freedom of association and collective bargaining are restricted under law, the company shall allow workers to freely elect their own representatives.

The company shall ensure that representatives of workers and any personnel engaged in organising workers are not subjected to discrimination, harassment, intimidation, or retaliation for reason of their being members of a union or participating in trade union activities, and that such representatives have access to their members in the workplace.

## **B – Health and Safety**

Supplier shall operate in accordance with international standards and local laws. Supplier shall provide its employees, contractors, partners or others who may be affected by Supplier's activities with a safe and healthy working environment and ensure correct use of its products.

### **9. General Requirements**

The supplier is encouraged to implement a Health & Safety management system in accordance with OSHAS 18001, and shall at least comply with the following requirements:

- a) Performing and maintaining a comprehensive risk assessment
- b) Define appropriate method statements to mitigate any risks
- c) Develop, put in place and follow an appropriate health and safety plan
- d) Have appropriate systems and processes in place to monitor any failures in such compliance.
- e) Appoint a senior management representative to be responsible for ensuring a safe and healthy workplace environment for all personnel and for implementing the health and safety elements of the above standard

## **10. Organisation**

Mechanisms are developed and implemented to ensure that all employees are competent to carry out the health and safety aspects of their responsibilities and duties. This should include the nomination and training of persons at an appropriate level, particularly executives who are responsible for discharging the supplier's Health and Safety obligations.

## **11. Product and Services Delivery**

Products and/or services delivery meets general principles of H&S risk prevention.

General principles shall include: identifying, minimising and preventing hazards, using competent and trained people, providing and maintaining safe equipment and tools, including personal protective equipment as required.

## **12. Occupational Safety**

The exposure of employees to potential safety risks that might be lead to accidents/injuries or occurrence of occupational disease should be assessed and controlled through proper preventive actions (e.g. design, engineering and administrative control, preventative maintenance and safe work procedures and on-going safety training, well-maintained personal protective equipment).

## **13. Accident and Emergencies Readiness**

Supplier shall have: systems and training to prepare for and respond to accidents, health problems and foreseeable emergency situations; and a means for recording, investigating and implementing learning points from accidents and emergency situations is in place.

Supplier shall identify and assess potential emergency situations and events, and minimize their impact by implementing emergency plans, evacuation procedures, employee training and drills, appropriate fire detection, sufficient extinguishers, adequate exit facilities and recovery plan.

#### **14. Occupational Injury and Illness**

Procedures and systems are to be in place to analyse (e.g. root cause analysis), prevent, manage, track and report occupational injury and illness including provisions to: encourage employee reporting, classify and record injury and illness cases; provide necessary medical treatment and equipment.

#### **15. Exposure to hazardous elements**

The exposure of employees to dangerous/hazardous substances (chemical, high temperature, radiation...) should be identified, evaluated and controlled.

Engineering controls (e.g. improvement of production facility) or administrative (e.g. law and regulations) controls must be in place to control exposure. When hazards cannot be adequately controlled by such means, employee health is to be protected by the provision of appropriate personal protective equipment, ensuring its use is monitored or elimination of exposure to such substances.

#### **16. Equipment Safeguarding**

Equipment, production machines and other machinery shall be evaluated for safety hazards. Physical guards, interlocks and barriers are to be provided and properly maintained where machinery presents an injury hazard to employees.

#### **17. Sanitation Food and Housing**

Facilities and amenities, including employee accommodation where provided by the company, shall be hygienic, safe and meet the basic needs of employees. Employees are to be provided with ready access to clean toilet facilities, potable water and sanitary food preparation, storage and eating facilities. Employee dormitories where provided are to be maintained, cleaned and safe and have appropriate emergency exits, water for drinking or bathing and showering, adequate heat and ventilation, and reasonable personal space along with reasonable entry and exit.

#### **18. Absolute Rules**

Supplier shall observe the following rules and ensure compliance and awareness at all levels and monitor compliance to:

always wearing seat belts when travelling in or operating vehicles

always using suitable Personal Protective Equipment (PPE), a safety harness and fall protection equipment when working at height, attaching harnesses at all times when working at height

never carrying out electrical work on electrical equipment, circuits and gear without appropriate qualifications and compliance to regulations

never working under the influence of substances (alcohol or drugs) which are illegal or in excess of legal levels or where this impairs ability to perform tasks

never using a hand held phone whilst driving and only making calls by pulling over or using hands free devices, when it is safe to do so

never exceeding speed limits or travelling at speeds which are dangerous for the type of road, vehicle or conditions

## **C – Environment**

The Supplier shall comply with relevant legislation and international standards, and in countries where environmental legislation is not evident or enforced, ensure responsible practices for managing environmental impacts are in place.

Supplier shall have processes in place to actively optimise the use of finite resources (such as energy, water and raw materials) and ensure appropriate management, operational and technical controls are in place to minimise the release of harmful emissions to the environment.

Suppliers shall strive to minimize the adverse environmental impact of its products and services during their whole life cycle: conception, development, production, transport, use and disposal or recycling. The supplier shall implement an internal environmental management system in accordance with recognised standards such as ISO 14001 or EMAS addressing the following aspects:

### **19. Environmental Permit and Reporting**

The supplier shall obtain, maintain and keep current all necessary environmental permits (e.g. waste management, transportation), approvals and registrations.

## **20. Design for the environment**

The supplier shall ensure appropriate measures are in place to improve the environmental performance of products and services when in use, such as considering energy efficiency and end-of-life of supplied products and/or services at the design stage.

Supplier shall adopt innovative developments in products and/or services that offer environmental and social benefits.

