

### Supplementary S1: *SimaPro* processes used for the components of this case study

Table 1 - *SimaPro* processes identified as the most suitable for the case studies under assessment

Sector	Scenario	Original Item	Transformed value per functional unit	Processes	Notes
Antenna	0, A, B	Aluminium	0.3 t	Aluminium, primary, ingot {IAI Area, EU27 & EFTA}  aluminium, ingot, primary, import from Northern America   Cut-off, S	-
	0, A, B	Concrete	64.5 t	Concrete, high exacting requirements {CH}  concrete production, for building construction, with cement CEM II/A   Cut-off, S	-
	0, A, B	Steel	14.8 t	Reinforcing steel {Europe without Austria}  reinforcing steel production   Cut-off, S & Reinforcing steel {RoW}  production   Cut-off, S	-
	0, A, B	Building machines	9651.6 L	Diesel, burned in building machine {GLO}  processing   Cut-off, S	-
	0, A, B	Diesel generators	0.153 t	Diesel-electric generating set, 650 kVA (0.52 MW) {RER}	1
Power Plant	0	LiFePO <sub>4</sub> batteries	0.13 kg	Battery, Li-ion, rechargeable, prismatic {GLO}  market for   Cut-off, S	Process chosen in Market due to the lack of information regarding the origin of the batteries and their transport to

<sup>1</sup> Due to the lack in the *SimaPro* database of a diesel generator similar to the one present in the New Norcia station, a new process was modelled starting from the “Diesel-electric generating set, 10MW {RER}| diesel-electric generating set production, 10MW | Cut-off, S”. This process was modified in order to create a new process able to model the impacts of a 650 Kva (0.52MW) generator.

Sector	Scenario	Original Item	Transformed value per functional unit	Processes	Notes
Component maintenance	0, A, B	Modular UPS transformers	22 kg	Transformer, high voltage use {GLO}  market for   Cut-off, S	New Norcia -
	0	Solar panels	0.34 kg	Photovoltaic cell, single-Si wafer {RoW}  production   Cut-off, S	2
Energy	0, A, B	Diesel	10000 L/y	Diesel {GLO}  market group for   Cut-off, S	-
	0	Electricity	890 MWh/y	Electricity, high voltage {AU}  market for   Cut-off, S	In scenario 0, only 890 Mwh/y were purchased from the Australian energy grid as 470 Mwh/y were self-produced by the photovoltaic panels
	A		1360 MWh/y	Electricity, high voltage {AU}  market for   Cut-off, S	-
	B		1360 MWh/y	Electricity, high voltage {ES}  market for   Cut-off, S	-
	0, A, B	Electricity production	10000 L/y	Diesel, burned in diesel-electric generating set {GLO}  market for   Cut-off, S	-
Transports	0, A, B	Trucks	Various	Transport, freight, lorry, unspecified {RoW}  transport, freight, lorry, all sizes, EURO3 to generic market for   Cut-off, S & Transport, freight, lorry, unspecified {RER}  transport, freight, lorry, all sizes, EURO3 to generic market for   Cut-off, S	Due to the lack of specific information on transport and its characteristics, the general and unspecified process was chosen

<sup>2</sup> Due to the lack in the *SimaPro* database of solar panels similar to those present in the New Norcia station, a new process was modelled starting from “Photovoltaic cell, single-Si wafer {RoW}| production | Cut-off, S. The aim was to represent ESA-owned photovoltaic panels (1.6 m · 1 m). For this circumstance, the new process was modelled starting from the ecoinvent process which referred to a photovoltaic solar panel (1 m 1 m).

Sector	Scenario	Original Item	Transformed value per functional unit	Processes	Notes
	0, A, B	Ships	Various	Transport, freight, sea, container ship {GLO}  market for transport, freight, sea, container ship   Cut-off, S	Due to the lack of specific information on transport and its characteristics, the general and unspecified process was chosen
<b>Maintenance (Gearbox oil)</b>	0, A, B	Gearbox oil	50 L/y (gearbox oil); Various components	Lubricating oil {RoW}  production   Cut-off, S	Maintenance also includes batteries, transformers and solar panels. These components' processes are the same as mentioned above in the respective sectors of this table
<b>Disposal</b>	0, A, B	Gearbox oil disposal	-	Refinery sludge {RoW}  treatment of, sanitary landfill   Cut-off, S Spent solvent mixture {RoW}  market for spent solvent mixture   Cut-off, S Gearbox oil (waste treatment)_recycling	The recycling process in an empty process due to Cut-off criteria
	0, A, B	Aluminium disposal	-	Waste aluminium {RoW}  treatment of, sanitary landfill   Cut-off, S Scrap aluminium {RoW}  treatment of, municipal incineration   Cut-off, S Aluminium scrap, post-consumer, prepared for melting {RoW}  treatment of metal scrap, mixed, for recycling, unsorted, sorting   Cut-off, S	-
	0, A, B	Concrete disposal	-	Waste concrete {RoW}  treatment of, inert material landfill   Cut-off, S Municipal solid waste {RoW}  treatment of,	-

