Life cycle assessment of various ALPLA packaging units and alternative materials - Poland

Update Version 3.1

Model Version 3.1.0

Roland Fehringer, January 10th 2024

c7-consult e.U. **A-**2453 Sommerein, Lindau 21 **T** +43 2168 62 861 **E** office@c7-consult.at **W** www.c7-consult.at

Content

- Introduction, Overview & Method
- Input Data
- Results LCA
- Summary

c7-consult
sustainable performance

Introduction, Overview & Method

Starting point

- In a nutshell, the public perception of beverage packaging is as follows:
  - Plastic bottles and aluminium cans have a negative environmental image
  - In most cases, glass bottles have a positive environmental image
- The political parameters include, for example:
  - The EU's circular economy package
  - EU Directive on Single-Use Plastics
    - Product design
    - Extended producer responsibility
    - Targets for separate collection
- Do public perception and the current political parameters tally with the facts and figures?

Aim of the analysis

- The aim of the analysis is to calculate a **life cycle assessment** in line with ISO 14044 for PET **packaging units** and alternative packaging materials for certain beverages, foods and detergents which are consumed via the food retail sector in ten countries.
- The purpose of the life cycle assessment is to promote an **objective discussion** of the environmental evaluation of the beverage packaging examined on the basis of the latest set of data.
- The results of the initial life cycle assessment 2019 are confirmed by an independent **reviewer**.
- This report includes an update to the latest Ecoinvent version 3.10 (December 2023), updating of the waste management condistions and expansion to additional countries.

Scope of the analysis

- The entire analysis comprises 59 material-content combinations for **brand name products** typically found in Austria. The packaging units are not necessarily representative of the market. The aim is not to depict the mix of packaging units found in the Austrian market.

content	capacity [l]	PET OW	rPET 50% OW	rPET 100% OW	PET MW	rPET 50% MW	rPET 100% MW	HDPE OW	rHDPE 50% OW	rHDPE 100% OW	PP OW	Pouch OW	Glass OW	Glass MW	Alu-can OW	Fe-can OW	beverage carton OW	
water	1,0	×	×	×	×	×	×						×	×				8
milk	1,0	×	×	×				×	×	×			×	×			×	9
juice	1,0	×	×	×									×	×			×	6
beer	0,5	×	×	×									×	×	×			6
CSD	0,5	×	×	×	×	×	×						×	×	×			9
food jar	0,35	×	×	×									×			×		5
ketchup	0,30	×	×	×				×	×	×	×		×					8
detergent	1,5	×	×	×				×	×	×	×	×						8
		8	8	8	2	2	2	3	3	3	2	1	7	5	2	1	2	59

- The entire analysis comprises 21 countries:
  - Austria, Belgium, Brazil, China, Czech Republic, France, Germany, Hungary, India, Italy, Mexico, Netherlands, Poland, Romania, Serbia, South Africa, Spain, Turkey, United Arab Emirates, United Kingdom, United States of America
- **Country variations**:
  - **NOTE:** The masses of the bottles, container, caps and labels are not changed for the country variations. It is assumed that brand name products have a very similar shape, mass and quality all over the world.
  - Country specific data are used for raw materials use and production, electricity mix, transport distances and waste management conditions - share of separate collection and recycling.

Analysed container

c7-consult
sustainable performance

	PET OW	PET MW	HDPE	PP	Pouch	Glass OW	Glass MW	ALU can	FE can	Carton
water 1,0 l										
milk 1,0 l										
juice 1,0 l										
beer 0,5 l										
CSD 0,5 l										
food jar 0,35 l										
ketchup 0,3 l										
detergent 1,5 l										

Procedure

1. **Definition** of functional unit and system boundary per content
2. **Data collection**: Production of raw materials, supply of energy and fuels, transport distances, filling, washing, distribution to retailer and waste management conditions
3. **Transformation** of life cycle data into environmental impacts
4. **Accounting** of the entire life cycle
5. **External review** and sensitivity analysis
6. **Interpretation** of results

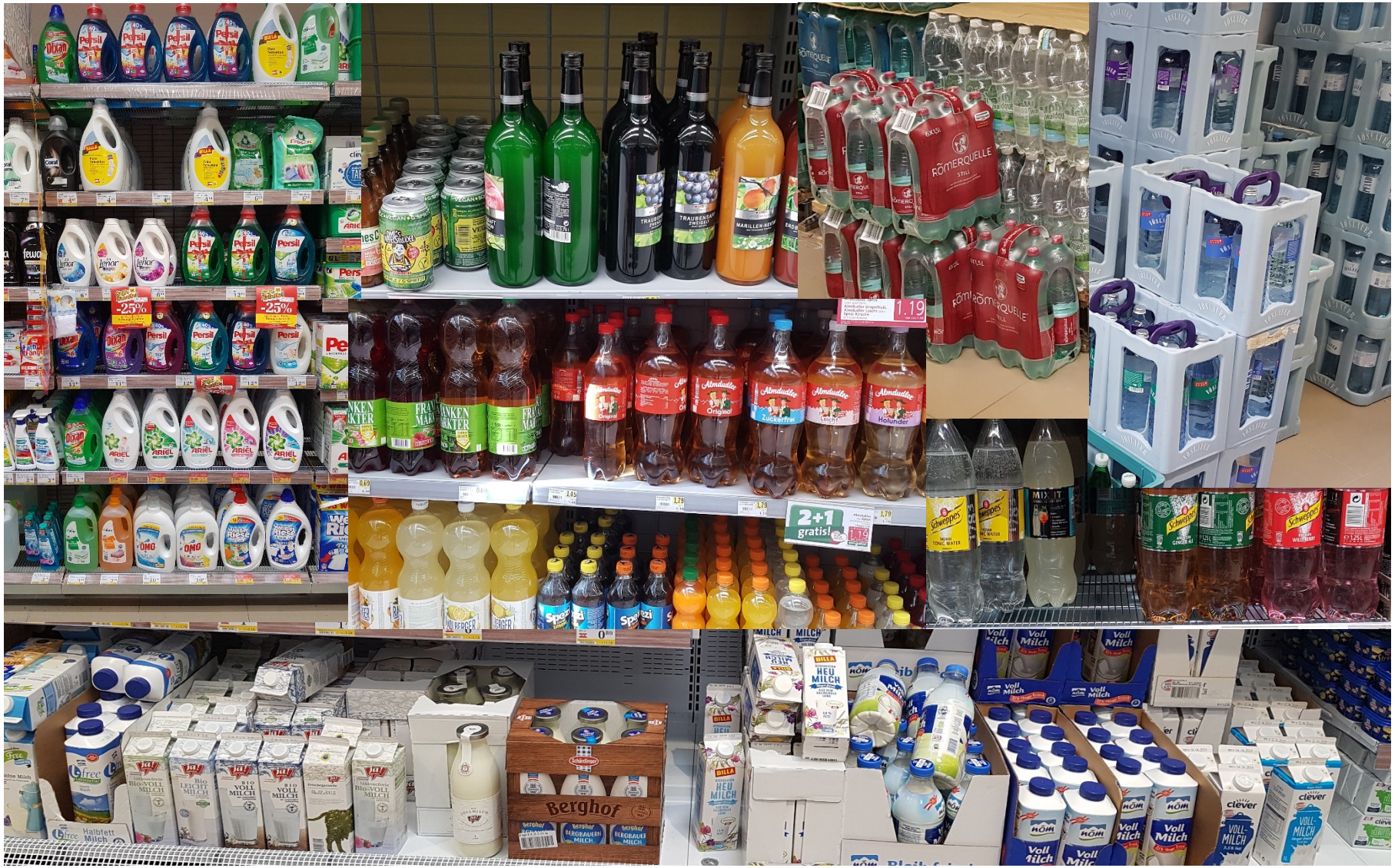
Functional unit

- Functional unit - filling volumes
  - 1 litre of mineral water
  - 1 litre of milk
  - 1 litre of juice
  - 0.5 litres of beer
  - 0.5 litres of carbonated soft drink (CSD)
  - 350 ml of food
  - 300 ml of ketchup
  - 1.5 l of liquid detergent
- The product system comprises:
  - **Packaging unit**, closure and label
  - Sales packaging (carton tray, reusable crate, film)
  - Transport packaging (pallets, shrink wrap)
  - Packaging for delivery of packaging units, lids, etc. to the bottler
- The analysis covers the packaging units' **entire life cycle**:
  - Generation of raw materials and energy sources
  - Packaging manufacture
  - Filling and cleaning of reusable packaging units
  - Distribution from the bottler to the food retailers
  - Collection, recycling and disposal of the packaging units and other packaging
  - Other transport processes and supply transports

Impact categories & Life cycle inventory analysis parameters

- Impact categories
  - Climate change [kg CO_2-eq.] (EF 3.1)
  - Acidification potential [mol H+-eq] (EF 3.1)
  - Photochemical oxidant formation (summer smog) [kg NMVOC-eq.] (EF 3.1)
  - Terrestrial eutrophication [mol N-eq.] (EF 3.1)
  - Freshwater eutrophication [kg P-eq.] (EF 3.1)
  - Marine eutrophication[kg N-eq.] (EF 3.1)
- Life cycle inventory analysis parameters
  - Depletion of abiotic resources – elements [kg SB-eq.] (EF 3.1)
  - Particulate matter formation [disease incidence] (EF 3.1)
  - Land use [dimensionless] (EF3.1)
  - Freshwater extraction – total [m^3]
  - Cumulative energy demand - total [MJ-eq.]
  - Cumulative energy demand – non-renewable [MJ-eq.]
  - Cumulative energy demand –renewable [MJ-eq.]

Container



c7-consult
sustainable performance

Input data

Container, cap, label, transport distances to retailer, waste management

Analysed bottles for water 1,0 l

PET OW	PET MW	HDPE	PP	Pouch	Glass OW	Glass MW	ALU can	FE can	Carton

Input data
Water 1,0 l

c7-consult
sustainable performance

water 1,0 l	unit	PET OW	50 % rPET OW	100 % rPET OW	PET MW	50 % rPET MW	100 % rPET MW	Glass OW	Glass MW
volume	[ml]	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
cycles	[-]	1	1	1	20	20	20	1	30
mass of container	[g]	24,9	24,9	24,9	65,0	65,0	65,0	470,0	551,9
material cap	[-]	HDPE	HDPE	HDPE	HDPE	HDPE	HDPE	Tinplate	Alu
mass cap	[g]	3,0	3,0	3,0	3,0	3,0	3,0	2,2	1,7
material label	[-]	PET	PET	PET	paper	paper	paper	paper	paper
mass label	[g]	0,4	0,4	0,4	1,0	1,0	1,0	1,0	1,0
mass product system: container, cap & label	[g]	28,3	28,3	28,3	69,0	69,0	69,0	473,2	554,6

secondary packaging / sales packaging	unit	PET OW	50 % rPET OW	100 % rPET OW	PET MW	50 % rPET MW	100 % rPET MW	Glass OW	Glass MW
container per tray/box	[pieces]	4	4	4	9	9	9	12	12
mass materials single use	[g]	12,2	12,2	12,2	0,3	0,3	0,3	-	-
mass materials multiple use	[g]	-	-	-	1.750,00	1.750,00	1.750,00	2.500,00	1.750,00

tertiary packaging / transport packaging per pallet	unit	PET OW	50 % rPET OW	100 % rPET OW	PET MW	50 % rPET MW	100 % rPET MW	Glass OW	Glass MW
trays/boxes per layer	[pieces]	24	24	24	11	11	11	8	8
layer per pallet	[pieces]	6	6	6	4	4	4	4	4
container per pallet	[pieces]	576	576	576	396	396	396	384	384

delivery to retailer	unit	PET OW	50 % rPET OW	100 % rPET OW	PET MW	50 % rPET MW	100 % rPET MW	Glass OW	Glass MW
mass for transport total	[kg]	22.429	22.429	22.429	18.880	18.880	18.880	17.412	16.247
container per lorry	[pieces]	20.736	20.736	20.736	14.256	14.256	14.256	9.984	9.216
delivery step 1 outbound	[km]	200	200	200	200	200	200	200	200
delivery step 1 inbound	[km]	60	60	60	200	200	200	60	200
delivery step 2 outbound	[km]	50	50	50	50	50	50	50	50
delivery step 2 inbound	[km]	50	50	50	50	50	50	50	50
delivery total	[km]	360	360	360	500	500	500	360	500
cooling lorry needed (1 = yes)	[-]	0	0	0	0	0	0	0	0

waste management	unit	PET OW	50 % rPET OW	100 % rPET OW	PET MW	50 % rPET MW	100 % rPET MW	Glass OW	Glass MW
allocation benefit recycling	[%]	50%	50%	50%	50%	50%	50%	50%	50%

Analysed bottles for milk 1,0 l

PET OW	PET MW	HDPE	PP	Pouch	Glass OW	Glass MW	ALU can	FE can	Carton

Input data
Milk 1,0 l

c7-consult
sustainable performance

milk 1,0 l	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	Glass OW	Glass MW	Carton OW
volume	[ml]	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
cycles	[-]	1	1	1	1	1	1	1	15	1
mass of container	[g]	22,1	22,1	22,1	18,8	18,8	18,8	420,0	493,2	26,8
material cap	[-]	HDPE	HDPE	HDPE	HDPE	HDPE	HDPE	Tinplate	Tinplate	HDPE
mass cap	[g]	2,7	2,7	2,7	1,7	1,7	1,7	4,0	4,0	2,1
material label	[-]	PET	PET	PET	paper	paper	paper	paper	paper	no label
mass label	[g]	3,2	3,2	3,2	1,5	1,5	1,5	1,8	1,8	-
mass product system: container, cap & label	[g]	27,9	27,9	27,9	22,0	22,0	22,0	425,8	499,0	28,9

secondary packaging / sales packaging	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	Glass OW	Glass MW	Carton OW
container per tray/box	[pieces]	12	12	12	12	12	12	6	6	12
mass materials single use	[g]	150,3	150,3	150,3	140,2	140,2	140,2	165,2	0,2	122,2
mass materials multiple use	[g]	-	-	-	-	-	-	-	1.200,00	-

tertiary packaging / transport packaging per pallet	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	Glass OW	Glass MW	Carton OW
trays/boxes per layer	[pieces]	12	12	12	12	12	12	17	17	13
layer per pallet	[pieces]	6	6	6	6	6	6	4	3	4
container per pallet	[pieces]	864	864	864	864	864	864	408	306	624

delivery to retailer	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	Glass OW	Glass MW	Carton OW
mass for transport total	[kg]	24.074	24.074	24.074	23.931	23.931	23.931	20.365	17.954	22.193
container per lorry	[pieces]	22.464	22.464	22.464	22.464	22.464	22.464	13.464	10.098	20.592
delivery step 1 outbound	[km]	150	150	150	150	150	150	150	150	150
delivery step 1 inbound	[km]	150	150	150	150	150	150	150	150	150
delivery step 2 outbound	[km]	50	50	50	50	50	50	50	50	50
delivery step 2 inbound	[km]	50	50	50	50	50	50	50	50	50
delivery total	[km]	400	400	400	400	400	400	400	400	400
cooling lorry needed (1 = yes)	[-]	1	1	1	1	1	1	1	1	1

waste management	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	Glass OW	Glass MW	Carton OW
allocation benefit recycling	[%]	50%	50%	50%	50%	50%	50%	50%	50%	50%

Analysed bottles for juice 1,0 l

c7-consult
sustainable performance

- Folgende Gebinde werden analysiert:

PET OW	PET MW	HDPE	PP	Pouch	Glass OW	Glass MW	ALU can	FE can	Carton

Input data
Juice 1,0 l

c7-consult
sustainable performance

juice 1,0 l	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	Glass MW	Carton OW
volume	[ml]	1.000	1.000	1.000	1.000	1.000	1.000
cycles	[-]	1	1	1	1	20	1
mass of container	[g]	28,3	28,3	28,3	516,2	637,0	33,7
material cap	[-]	HDPE	HDPE	HDPE	Alu	Alu	HDPE
mass cap	[g]	3,0	3,0	3,0	1,3	1,2	3,9
material label	[-]	PP	PP	PP	paper	paper	no label
mass label	[g]	1,3	1,3	1,3	1,7	4,8	-
mass product system: container, cap & label	[g]	32,6	32,6	32,6	519,2	643,0	37,6

secondary packaging / sales packaging	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	Glass MW	Carton OW
container per tray/box	[pieces]	6	6	6	6	8	10
mass materials single use	[g]	16,5	16,5	16,5	-	-	160,0
mass materials multiple use	[g]	-	-	-	2.000,00	2.000,00	-

tertiary packaging / transport packaging per pallet	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	Glass MW	Carton OW
trays/boxes per layer	[pieces]	22	22	22	16	8	12
layer per pallet	[pieces]	6	6	6	4	6	7
container per pallet	[pieces]	792	792	792	384	384	840

delivery to retailer	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	Glass MW	Carton OW
mass for transport total	[kg]	23.721	23.721	23.721	23.596	24.029	23.729
container per lorry	[pieces]	22.176	22.176	22.176	12.288	12.288	21.840
delivery step 1 outbound	[km]	250	250	250	250	250	250
delivery step 1 inbound	[km]	50	50	50	50	250	50
delivery step 2 outbound	[km]	50	50	50	50	50	50
delivery step 2 inbound	[km]	50	50	50	50	50	50
delivery total	[km]	400	400	400	400	600	400
cooling lorry needed (1 = yes)	[-]	0	0	0	0	0	0

waste management	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	Glass MW	Carton OW
allocation benefit recycling	[%]	50%	50%	50%	50%	50%	50%

Analysed bottles for beer 1,0 l

PET OW	PET MW	HDPE	PP	Pouch	Glass OW	Glass MW	ALU can	FE can	Carton

Input data
Beer 0,5 l

c7-consult
sustainable performance

beer 0,5 l	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	Glass MW	ALU can OW
volume	[ml]	500	500	500	500	500	500
cycles	[-]	1	1	1	1	30	1
mass of container	[g]	31,2	31,2	31,2	278,0	374,0	12,8
material cap	[-]	HDPE	HDPE	HDPE	Tinplate	Tinplate	Alu
mass cap	[g]	2,3	2,3	2,3	2,2	2,2	2,5
material label	[-]	paper	paper	paper	paper	paper	no label
mass label	[g]	1,5	1,5	1,5	1,5	1,5	-
mass product system: container, cap & label	[g]	35,0	35,0	35,0	281,7	377,7	15,3

secondary packaging / sales packaging	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	Glass MW	ALU can OW
container per tray/box	[pieces]	18	18	18	24	20	24
mass materials single use	[g]	20,5	20,5	20,5	340,4	-	106,3
mass materials multiple use	[g]	-	-	-	-	1.860,00	-

tertiary packaging / transport packaging per pallet	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	Glass MW	ALU can OW
trays/boxes per layer	[pieces]	12	12	12	9	10	12
layer per pallet	[pieces]	6	6	6	5	4	6
container per pallet	[pieces]	1.296	1.296	1.296	1.080	800	1.728

delivery to retailer	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	Glass MW	ALU can OW
mass for transport total	[kg]	18.779	18.779	18.779	23.049	20.815	24.064
container per lorry	[pieces]	33.696	33.696	33.696	28.080	20.800	44.928
delivery step 1 outbound	[km]	200	200	200	200	200	200
delivery step 1 inbound	[km]	40	40	40	40	200	40
delivery step 2 outbound	[km]	50	50	50	50	50	50
delivery step 2 inbound	[km]	50	50	50	50	50	50
delivery total	[km]	340	340	340	340	500	340
cooling lorry needed (1 = yes)	[-]	0	0	0	0	0	0

waste management	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	Glass MW	ALU can OW
allocation benefit recycling	[%]	50%	50%	50%	50%	50%	50%

Analysed bottles for Carbonated Soft Drinks (CSD) 0,5 l

PET OW	PET MW	HDPE	PP	Pouch	Glass OW	Glass MW	ALU can	FE can	Carton

Input data
Carbonated Soft Drinks (CSD) 0,5 l

c7-consult
sustainable performance

CSD 0,5 l	unit	PET OW	50 % rPET OW	100 % rPET OW	PET MW	50 % rPET MW	100 % rPET MW	Glass OW	Glass MW	ALU can OW
volume	[ml]	500	500	500	500	500	500	500	500	500
cycles	[-]	1	1	1	20	20	20	1	30	1
mass of container	[g]	20,8	20,8	20,8	45,0	45,0	45,0	335,0	385,0	12,8
material cap	[-]	HDPE	HDPE	HDPE	HDPE	HDPE	HDPE	Alu	Alu	Alu
mass cap	[g]	2,2	2,2	2,2	2,2	2,2	2,2	1,5	1,5	2,7
material label	[-]	PP	PP	PP	PET	PET	PET	paper	paper	no label
mass label	[g]	0,3	0,3	0,3	0,3	0,3	0,3	1,5	1,5	-
mass product system: container, cap & label	[g]	23,2	23,2	23,2	47,5	47,5	47,5	338,0	388,0	15,5

secondary packaging / sales packaging	unit	PET OW	50 % rPET OW	100 % rPET OW	PET MW	50 % rPET MW	100 % rPET MW	Glass OW	Glass MW	ALU can OW
container per tray/box	[pieces]	12	12	12	12	12	12	6	20	24
mass materials single use	[g]	8,9	8,9	8,9	-	-	-	169,2	-	105,5
mass materials multiple use	[g]	-	-	-	1.750,00	1.750,00	1.750,00	-	2.000,00	-

tertiary packaging / transport packaging per pallet	unit	PET OW	50 % rPET OW	100 % rPET OW	PET MW	50 % rPET MW	100 % rPET MW	Glass OW	Glass MW	ALU can OW
trays/boxes per layer	[pieces]	18	18	18	14	14	14	24	10	12
layer per pallet	[pieces]	6	6	6	5	5	5	6	4	6
container per pallet	[pieces]	1.296	1.296	1.296	840	840	840	864	800	1.728

delivery to retailer	unit	PET OW	50 % rPET OW	100 % rPET OW	PET MW	50 % rPET MW	100 % rPET MW	Glass OW	Glass MW	ALU can OW
mass for transport total	[kg]	18.369	18.369	18.369	15.766	15.766	15.766	20.172	21.174	24.069
container per lorry	[pieces]	33.696	33.696	33.696	21.840	21.840	21.840	22.464	20.800	44.928
delivery step 1 outbound	[km]	250	250	250	250	250	250	250	250	250
delivery step 1 inbound	[km]	50	50	50	250	250	250	50	250	50
delivery step 2 outbound	[km]	50	50	50	50	50	50	50	50	50
delivery step 2 inbound	[km]	50	50	50	50	50	50	50	50	50
delivery total	[km]	400	400	400	600	600	600	400	600	400
cooling lorry needed (1 = yes)	[-]	0	0	0	0	0	0	0	0	0

waste management	unit	PET OW	50 % rPET OW	100 % rPET OW	PET MW	50 % rPET MW	100 % rPET MW	Glass OW	Glass MW	ALU can OW
allocation benefit recycling	[%]	50%	50%	50%	50%	50%	50%	50%	50%	50%

Analysed bottles for food jar 350 g

PET OW	PET MW	HDPE	PP	Pouch	Glass OW	Glass MW	ALU can	FE can	Carton

350 g	content	330 g	340 g
350 ml	volume	310 ml	420 ml

Input data
Food jar 350 ml

c7-consult
sustainable performance

food jar 0,35 l	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	FE can OW
volume	[ml]	350	350	350	310	420
cycles	[-]	1	1	1	1	1
mass of container	[g]	19,2	19,2	19,2	162,7	46,1
material cap	[-]	PP	PP	PP	Tinplate	Tinplate
mass cap	[g]	9,5	9,5	9,5	11,5	10,0
material label	[-]	paper	paper	paper	paper	paper
mass label	[g]	1,0	1,0	1,0	0,8	1,8
mass product system: container, cap & label	[g]	29,7	29,7	29,7	175,0	57,9

secondary packaging / sales packaging	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	FE can OW
container per tray/box	[pieces]	6	6	6	6	6
mass materials single use	[g]	161,0	161,0	161,0	161,0	161,0
mass materials multiple use	[g]	-	-	-	-	-

tertiary packaging / transport packaging per pallet	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	FE can OW
trays/boxes per layer	[pieces]	40	40	40	40	38
layer per pallet	[pieces]	8	8	8	7	8
container per pallet	[pieces]	1.920	1.920	1.920	1.680	1.824

delivery to retailer	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	FE can OW
mass for transport total	[kg]	21.033	21.033	21.033	23.125	24.723
container per lorry	[pieces]	49.920	49.920	49.920	43.680	47.424
delivery step 1 outbound	[km]	300	300	300	300	300
delivery step 1 inbound	[km]	60	60	60	60	60
delivery step 2 outbound	[km]	50	50	50	50	50
delivery step 2 inbound	[km]	50	50	50	50	50
delivery total	[km]	460	460	460	460	460
cooling lorry needed (1 = yes)	[-]	0	0	0	0	0

waste management	unit	PET OW	50 % rPET OW	100 % rPET OW	Glass OW	FE can OW
allocation benefit recycling	[%]	50%	50%	50%	50%	50%

Analysed bottles for ketchup 330 ml

PET OW	PET MW	HDPE	PP	Pouch	Glass OW	Glass MW	ALU can	FE can	Carton

330 g
300 ml
320 ml

348 g
300 ml
370 ml

250 g
250 ml
270 ml

342 g
300 ml
330 ml

content
content
volume

Input data
Ketchup 300 ml

c7-consult
sustainable performance

ketchup 0,3 l	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	PP OW	Glass OW
volume	[ml]	320	320	320	370	370	370	270	330
cycles	[-]	1	1	1	1	1	1	1	1
mass of container	[g]	21,9	21,9	21,9	25,5	25,5	25,5	22,2	191,1
material cap	[-]	PP	PP	PP	PP	PP	PP	PP	Tinplate
mass cap	[g]	3,4	3,4	3,4	6,9	6,9	6,9	4,6	3,2
material label	[-]	PP	PP	PP	PP	PP	PP	PP	paper
mass label	[g]	0,8	0,8	0,8	1,5	1,5	1,5	0,7	0,8
mass product system: container, cap & label	[g]	26,0	26,0	26,0	33,9	33,9	33,9	27,5	195,0

secondary packaging / sales packaging	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	PP OW	Glass OW
container per tray/box	[pieces]	6	6	6	6	6	6	6	6
mass materials single use	[g]	134,0	134,0	134,0	134,0	134,0	134,0	134,0	138,0
mass materials multiple use	[g]	-	-	-	-	-	-	-	-

tertiary packaging / transport packaging per pallet	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	PP OW	Glass OW
trays/boxes per layer	[pieces]	40	40	40	40	40	40	40	40
layer per pallet	[pieces]	8	8	8	8	8	8	8	7
container per pallet	[pieces]	1.920	1.920	1.920	1.920	1.920	1.920	1.920	1.680

delivery to retailer	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	PP OW	Glass OW
mass for transport total	[kg]	19.187	19.187	19.187	22.077	22.077	22.077	16.764	24.753
container per lorry	[pieces]	49.920	49.920	49.920	49.920	49.920	49.920	49.920	43.680
delivery step 1 outbound	[km]	300	300	300	300	300	300	300	300
delivery step 1 inbound	[km]	60	60	60	60	60	60	60	60
delivery step 2 outbound	[km]	50	50	50	50	50	50	50	50
delivery step 2 inbound	[km]	50	50	50	50	50	50	50	50
delivery total	[km]	460	460	460	460	460	460	460	460
cooling lorry needed (1 = yes)	[-]	0	0	0	0	0	0	0	0

waste management	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	PP OW	Glass OW
allocation benefit recycling	[%]	50%	50%	50%	50%	50%	50%	50%	50%

Analysed bottles for liquid detergent 1,5 l

PET OW	PET MW	HDPE	PP	Pouch	Glass OW	Glass MW	ALU can	FE can	Carton

1,5 l 1,5 l 1,5 l 1,8 l volume

Input data
Liquid Detergent 1,5 l

c7-consult
sustainable performance

detergent 1,5 l	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	PP OW	Pouch OW
volume	[ml]	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.800
cycles	[-]	1	1	1	1	1	1	1	1
mass of container	[g]	91,5	91,5	91,5	101,1	101,1	101,1	122,5	42,3
material cap	[-]	PP	PP	PP	PP	PP	PP	PP	HDPE
mass cap	[g]	9,3	9,3	9,3	6,9	6,9	6,9	25,4	3,8
material label	[-]	paper	paper	paper	paper	paper	paper	paper	no label
mass label	[g]	2,0	2,0	2,0	2,0	2,0	2,0	2,0	-
mass product system: container, cap & label	[g]	102,8	102,8	102,8	110,0	110,0	110,0	149,9	46,1

secondary packaging / sales packaging	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	PP OW	Pouch OW
container per tray/box	[pieces]	4	4	4	4	4	4	4	5
mass materials single use	[g]	181,0	181,0	181,0	181,0	181,0	181,0	181,0	161,0
mass materials multiple use	[g]	-	-	-	-	-	-	-	-

tertiary packaging / transport packaging per pallet	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	PP OW	Pouch OW
trays/boxes per layer	[pieces]	22	22	22	22	22	22	22	18
layer per pallet	[pieces]	6	6	6	6	6	6	6	5
container per pallet	[pieces]	528	528	528	528	528	528	528	450

delivery to retailer	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	PP OW	Pouch OW
mass for transport total	[kg]	23.383	23.383	23.383	23.481	23.481	23.481	24.029	22.713
container per lorry	[pieces]	13.728	13.728	13.728	13.728	13.728	13.728	13.728	11.700
delivery step 1 outbound	[km]	300	300	300	300	300	300	300	300
delivery step 1 inbound	[km]	30	30	30	30	30	30	30	30
delivery step 2 outbound	[km]	50	50	50	50	50	50	50	50
delivery step 2 inbound	[km]	50	50	50	50	50	50	50	50
delivery total	[km]	430	430	430	430	430	430	430	430
cooling lorry needed (1 = yes)	[-]	0	0	0	0	0	0	0	0

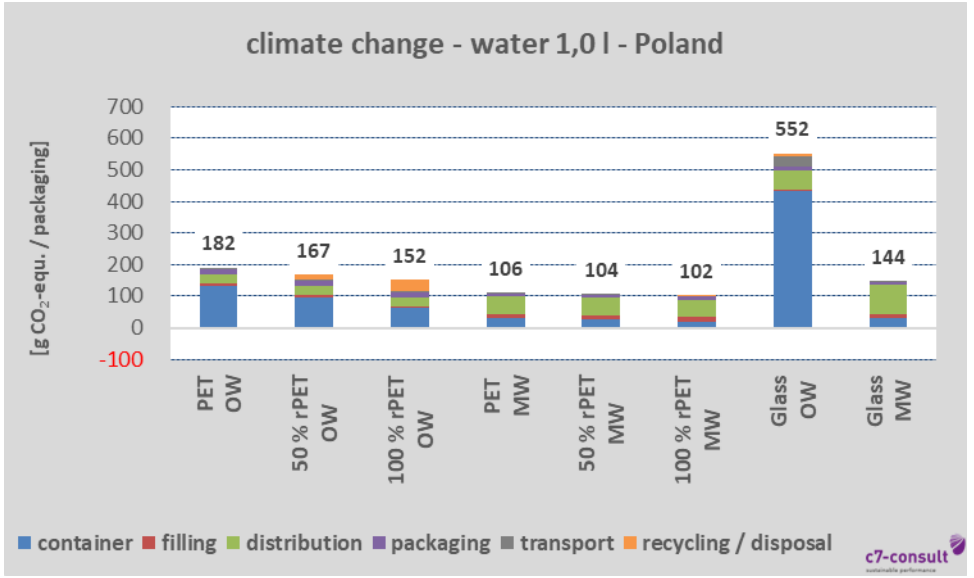
waste management	unit	PET OW	50 % rPET OW	100 % rPET OW	HDPE OW	50 % rHDPE OW	100% rHDPE OW	PP OW	Pouch OW
allocation benefit recycling	[%]	50%	50%	50%	50%	50%	50%	50%	50%

c7-consult
sustainable performance

Presentation of Results

Water

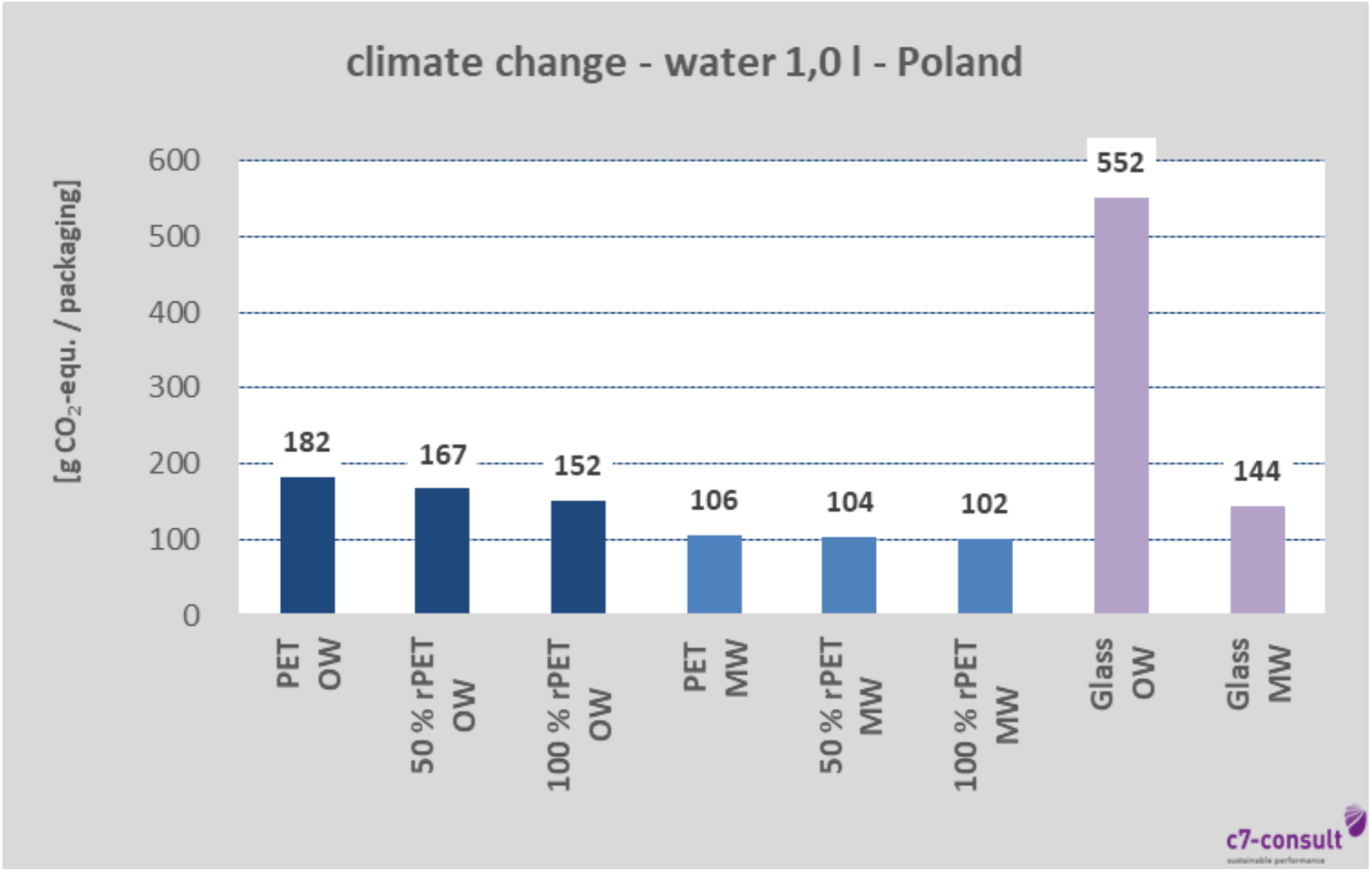
- Results cover total life cycle
  - **Bottle**: container, cap & label
  - **Filling**: filling & washing of returnable bottles
  - **Distribution**: delivery to retailer & back to bottler
  - **Packaging**: secondary & tertiary packaging including recycling
  - **Transport**: other transports like raw materials, container and cap to bottler, etc. as well as to recycling plants and final disposal
  - **Recycling / disposal**: material and energetic recovery of container, cap and label in 1. recycling step and final disposal.