## **21. Pollution Prevention and Resource Reduction**

The Supplier shall work to reduce the use of raw materials and resources as well as to reduce and treat the waste produced by all its activities. Supplier shall achieve this through the improvement of production, maintenance and cleaning processes, modes of conservation and transportation, as well as the elimination, substitution, re-use and recycling of materials.

A dedicated risk analysis shall be conducted regarding air, water and soil pollution. In accordance with applicable laws and international standards, pollution levels should be monitored and supplier shall remedy any activity that adversely affects human life, wildlife, and environment.

## **22. Liquid waste and Solid Waste**

The Supplier shall identify, monitor control and treat liquid waste and solid waste generated from operations, industrial processes and sanitation facilities prior to discharge or disposal.

## **23. Production Content: Hazardous Substances and Chemicals**

The supplier shall respect all applicable laws, regulations and customer requirements regarding prohibition or restriction of specific substances. Hazardous chemicals and other materials included in products, especially those included in the substances of Very High Concern list of the REACH regulation, are to be identified and managed to ensure their safe use, recycling or re-use and disposal. Their use has to be avoided and if not possible minimised. The Supplier is required to deliver electrical or electronic equipment in line with all relevant European Union regulations such as but not limited to RoHS and REACH irrespective of the country of use, including any non-European countries.

## **24. Air Pollutants**

The Supplier shall identify, minimise, monitor, control and treat all hazardous air pollutants and all emissions should be avoided in accordance with international standards and applicable laws

## **25. Climate Change**

The Supplier should identify, monitor and minimize Greenhouse Gas emissions (GHG) and energy consumption from own operations including CO2 emissions from transportation and travel. Supplier shall do this by making a self-declaration of the Supplier's annual energy consumption and GHG emissions that should be publicly available.

To proactively manage GHG emissions, Supplier is expected to:

- a) Have emissions reduction targets
- b) Measure and provide emission metrics for GHG emissions
- c) Take actions to reduce GHG emissions
- d) Publically reporting of GHG emission metrics annually
- e) Have a process to engage its sub-suppliers to drive GHG emission reduction within Supplier's operations and that of their suppliers

The Supplier should develop energy efficient products or services throughout the entire life cycle and comply with internationally recognised standards.

## **D – Ethics and Anti-Corruption**

To maintain high ethical conduct and operate responsibly, suppliers shall observe the following requirements:

## **26. Bribery & Corruption**

Supplier shall:

- a) Act in accordance with all applicable international standards and laws on bribery and corruption

- b) Not do or omit to do anything likely to cause any party to be in breach of any of such international standards and laws
- c) Not give, promise, receive or request any bribes (financial or other advantage), including but not limited to in relation to any public official
- d) Maintain an effective anti-bribery compliance programme, designed to ensure compliance with the law including the monitoring of compliance and detection of violations

## **27. Intellectual Property**

The Supplier shall respect Intellectual property rights. Transfer of technology and knowhow is to be handled in a manner that protects intellectual property rights.

## **28. Disclosure of Information**

The Supplier shall disclose information regarding business activities, structure, financial situation and performance in accordance with applicable regulations and applicable law.

## **29. Protection of Identity**

Supplier shall have a communicated process for their personnel to be able to raise any concerns without fear.

Supplier shall maintain programs ensuring the confidentiality and protection of any employee reporting through speak up or whistle-blowing procedures.

## **30. Fair Business, Advertising and Competition**

Supplier shall uphold standards of fair business, advertising and competition.

## **31. Responsible Sourcing of Minerals**

The Supplier shall have a clear policy and procedure in place to avoid knowingly purchasing conflict minerals or unsustainable (1) mined minerals at high environmental and social costs.

In particular the Supplier shall have a policy and procedure to reasonably assure that the tin, tantalum, tungsten and gold in the products it manufactures does not directly or indirectly finance or benefit armed groups that are perpetrators of serious human rights abuses, e.g. the Democratic Republic of the Congo.

Supplier shall exercise due diligence on the source and chain of custody of these

minerals and make their due diligence measure available. Also the Supplier shall have a policy and procedure, appropriate for suppliers' position in the supply chain, to reasonably assure that the tin, tantalum, tungsten and gold in the products its manufactures is not extracted using unsustainable mining practices. Supplier should participate in recognised industry initiatives working towards sustainable mining of minerals and support organisations focused on environmental restoration of areas affected by mining activities such as the mining of tin in Indonesia.

(1) Explanation of term 'unsustainable mining practices':

JAC will start using the term "unsustainable mining practices', looking at all the phases of the mining process, i.e.:

- mining itself (excavating and extracting the ores); this can lead to destruction of the natural environment even jeopardizing local biodiversity, and cause serious harm to miners if no proper health & safety measures are put in place; in order to be more environmentally sustainable, mining operations should be conducted in a manner that minimizes their impact on the surrounding environment, and leaves mine sites in an acceptable state for re-use by people or ecosystems, and not be based on the exploitation of workers, as well as the employment of child and juvenile workers;
- smelting/refining the minerals, even at the very first stage when for example the miners themselves separate the ore that they will trade using hazardous substances and methods. For example, if gold cannot be concentrated for smelting, as in the case of low-grade ore, then it is leached by an aqueous solution containing cyanide. When this is done by the miners themselves the used solution is then dispersed in the environment and can poison entire communities. Gold cyanidation is process which is also used at industrial level.
- transporting the minerals
- trading the minerals; this can result in funding guerrillas and civil wars.

