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Re: PPC Permit KP3235SS Waste and Water audits

As required by permit condition 2.4.1.2 (efficient use of raw materials) I hereby submit our waste minimisation and water efficiency audit for 2015.

In order to ensure that all waste streams from on-site activities were captured during the audit process, a process flow analysis was undertaken (Figure 1) which identified all inputs and outputs. Each waste stream was then evaluated with consideration being given to its final fate in line with the waste management hierarchy. The results of this evaluation are presented in table 1.

With respect to the water audit the usage and disposal of water was identified through the process flow and then evaluated in table 2.

Please contact me if you wish to discuss further.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'Shane Alder', followed by a horizontal line.

Shane Alder

HSE Manager

Fig 1 IQE Europe Ltd Process flow - resource inputs and waste outputs

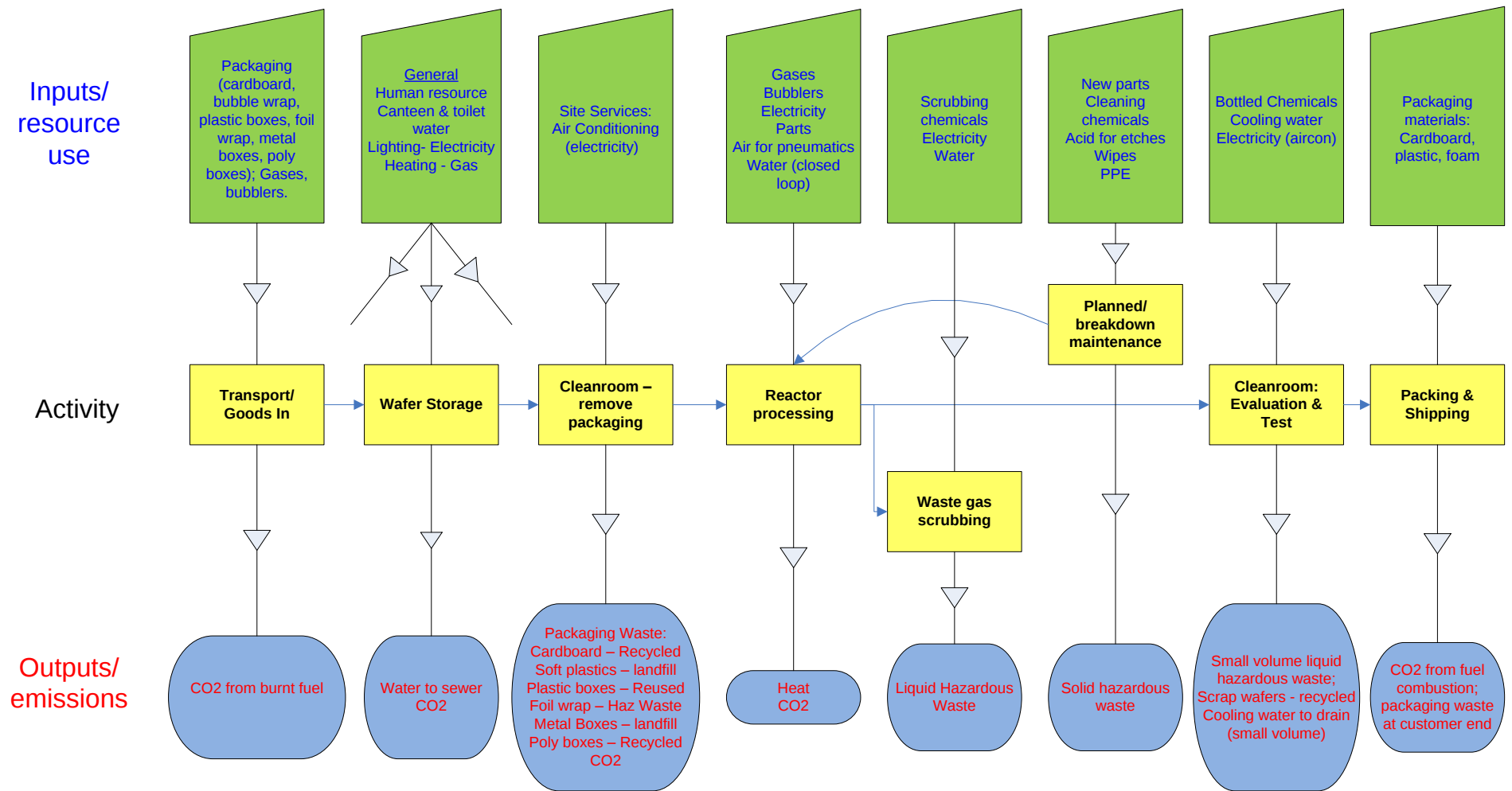


Table 1 – IQE Europe Ltd: Waste Streams

Process	Waste Stream	Treatment	Commentary
Goods In/ Wafer unpacking	Packaging waste Cardboard	Recycled	Due to current customer requirements it is not possible to re-use this packaging material. 100% of all cardboard waste is recycled.
Goods In/ Wafer unpacking	Packaging waste Soft Plastic	Landfill	Soft plastic waste is generated in the form of pallet shrink wrap. The quantity generated is estimated as being < 40kg making recycling financially prohibitive. Currently landfilled as the best practicable option.
Goods In/ Wafer unpacking	Packaging waste Hard plastic	Partial internal Reuse or recycled	Some wafers are delivered in hard plastic boxes. 20% are currently recycled for internal use with the remainder being sent for recycling.
Goods In/ Wafer unpacking	Packaging waste Foil wrap	Hazardous waste - incineration	No recycling opportunity currently available due to low level toxic contamination. Incineration is the only disposal option for this waste stream.
Goods In/ Wafer unpacking	Packaging waste Metal boxes	Partial internal reuse or landfill	Some wafers arrive in metal boxes, a small proportion are recycled for internal use with the remainder being landfilled.