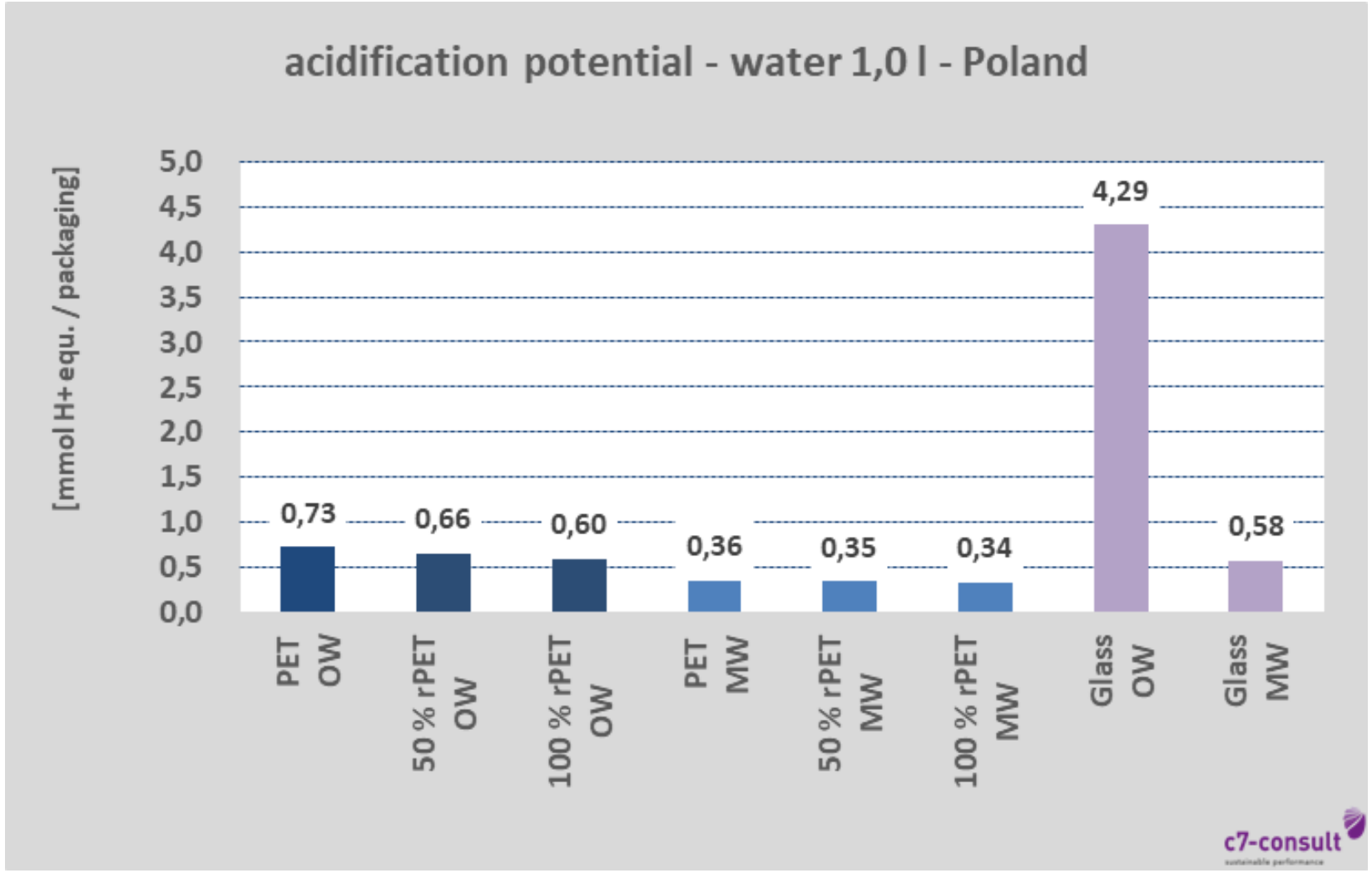
c7-consult
sustainable performance

Results Water 1,0 l

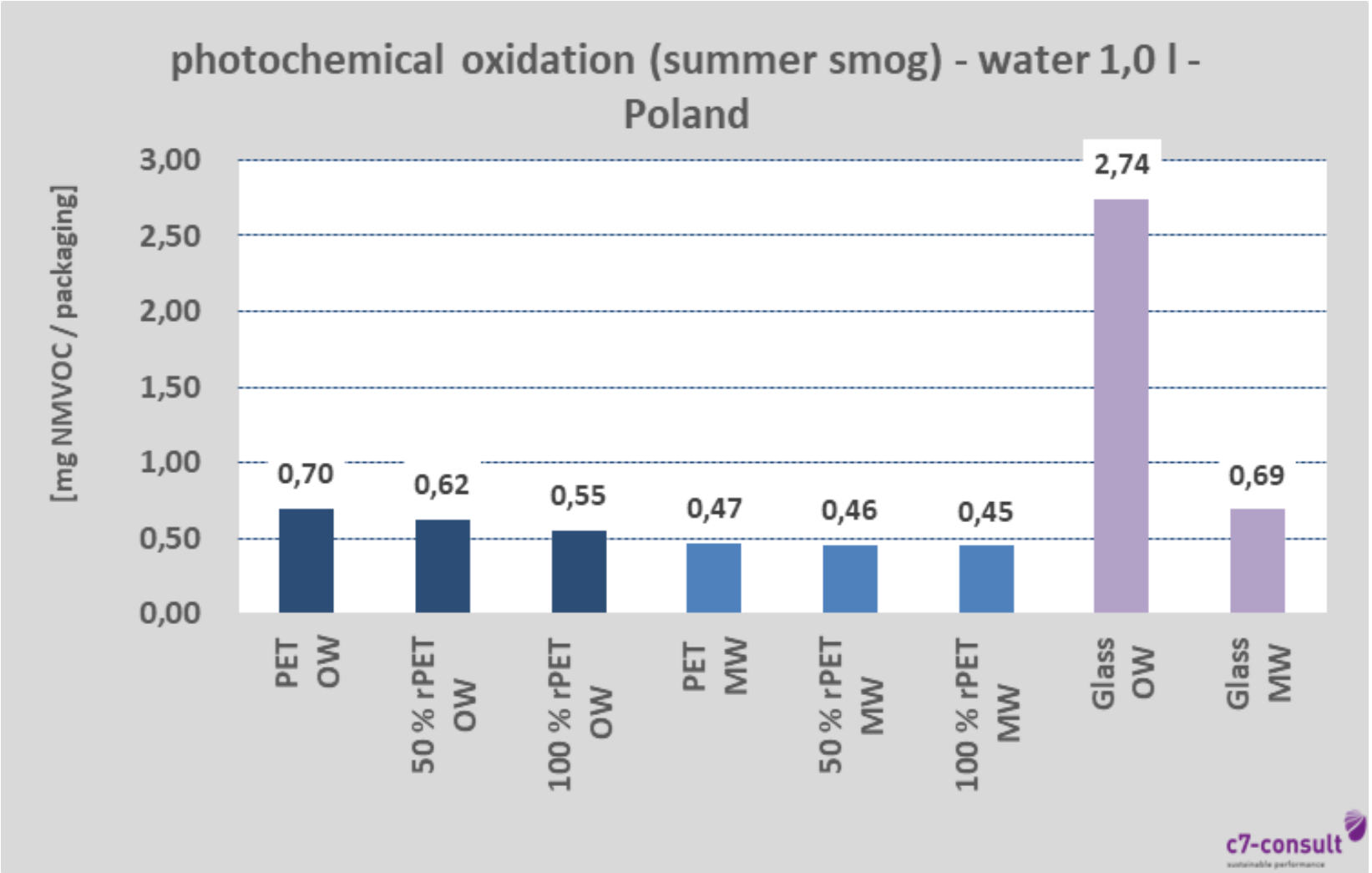
Water


climate change - water 1,0 l - Poland
[g CO2-equ. / packaging]
600
500
400
300
200
100
0
182
167
152
106
104
102
552
144
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

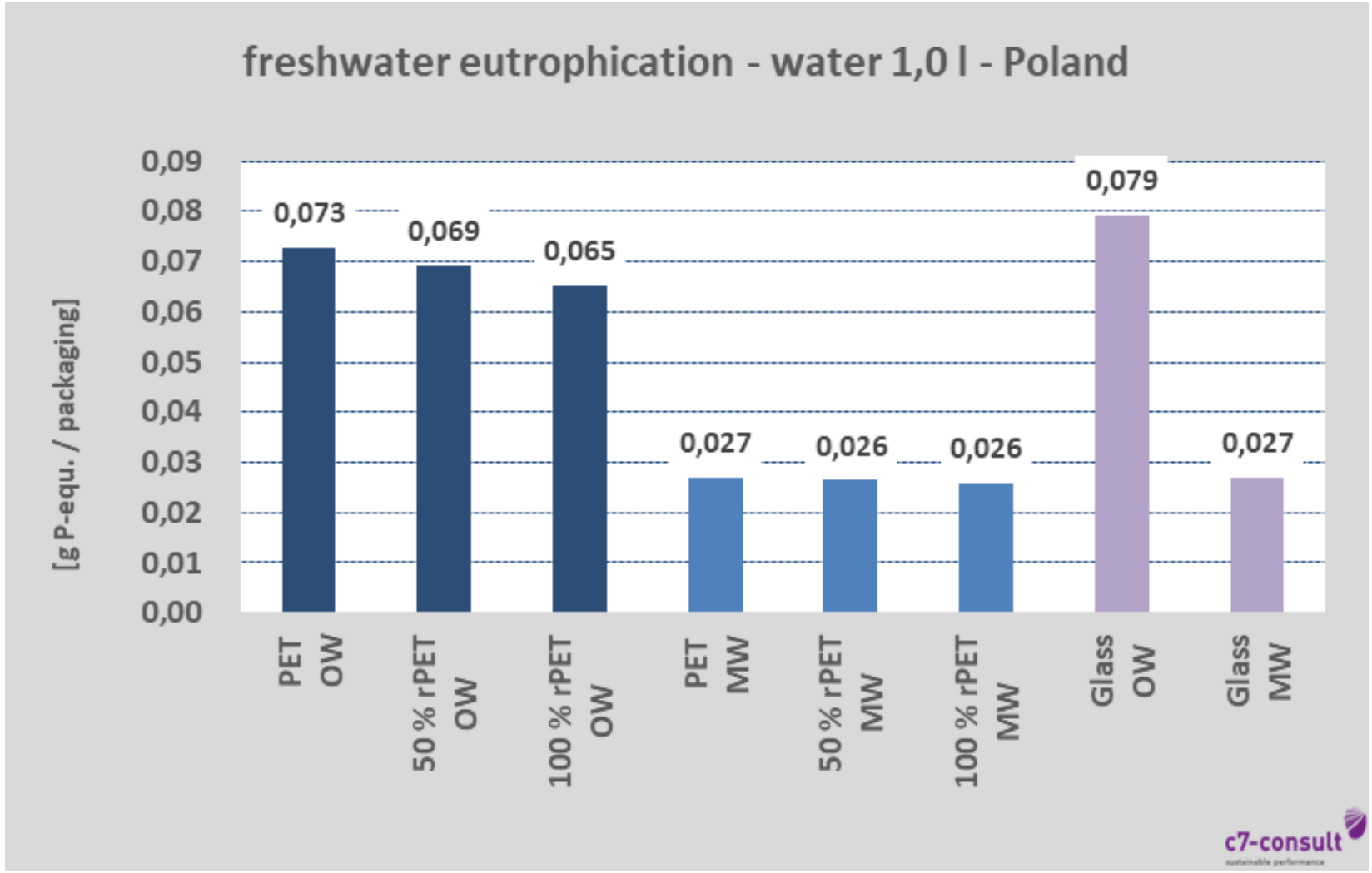
Water


acidification potential - water 1,0 l - Poland
[mmol H+ equ. / packaging]
5,0
4,5
4,0
3,5
3,0
2,5
2,0
1,5
1,0
0,5
0,0
0,73
0,66
0,60
0,36
0,35
0,34
4,29
0,58
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

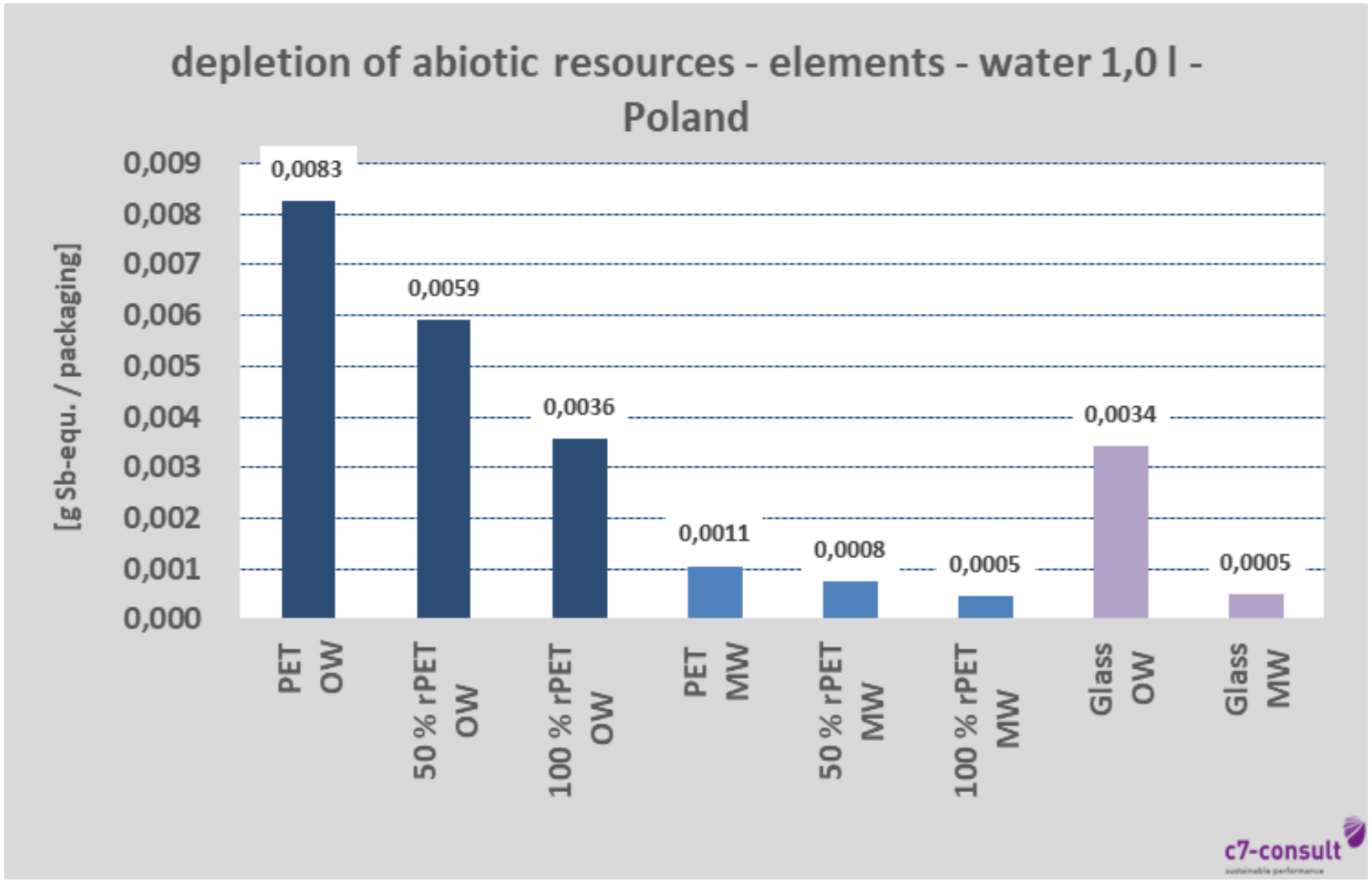
Water


photochemical oxidation (summer smog) - water 1,0 l - Poland
[mg NMVOC / packaging]
3,00
2,50
2,00
1,50
1,00
0,50
0,00
0,70
0,62
0,55
0,47
0,46
0,45
2,74
0,69
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

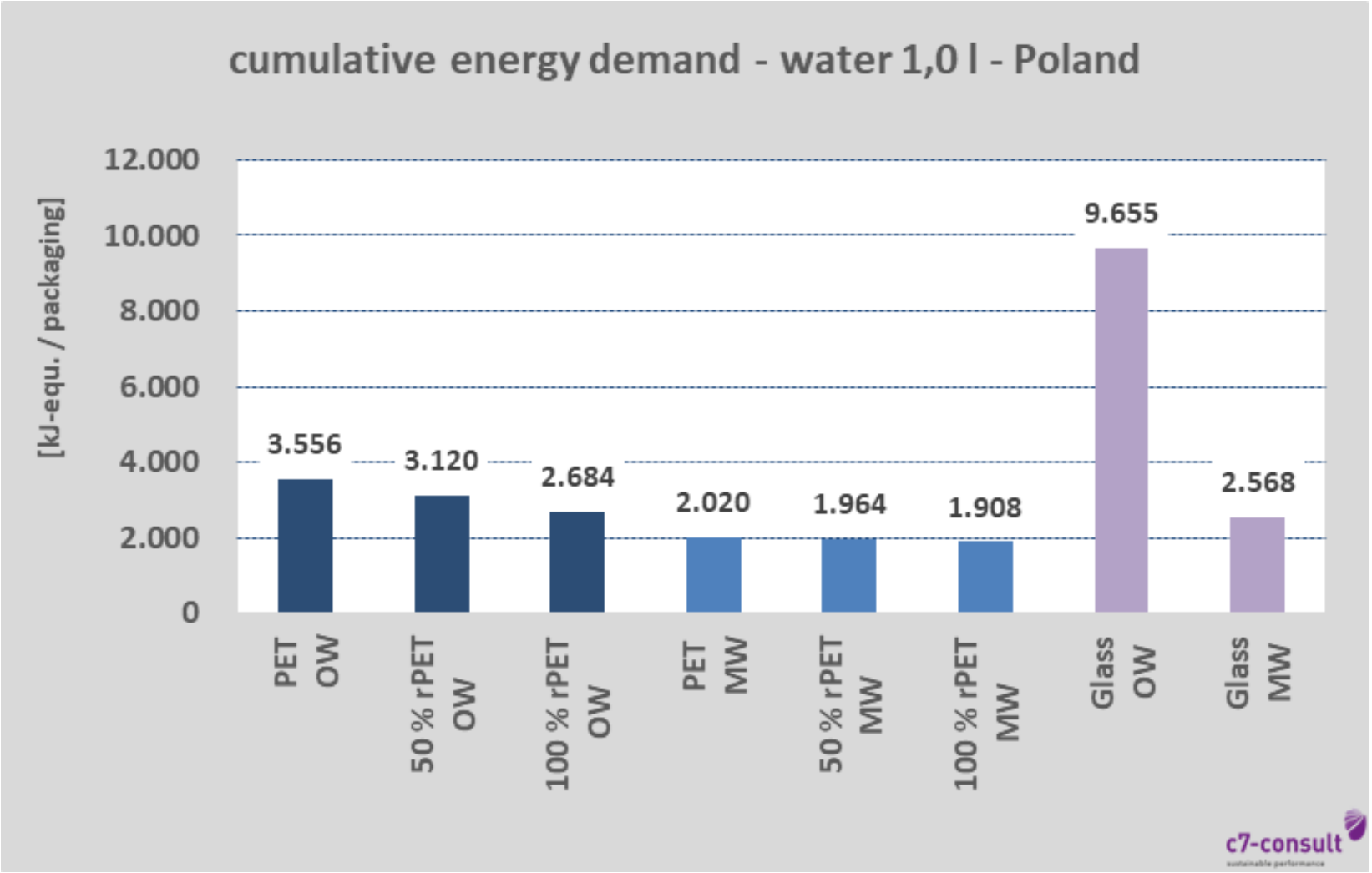
Water


freshwater eutrophication - water 1,0 l - Poland
[g P-equ. / packaging]
0,09
0,08
0,07
0,06
0,05
0,04
0,03
0,02
0,01
0,00
0,073
0,069
0,065
0,027
0,026
0,026
0,079
0,027
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

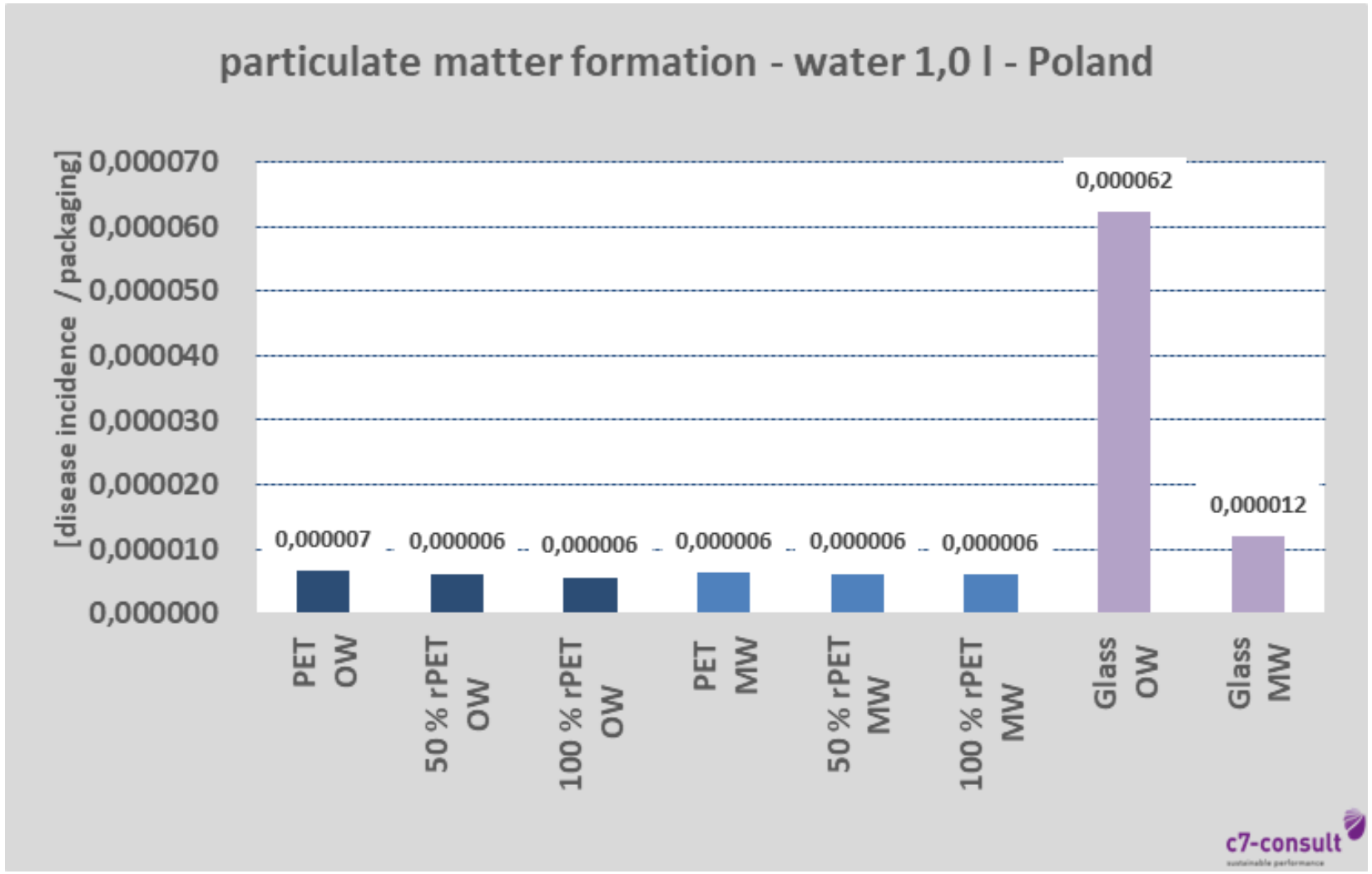
Water


depletion of abiotic resources - elements - water 1,0 l - Poland
[g Sb-equ. / packaging]
0,009
0,008
0,007
0,006
0,005
0,004
0,003
0,002
0,001
0,000
0,0083
0,0059
0,0036
0,0011
0,0008
0,0005
0,0034
0,0005
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

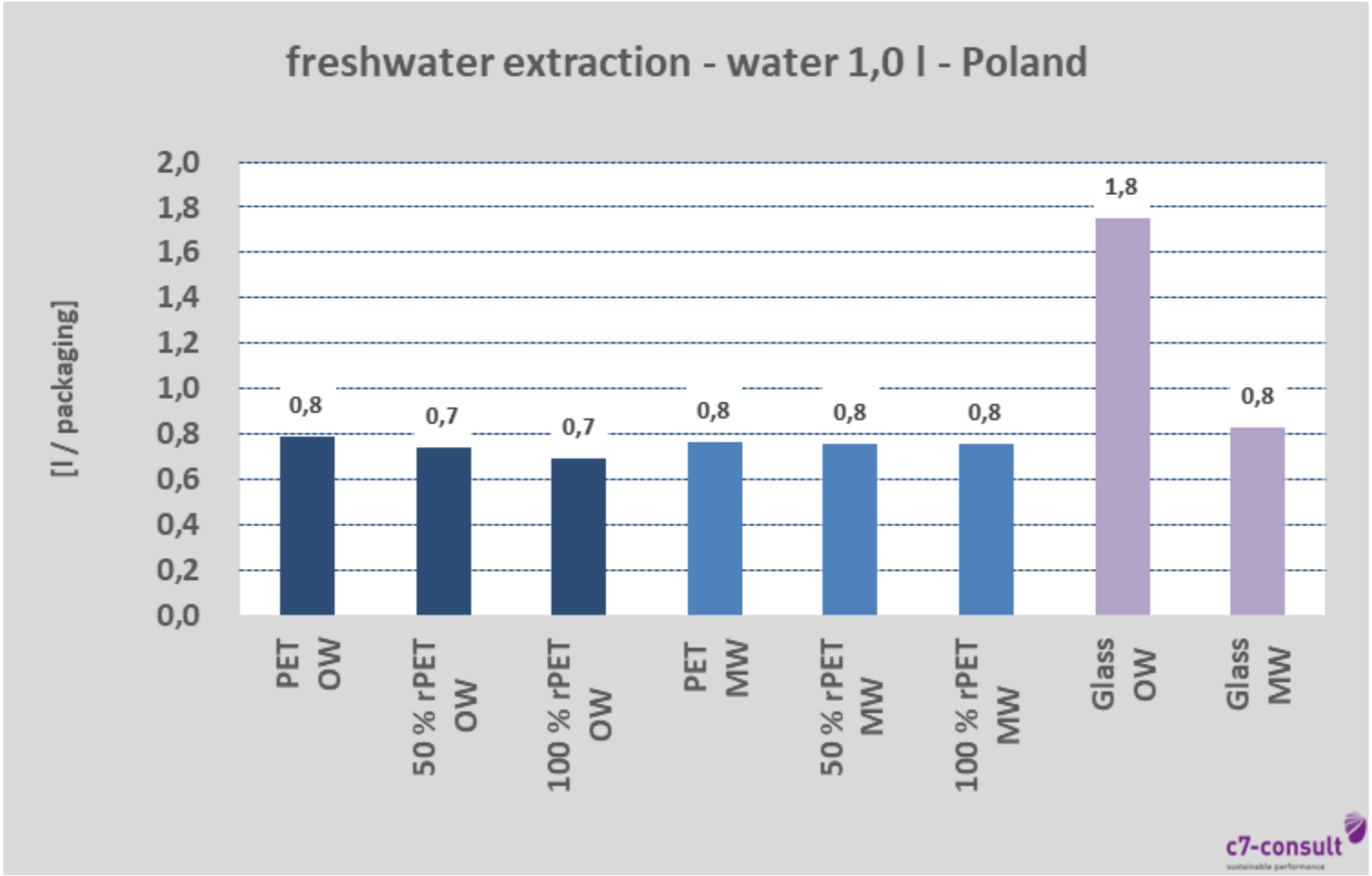
Water


cumulative energy demand - water 1,0 l - Poland
[kJ-equ. / packaging]
12.000
10.000
8.000
6.000
4.000
2.000
0
3.556
3.120
2.684
2.020
1.964
1.908
9.655
2.568
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

