Acción C2: Análisis socioeconómico y de sostenibilidad ambiental: Análisis de Coste Beneficio, Ciclo de Vida y Huella de Carbono y Ambiental

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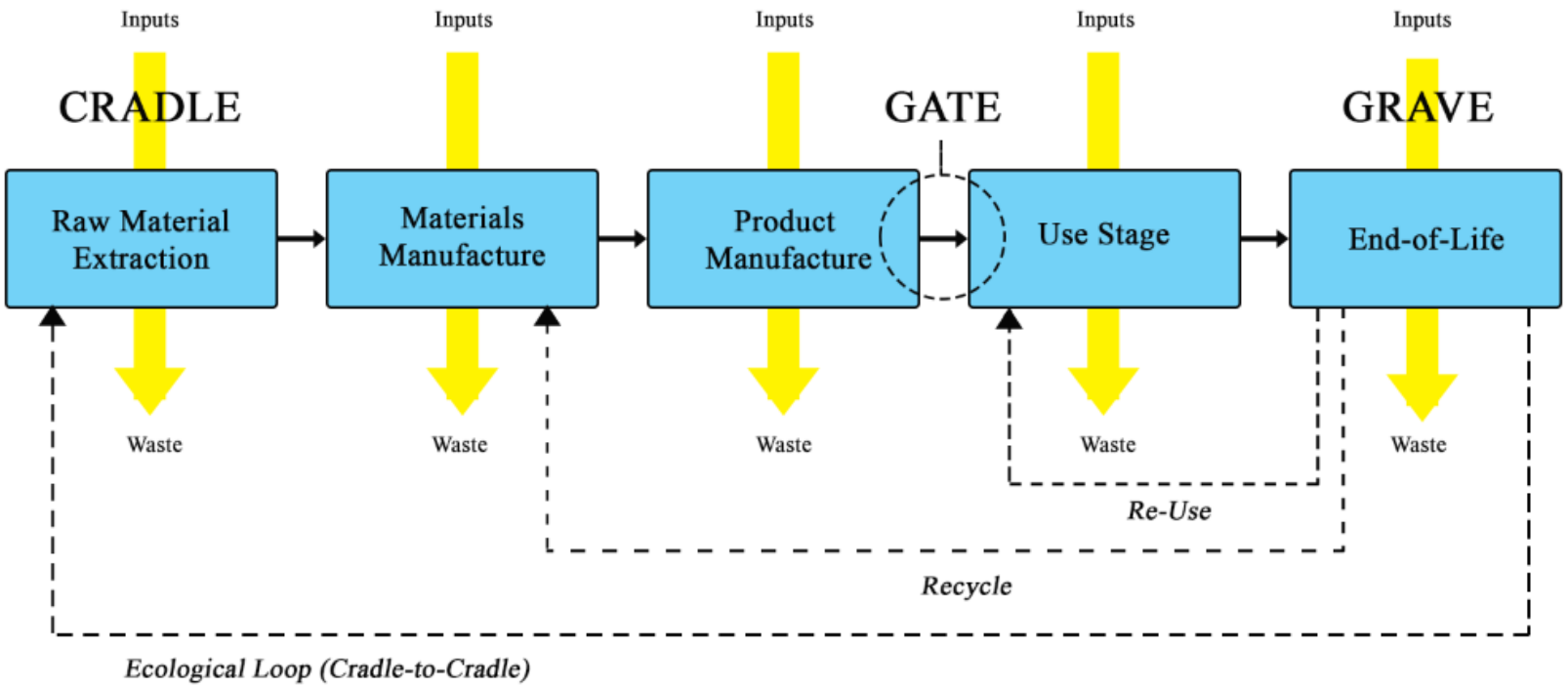
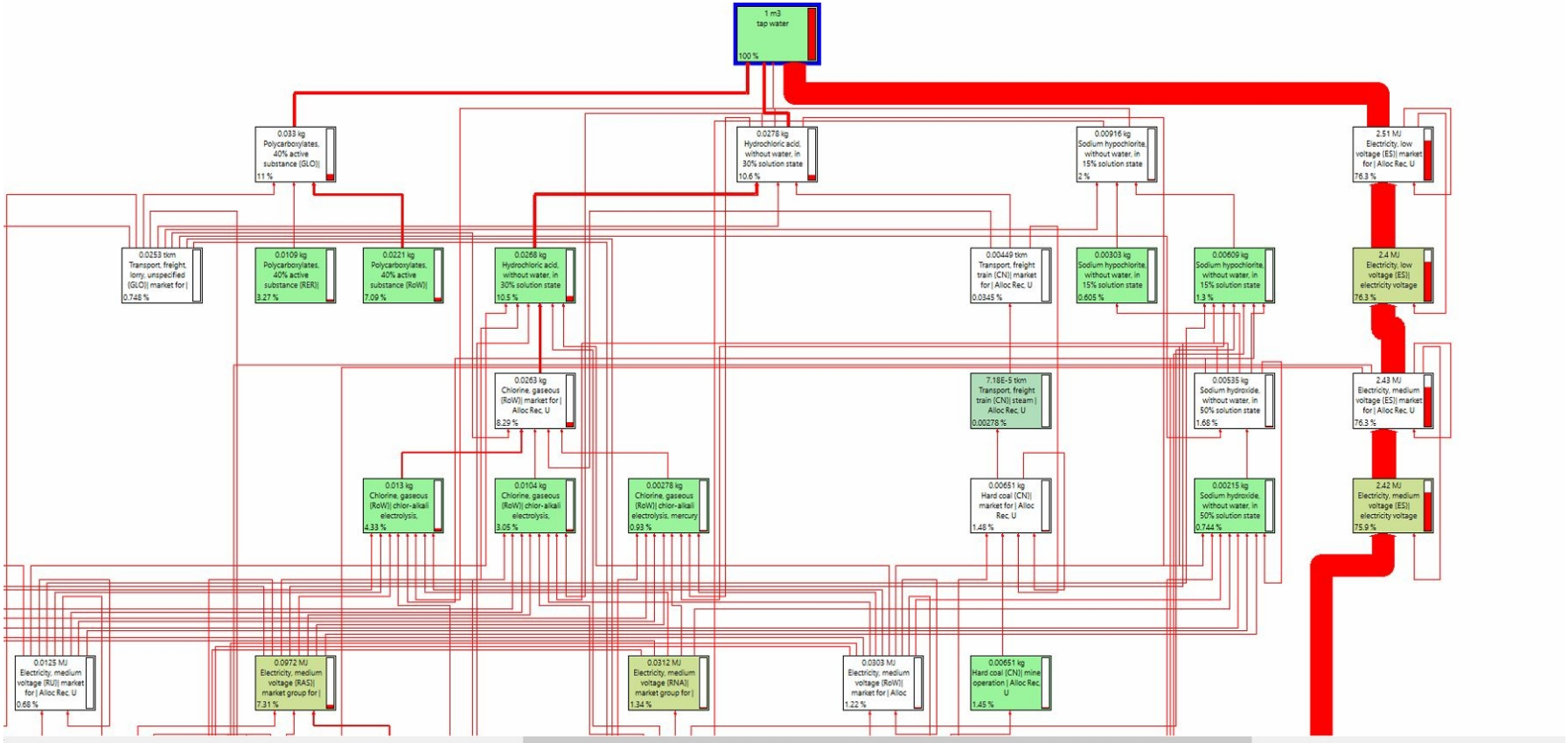
Francisco José González Gómez, UGR
Miguel Ángel García Rubio, UGR
Fernando Alguacil Duarte, PhD student