## **E- Measurement & Continuous Improvement**

### **Management System**

Supplier shall create and maintain a management system and documents and records to ensure regulatory compliance and conformity to the JAC Guidelines and company requirements with the following elements considered:

## **Improvement Objective**

Suppliers shall set up performance objectives, targets and implementation plan to continuously improve social and environmental performance including the regular measurement and reporting of key performance indicators as defined in section F to monitor compliance to requirements. Suppliers are encouraged to use a Plan-Do-Check-Act type of approach when approaching improvements

## **Communication**

Supplier shall clearly have policies capturing the requirements of the JAC Guidelines which are communicated to its employees, suppliers and customers. Employees understanding shall be assured and their feedback shall support sustainable improvement.

## **Training**

Managers and employees shall be trained to comply with Supplier's policies, procedures and improvement objectives and to meet applicable legal and regulatory requirements.

## **Risk Assessment, Risk Management and Self- Audit**

Risks out of labour practice, health and safety, environmental and ethics shall be assessed and corrective actions shall be conducted immediately.

Supplier shall drive self-audits to ensure conformity to legal and regulatory requirements, the content of customer codes and contractual requirements related to social and environmental responsibility.

## **F - Key Performance Indicators –**

The aim of the KPIs is to help the supplier to measure its compliance to the JAC Sustainability Guidelines, in an as simple and objective as possible way. Supplier shall assist to provide access to information and premises as is necessary to establish the level of compliance in accordance with these Sustainability Guidelines and Key Performance Indicators.

Audits could be conducted by a JAC member or third party and may also be conducted jointly between JAC members and the supplier, and include the assistance of an industry representative, or relevant Non-Governmental Organisation.

### **Working Hours:**

% of total workforce that have exceeded overtime limit over period of at least 3 months.

Target should be 100% of workers are within the local labour Law or 48 hours weekly (6 daily work) as per ILO Convention if no local labour law exists.

Overtime limit should be local labour law or 12 hours weekly (6 daily work) as per SA 8000 Section IV art 7 if there is not local labour law. However, we may allow a stepped target as Supplier bring working hours down as part of an agreed corrective action plan.

The analysis should include all hourly paid workers in all departments. The calculation should be very straightforward: the percentage represented by the number of workers that have worked working hours beyond the limits (as defined in the relevant article 4 of the Guidelines), in respect of the total number of workers.”

### **Rest day:**

% of total workforce that have had not one day off in seven over period of at least 3 months.

Target should be 100% of all workers are within the local Law or 1 day off following every six consecutive days as per SA 8000 Section IV if no local labour law exists.

The analysis should include all hourly paid workers in all departments.

The calculation should be very straightforward: the percentage represented by the number of workers that have not received the due rest days (as defined in the

relevant article 4 of the Guidelines), in respect of the total number of the workers.”

Other key areas to check:

- Working hours policy – Does the company have a clearly communicated policy that workers should not work overtime greater than that allowed by local Law and that they should have one day off in seven?
- Working hours management process – Does the company have a credible and robust process for accurately recording and managing working hours to within their stated policy? Can they evidence that it is being followed?

These would be the two key numeric KPI’s and the two key enablers that could be easily measured/verified during audits.

The numeric KPI’s are however lagging indicators. Thus, not for audit but for regular reporting we may wish to consider leading indicators for selected companies and in this case key leading indicators would include:

1. Workload volumes versus capacity (at legal working hour limit) – if the factory has or is expecting workload volumes to significantly exceed > 10% planned capacity, then overtime levels could be expected to rise.
2. Workload forecasting accuracy (a two way measure on the customer as well as supplier) – If the accuracy of order forecasting is typically less than 80%, then overtime levels could be expected to be at risk.
3. Staff churn - % of total workforce that have left and been replaced with new workers. If this exceeds 10%, then increase of overtime could be expected as workers have to work longer to meet production targets as less experienced.

Best practice would be for suppliers to discuss capacity and workload issues with customers and agree a way forward (even a temporary agreed increase whilst new workers hired / trained etc..) if the above leading indicators show a problem in forecast.

### **Fair Wage:**

Definition of fair wage

Suppliers shall pay a fair and reasonable wage to employees which is high enough to maintain a fair standard of living and which shall comply with at least legal and industry minimum standards. Within working needs the overtime pay rates shall be covered and should be above regular wages.

The supplier shall not use deductions from wages as disciplinary measure. Employees must be paid in a timely manner, and the basis on which employees are paid must be clearly conveyed. Suppliers shall give a payslip detailing payment due and to be made to the employee in line with the frequency shown in the Contract of Employment.

In order to create an understanding for suppliers of what is a fair wage in the opinion of the JAC initiative, the following benchmark KPI was created

#### Goal of KPI on fair wage

The goal of the KPI on fair wages is to provide a tool to help the supplier calculate a fair wage and thereby easily determine if supplier is paying such fair wage. For this calculation the fair wage is referred to as a basic needs wage (BNW). Furthermore it should give the supplier guidance on the meaning of the JAC guidelines and create comparability for different suppliers in a region.

#### Structure of KPI on fair wage

In according to SA 8000 Guidance Document, a basic needs wage is defined as the amount of wages needed to support half of the average-sized family above the poverty line, based on local prices near the workplace. Basic needs includes essential expenses such as food, clean water, clothes, shelter, transport, education, a discretionary income, as well as locally mandated social benefits (which may include health care, medical insurance, unemployment insurance, retirement plan)

To calculate the basic needs wage, SA 8000 proposes the following method:

##### Step 1

Determine the cost of the basic food basket needed for an adequate diet in the local community. In the majority of countries this is determined by the local government through national/regional household surveys; if there isn't, it's possible to calculate it by different methods (e.g. Anker, R., (2011) "*Estimating a living wage: a methodological review*", cap.9.1<sup>1</sup>)

##### Step 2

Determine what percentage of household expenditure is spent on food in the region. Divide the food cost figure calculated in Step 1 by this percentage. The result is an estimate of what the average household needs to spend per person.