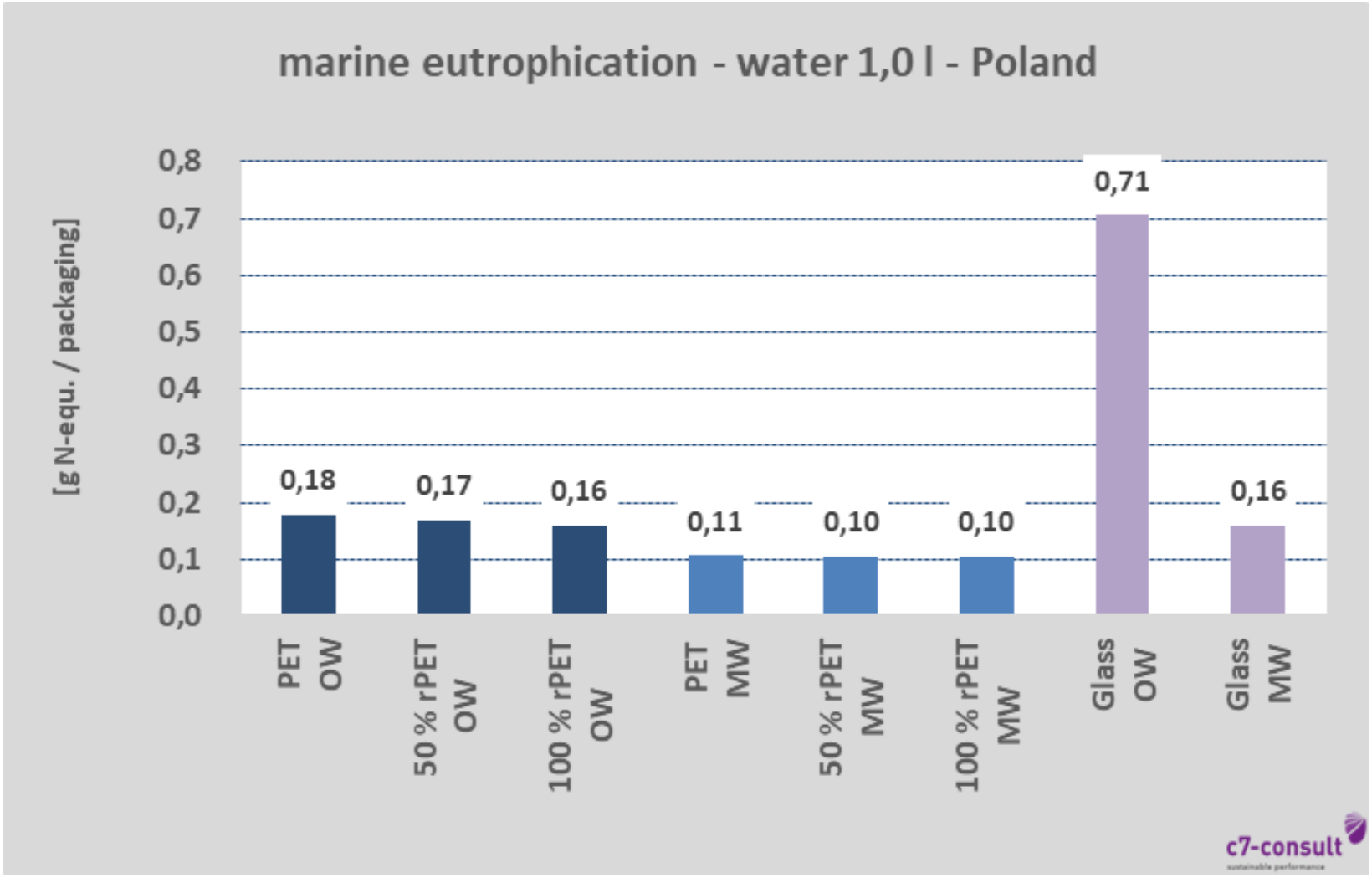
Water


particulate matter formation - water 1,0 l - Poland
[disease incidence / packaging]
0,000070
0,000060
0,000050
0,000040
0,000030
0,000020
0,000010
0,000000
0,000007
0,000006
0,000006
0,000006
0,000006
0,000006
0,000062
0,000012
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

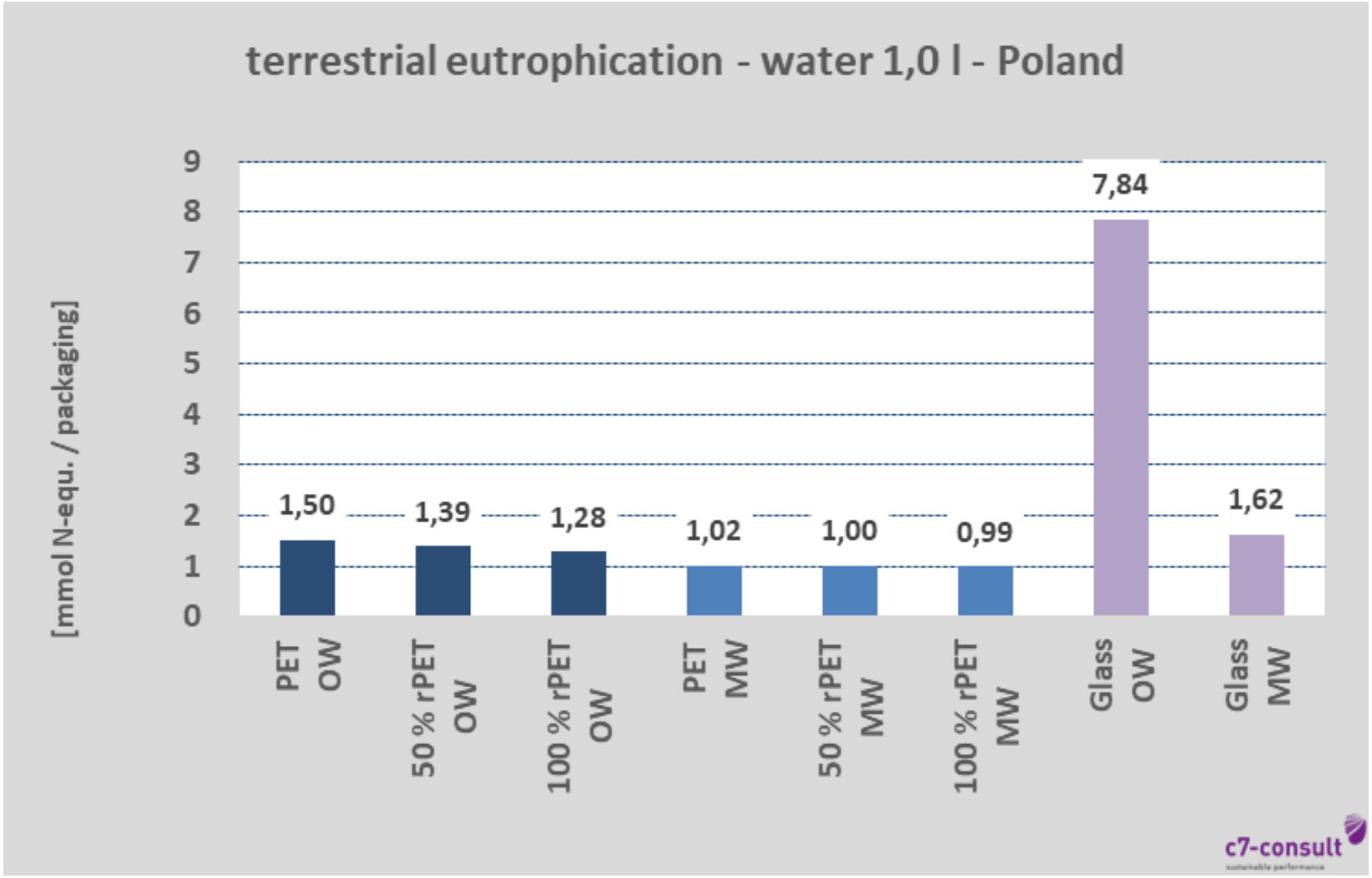
Water


freshwater extraction - water 1,0 l - Poland
[l / packaging]
2,0
1,8
1,6
1,4
1,2
1,0
0,8
0,6
0,4
0,2
0,0
0,8
0,7
0,7
0,8
0,8
0,8
1,8
0,8
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

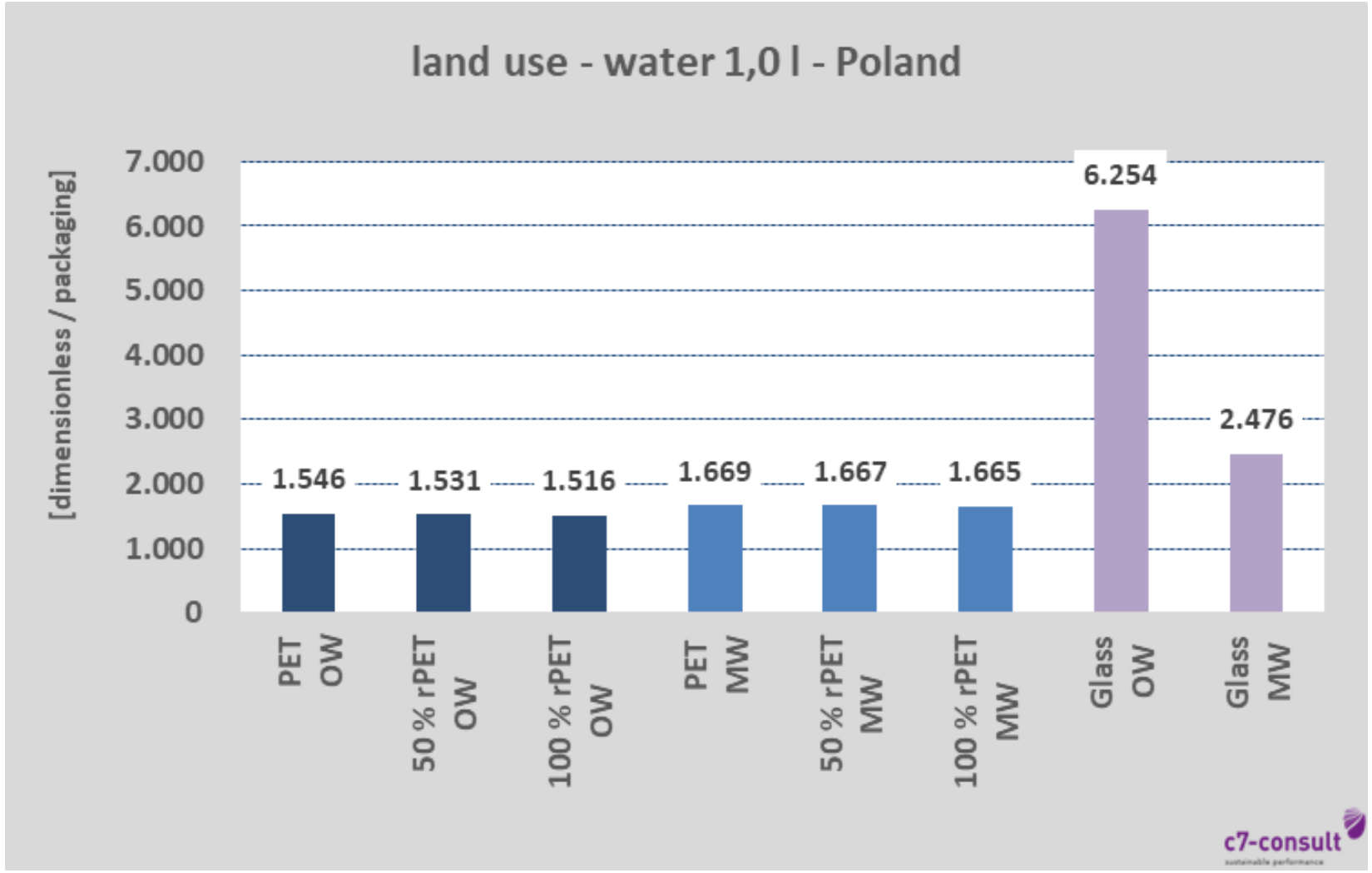
Water


marine eutrophication - water 1,0 l - Poland
[g N-equ. / packaging]
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0,0
0,18
0,17
0,16
0,11
0,10
0,10
0,71
0,16
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

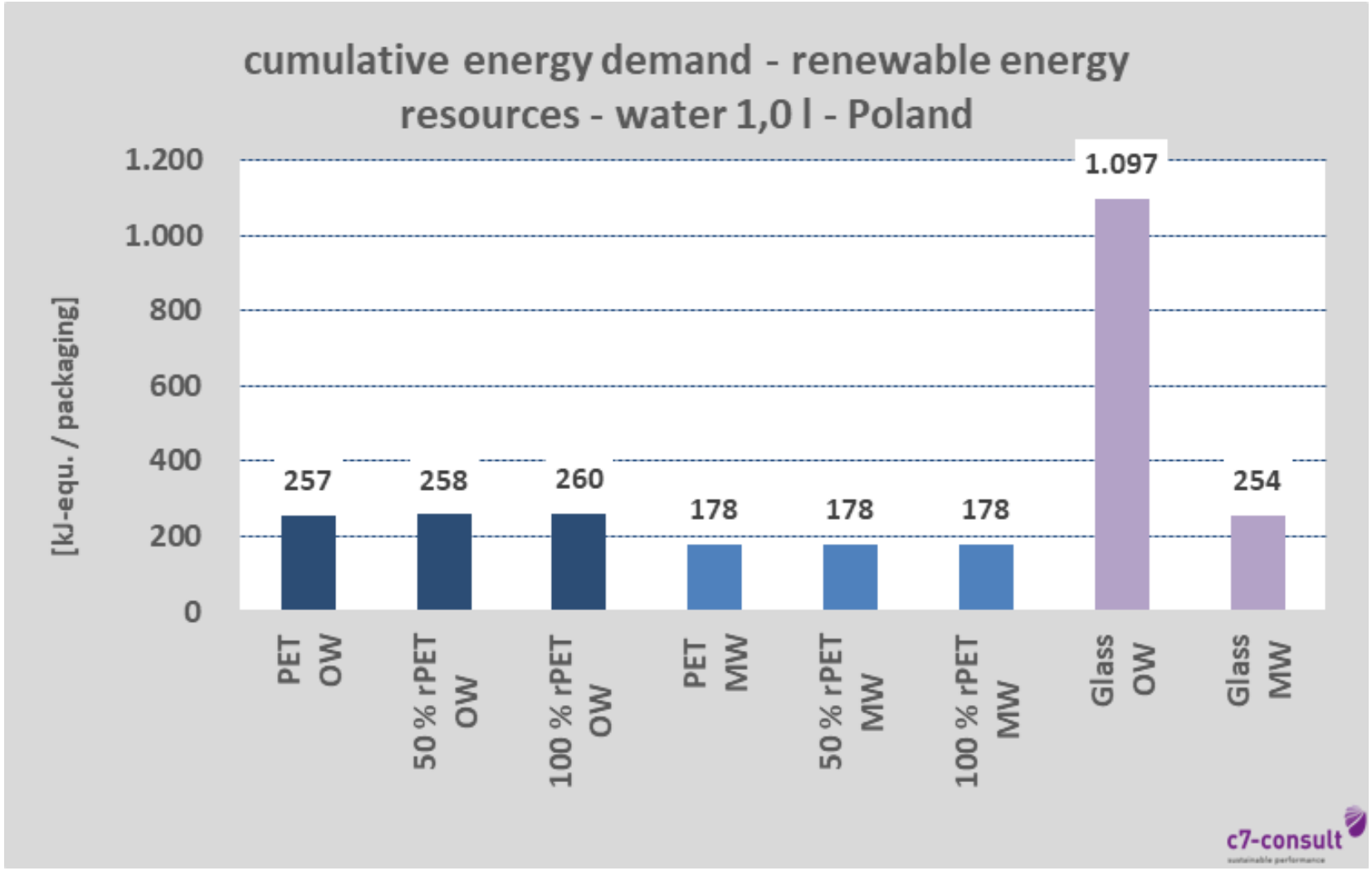
Water


terrestrial eutrophication - water 1,0 l - Poland
[mmol N-equ. / packaging]
9
8
7
6
5
4
3
2
1
0
1,50
1,39
1,28
1,02
1,00
0,99
7,84
1,62
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

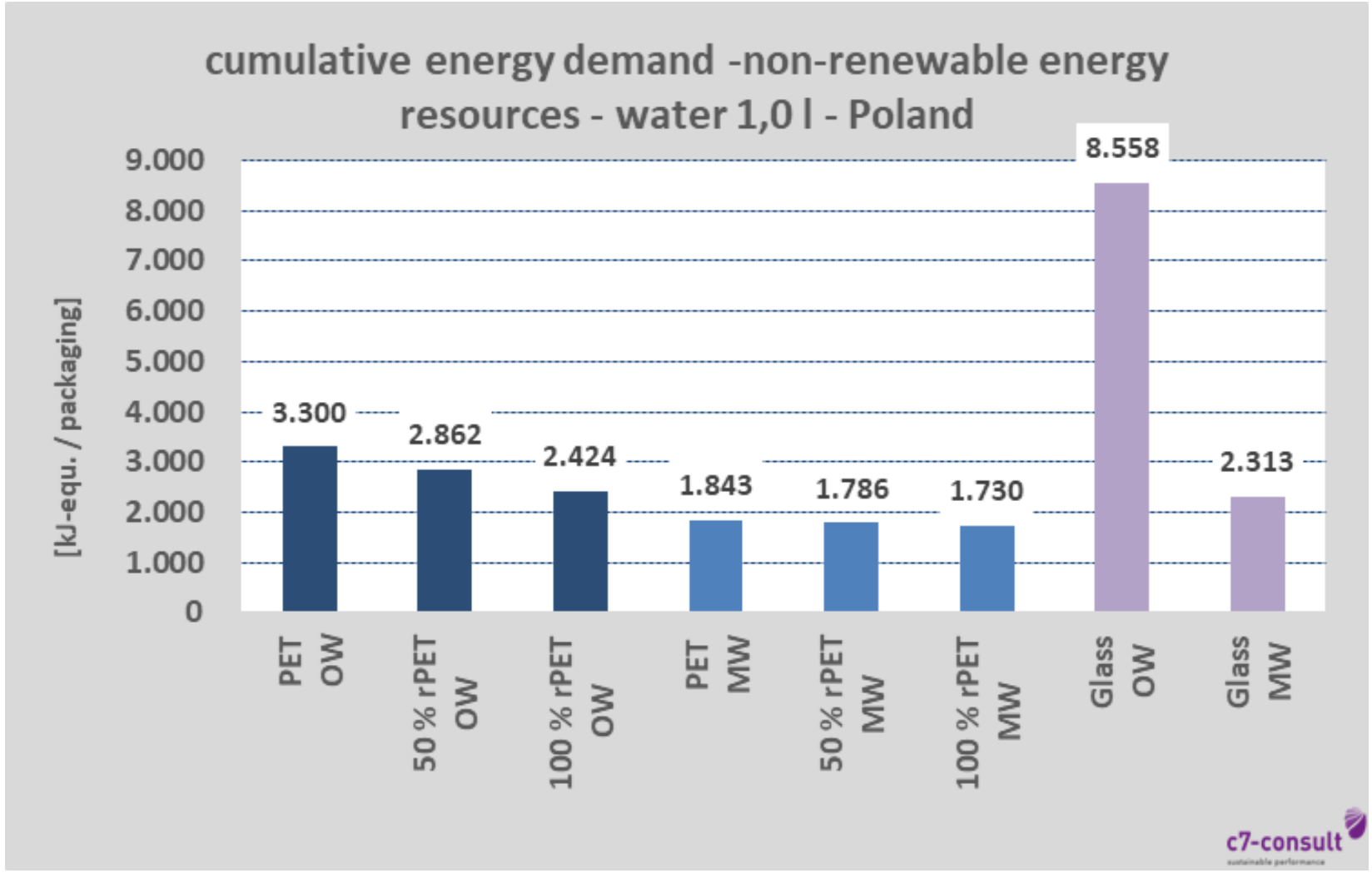
Water


land use - water 1,0 l - Poland
[dimensionless / packaging]
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0
1.546
1.531
1.516
1.669
1.667
1.665
6.254
2.476
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

Water


cumulative energy demand - renewable energy resources - water 1,0 l - Poland
[kJ-equ. / packaging]
1.200
1.000
800
600
400
200
0
257
258
260
178
178
178
1.097
254
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

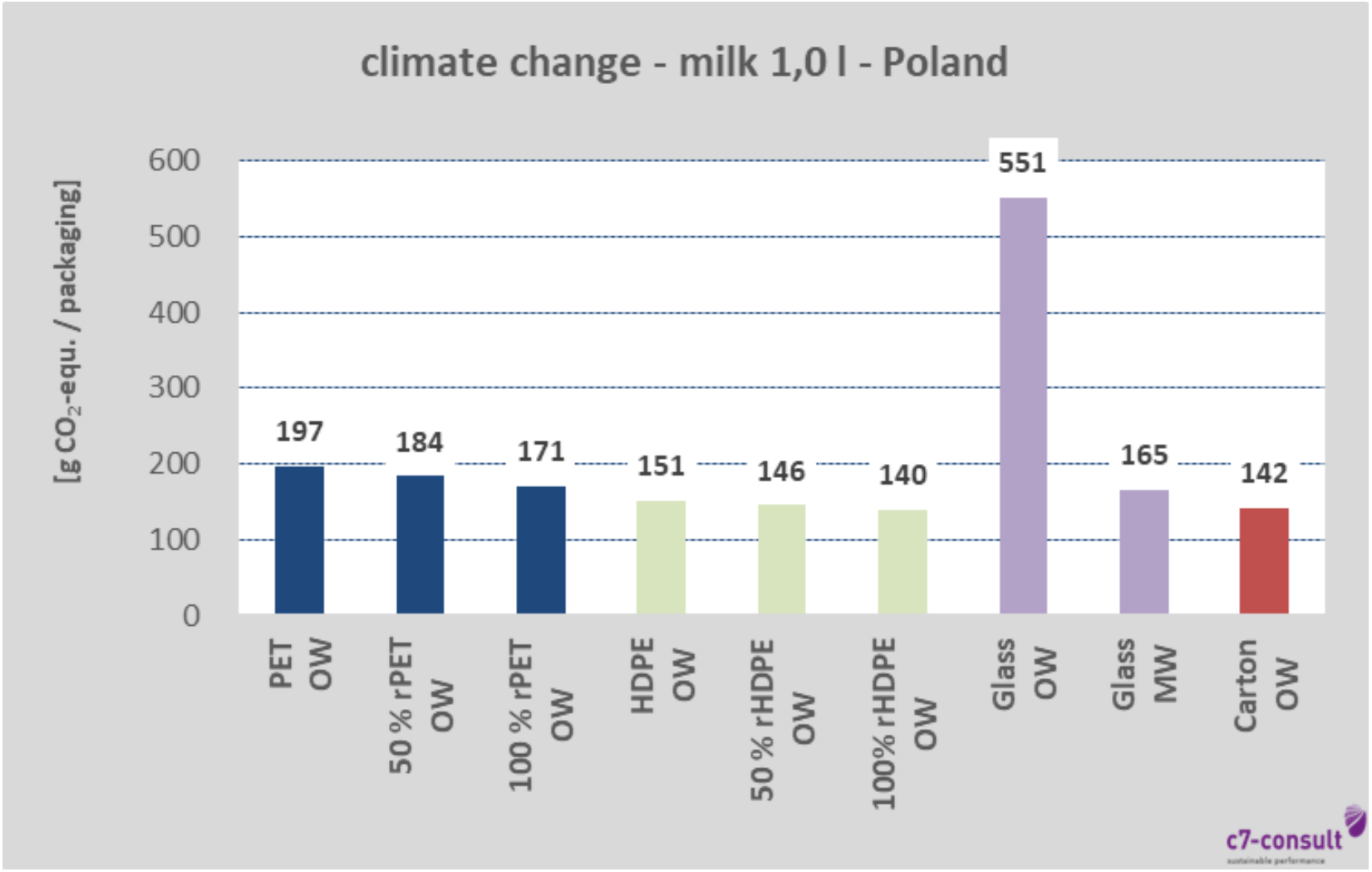
Water


cumulative energy demand -non-renewable energy resources - water 1,0 l - Poland
[kJ-equ. / packaging]
9.000
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0
3.300
2.862
2.424
1.843
1.786
1.730
8.558
2.313
PET OW
50 % rPET OW
100 % rPET OW
PET MW
50 % rPET MW
100 % rPET MW
Glass OW
Glass MW
c7-consult

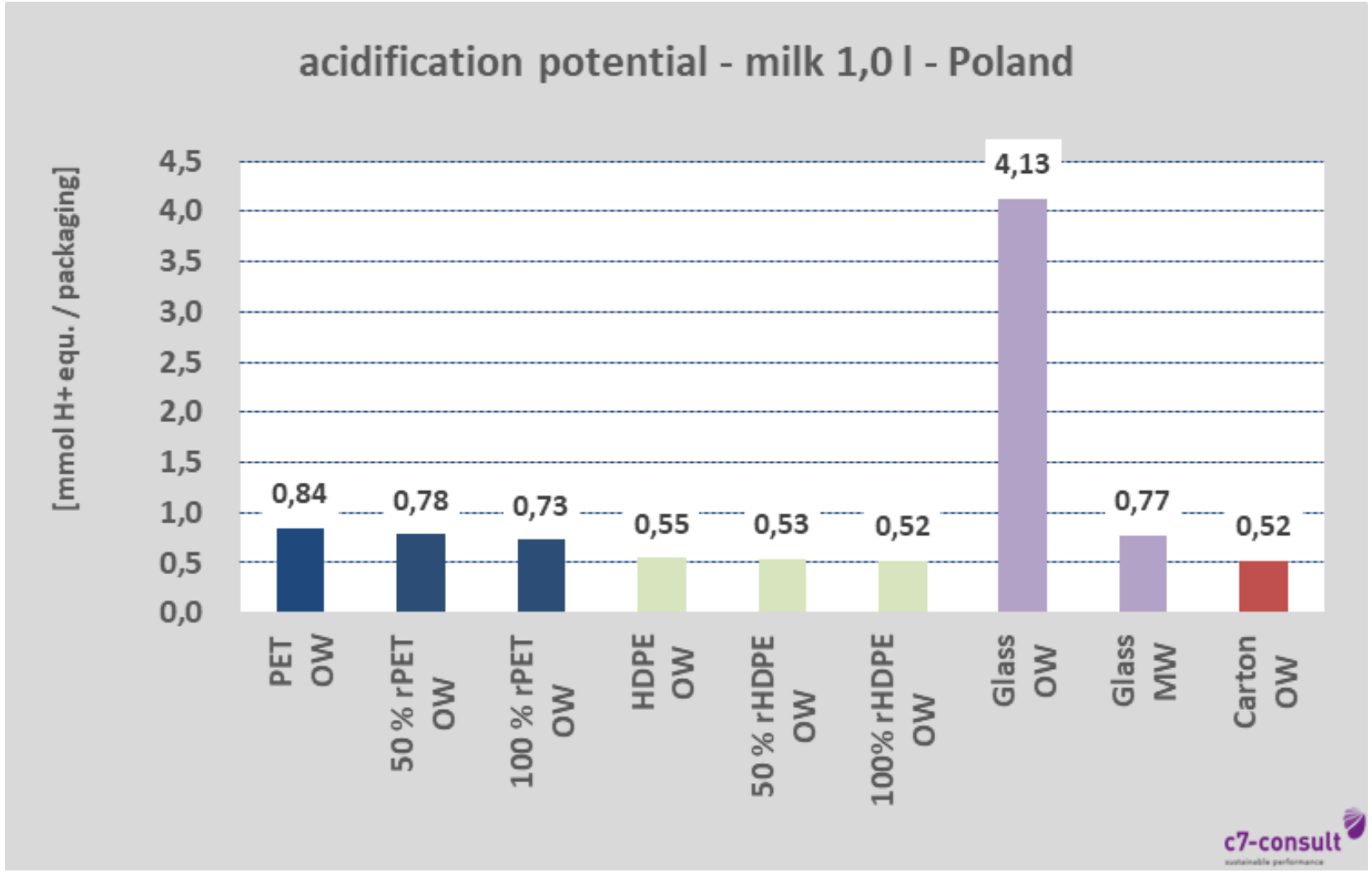
c7-consult
sustainable performance

Results Milk 1,0 l

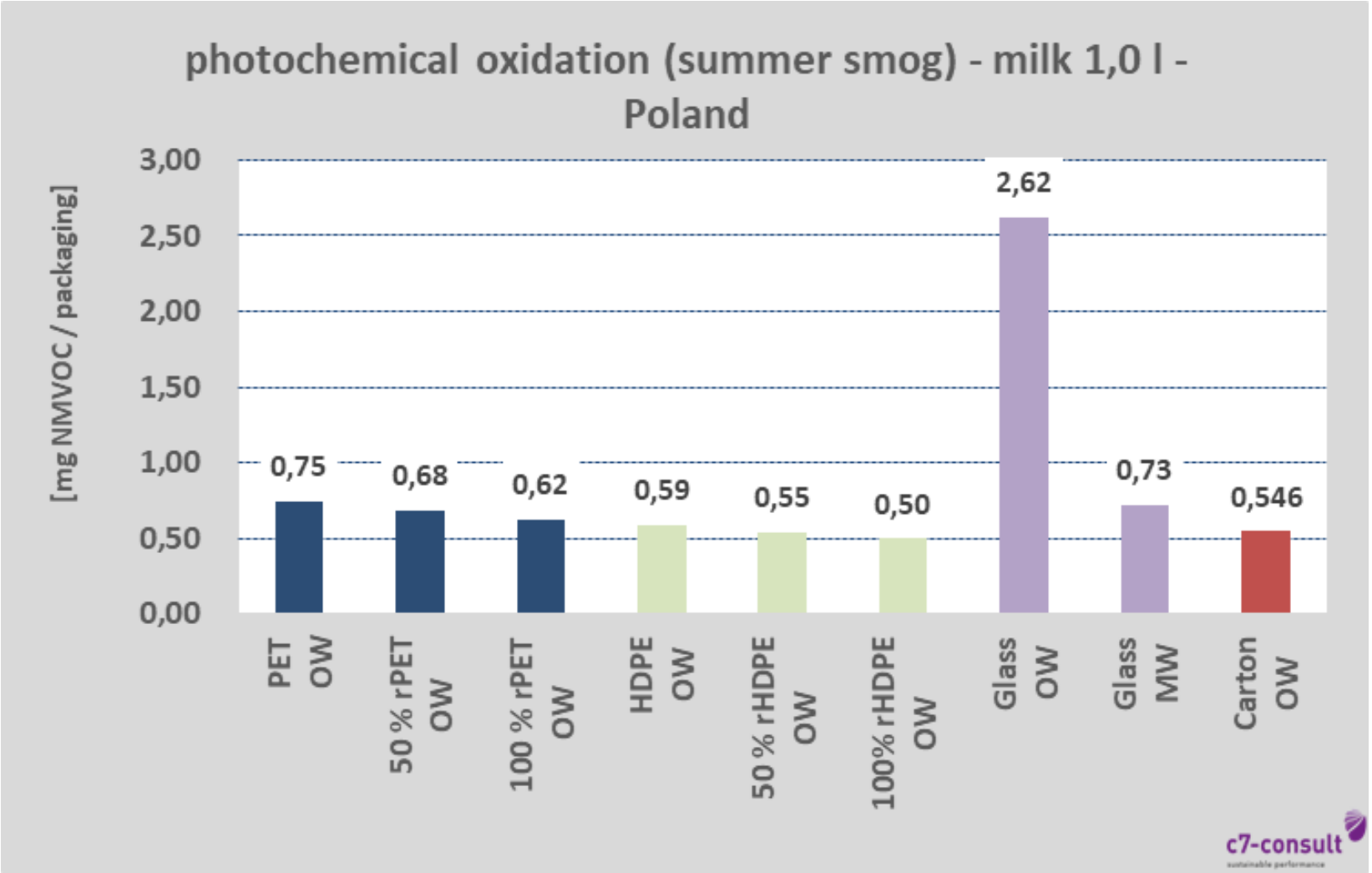
Milk


climate change - milk 1,0 l - Poland
[g CO2-equ. / packaging]
600
500
400
300
200
100
0
197
184
171
151
146
140
551
165
142
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