LIFE CYCLE ASSESSMENT

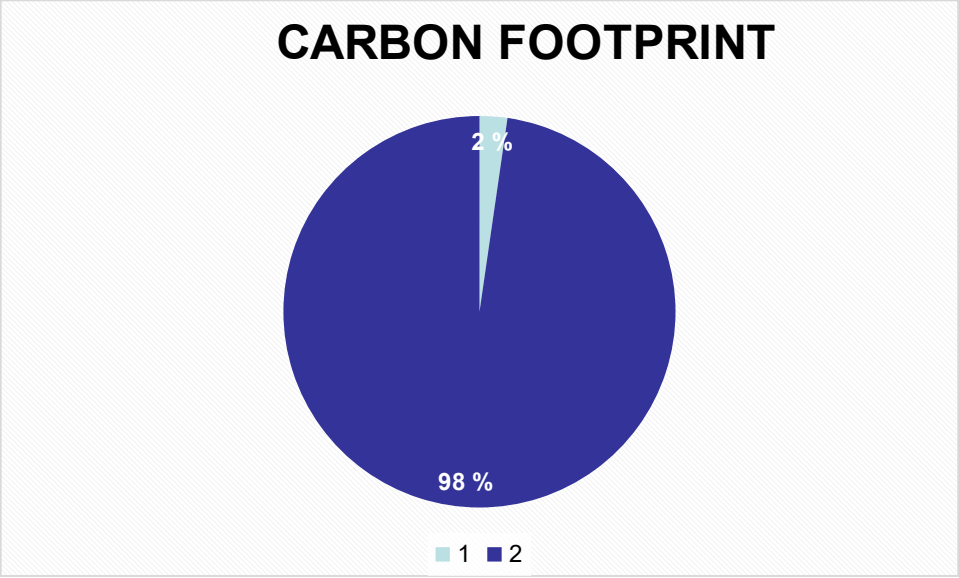




Unidad funcional/Unidad de Análisis: m³ agua apta para abastecimiento
Límites del sistema: Gate to Gate
Software: SimaPro
Base de datos: Ecoinvent

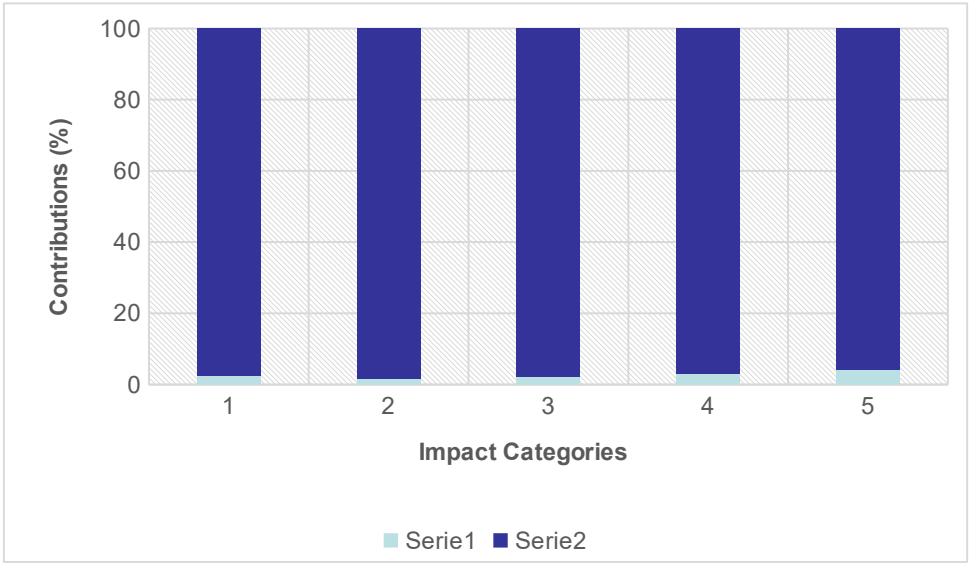
Comparison of Ecogranularwater vs Reverse Osmosis plant infrastructure

Inputs	CARBON FOOTPRINT (kg CO2 eq)
INFRAESTRUCTURE (osmosis)	1,51E-04
INFRAESTRUCTURE (ecogranularwater)	6,42E-03



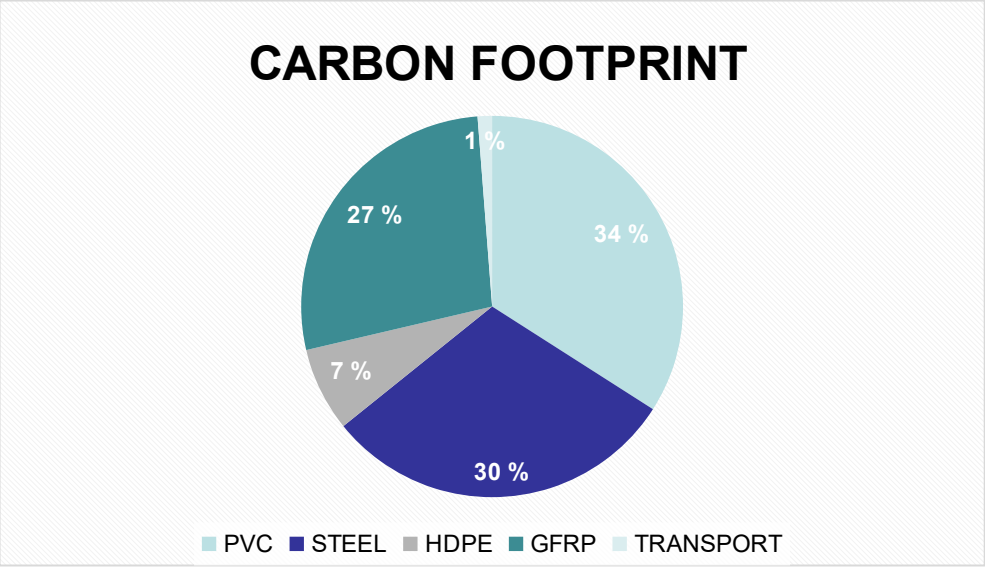
Comparison of Ecogranularwater vs Reverse Osmosis plant infrastructure