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<sup>1</sup> [http://www.ilo.org/wcmsp5/groups/public/---ed\\_protect/---protrav/---travail/documents/publication/wcms\\_162117.pdf](http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---travail/documents/publication/wcms_162117.pdf)

### Step 3

Determine the appropriate number of household members; it's recommended using at least half of the average household size for the area. This assumes there is at least one other income contributing to the household expenditures. In a local economy where there is a strong tendency toward single parent households, who has to estimate this KPI, has to consider raising number above the half.

### Step 4

Determine the percent multiplier to provide for some discretionary income (which means money left over after basic needs have been met). It is recommended to provide at least 10% for discretionary income and therefore use a multiplier of at least 1.1.

### Step 5

Estimate the basic needs wage (BNW) by, inserting the numbers determined in the foregoing steps into the following formula:

$$\text{BNW} = \text{Basic food basket} \times (\% \text{ of average household expenditure spent on food}) \times (0.5 \times \text{average household size}) \times 1.1$$

Example: Assuming that the Basic Food basket costs \$ 15 per week, the average household size in the area is 5.6 people, and the % of expenditure spent on food is 40 %, then the estimated basic needs wage would be \$ 115 per week.

The equation would be:  $\$ 15 \times (1/40\%) \times 2.8 \times 1.1 = \$ 115,50$

### Step 6

Compare the basic needs wage calculated as above with the legal an industry minimum standard of the region

### Target of the KPI

The minimum wage paid to all workers should be at least equal to the basic needs wage as calculated above and shall comply with at least legal and industry minimum standards.

## Environment:

### 1. Scope

A process based on measurements and controls would allow optimisation of the use of finite resources (such as energy, water, and raw materials) and ensure that appropriate management, operational and technical controls are in place to avoid pollution or to minimise the release of polluting emissions to water, soil and air.

### 2. Environmental KPIs

The aim of defining environmental KPIs is to help the supplier to measure, in a simple way, the environmental footprint of its organization and to identify areas for optimization with a focus on:

- water consumption and discharge;
- energy consumption and emission of GHGs and other pollutants;
- solid and hazardous waste.

Focus is also placed on compliance with applicable laws (mandatory) and best practices (recommended) such as the ISO 14001 international standard or European EMAS<sup>2</sup> registration that can also be used as references in countries where such laws and regulations do not exist regarding:

- restriction on the use of specific substances (such as RoHS<sup>3</sup> and REACH<sup>4</sup> that are mentioned here as possible reference);
- environmental permits;
- soil, air and water pollution.

#### 1.1 Water consumption KPIs: structure

Using water responsibly means setting targets for reduction, limiting its use in particular in the case of water stress/water scarcity. Whenever possible, environmental impacts of water use should be minimised and waste water properly managed.

Reporting the total volume of water withdrawn by source contributes to an understanding of potential impacts and risks associated with the organization's water use and provides a baseline figure for calculations relating to efficiency and use. The list of sources from which water is usually withdrawn is reported below in the Inventory section.

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<sup>2</sup> The EU voluntary Eco-Management and Audit Scheme (EMAS) is a management instrument developed by the European Commission for companies and other organisations to evaluate, report, and improve their environmental performance. See [http://ec.europa.eu/environment/emas/index\\_en.htm](http://ec.europa.eu/environment/emas/index_en.htm).

<sup>3</sup> Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS).

<sup>4</sup> Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

### Step 1: Inventory

A comprehensive inventory should include the water withdrawn from the following sources:

- surface water, including water from wetlands, rivers, lakes and oceans;
- ground water;
- rain water collected directly and stored by the organization;
- waste water from another organization;
- municipal water supplies or other water utilities.

### Step 2: Consumption measurement

Determine in the total volume in **m<sup>3</sup>** (or **litres** or **metric tonnes**) of the water withdrawn from each source.

Primary data on water withdrawal can be obtained by direct methods such as using and reading regularly cumulative water meters; or indirectly by (a) measuring the pumping rate with instantaneous flow meters, and (b) measuring or estimating pumping duration; in the latter case the total volume of water withdrawn can be calculated by multiplying the instantaneous flow rate times the total time of operation for the period of interest.

Another possibility, which is applicable only to water purchased from municipal water supplies or other water utilities is obtaining the data from the bills.

The measurement method should be specified, whether it is a direct measurement or an estimate.

### Step 3: Process analysis

Identify where and how much water is consumed in operations and analyze whether the consumption can be reduced/optimized (i.e. by recycling the water).

### Step 4: Defining target(s)

Establish a yearly target reduction (by % and value or as defined by international standards or local law) and define the baseline. Targets can be defined in both absolute and relative terms. In the case of relative targets the normalizing factor should be significant and closely linked to the consumption. For example, assessing the consumption per unit of product equivalent<sup>5</sup> can help understand

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<sup>5</sup> A unit of production is an individual item sold or transferred as such by the supplier. In case of a manufacture producing smartphones a unit of production is a single smartphone; no differentiation is made among different models to make the calculation easier. If the manufacturers produces also other items such as tablets and laptops, then the concept of unit of product equivalent applies as long as the items produced can be considered similar. When the unit of product cannot be easily identified another normalizing factor should be used.

the level of efficiency of operations and processes. Other normalizing factors such as revenues, hours worked, FTE employees can be used.