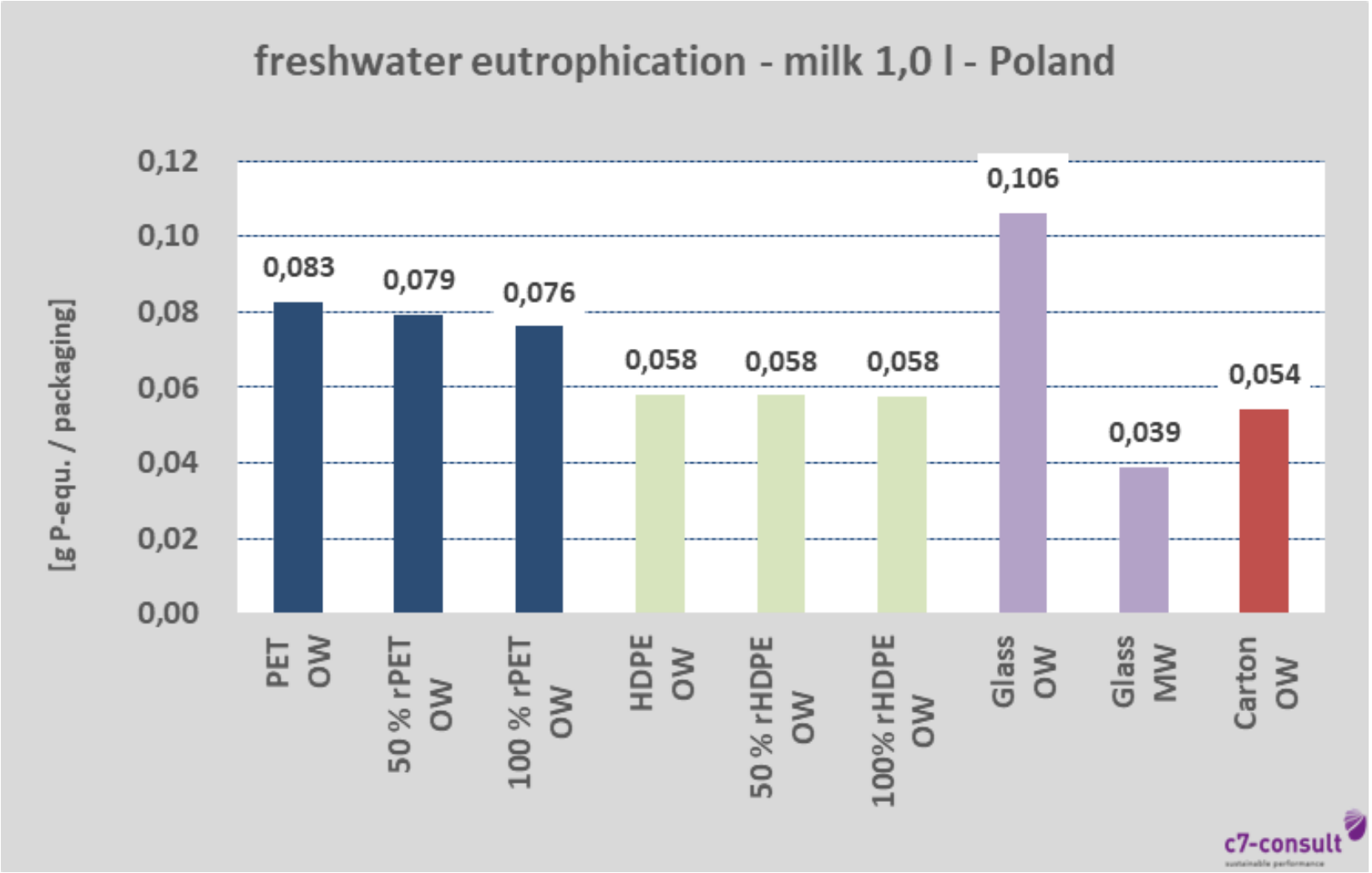
Milk


acidification potential - milk 1,0 l - Poland
[mmol H+ equ. / packaging]
4,5
4,0
3,5
3,0
2,5
2,0
1,5
1,0
0,5
0,0
0,84
0,78
0,73
0,55
0,53
0,52
4,13
0,77
0,52
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

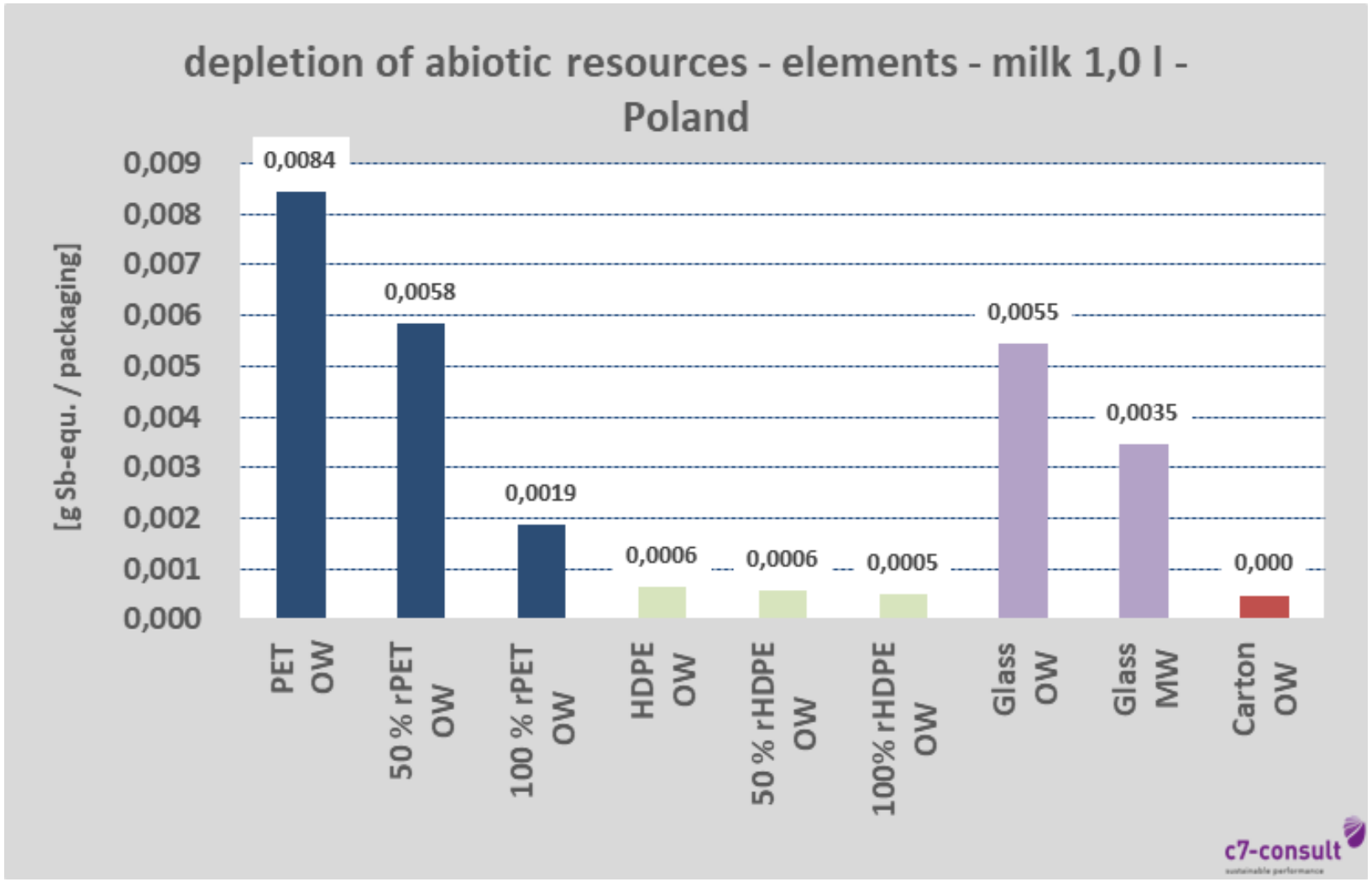
Milk


photochemical oxidation (summer smog) - milk 1,0 l - Poland
[mg NMVOC / packaging]
3,00
2,50
2,00
1,50
1,00
0,50
0,00
0,75
0,68
0,62
0,59
0,55
0,50
2,62
0,73
0,546
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

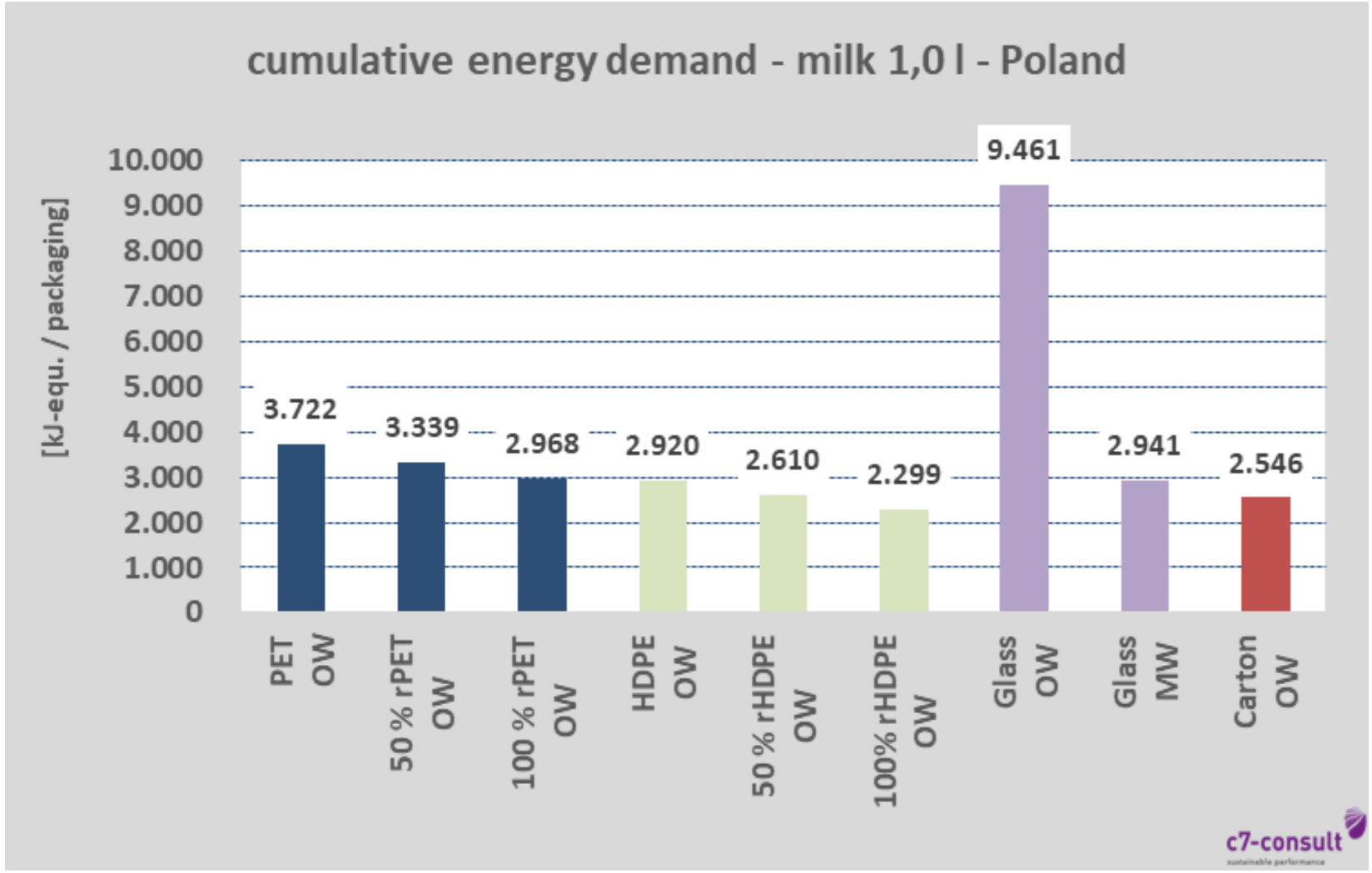
Milk


freshwater eutrophication - milk 1,0 l - Poland
[g P-equ. / packaging]
0,12
0,10
0,08
0,06
0,04
0,02
0,00
0,083
0,079
0,076
0,058
0,058
0,058
0,106
0,039
0,054
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

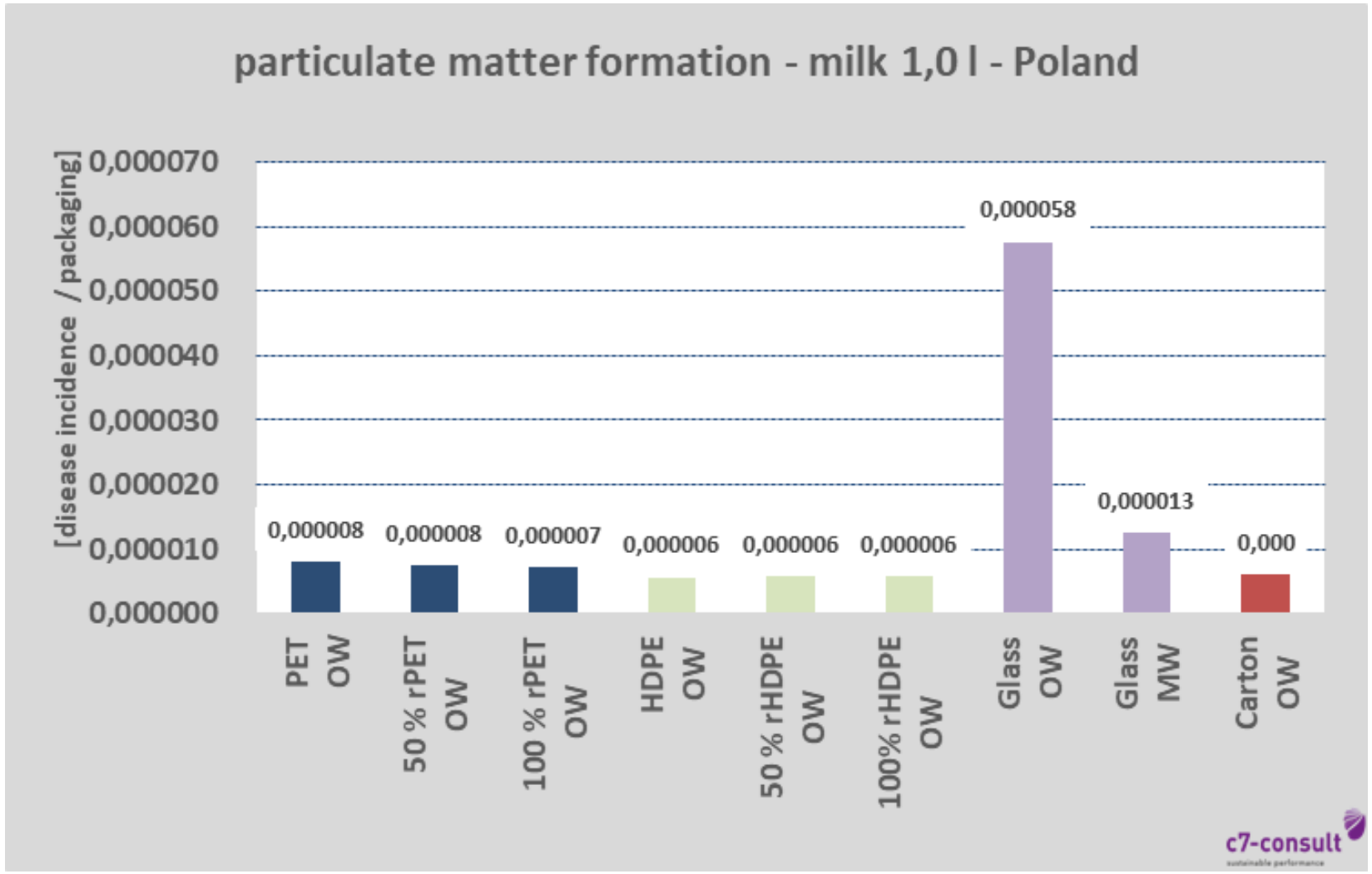
Milk


depletion of abiotic resources - elements - milk 1,0 l - Poland
[g Sb-equ. / packaging]
0,009
0,008
0,007
0,006
0,005
0,004
0,003
0,002
0,001
0,000
0,0084
0,0058
0,0019
0,0006
0,0006
0,0005
0,0055
0,0035
0,000
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

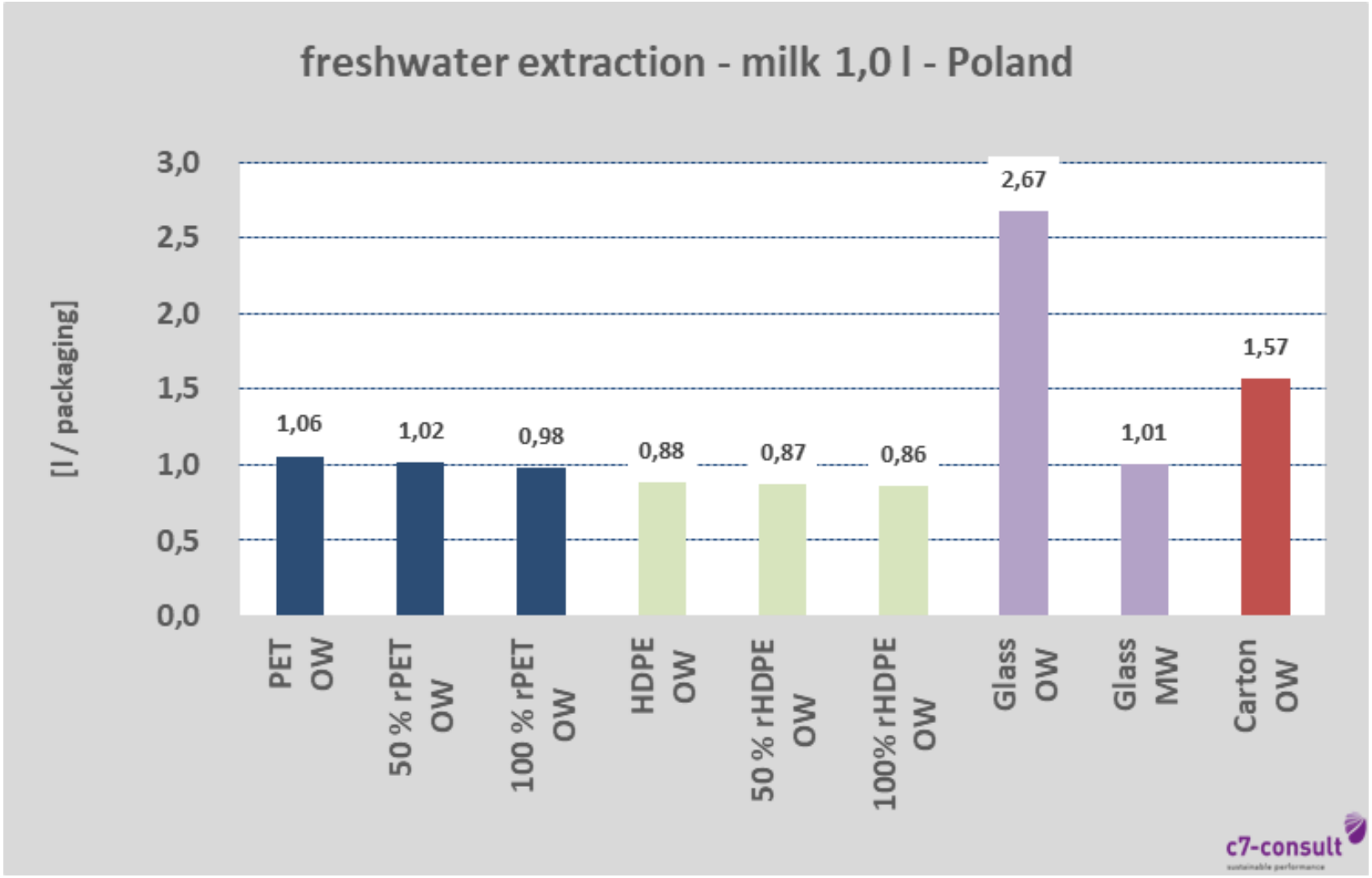
Milk


cumulative energy demand - milk 1,0 l - Poland
[kJ-equ. / packaging]
10.000
9.000
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0
3.722
3.339
2.968
2.920
2.610
2.299
9.461
2.941
2.546
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

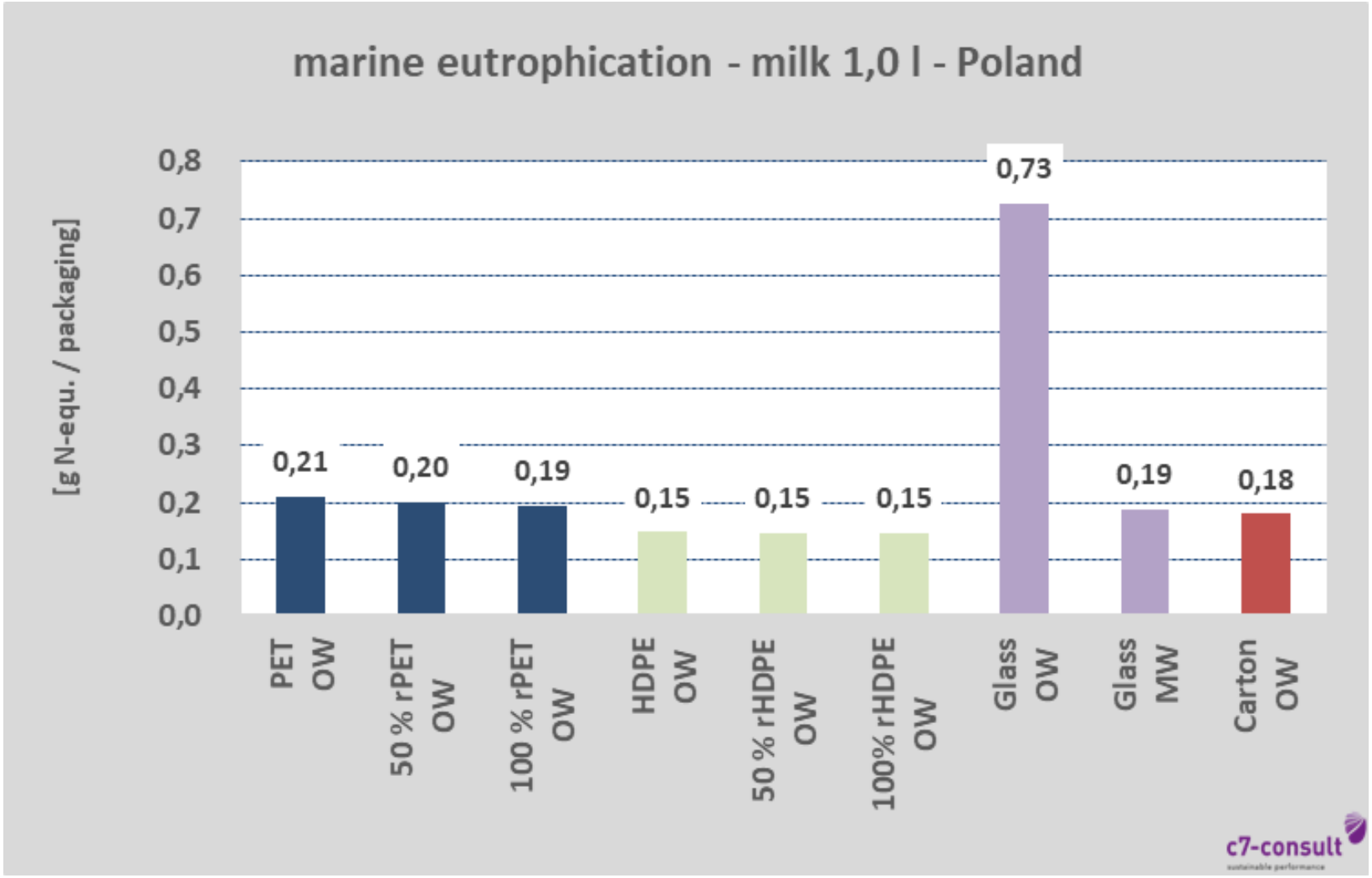
Milk


particulate matter formation - milk 1,0 l - Poland
[disease incidence / packaging]
0,000070
0,000060
0,000050
0,000040
0,000030
0,000020
0,000010
0,000000
0,000008
0,000008
0,000007
0,000006
0,000006
0,000006
0,000058
0,000013
0,000
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

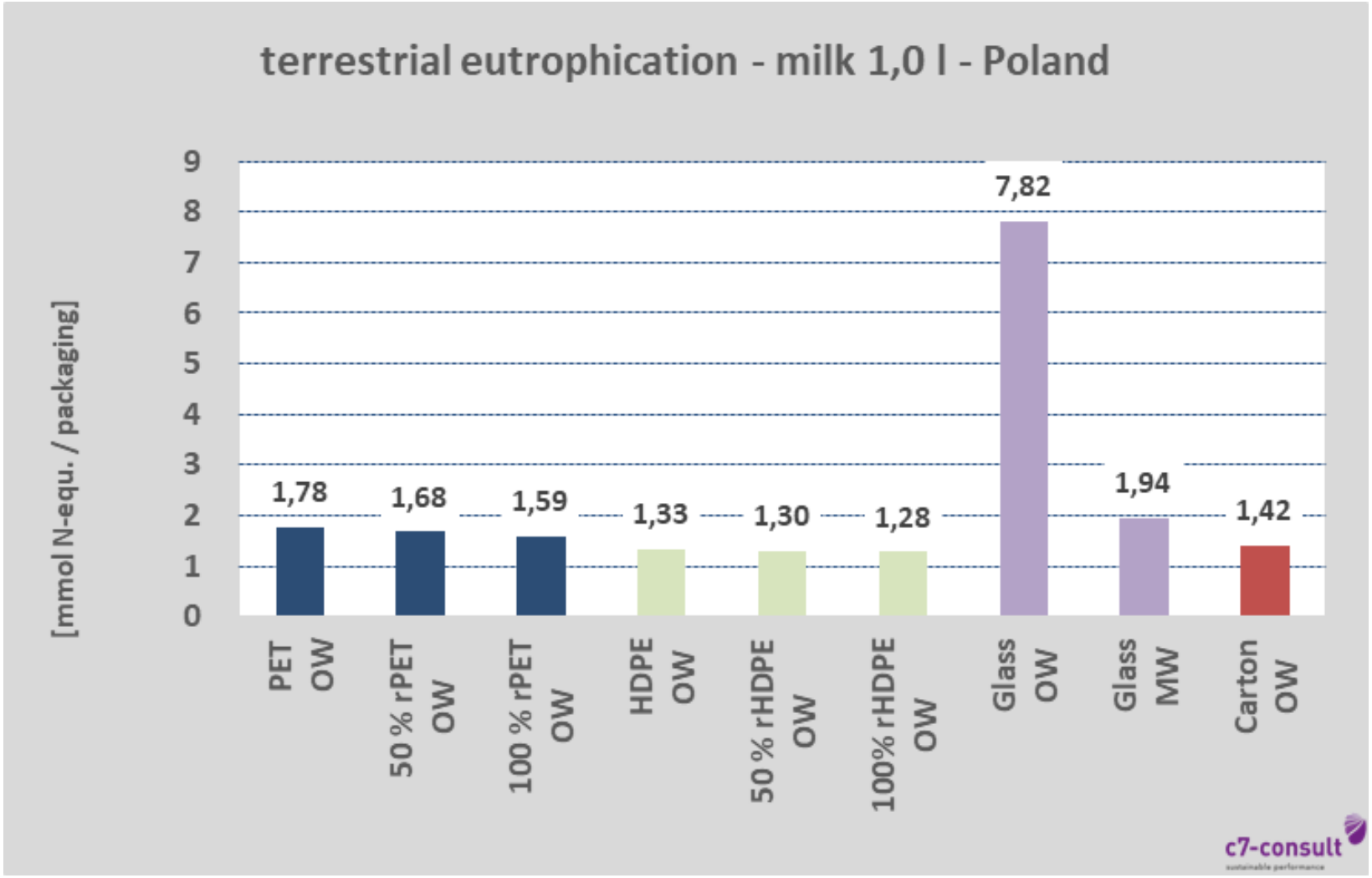
Milk


freshwater extraction - milk 1,0 l - Poland
[l / packaging]
3,0
2,5
2,0
1,5
1,0
0,5
0,0
1,06
1,02
0,98
0,88
0,87
0,86
2,67
1,01
1,57
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

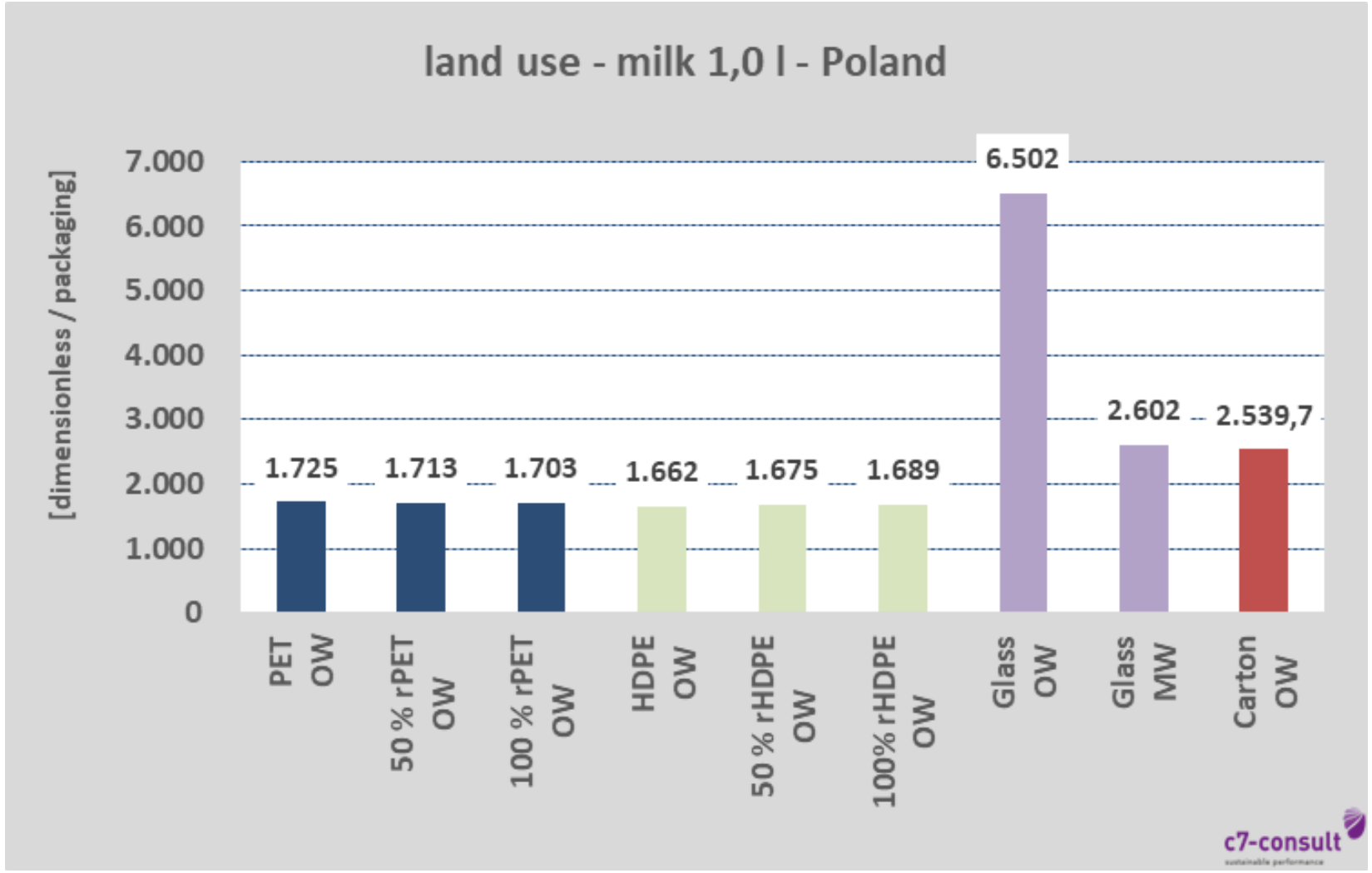
Milk


marine eutrophication - milk 1,0 l - Poland
[g N-equ. / packaging]
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0,0
0,21
0,20
0,19
0,15
0,15
0,15
0,73
0,19
0,18
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