Impacts per m3 FU		INFRAESTRUCTURA (ósmosis)	INFRAESTRUCTURA (ecogranularwater)
Carbon footprint	kg CO2 eq	1,51E-04	6,42E-03
Photochemical ozone formation	kg NMVOC eq	5,42E-07	3,37E-05
Acidification	molc H+ eq	8,52E-07	3,90E-05
Freshwater eutrophication	kg P eq	6,96E-08	2,38E-06
Freshwater ecotoxicity	CTUe	3,94E-03	9,36E-02



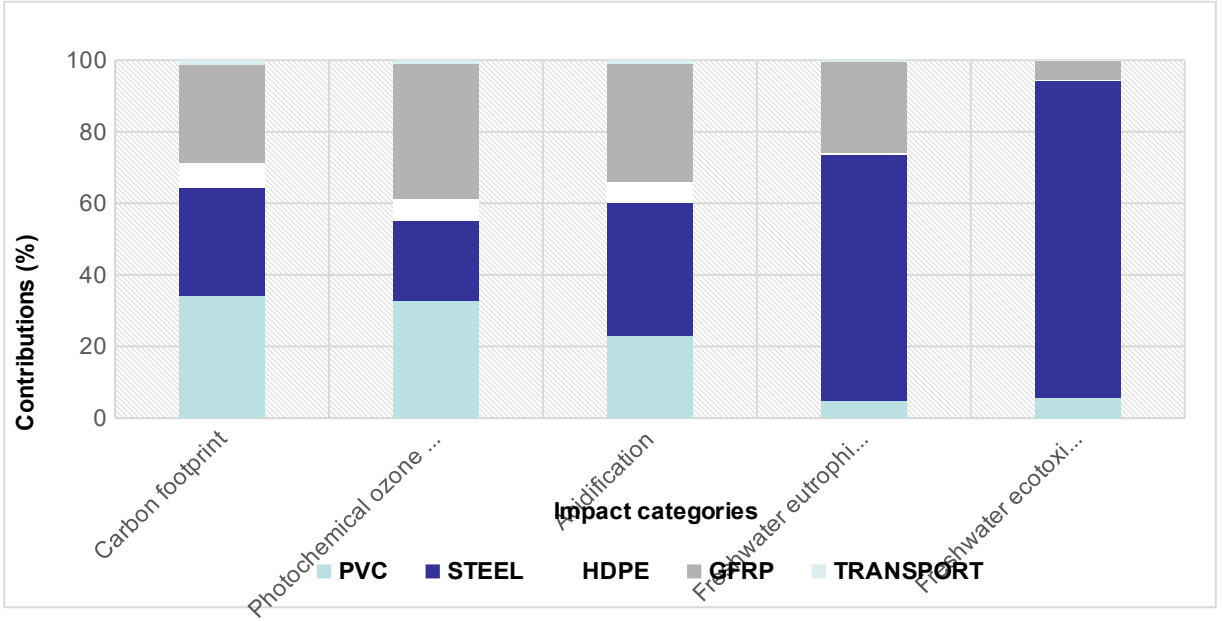
Results of the assessment of the Reverse Osmosis plant infrastructure

Inputs	CARBON FOOTPRINT (kg CO2 eq)
PVC	2,23E-05
STEEL	1,97E-05
HDPE	4,66E-06
GFR	1,80E-05
TRANSPORT	7,99E-07



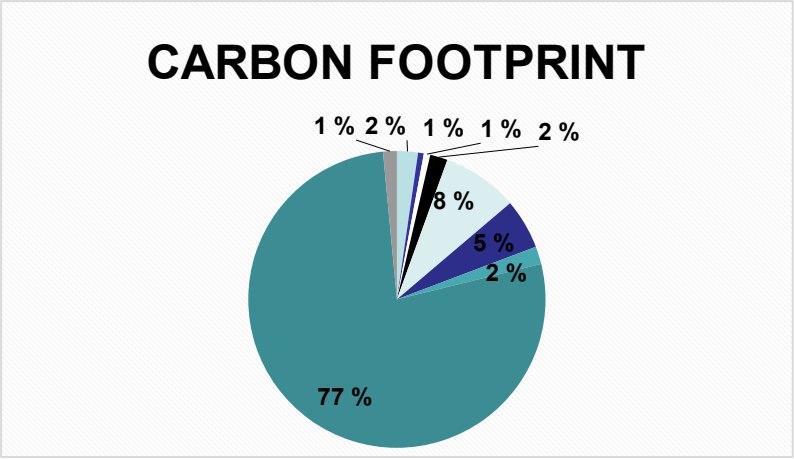
Results of the assessment of the Reverse Osmosis plant infrastructure

Characterization						
Impacts per m3 FU		PVC	STEEL	HDPE	GFR	TRANSPORT
Carbon footprint	kg CO2 eq	2,23E-05	1,97E-05	4,66E-06	1,80E-05	7,99E-07
Photochemical ozone formation	kg NMVOC eq	9,99E-08	6,77E-08	1,93E-08	1,15E-07	2,97E-09
Acidification	molc H+ eq	7,48E-08	1,21E-07	1,87E-08	1,07E-07	3,29E-09
Freshwater eutrophication	kg P eq	9,93E-10	1,38E-08	6,69E-11	5,14E-09	7,24E-11
Freshwater ecotoxicity	CTUe	1,30E-04	2,06E-03	8,53E-06	1,21E-04	4,98E-06