Water consumption KPIs:

- absolute KPI: % variation, compared with the previous year and the baseline year, of the total volume of water consumption by source, identifying the areas of efficient use of water in the organization;
- relative KPI: % variation, compared with the previous year and the baseline year, of the total water consumed per unit of production (unit of revenues, or per FTE employee, etc.) .

Any increases/decrease due to expansion/reduction of activities should be explained.

## 1.2 Energy consumption KPIs: structure

Suppliers need energy to operate (fuel, electricity, heating, cooling and steam). Most of the energy is generated by non-renewable sources such as fossil fuels (coal, oil, natural gas) to power plants, equipment and buildings. Energy represents one of the major costs associated with running a business, and the production of energy has a significant impact on the environment since most of the energy is generated by burning fossil fuels. This produces Greenhouse Gases - or GHGs - such as carbon dioxide (CO<sub>2</sub>), which traps heat in the atmosphere causing global warming and climate change.

Reporting the total amount of energy consumption by sources and its reduction by initiatives increasing energy efficiency, provides a baseline figures indicating the supplier's organization efforts to optimize energy use and minimizing its environmental impacts.

### Step 1. Inventory

Identify the type of energy (fuel, electricity, heating, cooling and steam) consumed within the organization. As far as electricity is concerned, specify also the amounts purchased or produced from renewable sources<sup>6</sup>.

### Step 2: Measurement

Identify the amount of energy (fuel, electricity from renewable and non-renewable sources, heating, cooling and steam) consumed within the organization.

When meters are not available at the site, the common starting point for facility consumption calculation is energy use information from utility and fuel bills. These provide the cost and amount of each type of energy (electricity, natural gas, fuel oil, etc.) used at the site on a periodic basis or when an order is places. The consumption of other types of energy, such as vehicle fuels, if purchase is not centralized, can be calculated keeping track of vehicle tank filling operations and summing up the amounts purchased each time.

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<sup>6</sup> Renewable energy includes [biomass](#), wind, hydro-power, geothermal and solar sources.

Measurement units used to account for the amount of the different energy types consumed may vary depending upon whether energy is purchased directly as such from a utility company (such as electricity from grid, district heating, steam, etc.) or produced directly by the user (such as in the case of owned power or co-generation plants, diesel generators, solar/wind power stations, etc.). The overall energy consumption is usually reported in Megajoules (1 MJ = 1,000,000 joules) or Terajoules (1 TJ = 1,000,000,000 joules) depending upon the size of the operations included in the scope of the reporting and associated consumption.

An energy consumption calculation tool is available in Annex I.

### Step 3: Process analysis

Identify where and how much energy is consumed in operations and analyze whether the consumption can be reduced/optimized.

### Step 4: Defining target(s)

Establish a yearly target reduction (by % and value or as defined by international standards or local law) and define the baseline. Targets can be defined in both absolute and relative terms<sup>7</sup>..

#### Energy consumption KPIs:

- absolute KPI: % variation of energy consumption by type vs. previous year and vs. baseline year;
- absolute KPI: % of energy provided from renewable sources directly (e.g. solar photovoltaic, geothermal, wind, etc.) and its variation vs. previous year and baseline year.
- relative KPI: % variation, compared with the previous year and the baseline year, of the total energy consumed per unit of production (unit of revenues, or per FTE employee, etc.) .
- relative KPI: % variation, compared with the previous year and the baseline year, of the total energy from renewable sources consumed per unit of production (unit of revenues, or per FTE employee, etc.) .

Any increases/decrease due to expansion/reduction of activities should be explained.

### 1.3 Solid waste and Hazardous waste KPIs: structure

Waste means any by-product, unused material, or trash from Supplier operations. Every Supplier creates some kind of waste. A proper waste management program that includes **reusing**, **reducing** and **recycling** waste helps reduce impact on the environment and lowers costs for the Supplier.

### Step 1: Inventory

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<sup>7</sup> See explanation in the section on water consumption KPIs.

Identify the types of waste produced (basically hazardous and non-hazardous). In order to classify the wastes the European List of Waste (2000/532/EC) and Annex III to Directive 2008/98/EC<sup>8</sup> can be used as reference documents.

## Step 2: Measurement

Report the total weight of hazardous and non-hazardous waste by the following disposal methods:

- reuse<sup>9</sup>
- recycling<sup>10</sup>
- composting<sup>11</sup>
- recovery, including energy recovery
- incineration (mass burn)
- deep well injection<sup>12</sup>
- landfill
- on site storage.

The weight of solid waste is usually measured in **kilograms (kg)** or **tonnes** (1 t = 1,000 kg). Other measurement units can be used, in particular in the case of liquid waste where the volume of waste produced can be measured in **litres** or in **cubic meters**, Gaseous wastes are usually measured in **kilograms**.

## Step 3: Process analysis

Identify where and how much waste is produced in operations and analyze whether the production can be reduced/optimized (i.e. recycling waste materials), and whether a more environmentally friendly alternative disposal method can be used, compared with the one(s) currently adopted.

## Step 4: Defining target(s)

Establish a yearly target reduction (by % and value or as defined by international standards or local law) and define the baseline. Targets should remain in absolute terms (meaning not per item/person/revenue). A target on % waste disposed with a more environmentally friendly method compared with previous/baseline year can also be established if appropriate.