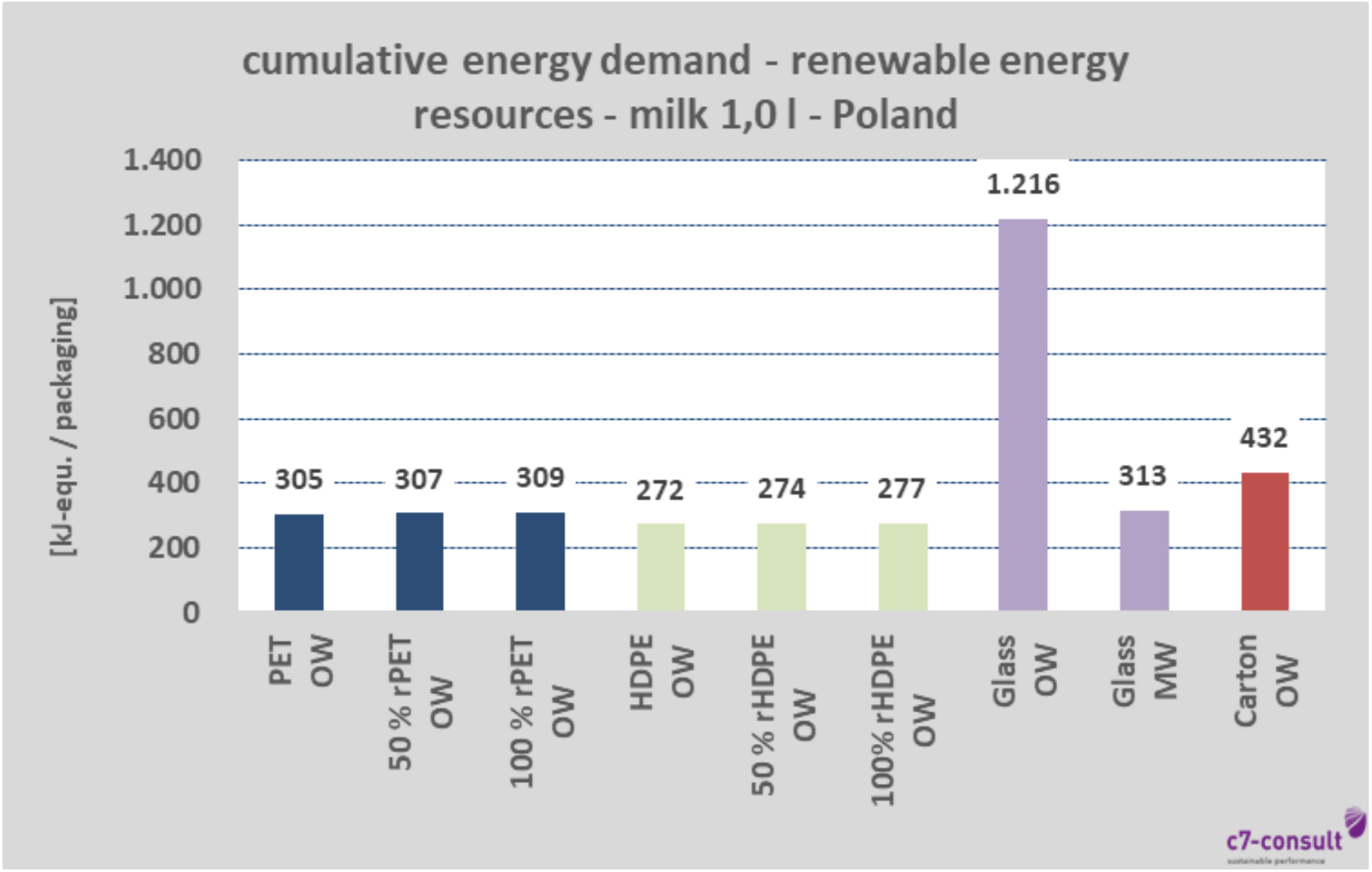
Milk


terrestrial eutrophication - milk 1,0 l - Poland
[mmol N-equ. / packaging]
0
1
2
3
4
5
6
7
8
9
1,78
1,68
1,59
1,33
1,30
1,28
7,82
1,94
1,42
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

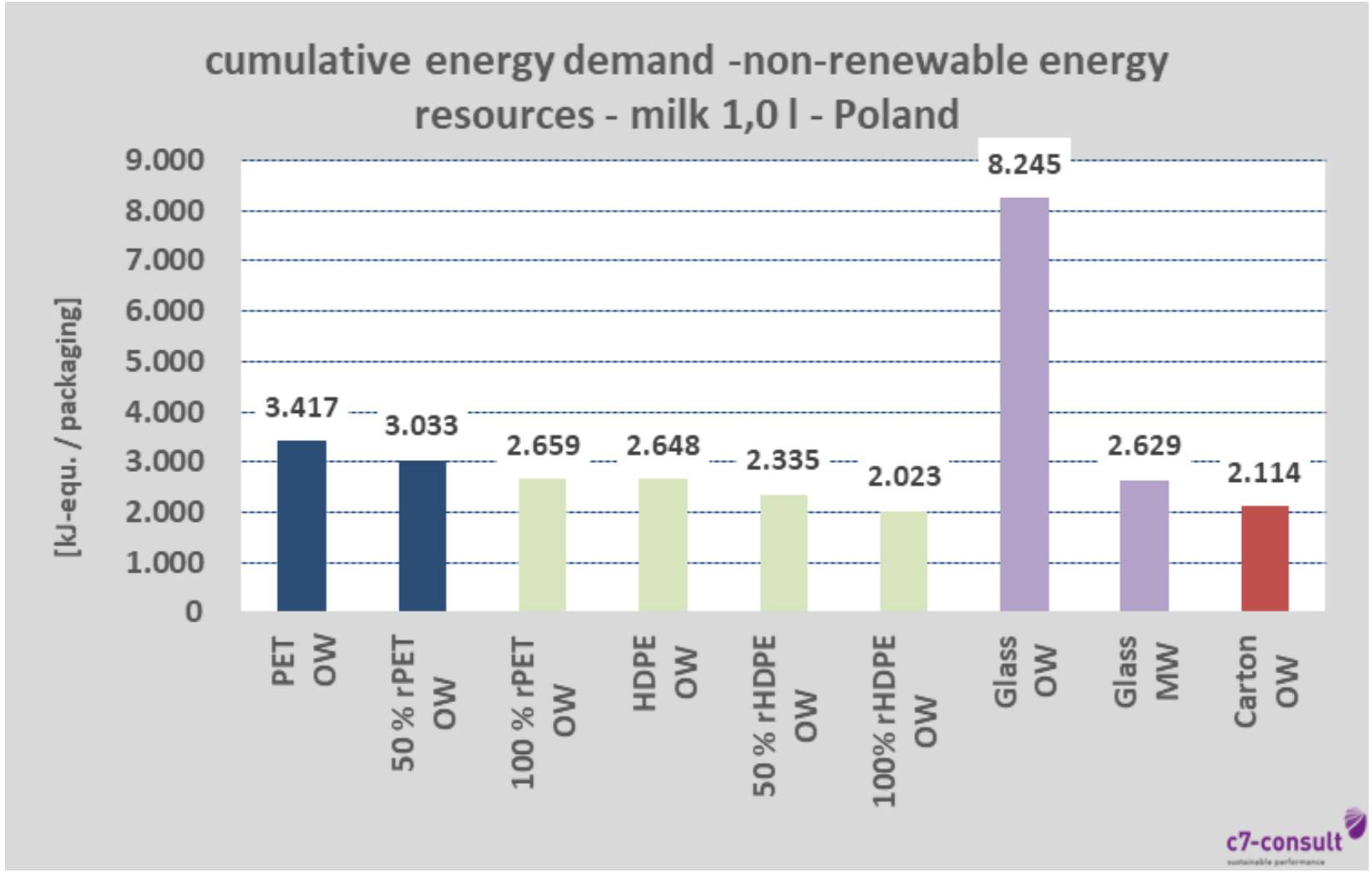
Milk


land use - milk 1,0 l - Poland
[dimensionless / packaging]
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0
1.725
1.713
1.703
1.662
1.675
1.689
6.502
2.602
2.539,7
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

Milk


cumulative energy demand - renewable energy resources - milk 1,0 l - Poland
[kJ-equ. / packaging]
1.400
1.200
1.000
800
600
400
200
0
305
307
309
272
274
277
1.216
313
432
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

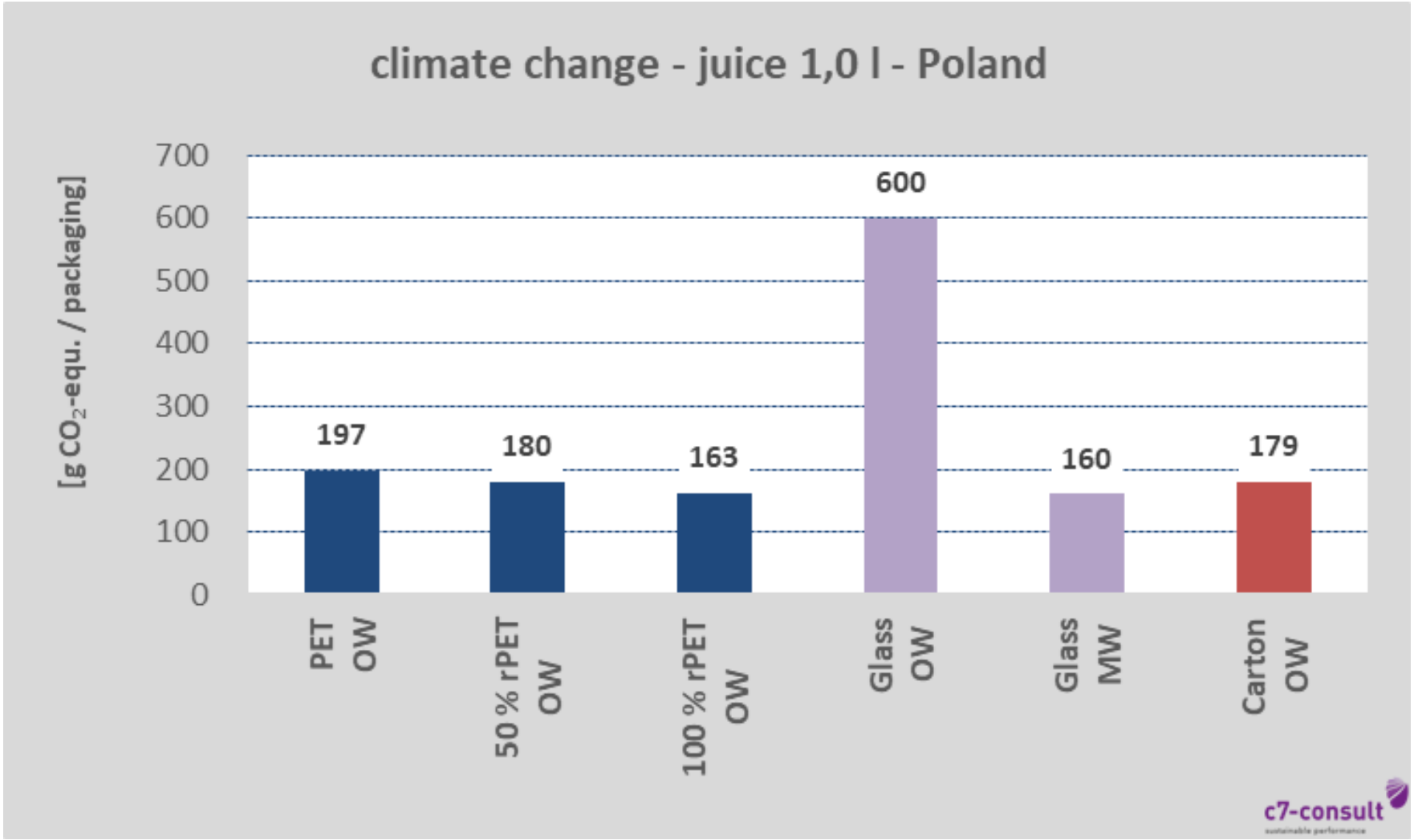
Milk


cumulative energy demand -non-renewable energy resources - milk 1,0 l - Poland
[kJ-equ. / packaging]
9.000
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0
3.417
3.033
2.659
2.648
2.335
2.023
8.245
2.629
2.114
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
Glass OW
Glass MW
Carton OW
c7-consult

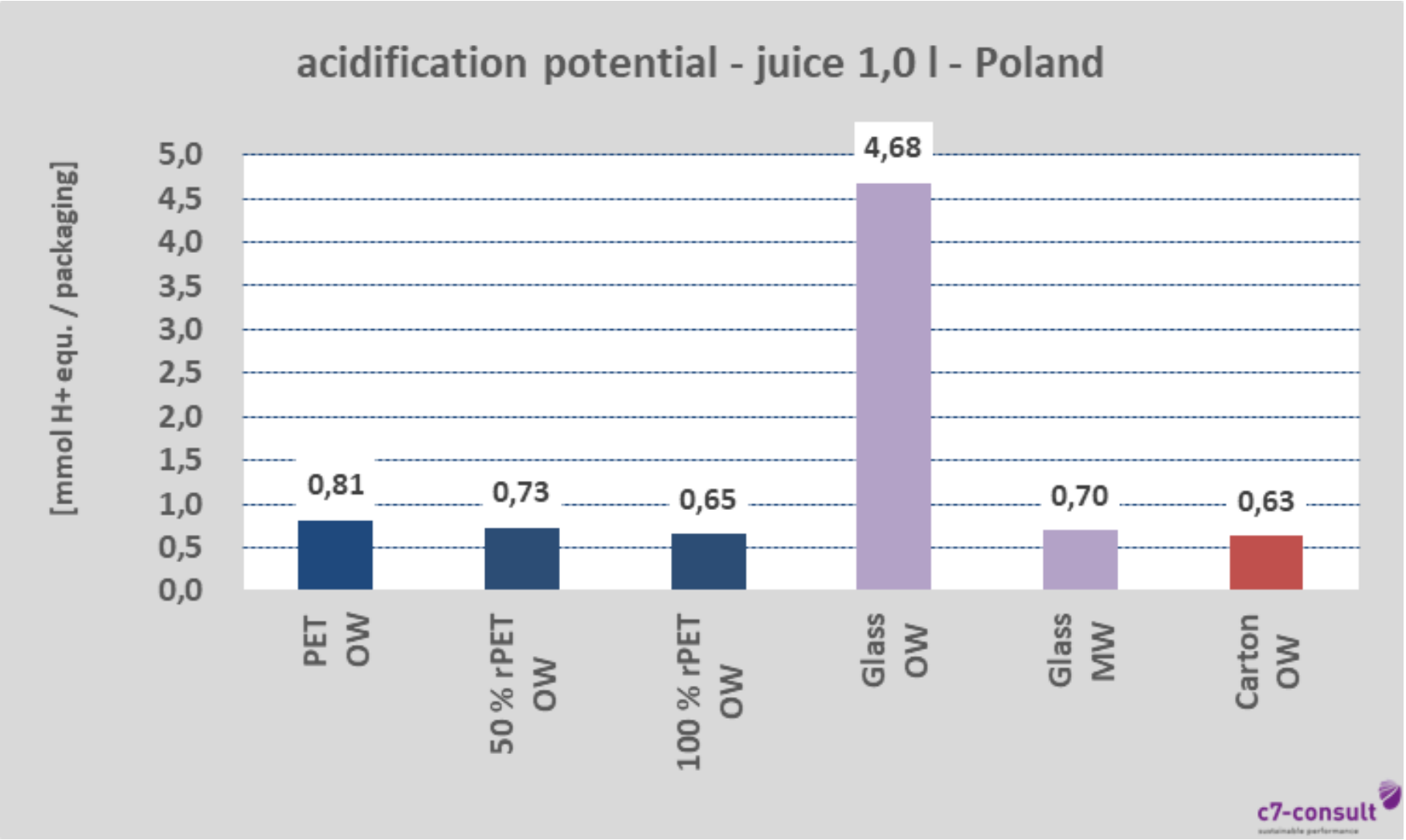
c7-consult
sustainable performance

Results Juice 1,0 l

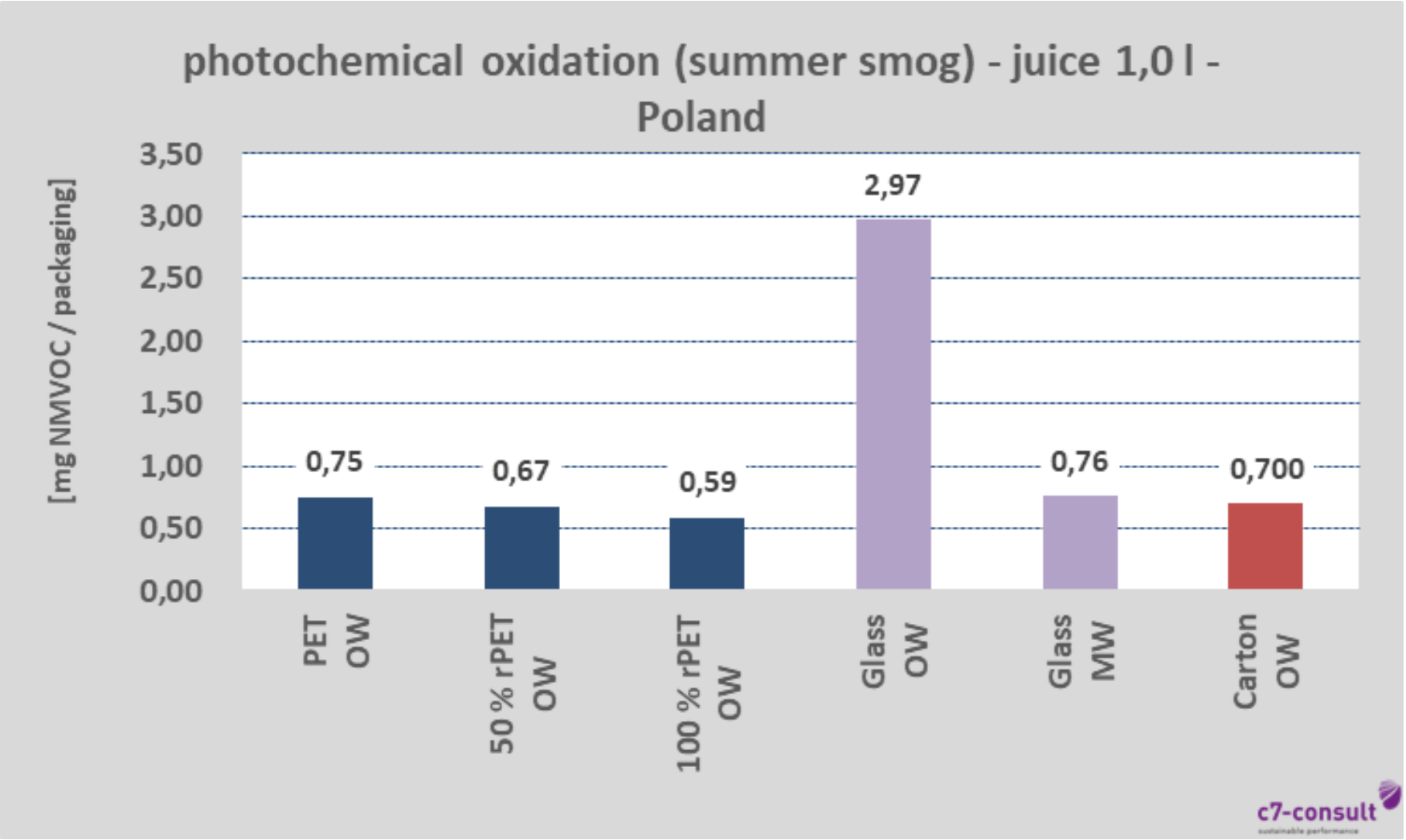
Juice


climate change - juice 1,0 l - Poland
[g CO2-equ. / packaging]
700
600
500
400
300
200
100
0
197
180
163
600
160
179
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

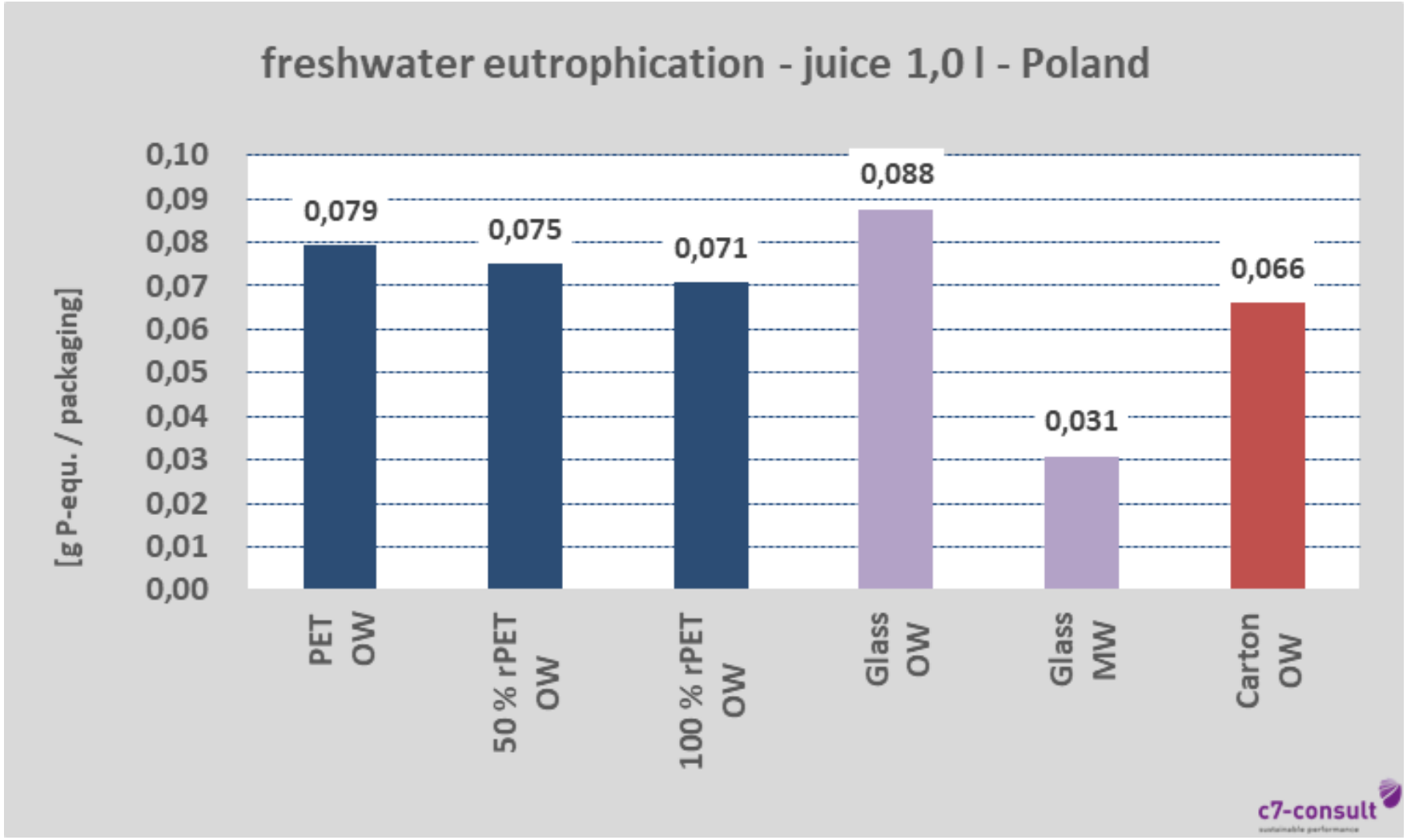
Juice


acidification potential - juice 1,0 l - Poland
[mmol H+ equ. / packaging]
5,0
4,5
4,0
3,5
3,0
2,5
2,0
1,5
1,0
0,5
0,0
0,81
0,73
0,65
4,68
0,70
0,63
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

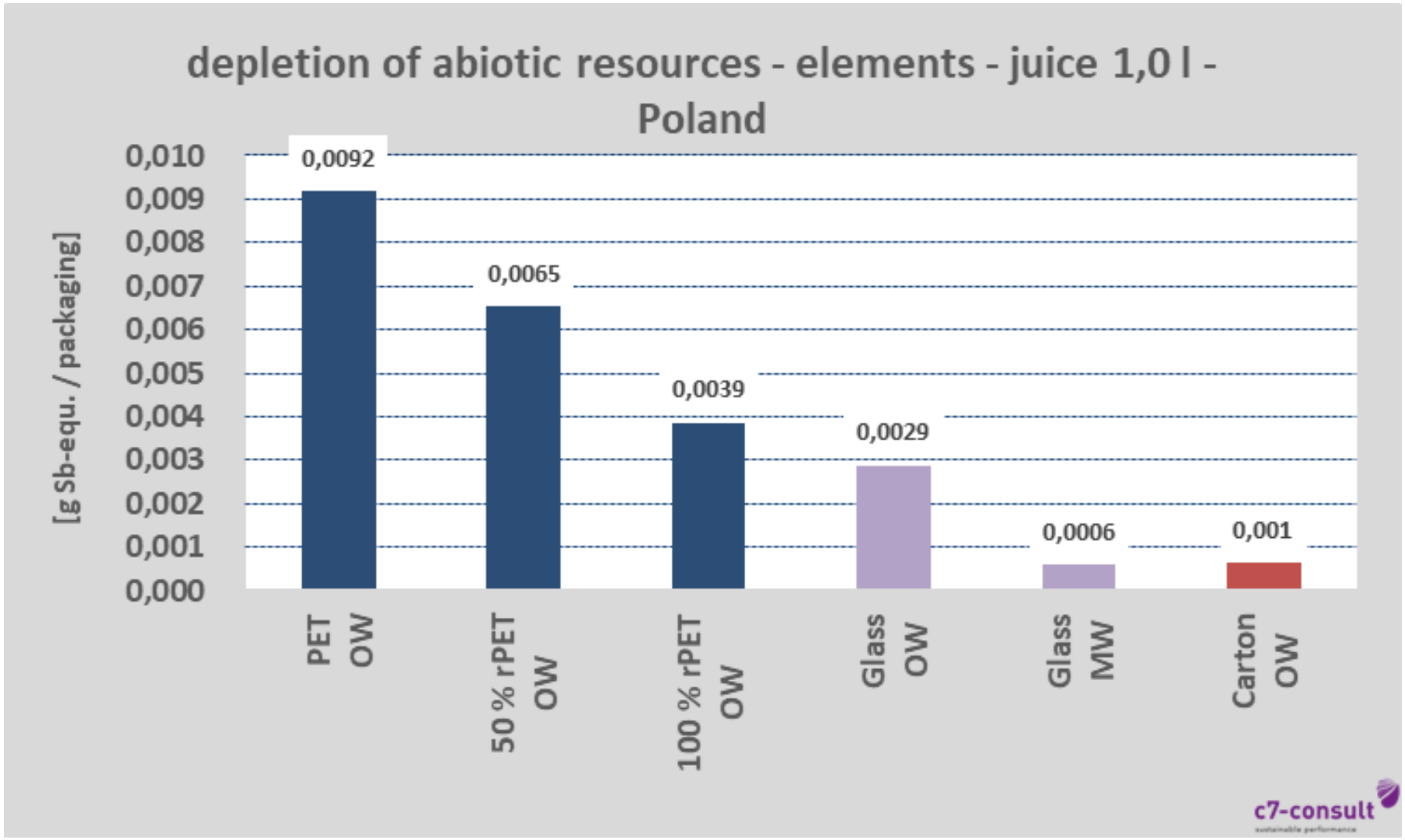
Juice


photochemical oxidation (summer smog) - juice 1,0 l - Poland
[mg NMVOC / packaging]
3,50
3,00
2,50
2,00
1,50
1,00
0,50
0,00
0,75
0,67
0,59
2,97
0,76
0,700
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

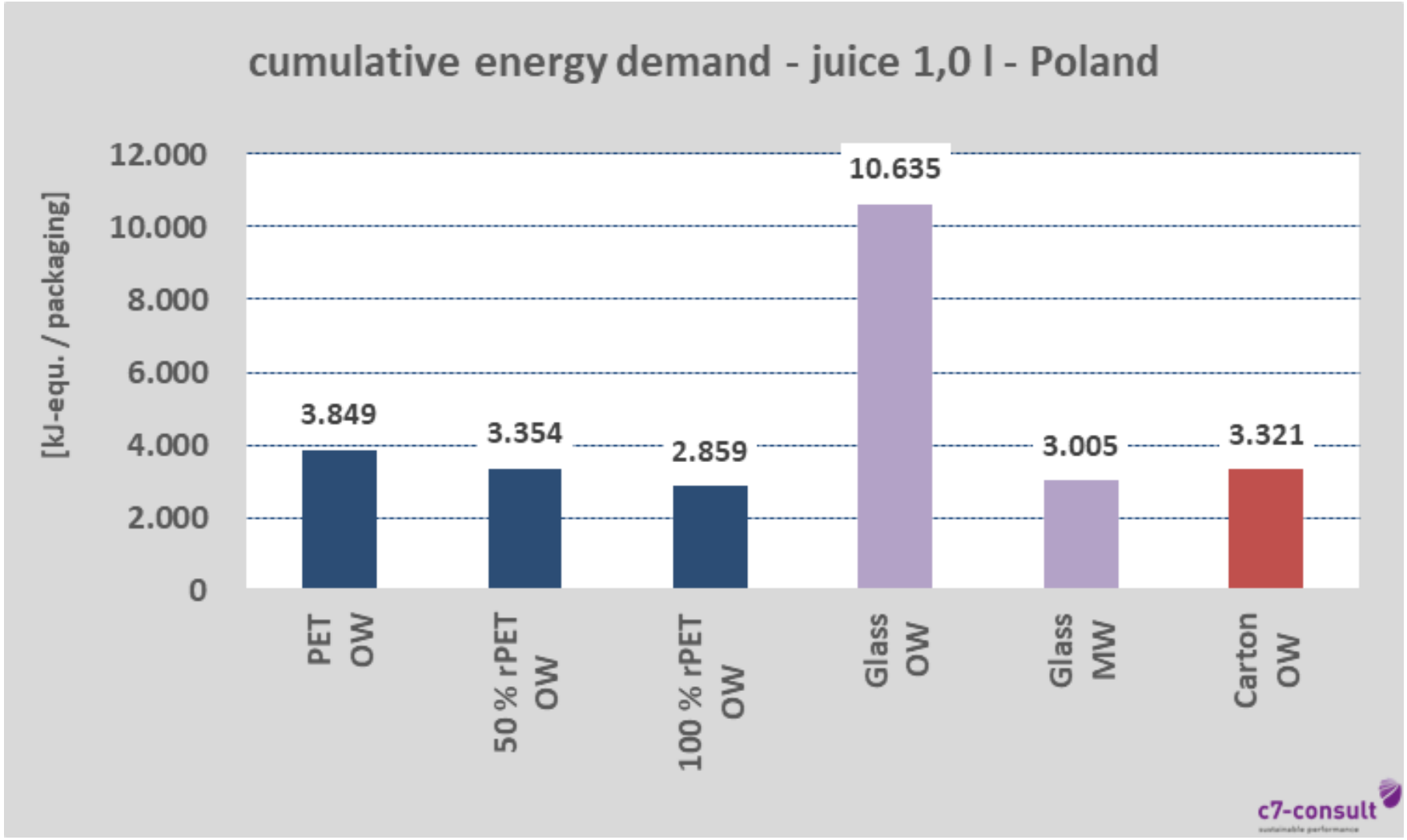
Juice


freshwater eutrophication - juice 1,0 l - Poland
[g P-equ. / packaging]
0,10
0,09
0,08
0,07
0,06
0,05
0,04
0,03
0,02
0,01
0,00
0,079
0,075
0,071
0,088
0,031
0,066
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