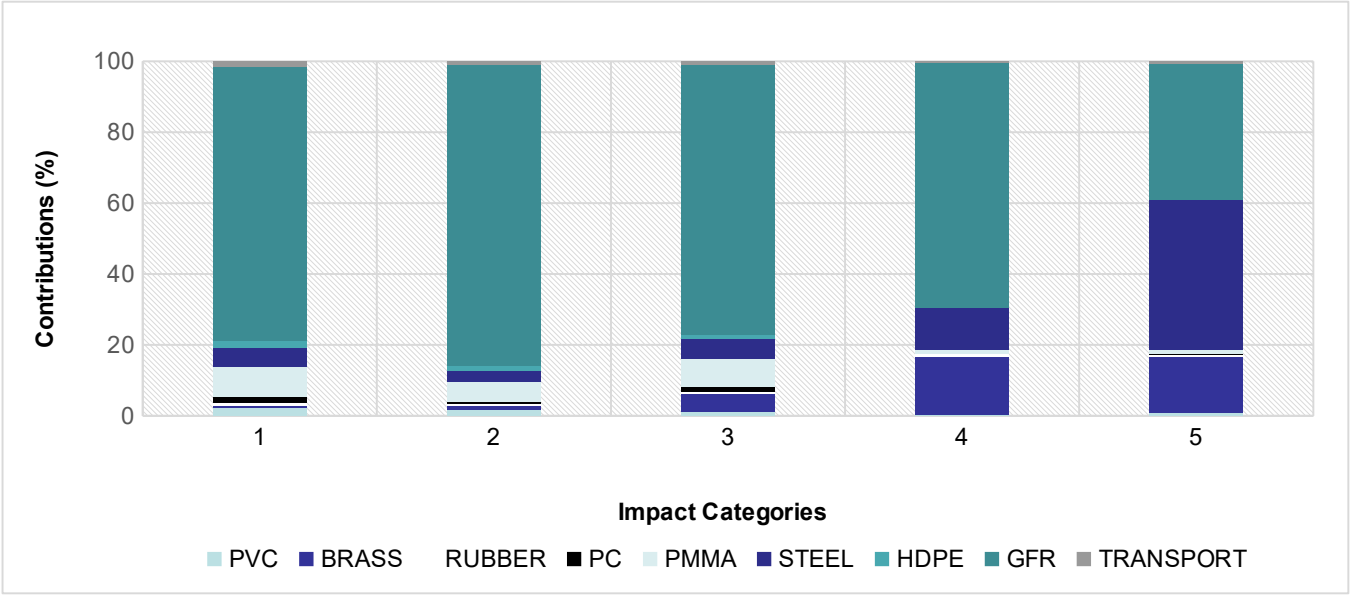
- Results of the assessment of the Ecogranularwater plant infrastructure

Inputs	CARBON FOOTPRINT (kg CO2 eq)
PVC	1,19E-04
BRASS	3,24E-05
RUBBER	3,70E-05
PC	9,89E-05
PMMA	4,29E-04
STEEL	2,84E-04
HDPE	1,01E-04
GFR	4,02E-03
TRANSPORT	7,77E-05



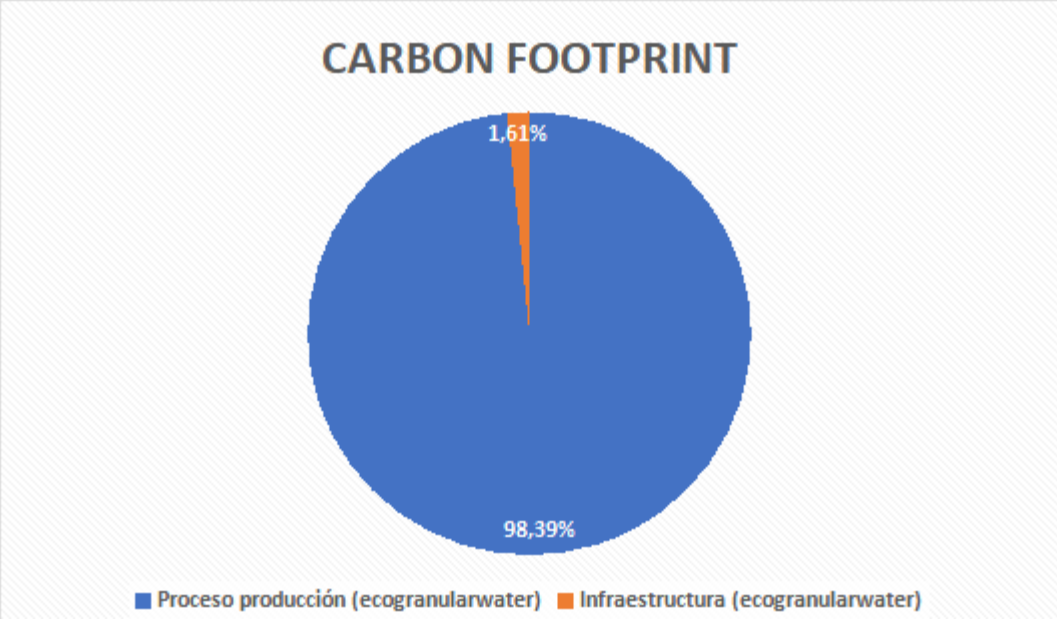
- Results of the assessment of the Ecogranularwater plant infrastructure

Characterization										
Impacts per m3 FU		PVC	BRASS	RUBBER	PC	PMMA	STEEL	HDPE	GFR	TRANSPORT
Carbon footprint	kg CO2 eq	1,19E-04	3,24E-05	3,70E-05	9,89E-05	4,29E-04	2,84E-04	1,01E-04	4,02E-03	7,77E-05
Photochemical ozone formation	kg NMVOC eq	5,33E-07	3,13E-07	1,39E-07	2,31E-07	1,68E-06	9,74E-07	4,16E-07	2,57E-05	2,89E-07
Acidification	molc H+ eq	3,99E-07	1,56E-06	2,14E-07	3,75E-07	2,51E-06	1,73E-06	4,03E-07	2,39E-05	3,20E-07
Freshwater eutrophication	kg P eq	5,29E-09	2,74E-07	1,14E-08	2,72E-09	1,72E-08	1,99E-07	1,44E-09	1,15E-06	7,05E-09
Freshwater ecotoxicity	CTUe	6,94E-04	1,12E-02	2,66E-04	1,75E-04	8,93E-04	2,97E-02	1,84E-04	2,70E-02	4,84E-04



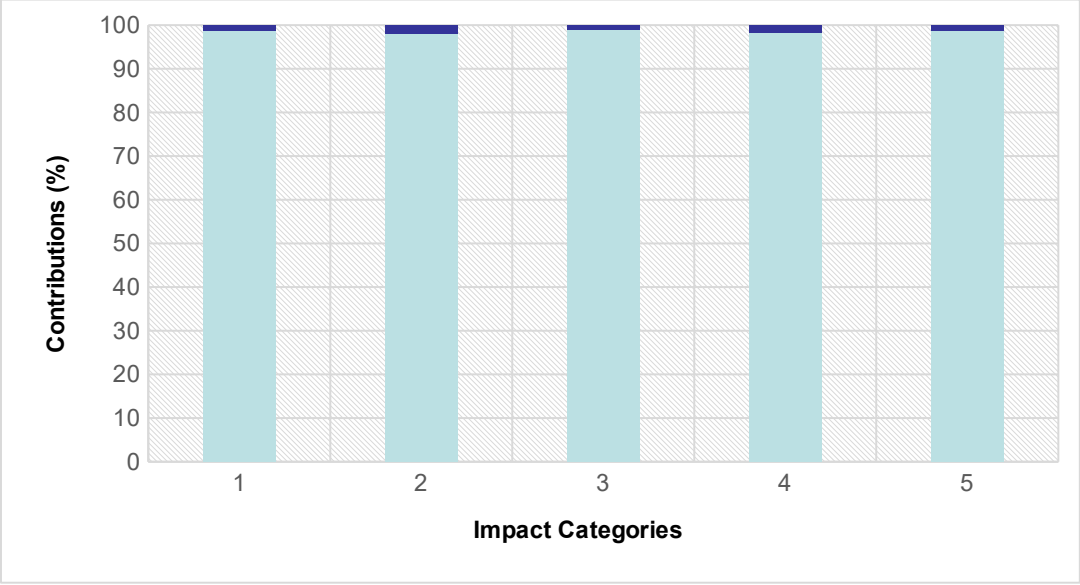
Comparison between the infrastructure and the production process of the Ecogranularwater plant