Sector	Scenario	Original Item	Transformed value per functional unit	Processes	Notes
	0, A, B	Steel disposal	-	incineration   Cut-off, S Waste reinforced concrete {RoW}  treatment of waste reinforced concrete, recycling   Cut-off, S Scrap steel {RoW}  treatment of, inert material landfill   Cut-off, S Scrap steel {RoW}  treatment of scrap steel, municipal incineration   Cut-off, S Waste reinforcement steel {RoW}  treatment of waste reinforcement steel, recycling   Cut-off, S Inert waste {RoW}  treatment of, sanitary landfill   Cut-off, S	-
	0, A, B	Diesel generators disposal	-	Scrap steel {RoW}  treatment of scrap steel, municipal incineration   Cut-off, S Diesel-electric generating set (waste treatment)_recycling	The recycling process in an empty process due to Cut-off criteria
	0, A, B	Transformers disposal	-	Waste electric and electronic equipment {GLO}  treatment of, shredding   Cut-off, S Residue from mechanical treatment, industrial device {RoW}  treatment of, municipal waste incineration   Cut-off, S Transformers (waste treatment)_recycling	The recycling process in an empty process due to Cut-off criteria
	0	Batteries disposal	-	Waste electric and electronic equipment {GLO}  treatment of, shredding   Cut-off, S Used Li-ion battery {GLO}  treatment of used Li-ion battery, pyrometallurgical treatment   Cut-off, S Batteries (waste treatment)_recycling	The recycling process in an empty process due to Cut-off criteria
	0	photovoltaic panels	-	Waste electric and electronic equipment {GLO}	The recycling process in an

Sector	Scenario	Original Item	Transformed value per functional unit	Processes	Notes
		disposal		treatment of, shredding   Cut-off, S Residue from mechanical treatment, industrial device {RoW}  treatment of, municipal waste incineration   Cut-off, S Solar panels (waste treatment)_recycling	empty process due to Cut-off criteria

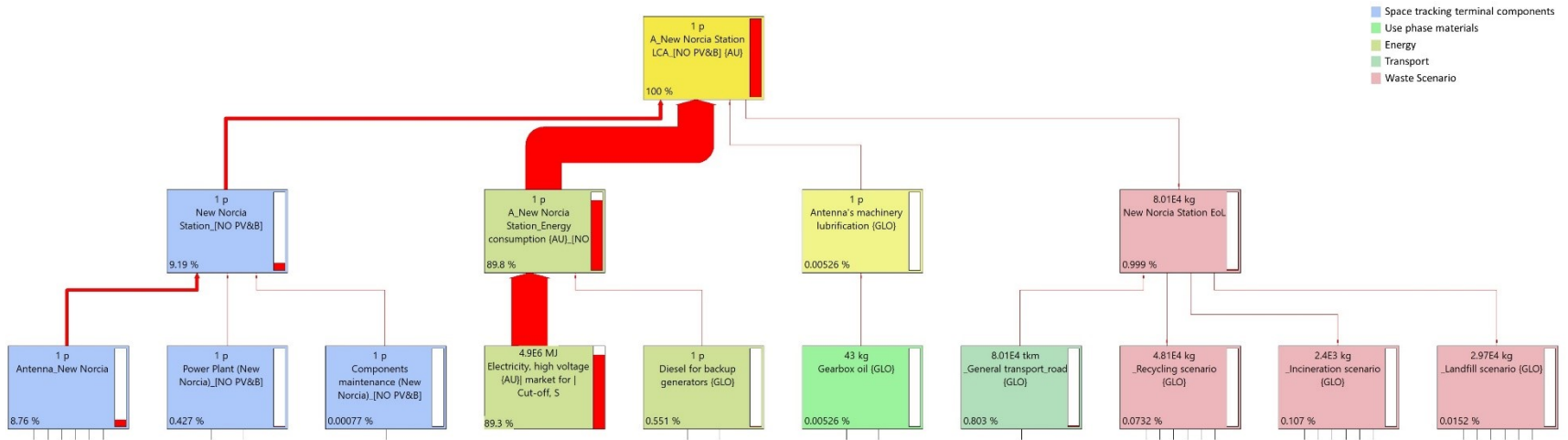


Figure 1: (Scenario A) New Norcia Life Cycle Assessment flowchart including only the 3 upper levels of the model. The red lines below the last reported level correspond to further sub-categories. Furthermore, the components that present [NO PV and B] indicate that all the raw materials, energies, etc. inherent to the photovoltaic panels (PV) and batteries (B) are not present inside that component.