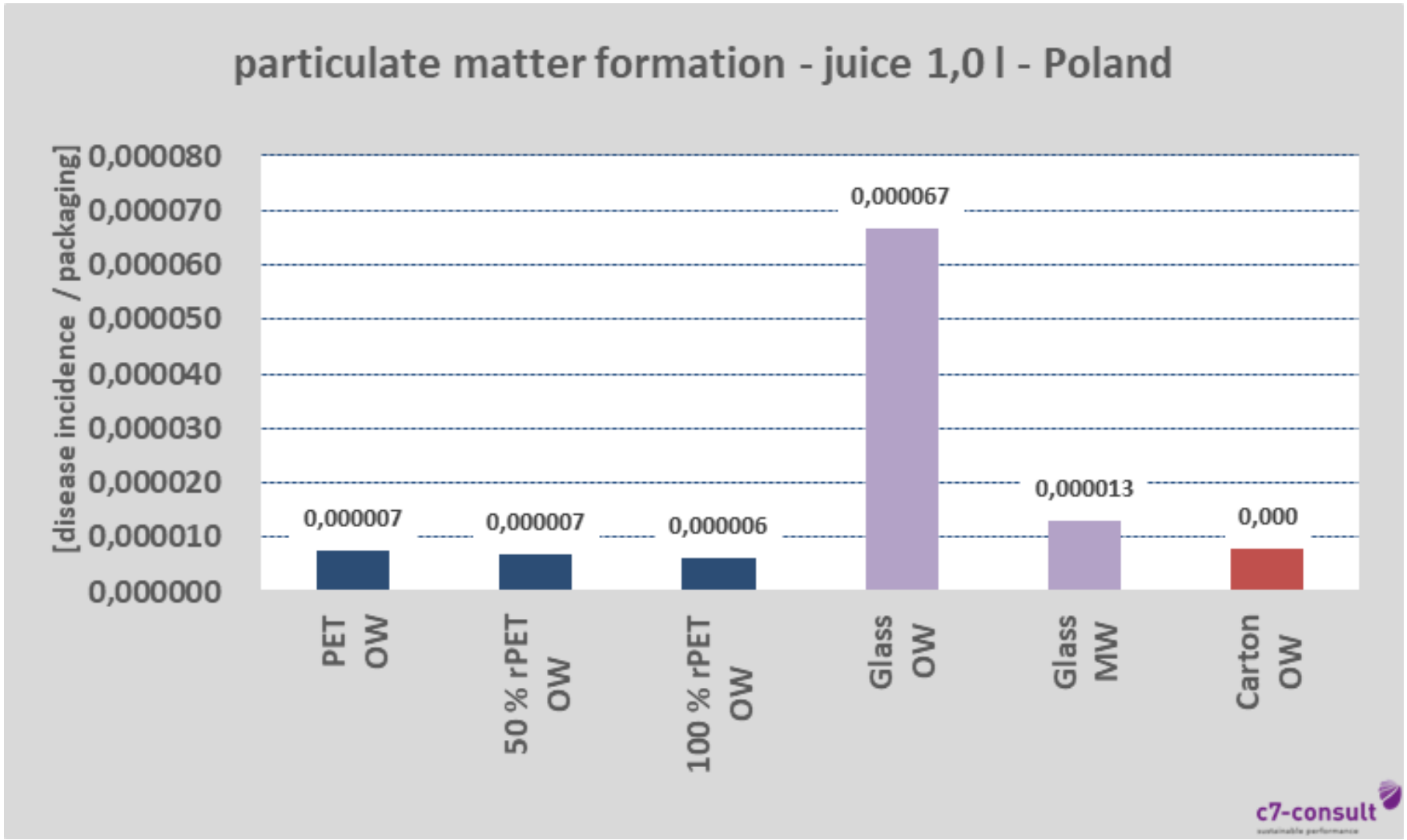
Juice


depletion of abiotic resources - elements - juice 1,0 l - Poland
[g Sb-equ. / packaging]
0,010
0,009
0,008
0,007
0,006
0,005
0,004
0,003
0,002
0,001
0,000
0,0092
0,0065
0,0039
0,0029
0,0006
0,001
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

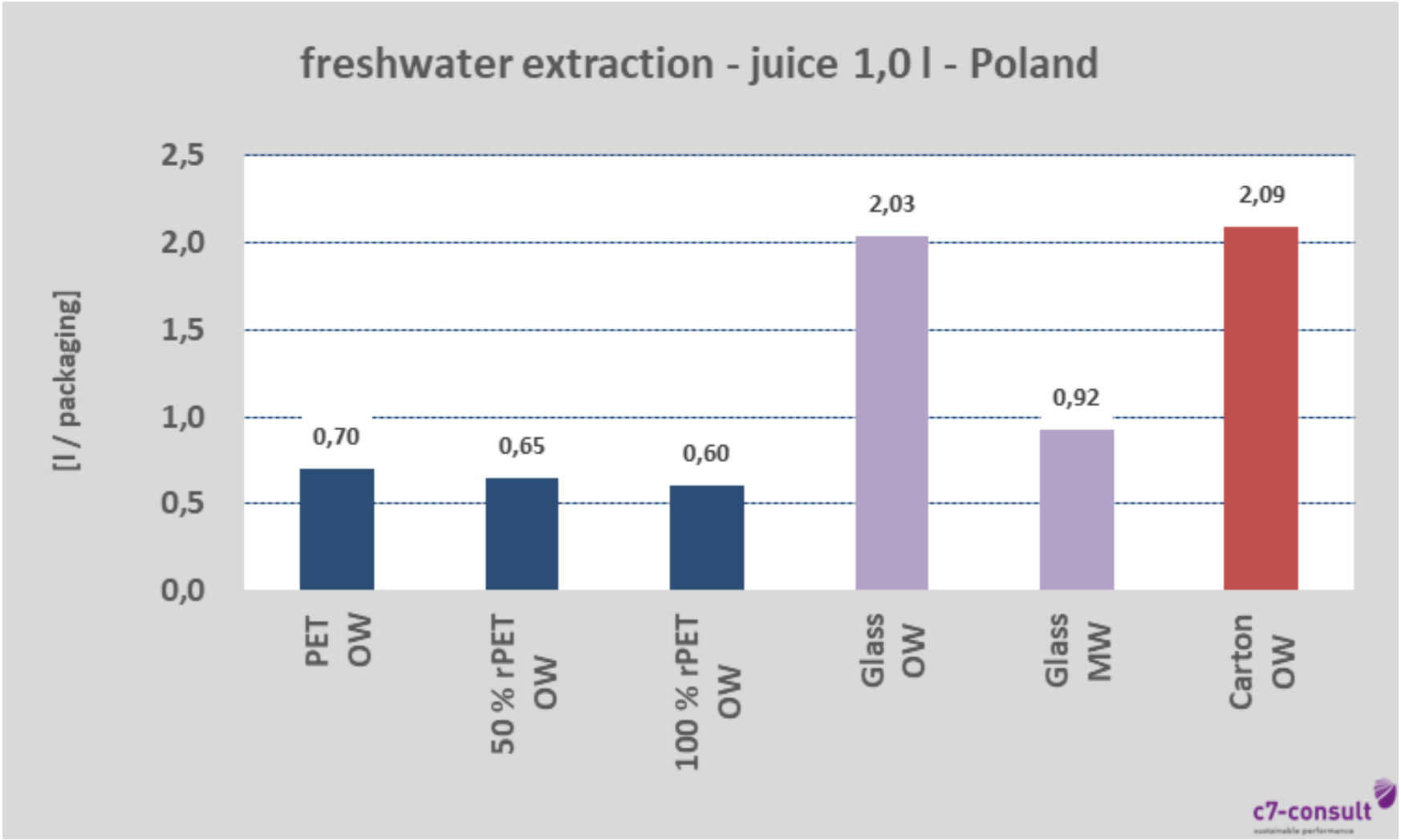
Juice


cumulative energy demand - juice 1,0 l - Poland
[kJ-equ. / packaging]
12.000
10.000
8.000
6.000
4.000
2.000
0
3.849
3.354
2.859
10.635
3.005
3.321
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

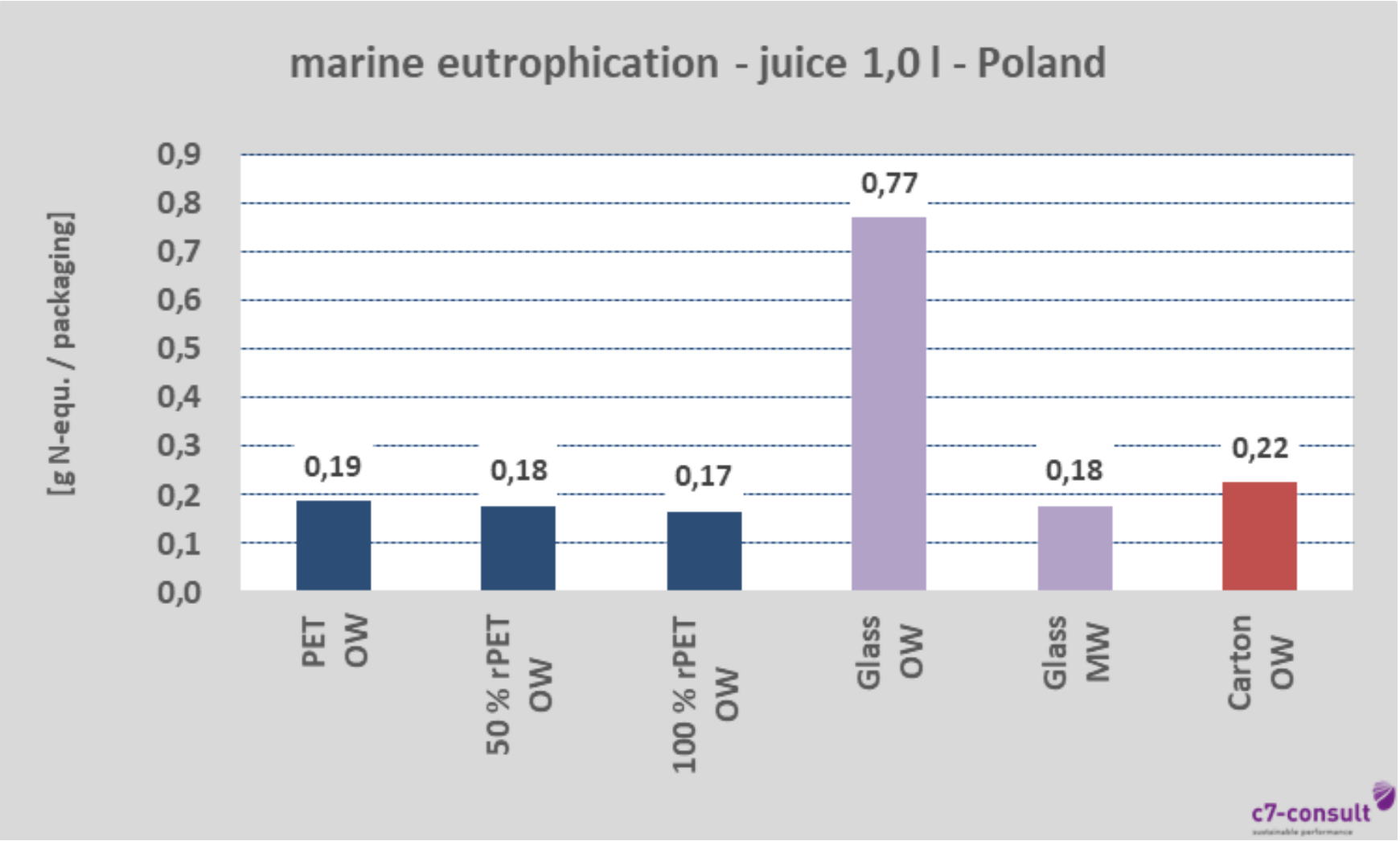
Juice


particulate matter formation - juice 1,0 l - Poland
[disease incidence / packaging]
0,000080
0,000070
0,000060
0,000050
0,000040
0,000030
0,000020
0,000010
0,000000
0,000007
0,000007
0,000006
0,000067
0,000013
0,000
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

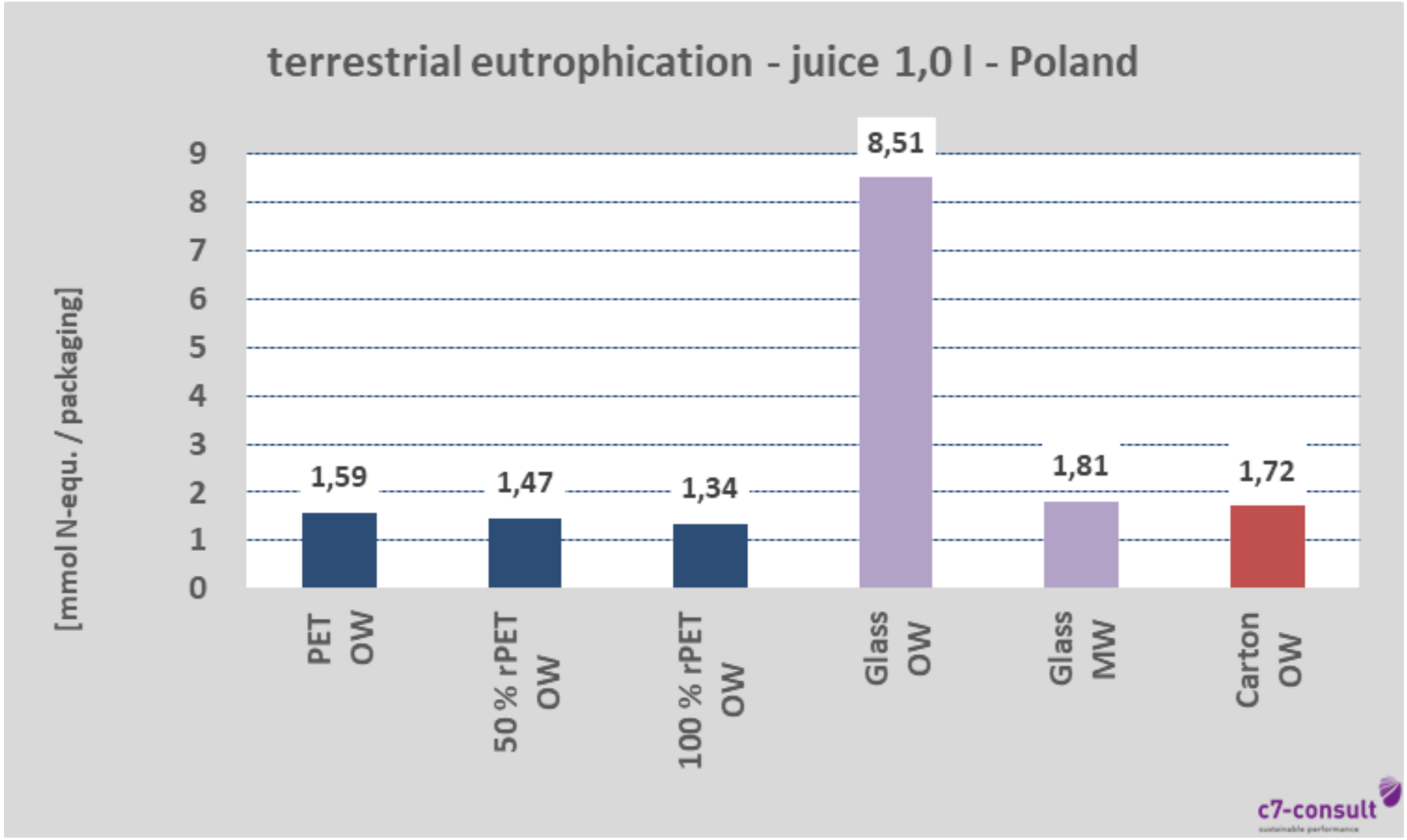
Juice


freshwater extraction - juice 1,0 l - Poland
[l / packaging]
2,5
2,0
1,5
1,0
0,5
0,0
0,70
0,65
0,60
2,03
0,92
2,09
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

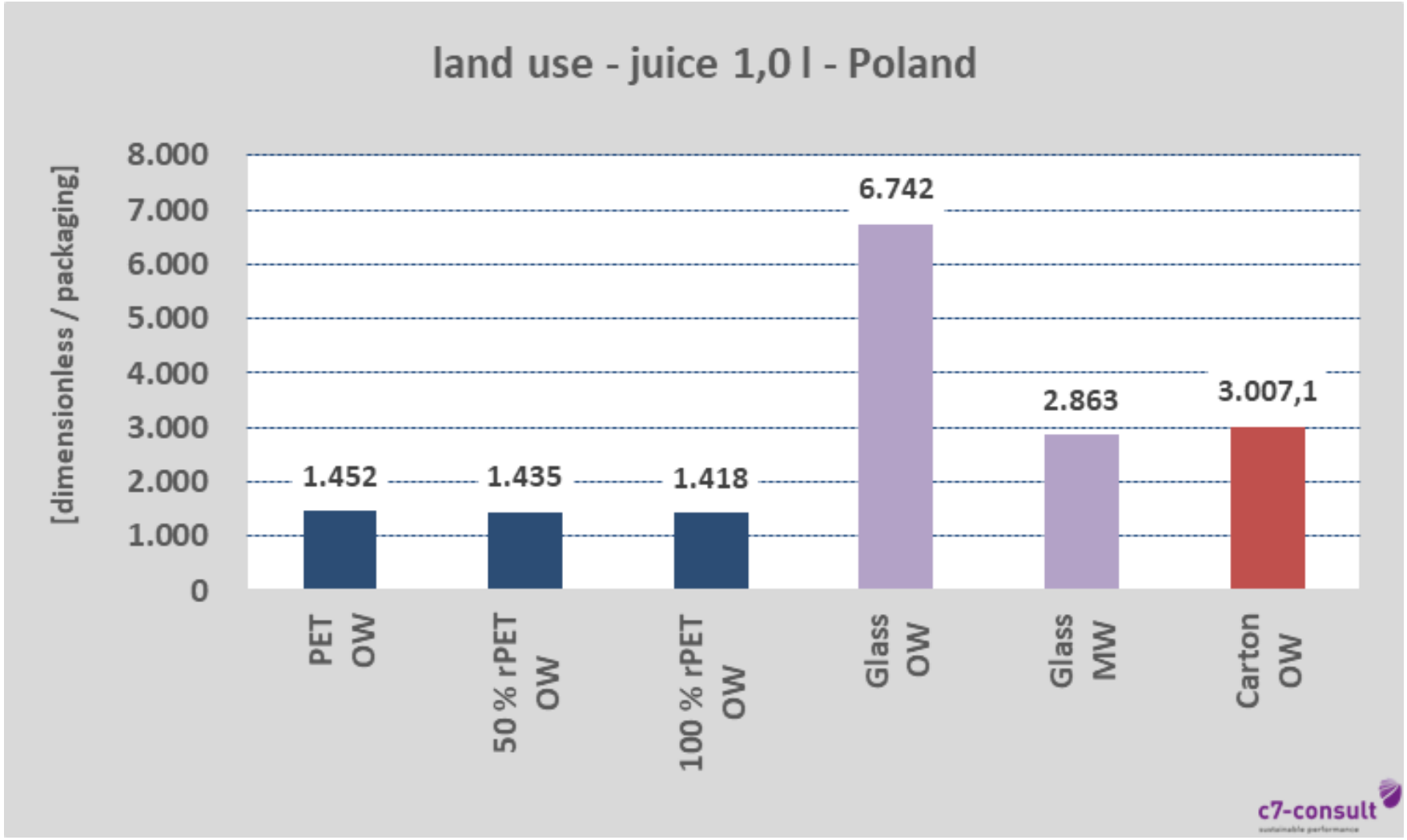
Juice


marine eutrophication - juice 1,0 l - Poland
[g N-equ. / packaging]
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0,0
0,19
0,18
0,17
0,77
0,18
0,22
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

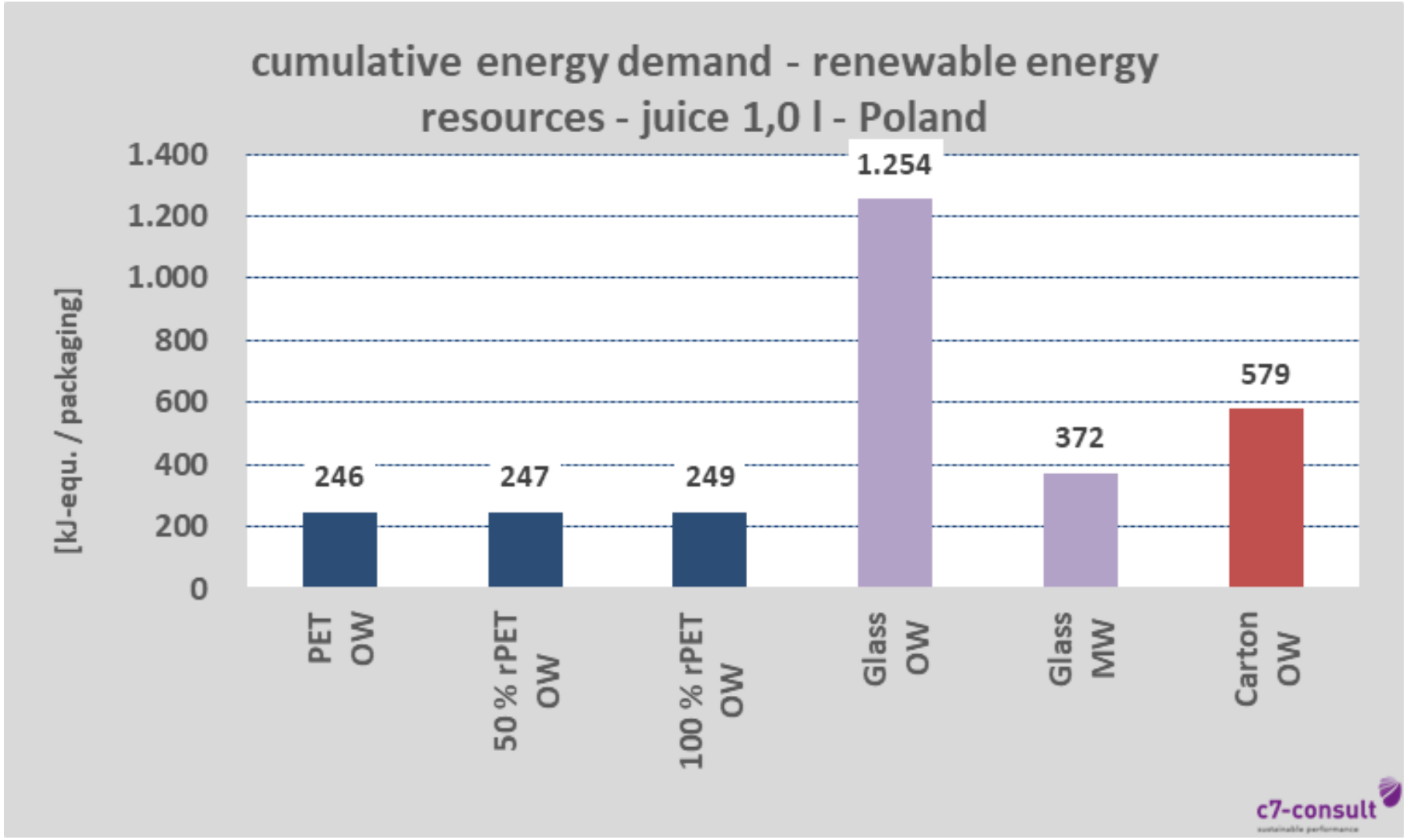
Juice


terrestrial eutrophication - juice 1,0 l - Poland
[mmol N-equ. / packaging]
0
1
2
3
4
5
6
7
8
9
1,59
1,47
1,34
8,51
1,81
1,72
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

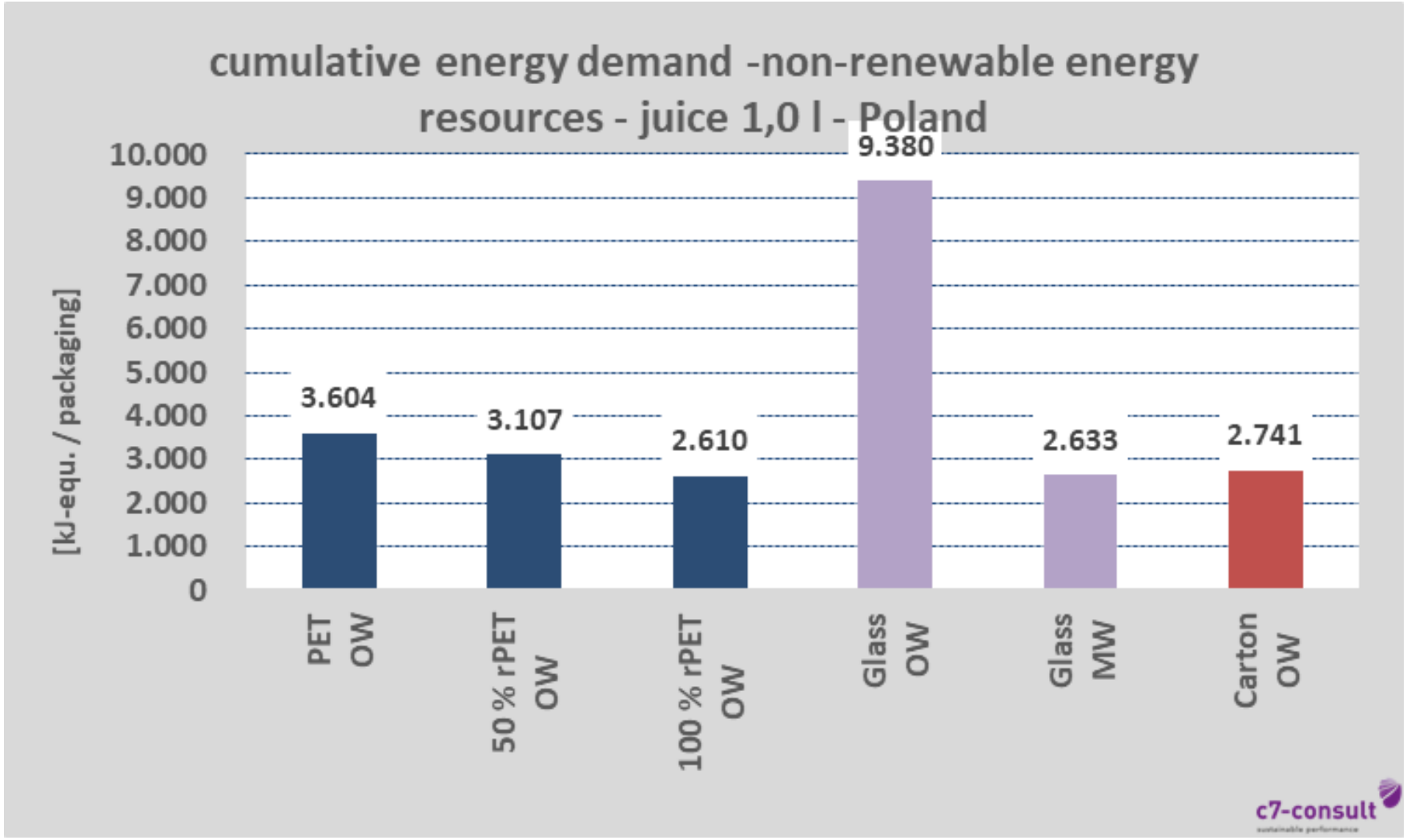
Juice


land use - juice 1,0 l - Poland
[dimensionless / packaging]
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0
1.452
1.435
1.418
6.742
2.863
3.007,1
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

Juice


cumulative energy demand - renewable energy resources - juice 1,0 l - Poland
[kJ-equ. / packaging]
1.400
1.200
1.000
800
600
400
200
0
246
247
249
1.254
372
579
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

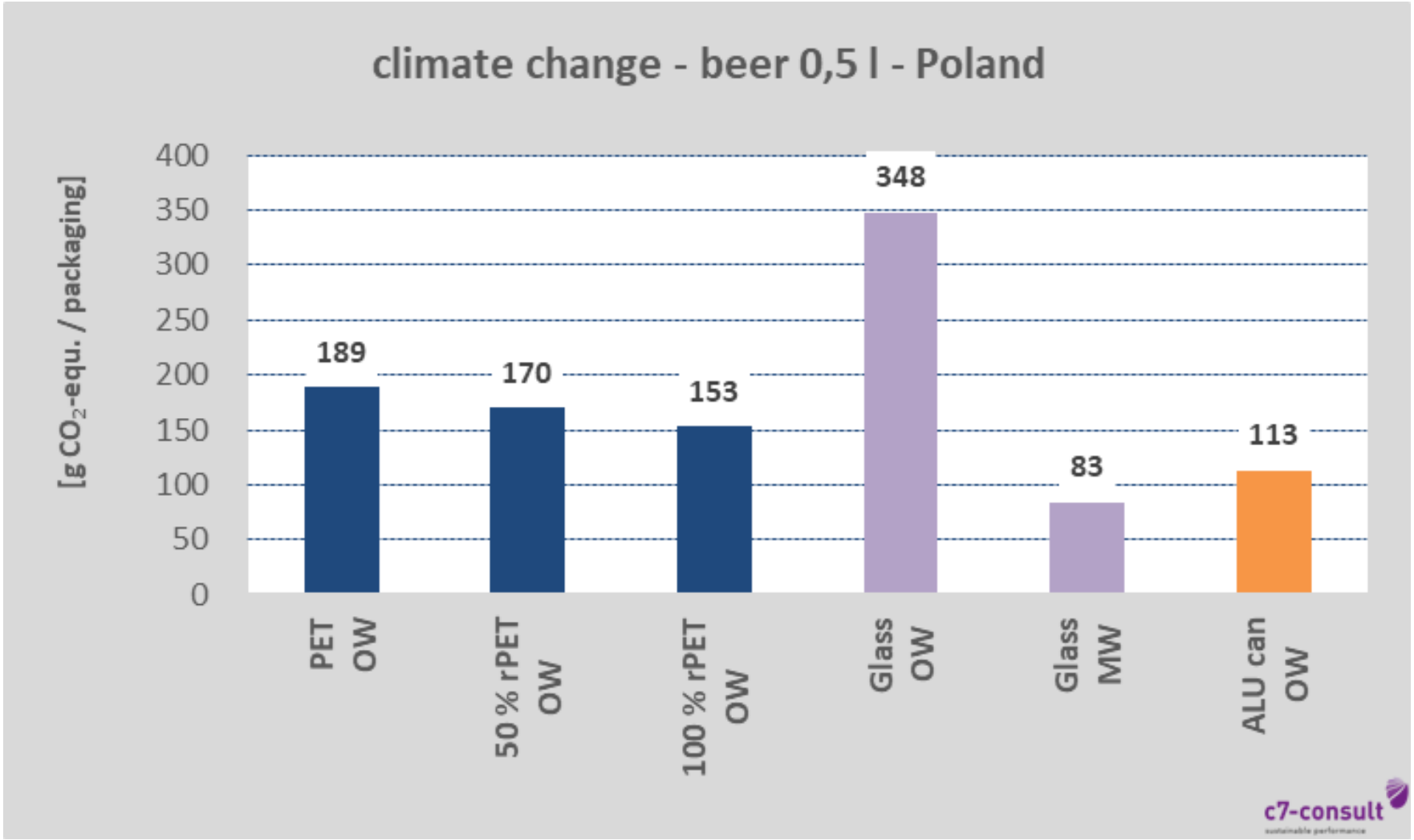
Juice


cumulative energy demand -non-renewable energy resources - juice 1,0 l - Poland
[kJ-equ. / packaging]
10.000
9.000
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0
3.604
3.107
2.610
9.380
2.633
2.741
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
Carton OW
c7-consult