Inputs	CARBON FOOTPRINT (kg CO2 eq)
Production process (ecogranularwater)	3,92E-01
Infraestructure (ecogranularwater)	6,42E-03



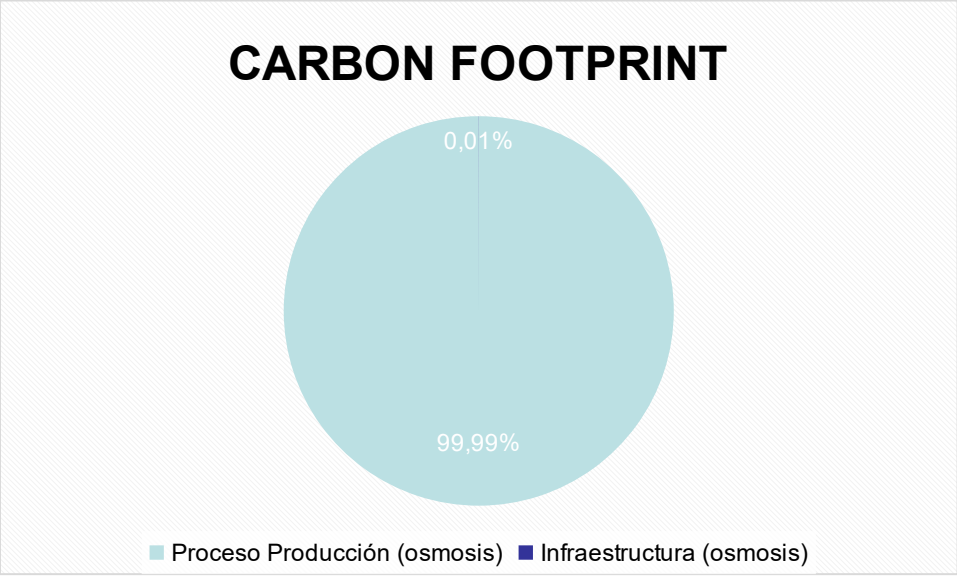
Comparison between the infrastructure and the production process of the Ecogranularwater plant

Impacts per m3 FU		Proceso producción (ecogranularwater)	Infraestructura (ecogranularwater)
Carbon footprint	kg CO2 eq	3,92 E-01	6,42E-03
Photochemical ozone formation	kg NMVOC eq	1,34E-03	3,37E-05
Acidification	molc H+ eq	2,63E-03	3,90E-05
Freshwater eutrophication	kg P eq	1,04E-04	2,38E-06
Freshwater ecotoxicity	CTUe	5,22 E+00	9,36E-02



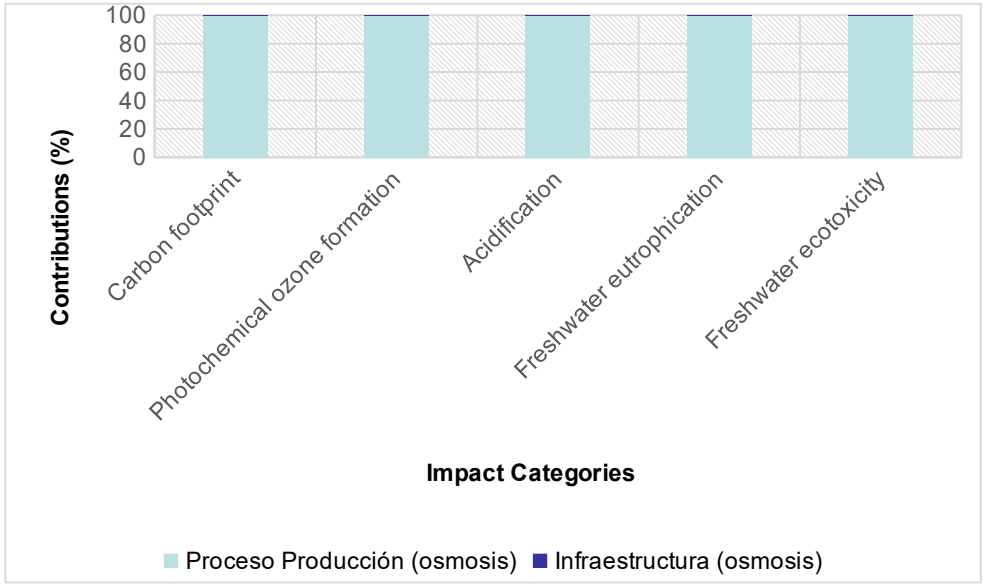
Comparison between the infrastructure and the production process of the Reverse Osmosis

Inputs	CARBON FOOTPRINT (kg CO2 eq)
Production process (osmosis)	1,02E+00
Infraestructure (osmosis)	1,51E-04



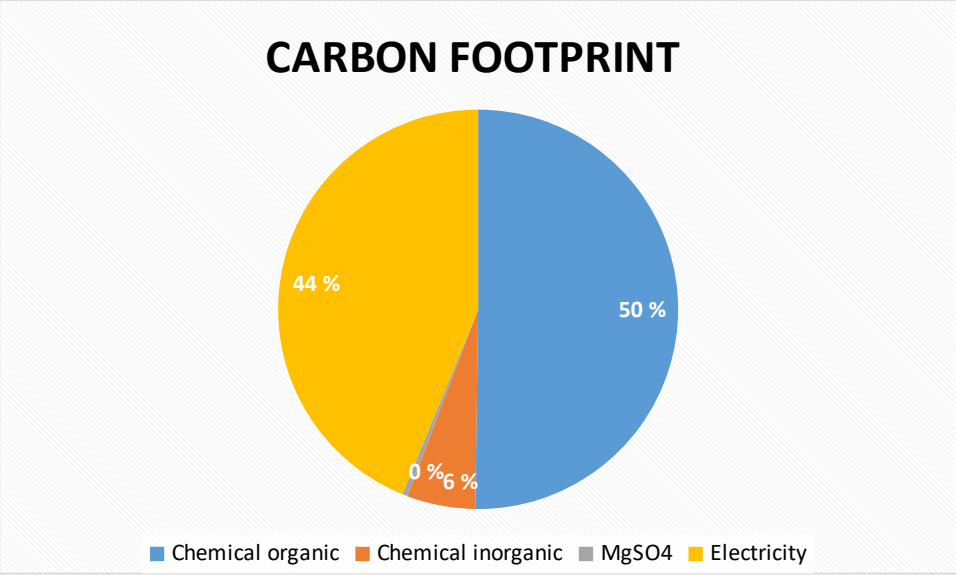
Comparison between the infrastructure and the production process of the Reverse Osmosis plant