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<sup>8</sup> Directive 2008/98/EC of the European Parliament and Council of 19 November 2008 on waste and repealing certain Directives

<sup>9</sup> To reuse means using an item again after it has been used and has been discarded by the original owner/user . This includes conventional reuse where the item is used again for the same function, and new-life reuse where it is used for a different function

<sup>10</sup> [Recycling](#) is the breaking down of the used item into [raw materials](#) which are returned into the production cycle. Thermal recycling or energy recovery (combustion or conversion to thermal energy) is also commonly referred to as recycling

<sup>11</sup> Composting is nature's process of recycling decomposed organic materials into a rich soil known as compost, which can be recycled as a fertilizer and soil amendment.

<sup>12</sup> Deep well injection is a liquid waste disposal technology which uses injection wells to place treated or untreated liquid waste into geologic formations that have no potential to allow migration of contaminants into potential potable water aquifers.

#### Solid waste and Hazardous waste KPIs:

- absolute KPI: % variation of weight of waste produced per type vs. previous/baseline year;
- absolute KPI: % of recycled waste and variation compared with previous/baseline year;
- relative KPI: % variation, compared with the previous year and the baseline year, of the total waste produced per unit of production (unit of revenues, or per FTE employee, etc.);

#### Report how the waste disposal method has been determined:

- disposed of directly by the organization or otherwise directly confirmed;
- information provided by the waste disposal contractor;
- organizational,

Any increases/decrease due to expansion/reduction of activities should be explained.

#### 1.4 Air Emissions KPIs: structure

Air emissions are the gases, vapour and particles (dust) discharged into the air from sources, such as exhaust stacks, vehicle exhausts, generators and facility vents. These emissions cause air pollution, which can affect the environment as well as workers and community members. Supplier must prevent, minimize, control and regularly monitor Air emissions generated by its company operations.

In this section all the main gas emissions resulting from operations and activities are considered, with the exception of Greenhouse Gases (GHGs) which are dealt with in a dedicated section.

#### Step 1: Inventory

Identify the types of air emissions produced analyzing processes and activities as well as materials and chemicals used. The main gases to be taken into consideration are the following:

- Nitrogen Oxides - NO<sub>x</sub><sup>13</sup>
- Sulphur Oxides - SO<sub>x</sub><sup>14</sup>
- Persistent organic pollutants (POP)<sup>15</sup>

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<sup>13</sup> NO<sub>x</sub> is a generic term for the various nitrogen oxides produced during combustion. They are believed to aggravate asthmatic conditions, react with the oxygen in the air to produce ozone, which is also an irritant and eventually form nitric acid when dissolved in water. When dissolved in atmospheric moisture the result can be acid rain which can damage both trees and entire forest ecosystems.

<sup>14</sup> SO<sub>x</sub> refers to all sulphur oxides, the two major ones being sulphur dioxide (SO<sub>2</sub>) and sulphur trioxide (SO<sub>3</sub>). When sulphur dioxide combines with the oxygen (O<sub>2</sub>) in the air some sulphur trioxide is slowly formed. Sulphur trioxide rapidly combines with water to produce sulphuric acid. Man-made sources of sulphur dioxide include sour gas processing, oil sands production, coal combustion, ore refining, chemical manufacturing and other fossil fuel processing and burning.

<sup>15</sup> Persistent Organic Pollutants (POPs) are chemical substances that persist in the environment, bioaccumulate through the food web, and pose a risk of causing adverse effects to human health and the environment. With the evidence of long-range transport of these substances to regions where they have

- Volatile organic compounds (VOC) <sup>16</sup>
- Hazardous air pollutants (HAP) <sup>17</sup>
- Particulate matter (PM) <sup>18</sup>.

Identification of types and amounts of the emissions listed above requires air sampling and analysis in most cases.

### Step 2: Measurement

Calculation of the amounts of air emissions can be made carried out by measuring the air flow rates from vents and exhausts and multiplying them by the contents of air pollutants per unit volume of air, as obtained by air sampling and analysis.

### Step 3: Process analysis

Identify where air emissions are originated in operations and analyze whether their amounts (per each type) can be reduced or eliminated (i.e. by replacing some materials/chemicals used in processes/activities with more environmentally friendly alternatives or reducing the amounts used).

### Step 4: Defining target(s)

Establish a yearly target reduction (by % and value or as defined by international standards or local law) and define the baseline. Targets can be defined in both absolute and relative terms<sup>19</sup>.

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never been used or produced and the consequent threats they pose to the environment of the whole globe, the international community has now, at several occasions called for urgent global actions to reduce and eliminate releases of these chemicals. In May 1995, the United Nations Environment Programme Governing Council decided to investigate POPs, beginning with a list of the following twelve POPs, known as the 'dirty dozen: aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, polychlorinated biphenyls (PCBs), polychlorinated dibenzo-*p*-dioxins, polychlorinated dibenzofurans, and toxaphene.

<sup>16</sup> VOC are organic compounds that evaporate readily to the atmosphere. VOC are primary precursors to the formation of ground level ozone and particulate matter in the atmosphere which are the main ingredients of the air pollutant referred to as smog. Smog is known to cause serious health effects for human beings as well as harmful effects on vegetation. VOCs are widely used in household and commercial products. Some cleansers, disinfectants, waxes, glues, cosmetics, dry cleaning products, paints, varnishes and preservatives include VOCs. Gasoline, kerosene and other fuels also contain VOCs. VOCs are also found in cigarette smoke and pesticides. Some examples of VOCs include benzene, methylene chloride, hexane, toluene, trichloroethane, styrene, heptane, and perchloroethylene.