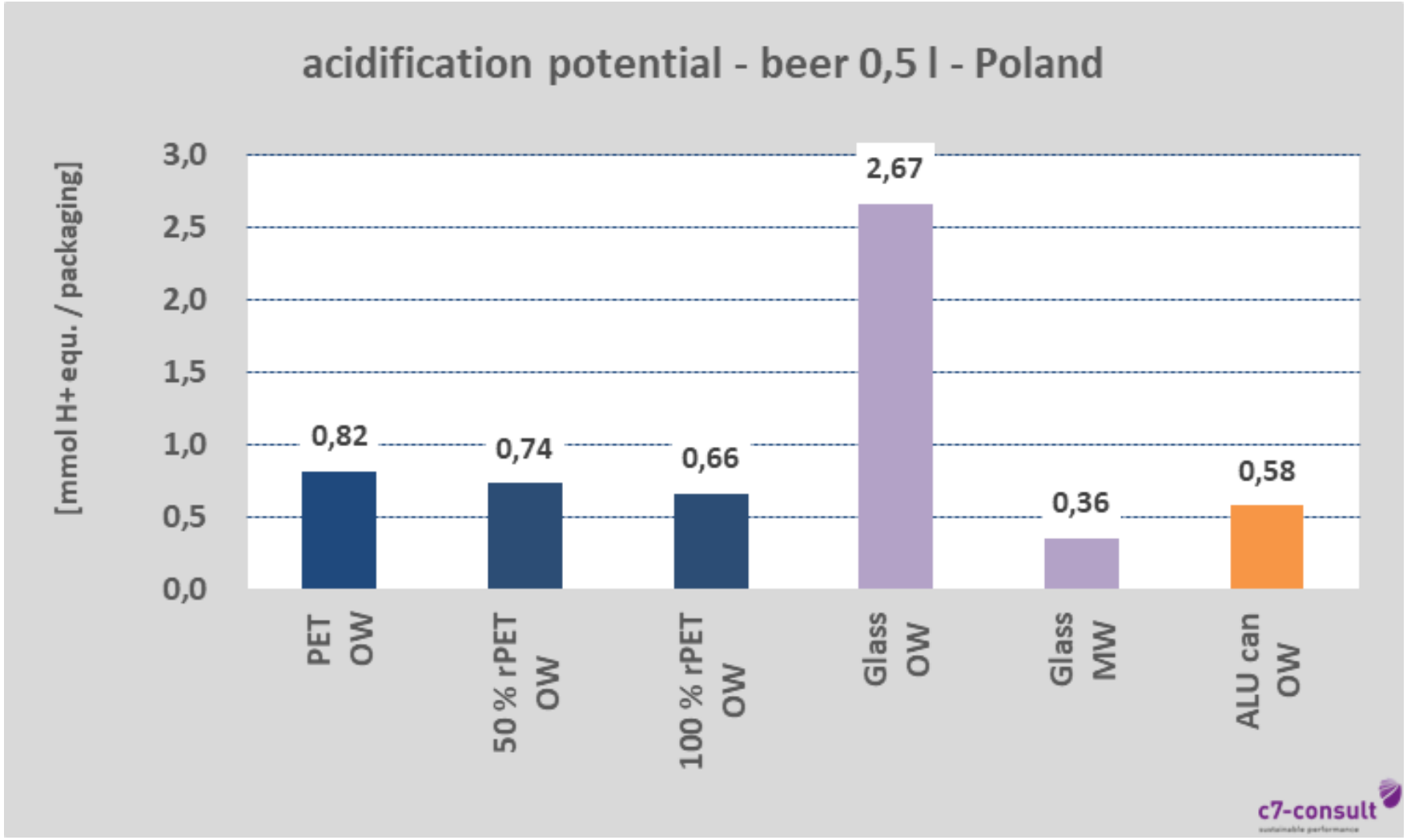
c7-consult
sustainable performance

Results Beer 0,5 l

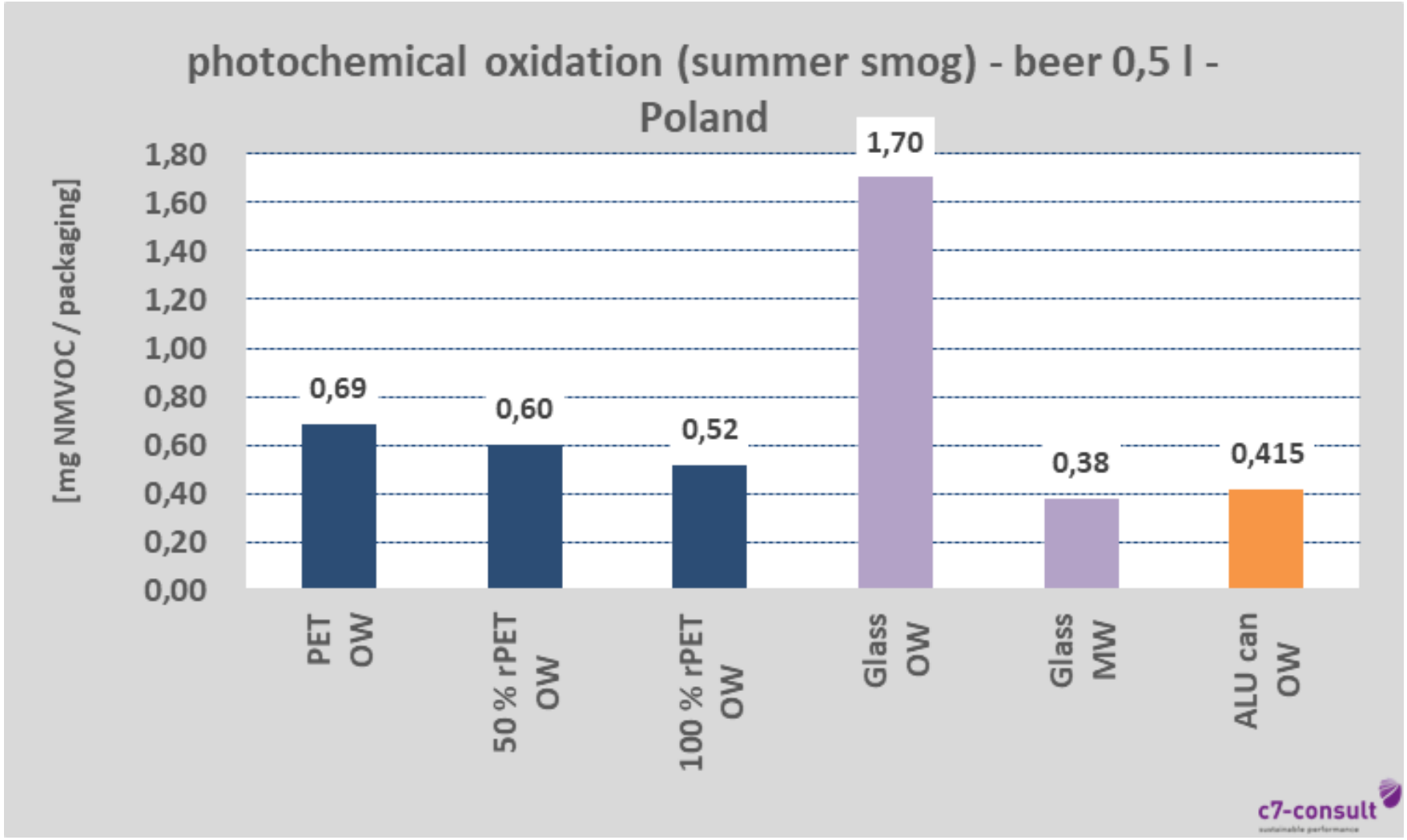
Beer


climate change - beer 0,5 l - Poland
[g CO2-equ. / packaging]
400
350
300
250
200
150
100
50
0
189
170
153
348
83
113
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

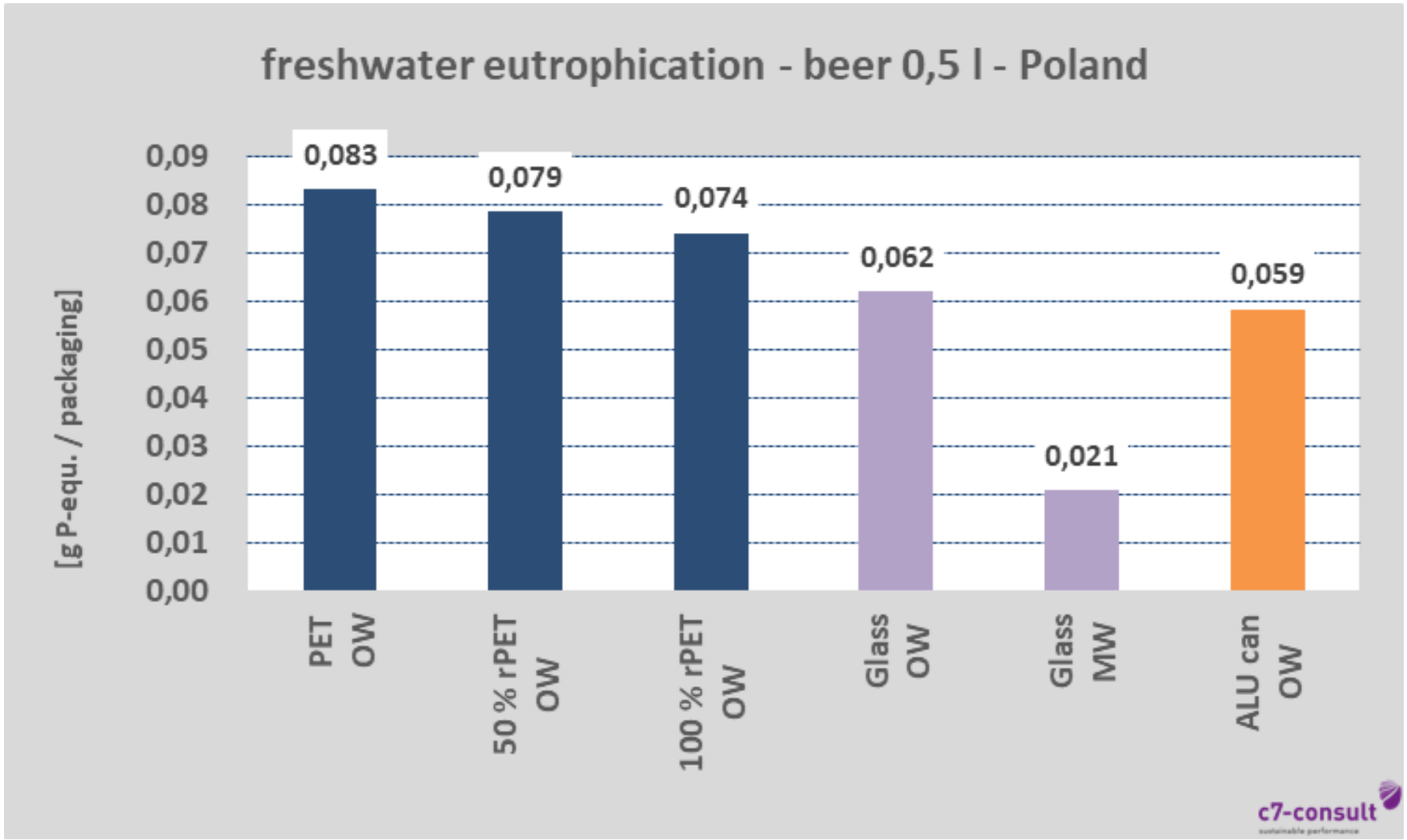
Beer


acidification potential - beer 0,5 l - Poland
[mmol H+ equ. / packaging]
3,0
2,5
2,0
1,5
1,0
0,5
0,0
0,82
0,74
0,66
2,67
0,36
0,58
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

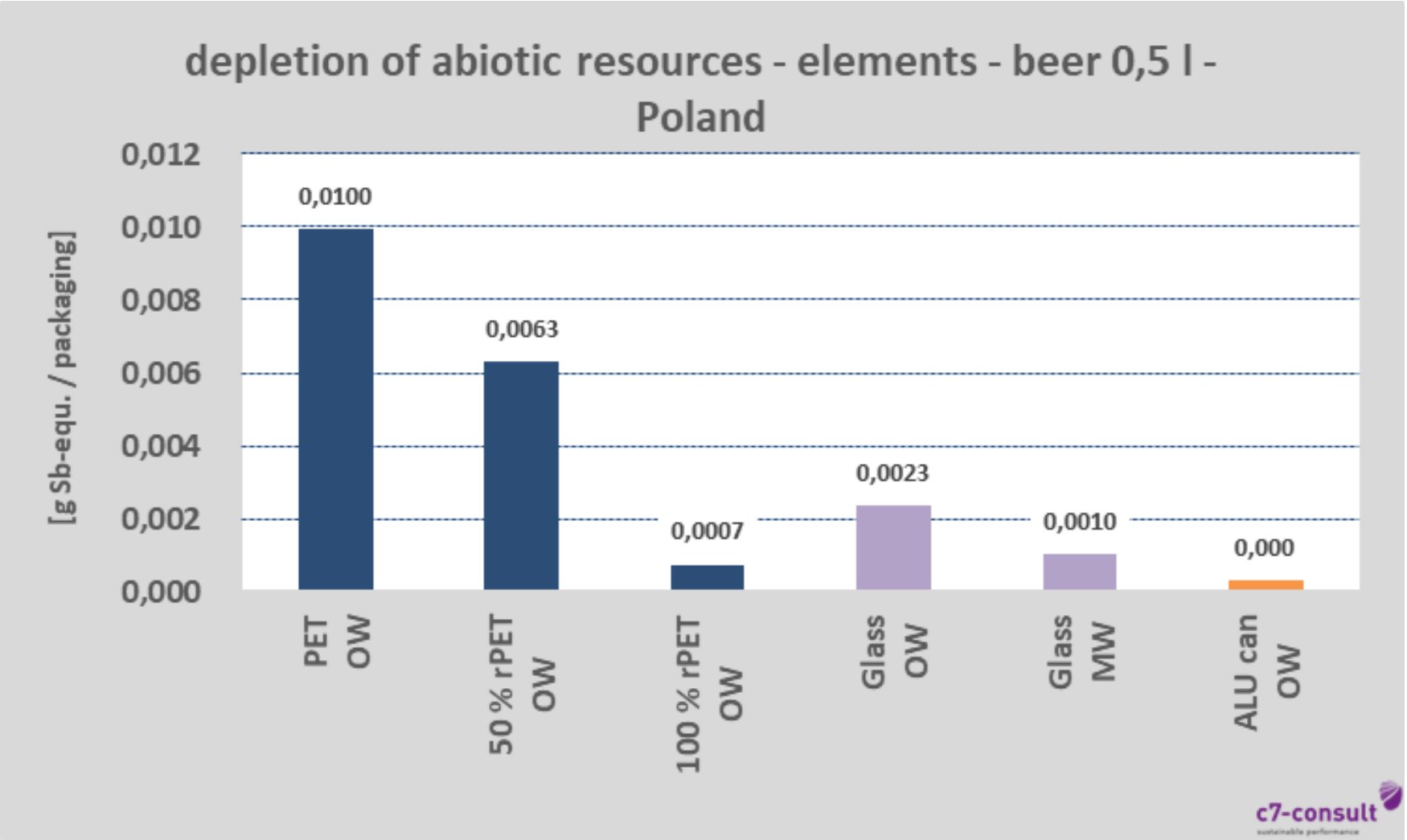
Beer


photochemical oxidation (summer smog) - beer 0,5 l - Poland
[mg NMVOC / packaging]
1,80
1,60
1,40
1,20
1,00
0,80
0,60
0,40
0,20
0,00
0,69
0,60
0,52
1,70
0,38
0,415
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

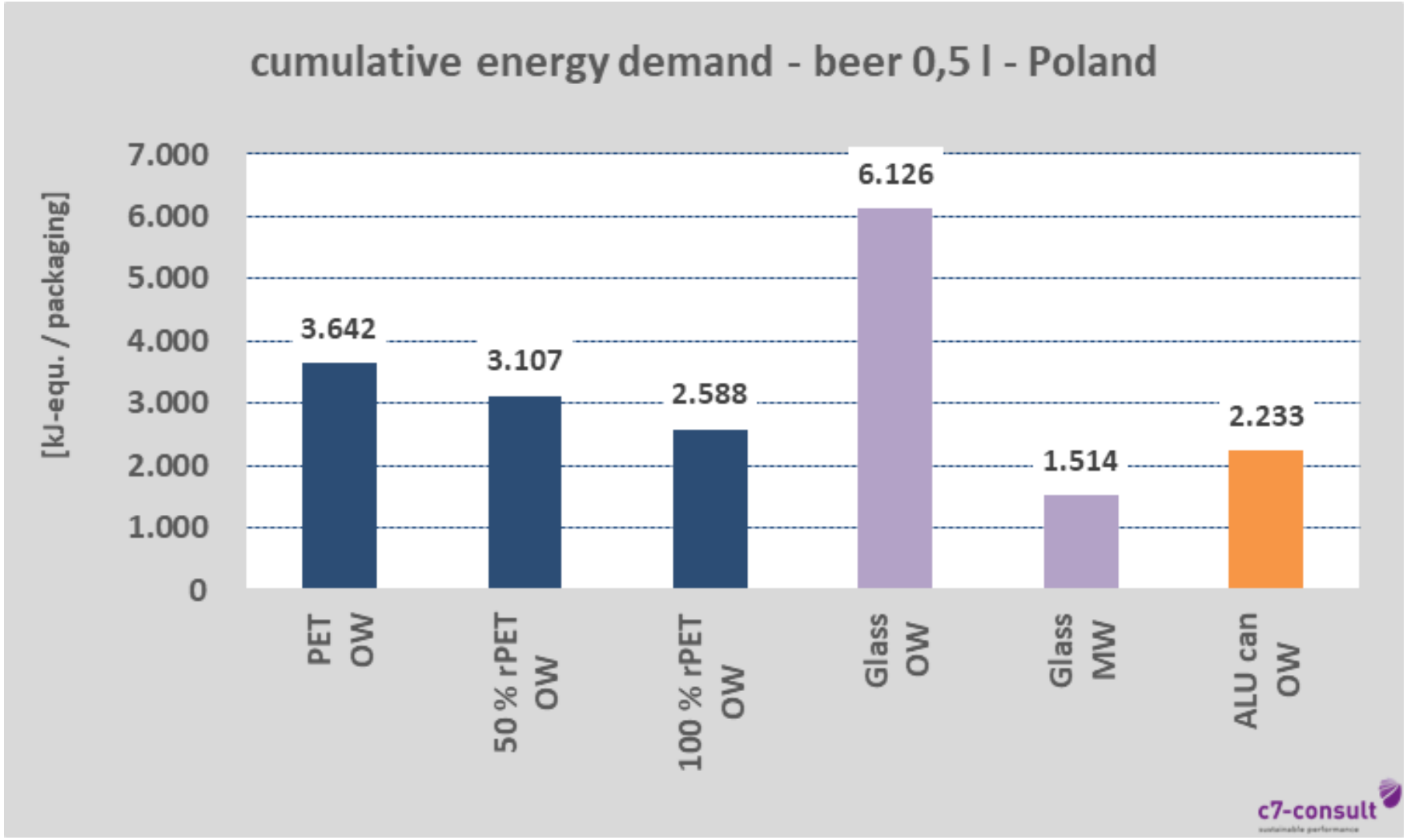
Beer


freshwater eutrophication - beer 0,5 l - Poland
[g P-equ. / packaging]
0,09
0,08
0,07
0,06
0,05
0,04
0,03
0,02
0,01
0,00
0,083
0,079
0,074
0,062
0,021
0,059
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

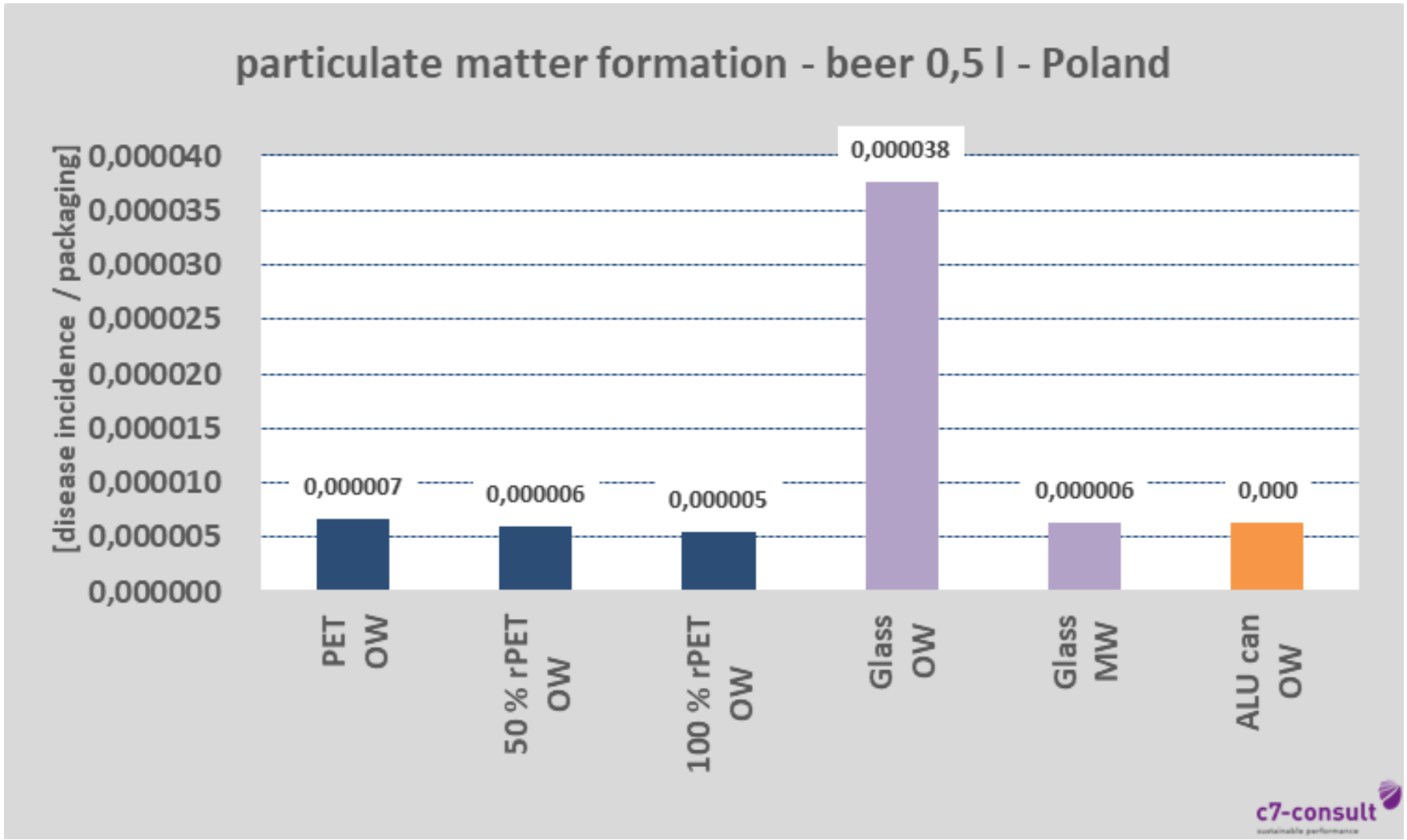
Beer


depletion of abiotic resources - elements - beer 0,5 l - Poland
[g Sb-equ. / packaging]
0,012
0,010
0,008
0,006
0,004
0,002
0,000
0,0100
0,0063
0,0007
0,0023
0,0010
0,000
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

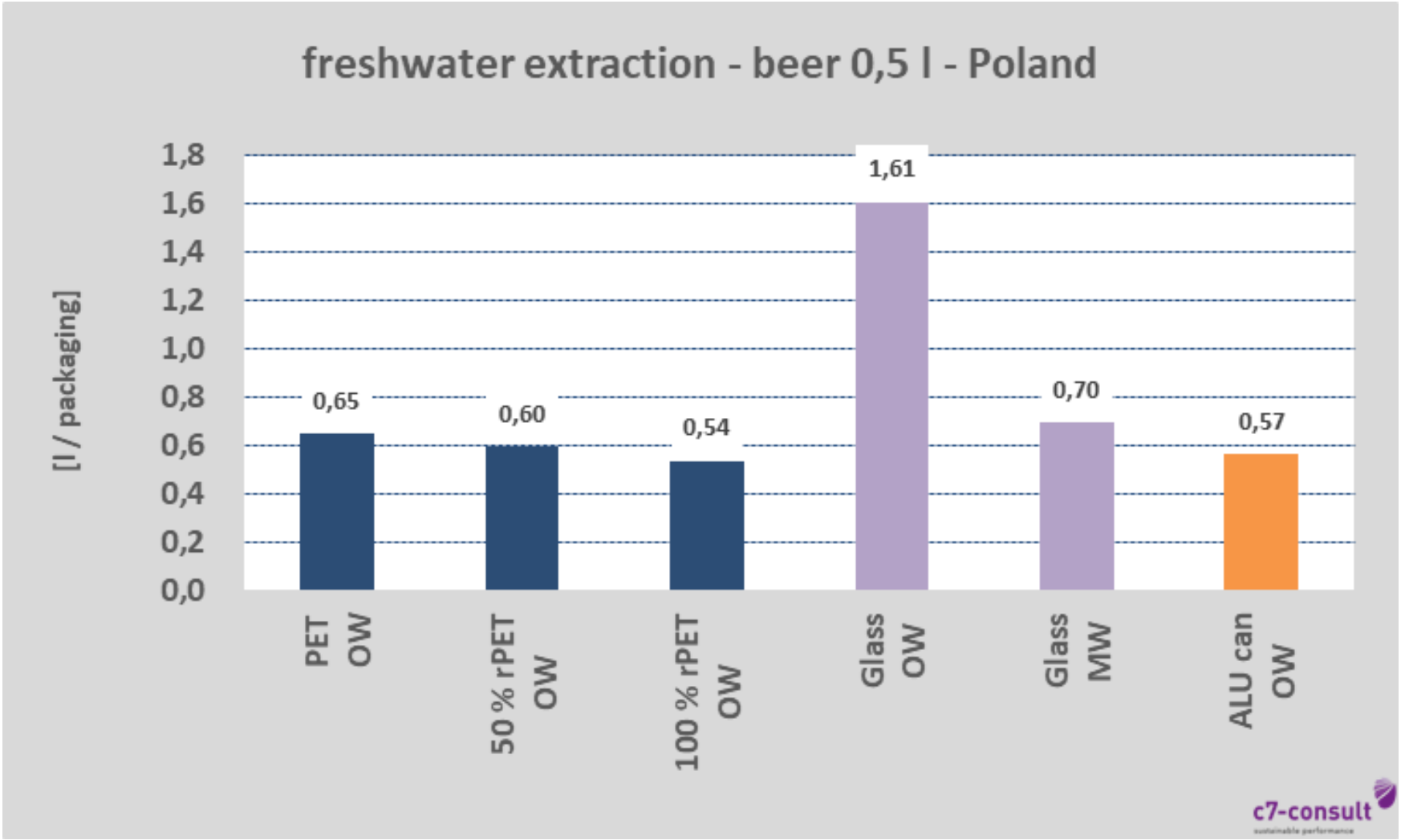
Beer


cumulative energy demand - beer 0,5 l - Poland
[kJ-equ. / packaging]
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0
3.642
3.107
2.588
6.126
1.514
2.233
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

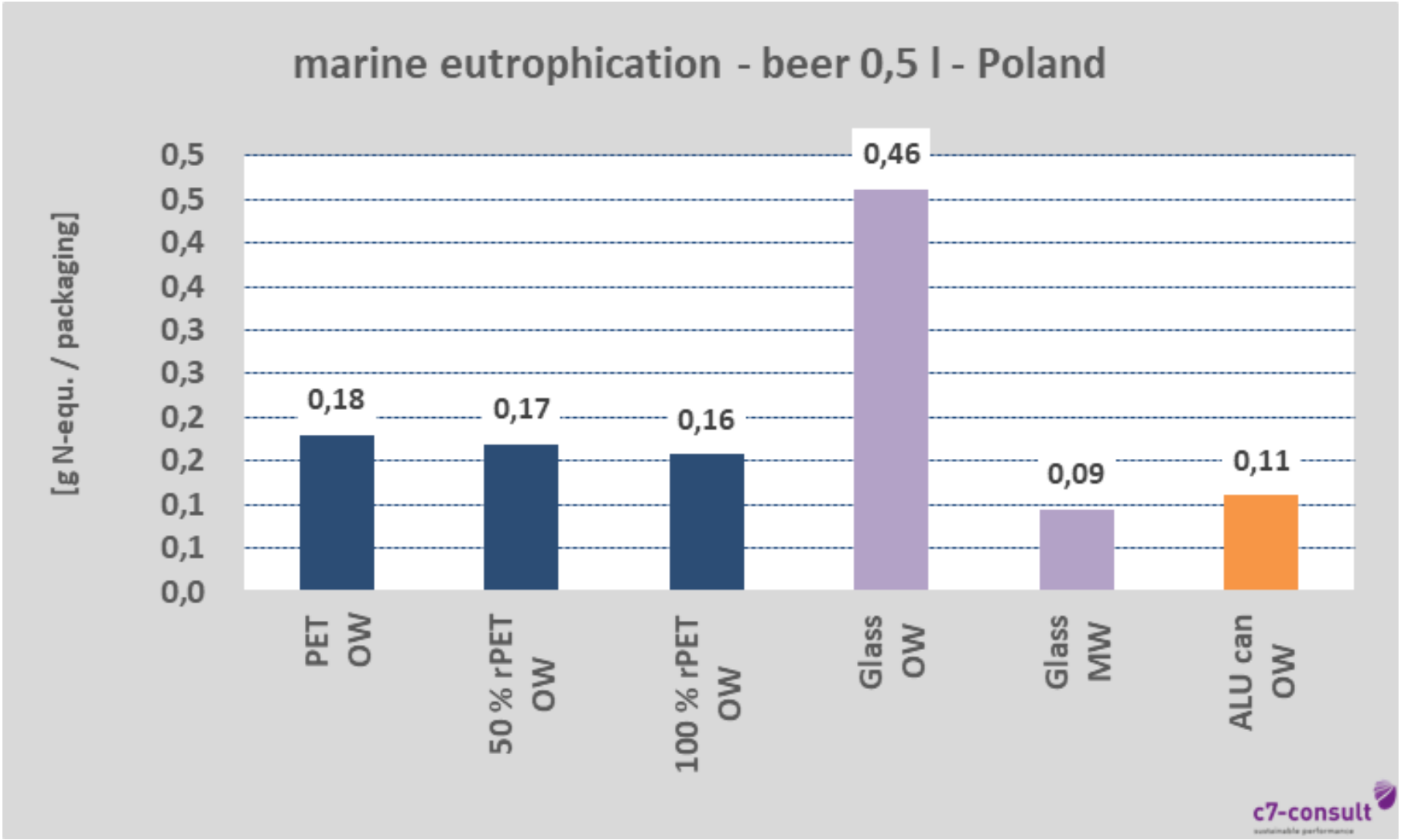
Beer


particulate matter formation - beer 0,5 l - Poland
[disease incidence / packaging]
0,000040
0,000035
0,000030
0,000025
0,000020
0,000015
0,000010
0,000005
0,000000
0,000007
0,000006
0,000005
0,000038
0,000006
0,000
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

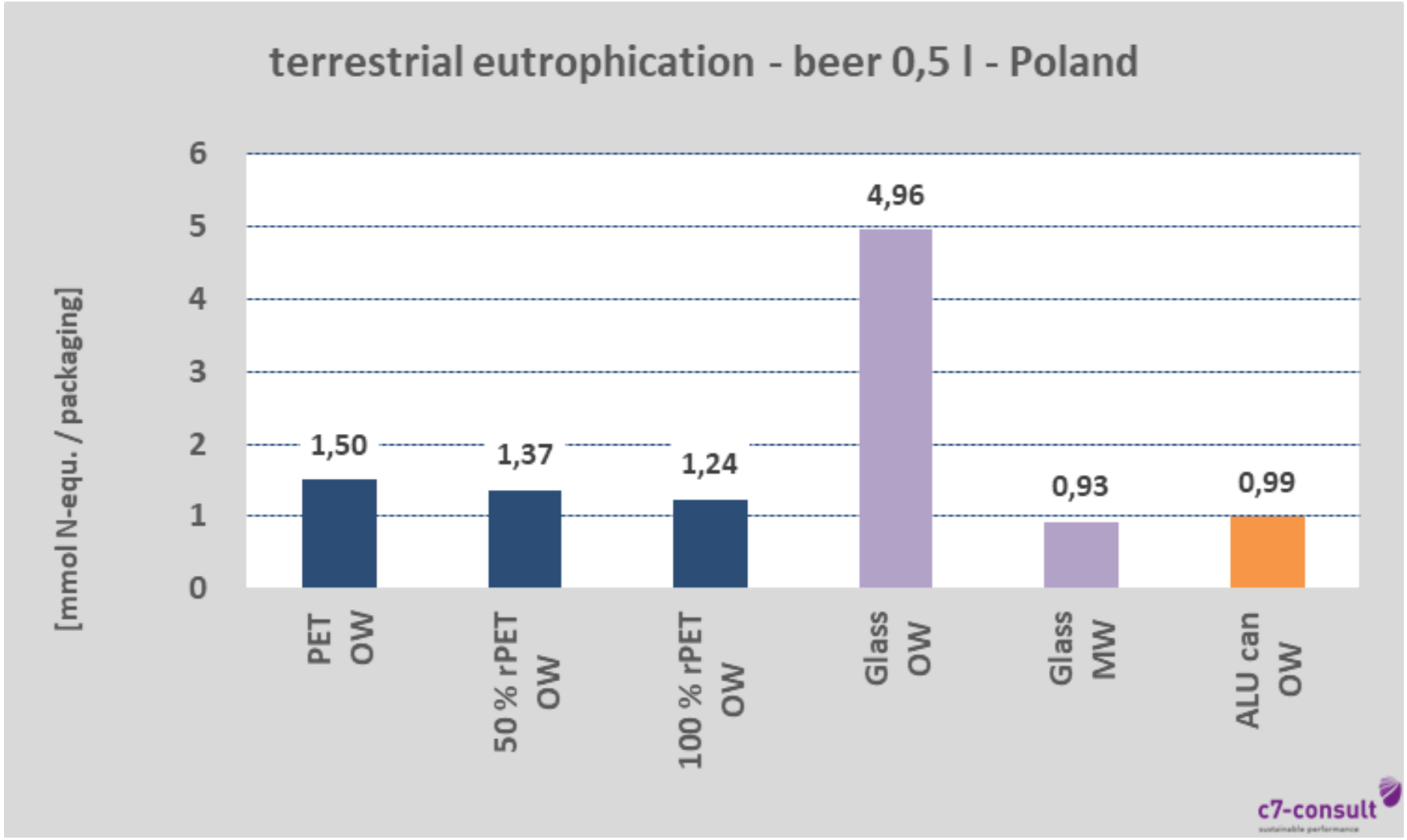
Beer


freshwater extraction - beer 0,5 l - Poland
[l / packaging]
1,8
1,6
1,4
1,2
1,0
0,8
0,6
0,4
0,2
0,0
0,65
0,60
0,54
1,61
0,70
0,57
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