Impacts per m3 FU		Proceso Producción (osmosis)	Infraestructura (osmosis)
Carbon footprint	kg CO2 eq	1,02E+00	1,51E-04
Photochemical ozone formation	kg NMVOC eq	3,27E-03	5,42E-07
Acidification	molc H+ eq	8,17E-03	8,52E-07
Freshwater eutrophication	kg P eq	3,34E-04	6,96E-08
Freshwater ecotoxicity	CTUe	2,41E+01	3,94E-03



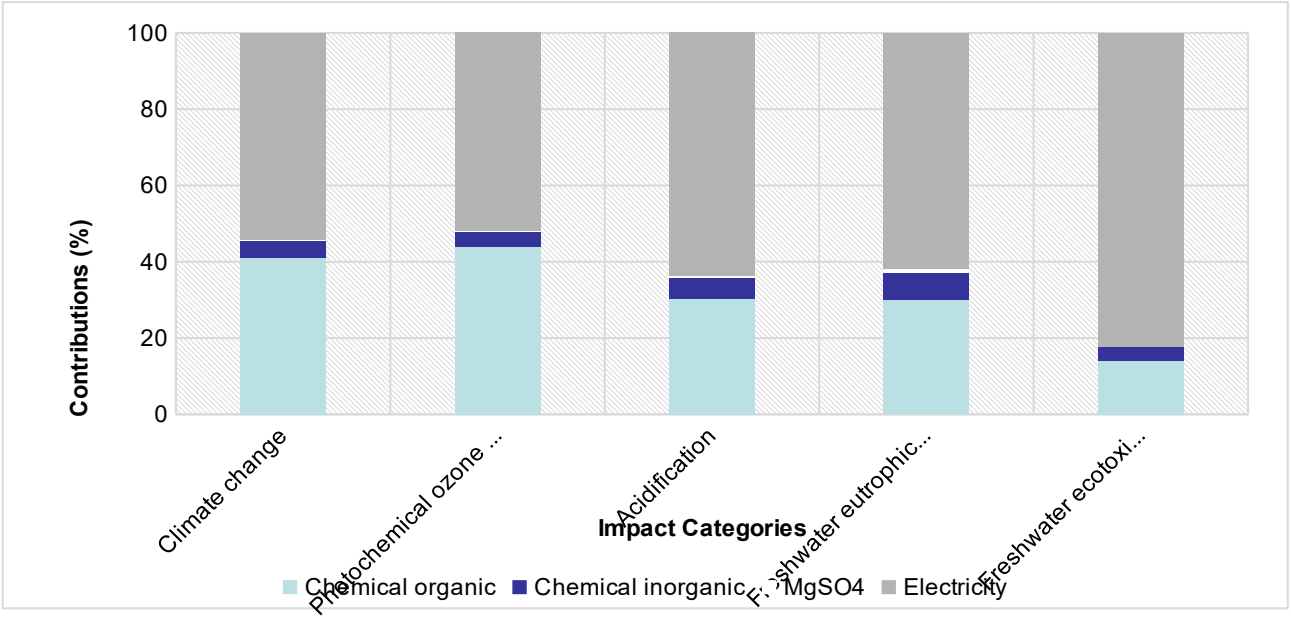
Results of the assessment of the Ecogranularwater plant production process

Inputs	CARBON FOOTPRINT (kg CO2 eq)
Chemical organic	1,97E-01
Chemical inorganic	2,17E-02
MgSO4	1,64E-03
Electricity	1, 1,72 E-01



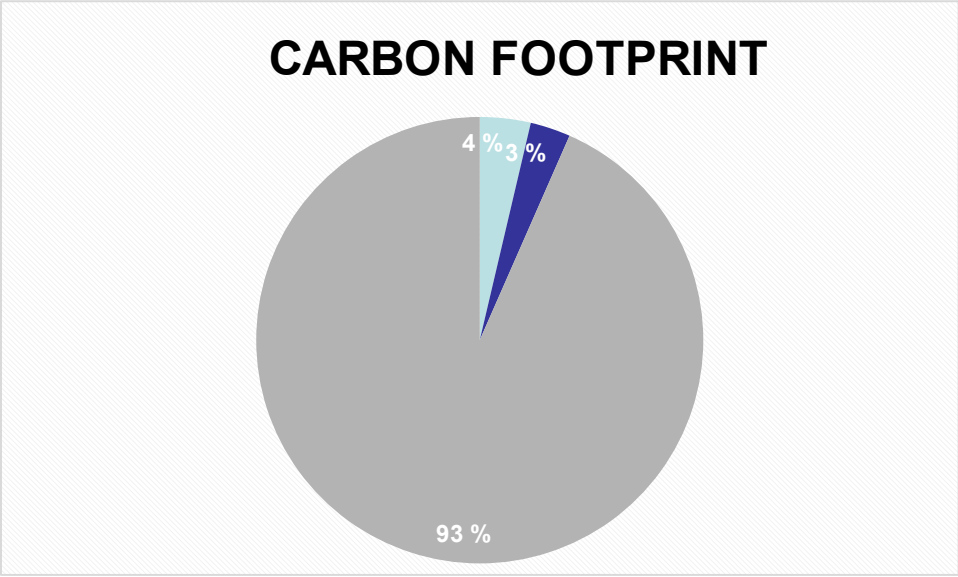
Results of the assessment of the Ecogranularwater plant production process

Impacts per m3 FU		Chemical organic	Chemical inorganic	MgSO4	Electricity
Carbon footprint	kg CO2 eq	1,97E-01	2,17E-02	1,64E-03	1,72 E-01
Photochemical ozone formation	kg NMVOC eq	7,16E-04	6,27E-05	4,41E-06	5,60 E-04
Acidification	molc H+ eq	1,02E-03	1,85E-04	1,02E-05	1,41 E-03
Freshwater eutrophication	kg P eq	3,96E-05	9,42E-06	1,40E-06	5,38 E-05
Freshwater ecotoxicity	CTUe	1,01E+00	2,58E-01	1,53E-02	3,93 E+00