<sup>17</sup> Hazardous air pollutants, also known as toxic air pollutants or air toxics, are those pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects. Examples of toxic air pollutants include benzene, which is found in gasoline; perchlorethylene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper by a number of industries. Most air toxics originate from human-made sources, including mobile sources (e.g., cars, trucks, buses) and stationary sources (e.g., factories, refineries, power plants), as well as indoor sources (e.g., building materials and activities such as cleaning).

<sup>18</sup> Particulate matter, also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems: particles that are 10 micrometers in diameter or smaller are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects.

#### Air Emissions KPIs:

- absolute target: % variation of emission of air polluting substances (per substance type) vs. previous/baseline year;
- absolute target: % air emission pollution vs. local legislation threshold (per substance type);
- absolute target: % air emission pollution vs. international regulations threshold (per substance type);
- relative target: % variation, compared with the previous year and the baseline year, of the total emissions of air polluting substances per typer per unit of production (unit of revenues, or per FTE employee, etc.)

Any increases/decrease due to expansion/reduction of activities should be explained.

Standards, methodologies and assumptions used as well as sources of emission factors should be reported.

#### 1.5 Water discharge quality KPIs: structure

Water is critical for almost every business, whether it is a factory, farm, office, or food processing facility. Using water responsibly means limiting its use when possible, minimizing the environmental impact of water use, and properly managing wastewater.

In general, all industrial and commercial facilities that discharge wastewater or stormwater directly from a point source (a discrete conveyance such as a pipe, ditch or channel) into a water vessel (such as a lake, river, or ocean) must obtain a permit from the national or local authorities. All permits are written to ensure the receiving waters will achieve the proper quality standard.

By progressively improving the quality of discharged water or reducing volumes, the Supplier reduces its impact on the surrounding environment and on the community members.

#### Step 1: Inventory

Identify the types of substances that are discharged with wastewater, resulting from industrial processes and other activities (such as cleaning, food preparation in canteens, sanitation, etc.). Proper treatment systems should be in place, that prevent substances like heavy metals (e.g. cadmium, copper, chrome, mercury, nickel, lead and zinc), persistent organic pollutants<sup>20</sup> (e.g. organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), polychlorinated dibenzo-p-dioxins and polychlorinated

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<sup>19</sup> See explanation in the section on water consumption KPIs.

<sup>20</sup> Most of Persistent organic pollutants (POPs) are characterized by low water solubility. They persist for long periods of time in the environment and can accumulate and pass from one species to the next through the food chain.

dibenzofurans (PCDD/Fs), perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA)), oils etc. to be discharged in water vessels or in municipal sewage systems.

### Step 2: Measurement

The concentrations of the substances discharged with wastewater after proper treatment must be compliant with the thresholds set by national and local legislations and international standards which usually include allowable concentrations of Biochemical Oxygen Demand (BOD)<sup>21</sup>, Chemical Oxygen Demand (COD)<sup>22</sup>, Suspended Solids (SS)<sup>23</sup>, Nitrogen, Phosphorus, etc. Most such concentrations are expressed in mg/l (milligrams/ liter).

Measure the total volume (m<sup>3</sup>, litres) of planned and unplanned water discharge by:

- destination;
- quality of the water including treatment method;
- whether it was reused by another organization.
- 

### Step 3: Process analysis

Identify where polluting substances discharged with wastewater are originated in operations and analyze whether their amounts (per each type) can be reduced or eliminated (i.e. by replacing some materials/chemicals used in processes/activities with more environmentally friendly alternatives or reducing the amounts used).

### Step 4: Defining target(s)

Establish a yearly target reduction (by % and value or as defined by international standards or local law) and define the baseline. In this specific case absolute targets are sufficient.

Water discharge quality KPIs:

- absolute target: % variation of concentration of the substances identified during inventory before sending water to discharges per type;
- absolute target: % variation of the quality of discharged water (with respect to the limit concentrations set by local/national legislation.

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<sup>21</sup> BOD measures the amount of oxygen required or consumed for the microbiological decomposition (oxidation) of organic material in water. The presence of high BOD may indicate faecal contamination or increases in particulate and dissolved organic carbon from non-human and animal sources that can restrict water use and development, necessitate expensive treatment and impair ecosystem health.

<sup>22</sup> Chemical oxygen demand (COD) is often used to measure organic matter in wastewater, treated effluent, and receiving waters. High levels of COD in water often correlate with threats to human health including toxic algae blooms bacteria from organic wastes and seafood contamination.

<sup>23</sup> Suspended solids (SS) is the amount of tiny solid particles that remain suspended in water and act as a colloid.

Any increases/decrease due to expansion/reduction of activities should be explained. Standards, methodologies and assumptions used should be reported.

#### 1.6 Greenhouse Gases (GHG) KPI: structure

Most of the energy is generated by fuels such as natural gases, gasoline, wood, diesel oil or propane to power plants and buildings. This produces Greenhouse Gases or GHGs emissions such as:

- carbon dioxide (CO<sub>2</sub>),
- methane (CH<sub>4</sub>),
- nitrous oxide (N<sub>2</sub>O),
- hydrofluorocarbons (HFCs) and hydrofluorochlorocarbons (HCFCs),
- perfluorocarbons (PFCs),
- sulphur hexafluoride (SF<sub>6</sub>),

which trap heat in the atmosphere causing global climate change.

It is critical that Suppliers optimize energy use, using systems and procedure to reduce energy requirements, and thereby minimising negative impact on environment.