Goods In/ Wafer unpacking	Packaging waste Poly boxes	Recycled	A small proportion are re-used on site. The remainder are recycled via external contractor. This is the best practicable environmental option for this waste stream.
Gas scrubbers	Sodium Hypochlorite solution	Hazardous waste – chemical treatment	Treated and discharged. The only other alternative is on site treatment and discharge to reduce transport CO2 emissions.
Maintenance	Solid toxics (Inc. arsenic salts)	Hazardous waste – incineration	Best option due to toxic properties.
Maintenance	Solid toxics (Inc. phosphorus)	Hazardous waste – incineration	Best option due to toxic properties.
Cleanroom	Mixed waste acids	Hazardous waste – chemical treatment	Approx. 200l per month is chemically treated. Best option in place
Cleanroom	Scrap wafers	Hazardous waste – recycled	Scrap wafers are recycled to reclaim heavy metals
Personnel	Food	Food waste in landfilled	No canteen on site, very little food waste produced
Personnel	Coffee cups	Coffee cups are recycled	
General	Batteries	Recycled	Some batteries used on site. Employees are actively encouraged to bring batteries used at home to work so they can be recycled on their behalf.

Table 2 – IQE Europe Ltd: Water audit

Process utilising water	Quantity used	Commentary
Cleanroom – measurement kit	Closed loop	No improvement required
Air conditioning / Chiller systems	Closed loop	No improvement required
Reactor cooling system	Closed loop	No improvement required
Toilets and wash basins	20l per person (x90) =1800l per day = 12,600l per week	Assuming site manned at full level for 7 days. Manning level reduced to 15 personnel on nightshifts and weekends.
Scrubbers	5615 litres/ week (based on 2014 data)	Two new scrubbers have been installed with larger capacity tanks than the old units. Small increase in consumption as a direct result of tank capacity.
De-ionised water	1500l per week	Only used for rinsing tasks following equipment cleaning. It is not possible to use normal tap water due to purity requirements.
Chemstations and lab sinks	Circa 7,500l per week	Variable Demand
Maintenance activities Eg topping up and hosing down etc.	10,000l/week	Variable demand
Total consumption	Approx. 50,000 litres per week +/- 5000 litres	Variable demand based on scrubber loading, cleanroom and maintenance activities.