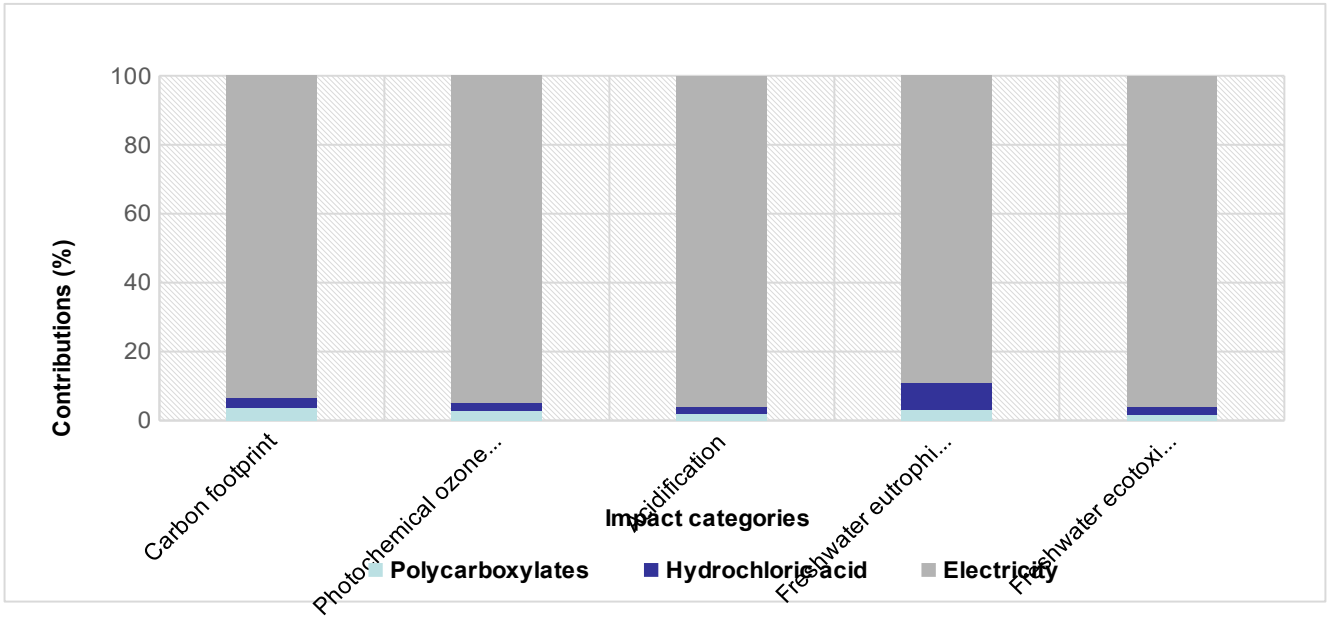
Results of the assessment of the Reverse Osmosis plant production process

Inputs	CARBON FOOTPRINT (kg CO2 eq)
Polycarboxylates	3,74E-02
Hydrochloric acid	2,96E-02
Electricity	9,52E-01



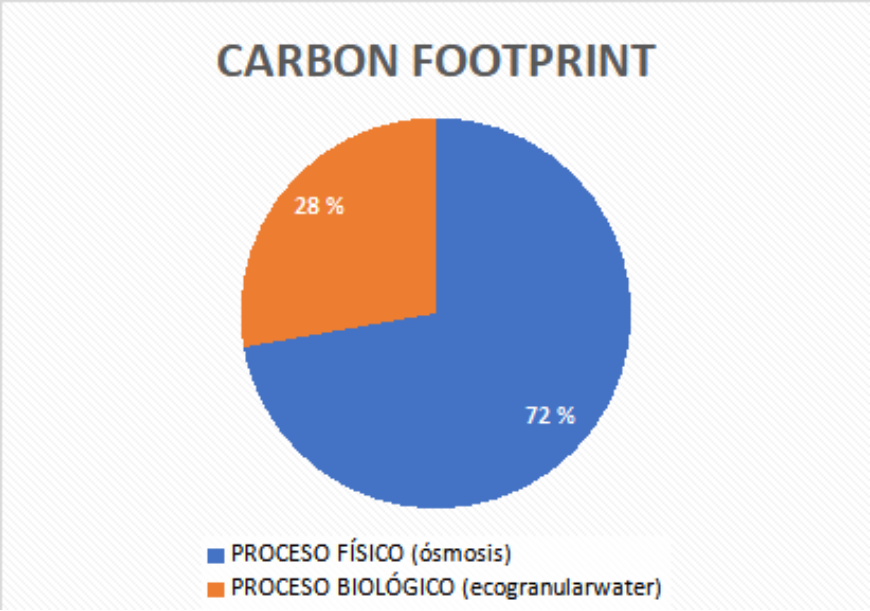
Results of the assessment of the Reverse Osmosis plant production process

Characterization				
Impacts per m3 FU		Polycarboxylates	Hydrochloric acid	Electricity
Carbon footprint	kg CO2 eq	3,74E-02	2,96E-02	9,52E-01
Photochemical ozone formation	kg NMVOC eq	9,18E-05	7,58E-05	3,10E-03
Acidification	molc H+ eq	1,50E-04	1,87E-04	7,84E-03
Freshwater eutrophication	kg P eq	1,11E-05	2,53E-05	2,98E-04
Freshwater ecotoxicity	CTUe	3,84E-01	5,31E-01	2,18E+01



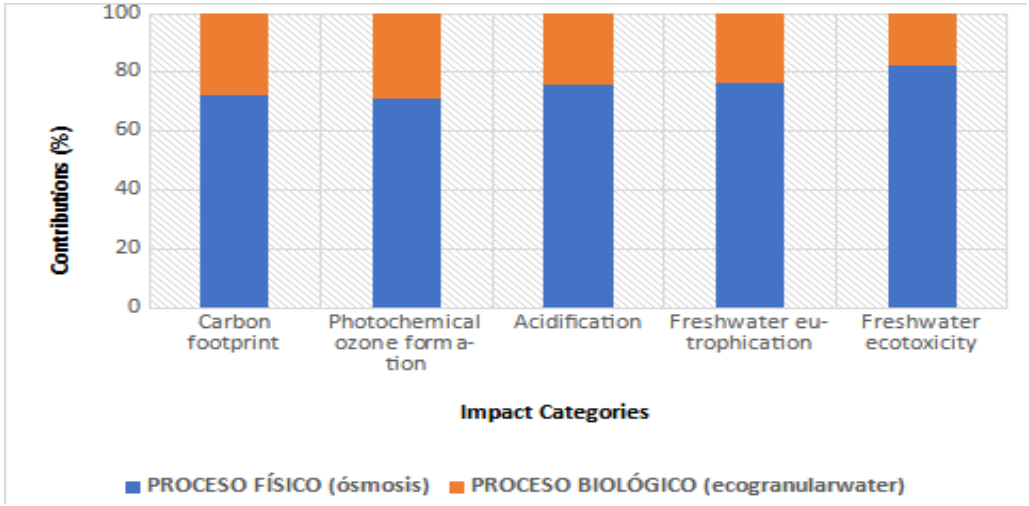
Comparison between the production processes of the Ecogranularwater plant and the reverse osmosis plant