#### Step 1: Inventory

a) Identify *direct* GHG emissions<sup>24</sup> from sources that are owned or controlled by the company:

- generation of electricity, heating, cooling and steam. These emissions results from combustion of fuels in stationary sources: such as boilers, furnaces, turbines;
- emissions from chemical production in owned or controlled process equipment such as cement, steel, aluminium, waste processing;
- fugitive emissions. These emissions result from intentional or unintentional releases, such as equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting; hydro fluorocarbon (HFC) emissions from refrigeration and air conditioning equipment; and methane leakages from gas transport;
- transportation of materials, products, waste, employees, and passengers. These emissions result from the combustion of fuels in mobile combustion sources owned or controlled by the organization (such as trucks, trains, ships, airplanes, buses, cars).

b) Identify *indirect* GHG emissions<sup>25</sup> that results from the generation of electricity, heating cooling and steam which is purchased for own consumption by the company.

#### Step 2: Measurement

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<sup>24</sup> Such emissions are usually referred to as Scope 1 emissions by the GHG Protocol.

<sup>25</sup> Such emissions are usually referred to as Scope 2 emissions by the GHG Protocol.

Measurement of direct GHG emissions is normally complicated. GHG emissions are rather calculated: a popular option, mostly adopted by businesses and organizations, is to collect first of all the following information:

- quantities of fuels used to heat and cool buildings per type (e.g. natural gas, heating oil, coal, wood);
- quantities of vehicle fuels purchased for the company fleet per type (e.g. gasoline, diesel, liquefied petroleum gas (LPG), compressed natural gas (CNG));
- quantities of fuel used to produce electricity for own use per type (e.g. diesel oil for generators, natural gas for co-generation systems);
- quantities of refrigerant gases replaced in cooling systems per type (e.g. HFCs and HCFCs).

If fuel and plant/system (and vehicle) characteristics are not known, one can use tables with factors that allow easy conversion of amounts of fuels into amounts of GHGs that are made available by organizations such as the Greenhouse Gas Protocol ([www.ghgprotocol.org](http://www.ghgprotocol.org)) often together with calculation tools.

The same applies to indirect emissions. However conversion factors for purchased electricity can also be obtained directly by power companies and/or national/local energy authorities.

Emissions of each gas can be calculated separately or aggregated using the CO<sub>2</sub> equivalent (CO<sub>2</sub>e) unit of measurement<sup>26</sup> for all of them.

Guidance to GHG emissions (Scope 1 and 2) calculations is provided in Annex II.

### Step 3: Process analysis

Identify where GHG emissions originate in operations and analyze whether their amounts (per each type) can be reduced or eliminated (e.g. by reducing/optimizing electricity and fuel consumption, buying/producing electricity from renewable sources such as solar panels or wind turbines).

### Step 4: Defining target(s)

Establish a yearly target reduction per type of emissions (Scope 1 and 2, by % and value or as defined by international standards or local law) and define the baseline. Targets can be defined in both absolute and relative terms<sup>27</sup>. Targets can be set for each greenhouse gas, or be cumulative and measured in kg (or multiples such as metric tonnes [t], million tonnes [Mt]) CO<sub>2</sub>e.

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<sup>26</sup> A **carbon dioxide equivalent** or **CO<sub>2</sub> equivalent**, abbreviated as **CO<sub>2</sub>e** is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential. The carbon dioxide equivalent for a gas is derived by multiplying the tonnes of the gas by the associated GWP: For example, the GWP for methane is 21 and for nitrous oxide 310. This means that emissions of 1 metric tonne of methane and nitrous oxide respectively is equivalent to emissions of 21 and 310 metric tonnes of carbon dioxide.

<sup>27</sup> See explanation in the section on water consumption KPIs.

GHG emission KPIs:

- absolute target: % variation of CO<sub>2</sub>e emissions per Scope vs. previous/baseline year.
- relative target: % variation, compared with the previous year and the baseline year, of CO<sub>2</sub>e emissions per Scope per unit of production (unit of revenues, or per FTE employee, etc.)

Any increases/decrease due to expansion/reduction of activities should be explained. Standards, methodologies and assumptions used as well as sources of emission factors should be reported.

## Information Sources

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- *The Global Reporting Initiative* - [www.globalreporting.org](http://www.globalreporting.org)
- *The Greenhouse Gas Protocol* – [www.ghgprotocol.org](http://www.ghgprotocol.org)
- *European Commission – Environment Directorate General* - <http://ec.europa.eu/dgs/environment/>
- *European Environment Agency* - [www.eea.europa.eu](http://www.eea.europa.eu)
- *US Environmental Protection Agency* - [www.epa.gov](http://www.epa.gov)
- *Environment Canada* - [www.ec.gc.ca](http://www.ec.gc.ca)
- *Sustainable Energy Authority of Ireland* - [www.seai.ie](http://www.seai.ie)
- *United Nations Environment Programme - Division of Technology, Industry and Economics/Chemical Branch* - [www.chem.unep.ch](http://www.chem.unep.ch)
- *Intergovernmental Panel on Climate Change* - [www.ipcc.ch](http://www.ipcc.ch)

## Annex I – Energy Consumption Calculation Tool

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The original Energy Consumption Calculation Tool has been developed by the Sustainable Energy Authority of Ireland (SEAI); JAC added some additional features.

Unless stated otherwise the conversion factors are those used by SEAI Energy Policy Statistical Support Unit for statistical purposes.



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## Annex II – Guidance to Energy Consumption & GHG Emission Calculation

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Guidelines V1.1.xls