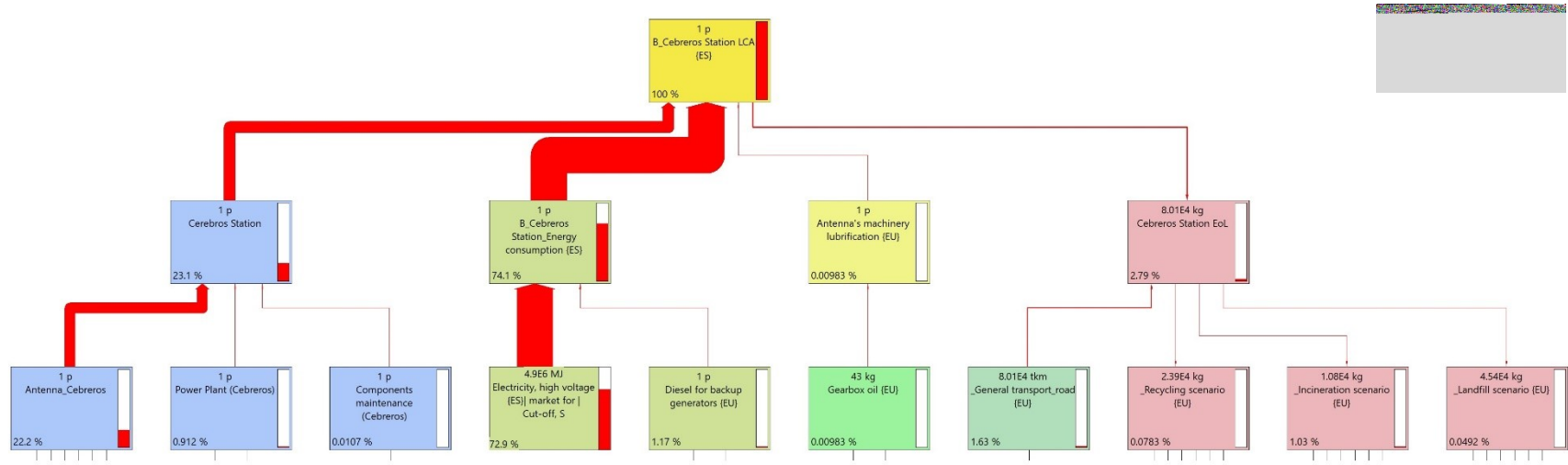


Figure 2: (Scenario B) Cereberos Life Cycle Assessment flowchart including only the 3 upper levels of the model. The red lines below the last reported level correspond to further sub-categories. Furthermore, the components that present (Cereberos) indicate that all the raw materials, energies, etc. inherent to the photovoltaic panels (PV) and batteries (B) are not present inside that component. Finally, in this scenario, all energies and transport have been remodelled on a Spanish basis.

**Supplementary S2: List of acronyms**

Table 2: Endpoint indicators acronymous

<b>Endpoint Indicators</b>	
<i>DALY</i>	Disability-adjusted life year
<i>Species.yr</i>	Species lost per year
<i>USD2013</i>	Surplus cost in United States dollar

Table 3: Endpoint indicators acronymous

<b>Midpoint Indicators</b>	
<i>CO<sub>2eq</sub></i>	Carbon dioxide equivalent
<i>CFC<sub>11eq</sub></i>	Trichlorofluoromethane equivalent
<i>KBq<sub>eq</sub></i>	KiloBecquerel equivalent
<i>NO<sub>xeq</sub></i>	Nitrogen oxides equivalent
<i>PM<sub>2.5eq</sub></i>	Fine particulate matter (2.5 microns or smaller in size) equivalent
<i>SO<sub>2eq</sub></i>	Sulfur dioxide equivalent
<i>P<sub>eq</sub></i>	Phosphorus equivalent
<i>N<sub>eq</sub></i>	Nitrogen equivalent
<i>1,4-DCB<sub>eq</sub></i>	1,4-Dichlorobenzene equivalent
<i>m<sup>2</sup>a crop<sub>eq</sub></i>	m <sup>2</sup> ×yr annual crop land equivalent
<i>Cu<sub>eq</sub></i>	Copper equivalent