Inputs	CARBON FOOTPRINT (kg CO2 eq)
ECOGRANULARWATER	3,92E-01
OSMOSIS	1,02 E00



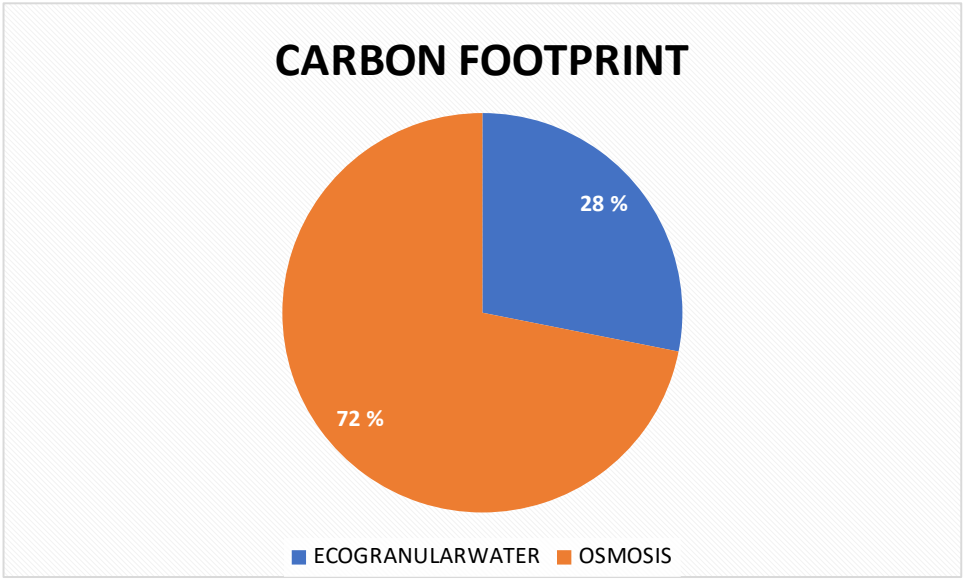
Comparison between the production processes of the Ecogranularwater plant and the reverse osmosis plant

Impacts per m3 FU		ECOGRANULARWATER	OSMOSIS
Carbon footprint	kg CO2 eq	3,92E-01	1,02E+00
Photochemical ozone formation	kg NMVOC eq	1,34E-03	3,27E-03
Acidification	molc H+ eq	2,63 E-03	8,17E-03
Freshwater eutrophication	kg P eq	1,04E-04	3,35E-04
Freshwater ecotoxicity	CTUe	5,22 E+00	2,41E+01



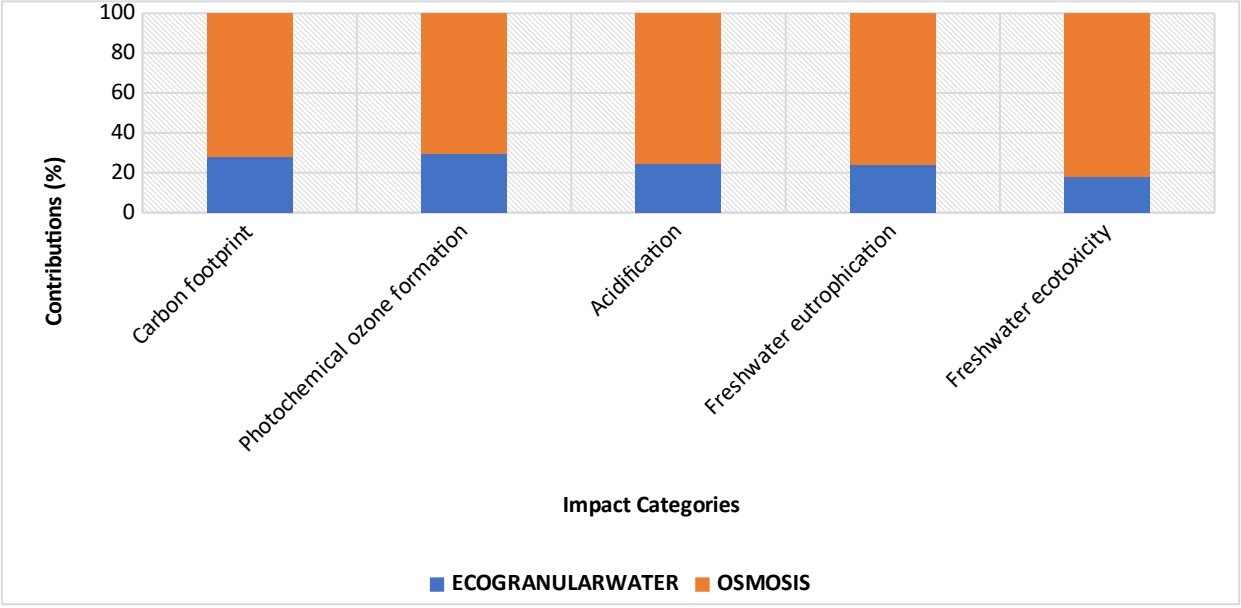
Comparison between Ecogranularwater and Reverse Osmosis treatment plants

Inputs	CARBON FOOTPRINT (kg CO2 eq)
PROCESO FÍSICO (ósmosis)	1,02E+00
PROCESO BIOLÓGICO (ecogranularwater)	3,980E-01



Comparison between Ecogranularwater and Reverse Osmosis treatment plants

Impacts per m3 FU		PROCESO FÍSICO (ósmosis)	PROCESO BIOLÓGICO (ecogranularwater)
Carbon footprint	kg CO2 eq	1,02E+00	4,80E-01
Photochemical ozone formation	kg NMVOC eq	3,27E-03	1,63E-03
Acidification	molc H+ eq	8,17E-03	3,36E-03
Freshwater eutrophication	kg P eq	3,34E-04	1,32E-04
Freshwater ecotoxicity	CTUe	2,41E+01	7,24E+00




DISEÑO DE LOS COMPONENTES DE LA PLANTA
DISEÑO INSTALACIÓN ELÉCTRICA. ESQUEMA UNIFILAR

Acción C2: Análisis socioeconómico y de sostenibilidad ambiental: Análisis de Coste Beneficio, Ciclo de Vida y Huella de Carbono y Ambiental

Gracias por su atención

Francisco José González Gómez, UGR
Miguel Ángel García Rubio, UGR
Fernando Alguacil Duarte, PhD student