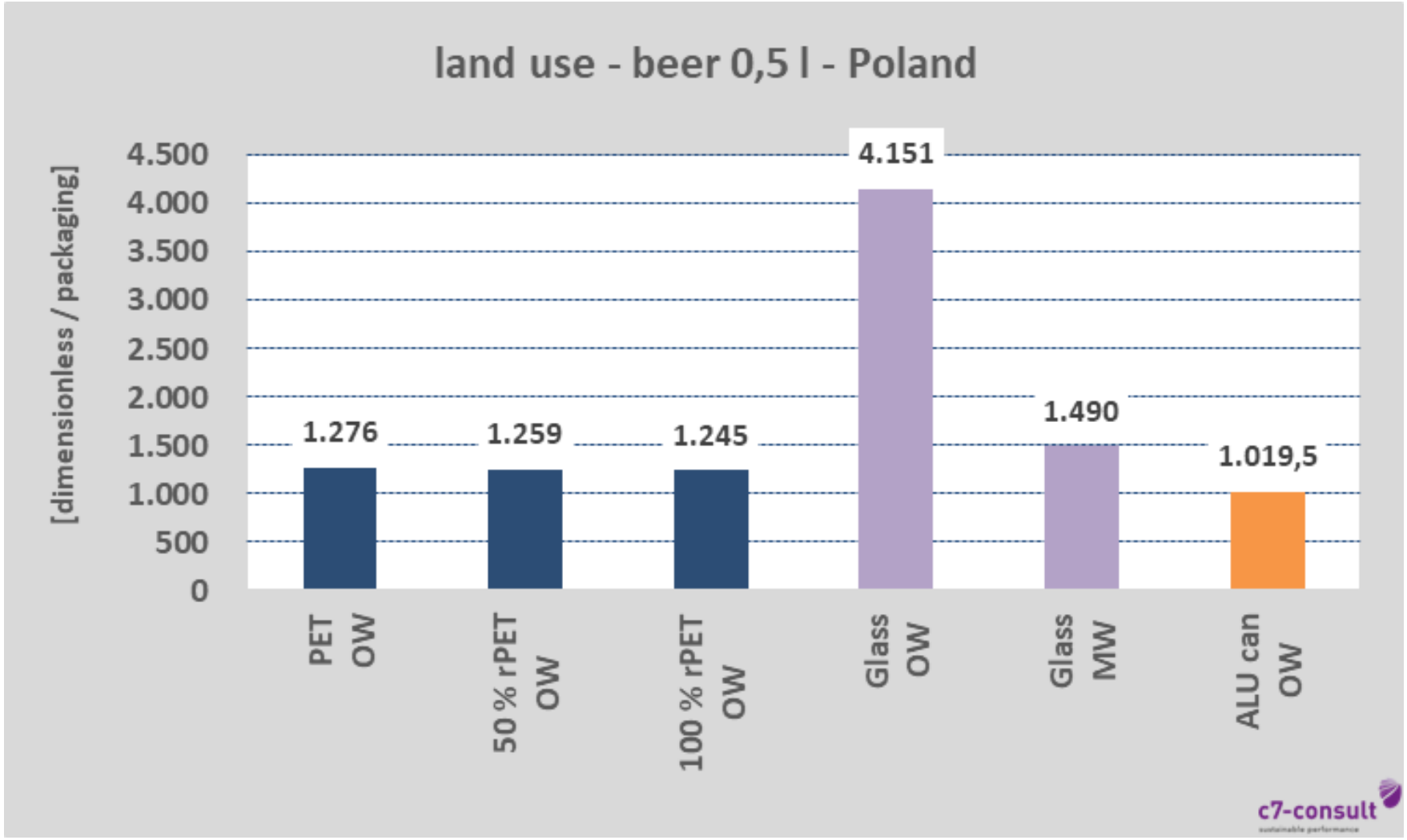
Beer


marine eutrophication - beer 0,5 l - Poland
[g N-equ. / packaging]
0,5
0,5
0,4
0,4
0,3
0,3
0,2
0,2
0,1
0,1
0,0
0,18
0,17
0,16
0,46
0,09
0,11
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

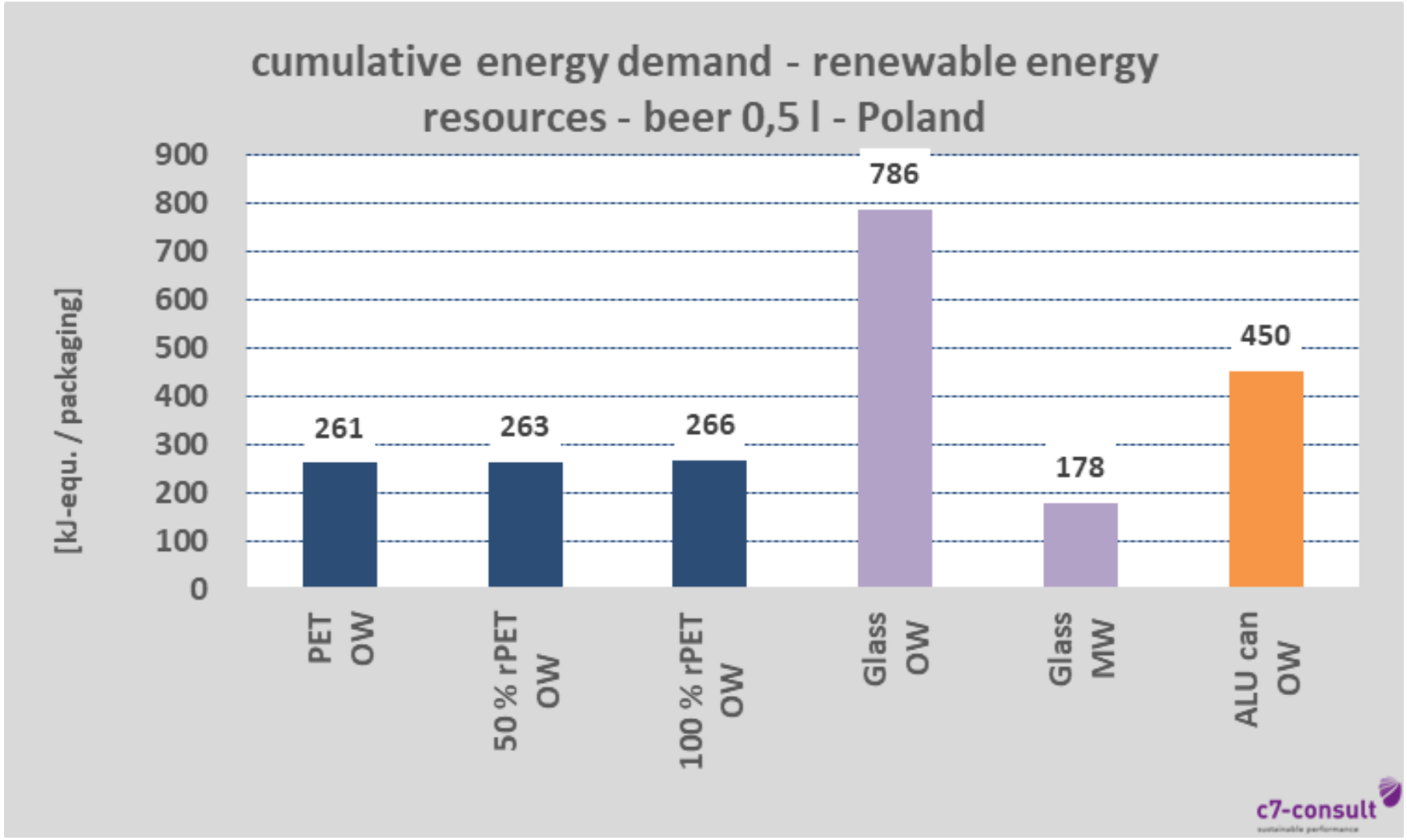
Beer


terrestrial eutrophication - beer 0,5 l - Poland
[mmol N-equ. / packaging]
6
5
4
3
2
1
0
1,50
1,37
1,24
4,96
0,93
0,99
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

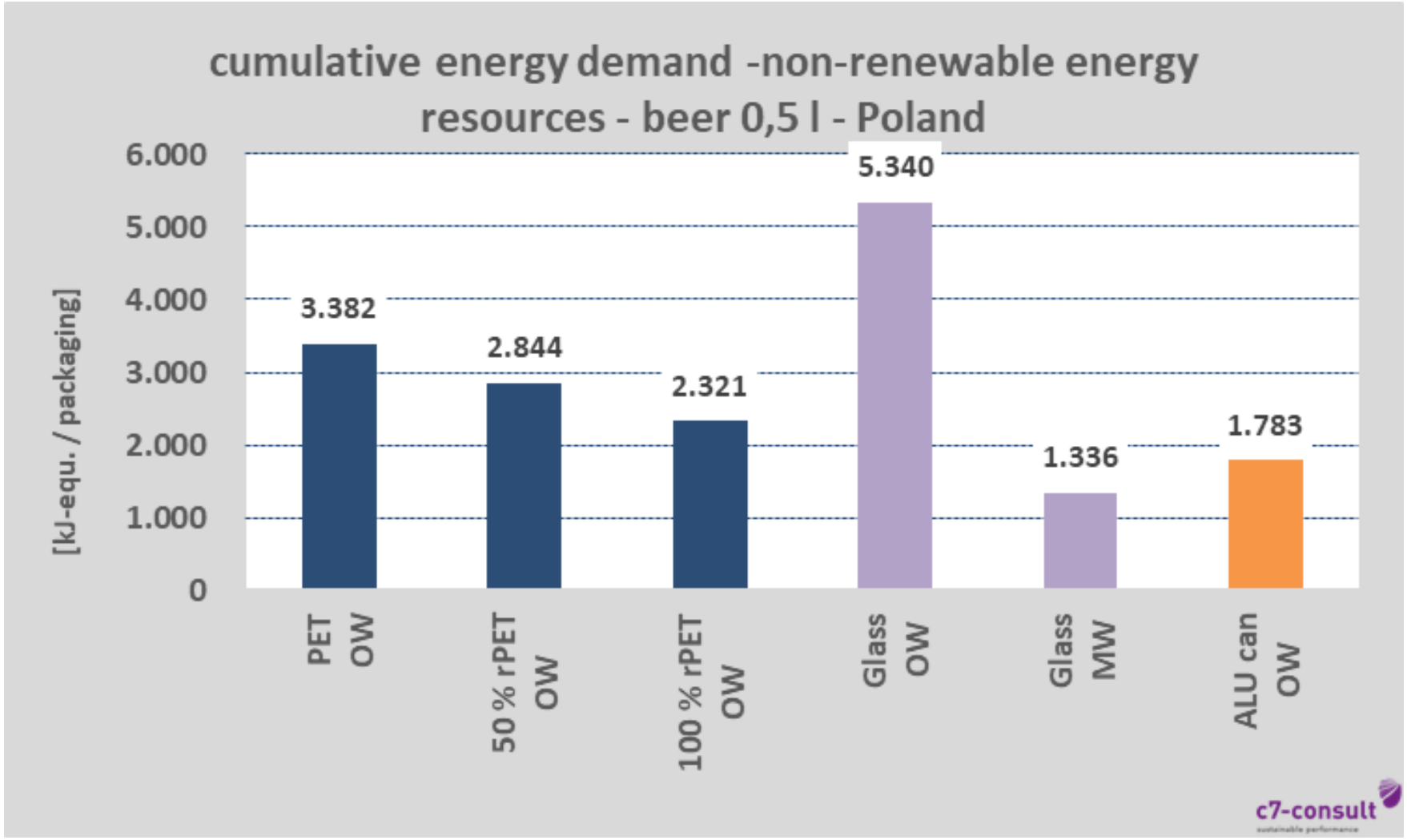
Beer


land use - beer 0,5 l - Poland
[dimensionless / packaging]
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
500
0
1.276
1.259
1.245
4.151
1.490
1.019,5
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

Beer


cumulative energy demand - renewable energy resources - beer 0,5 l - Poland
[kJ-equ. / packaging]
900
800
700
600
500
400
300
200
100
0
261
263
266
786
178
450
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

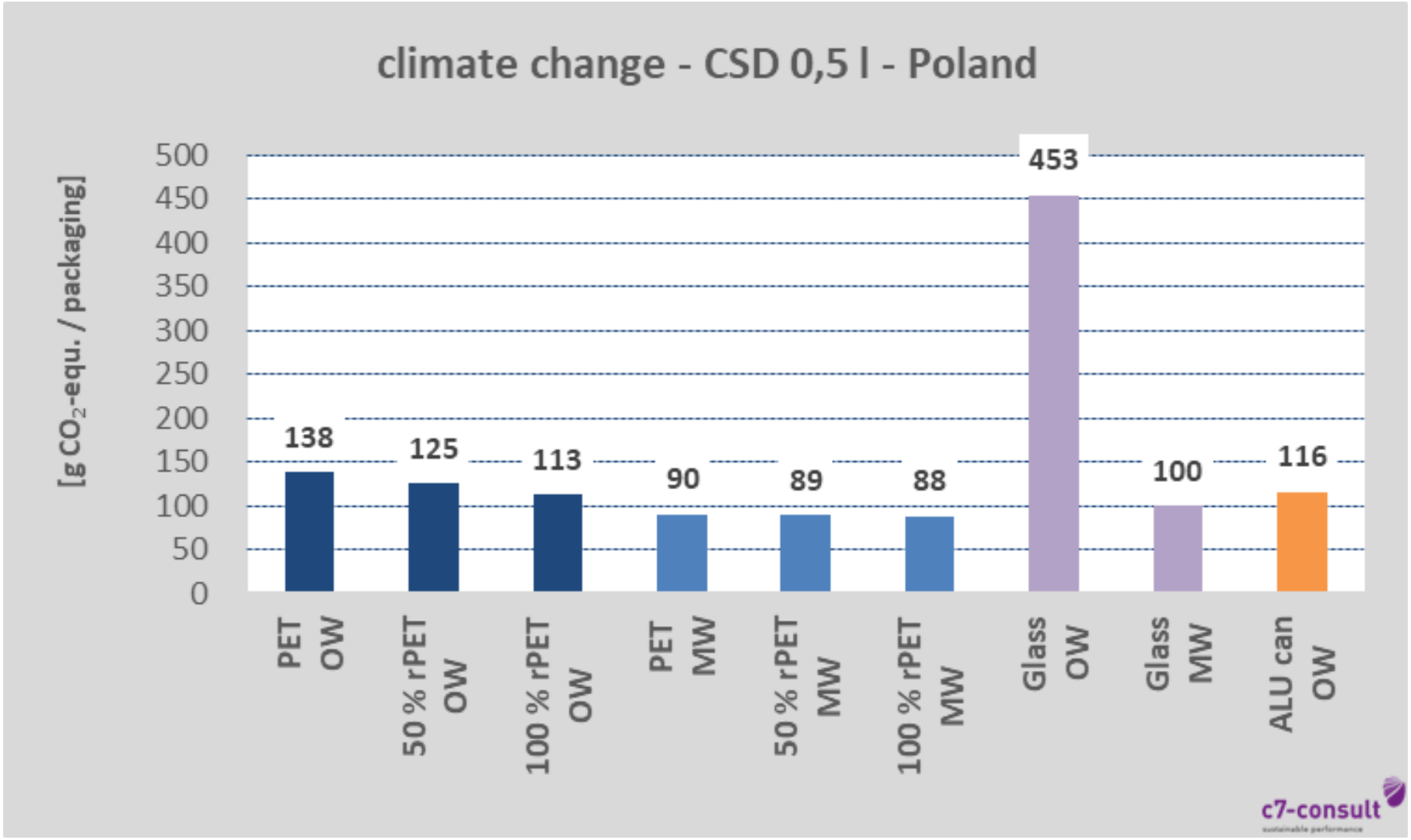
Beer


cumulative energy demand -non-renewable energy resources - beer 0,5 l - Poland
[kJ-equ. / packaging]
6.000
5.000
4.000
3.000
2.000
1.000
0
3.382
2.844
2.321
5.340
1.336
1.783
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
Glass MW
ALU can OW
c7-consult

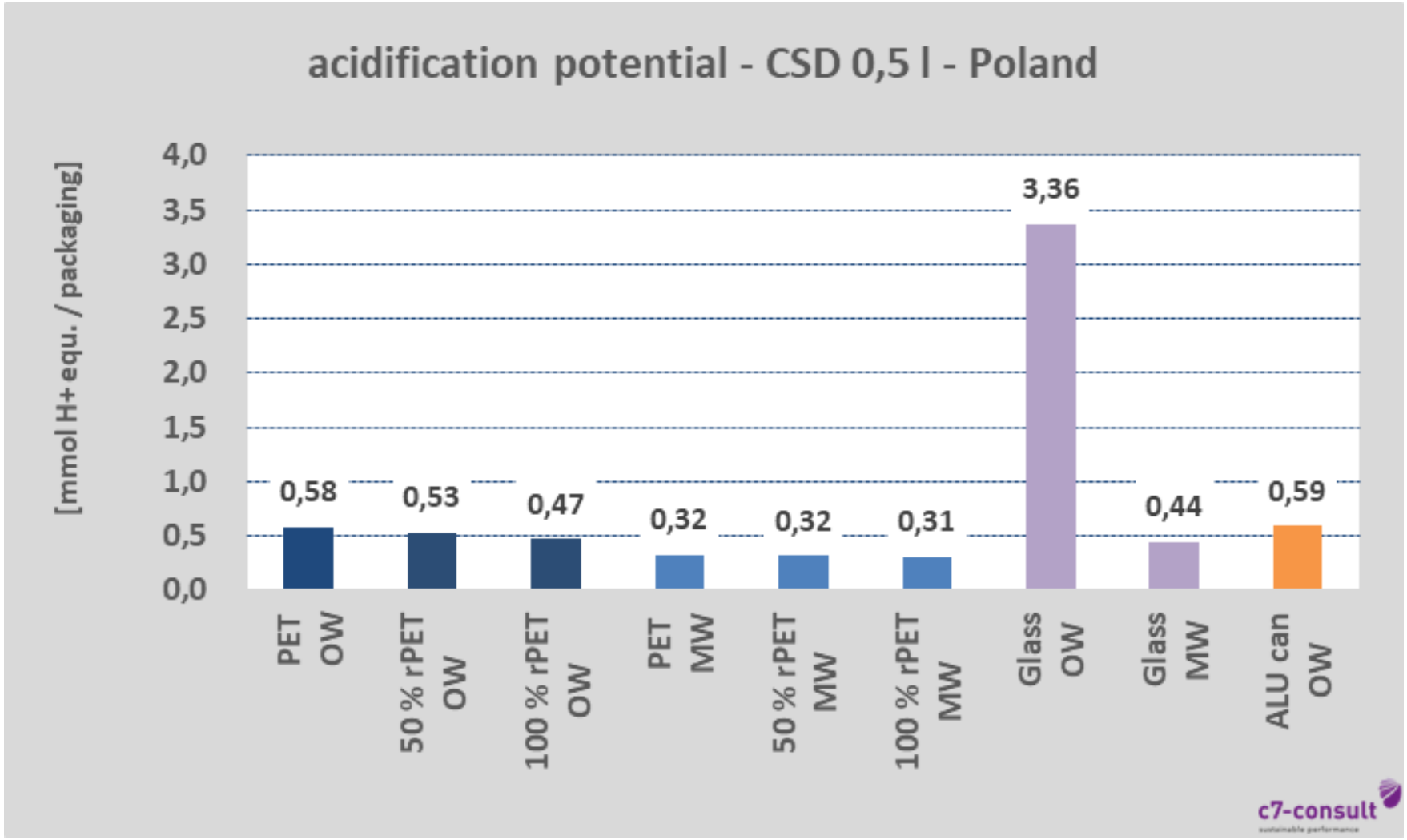
c7-consult
sustainable performance

Results Carbonated Soft Drinks 0,5 l

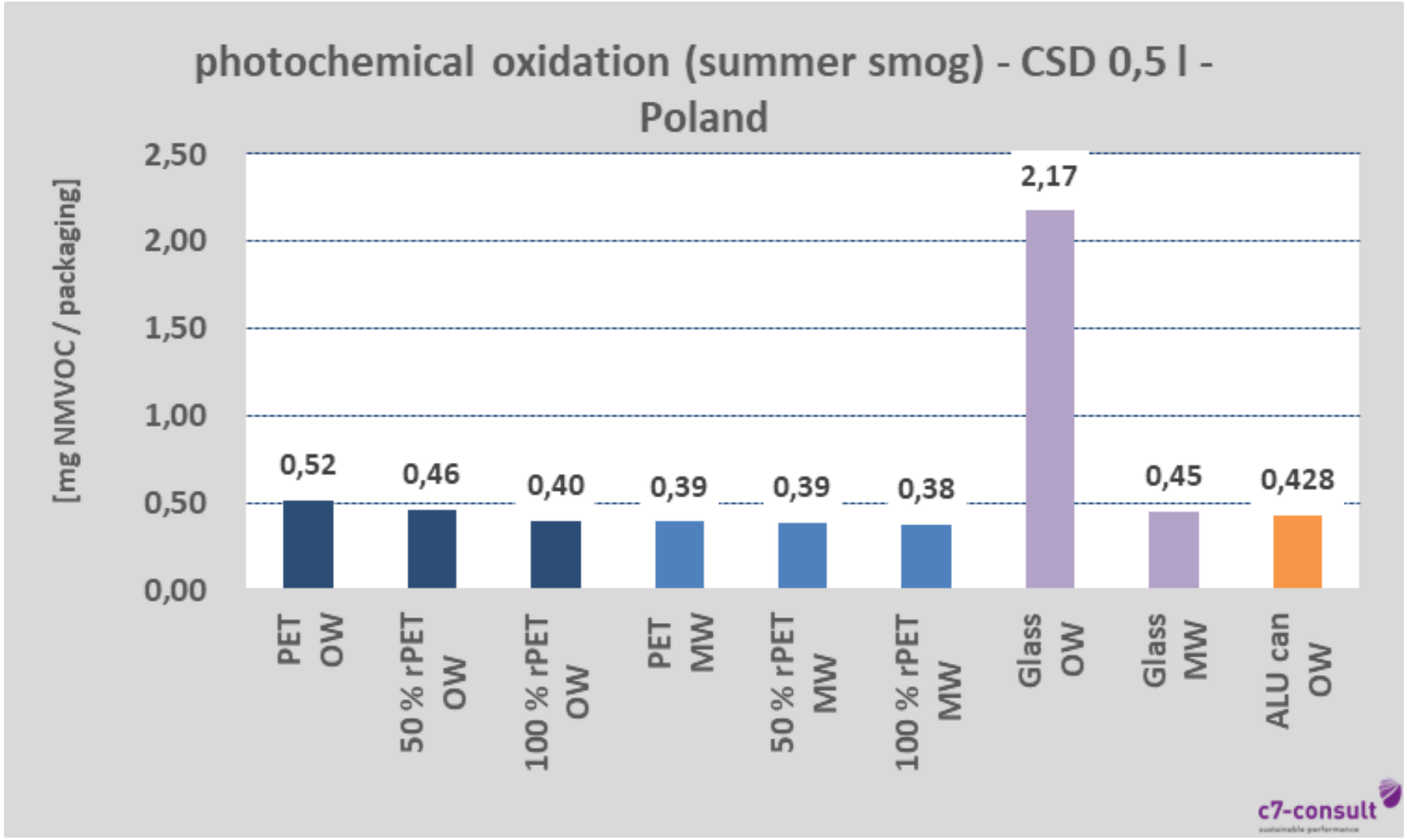
Carbonated Soft Drinks



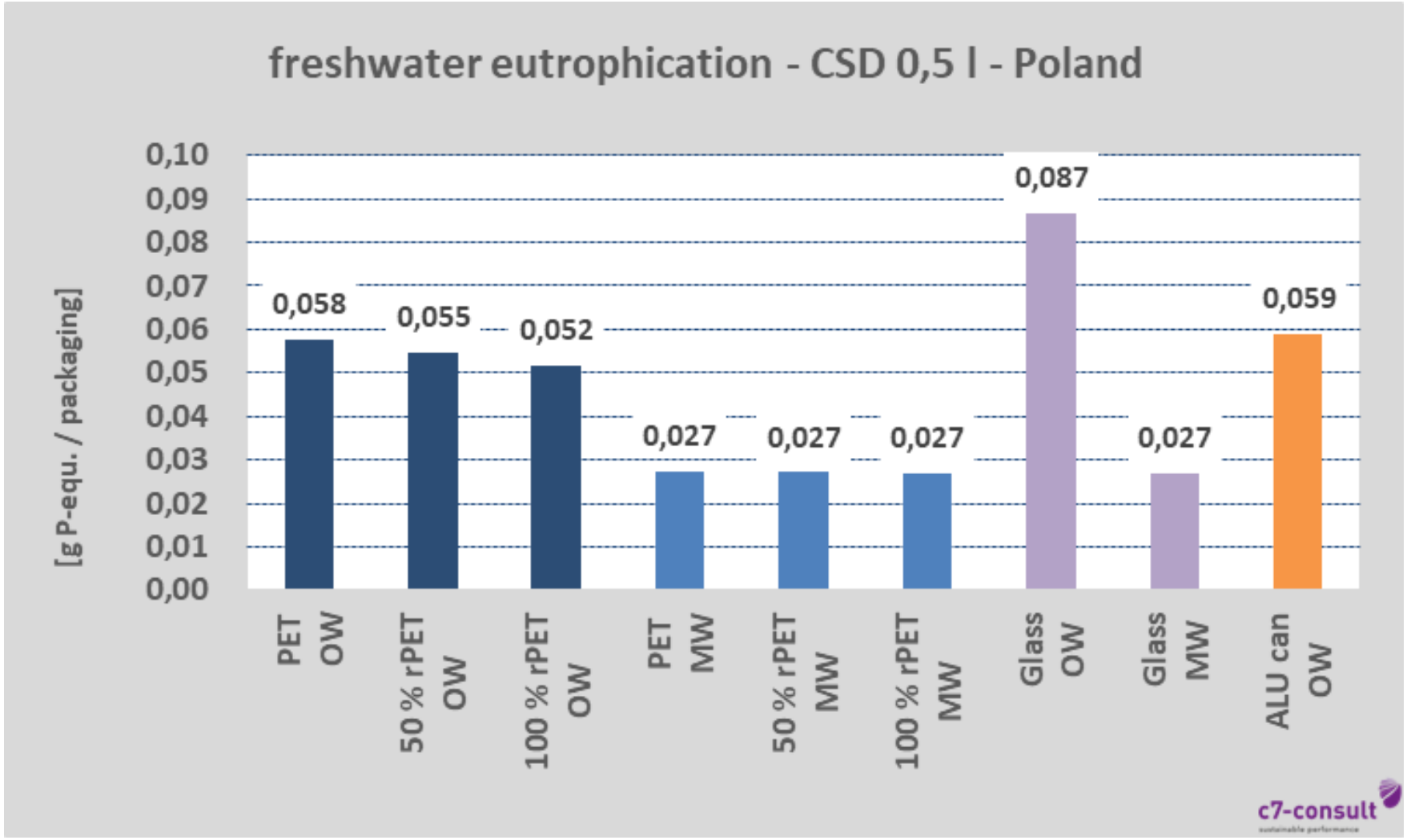
Carbonated Soft Drinks



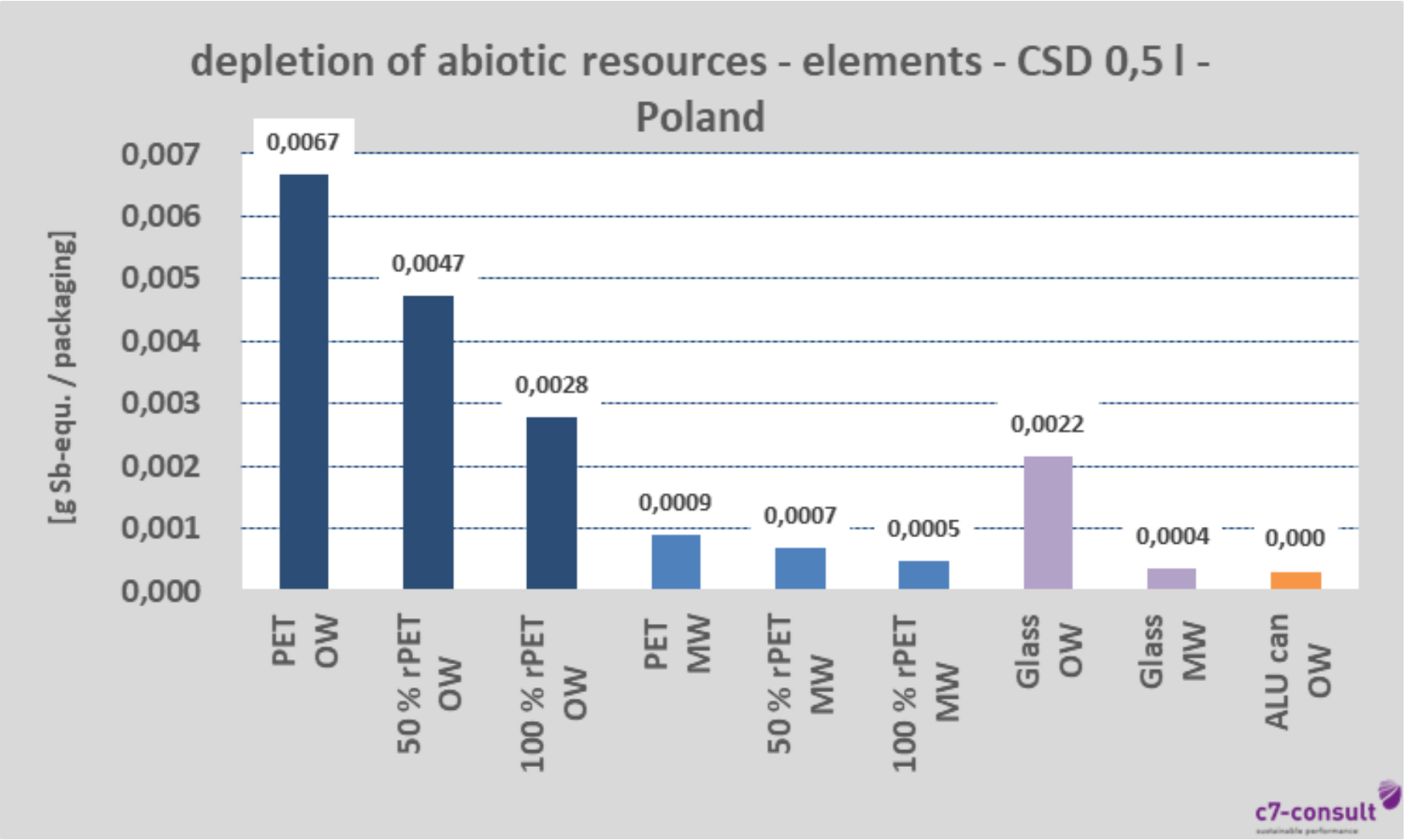
Carbonated Soft Drinks



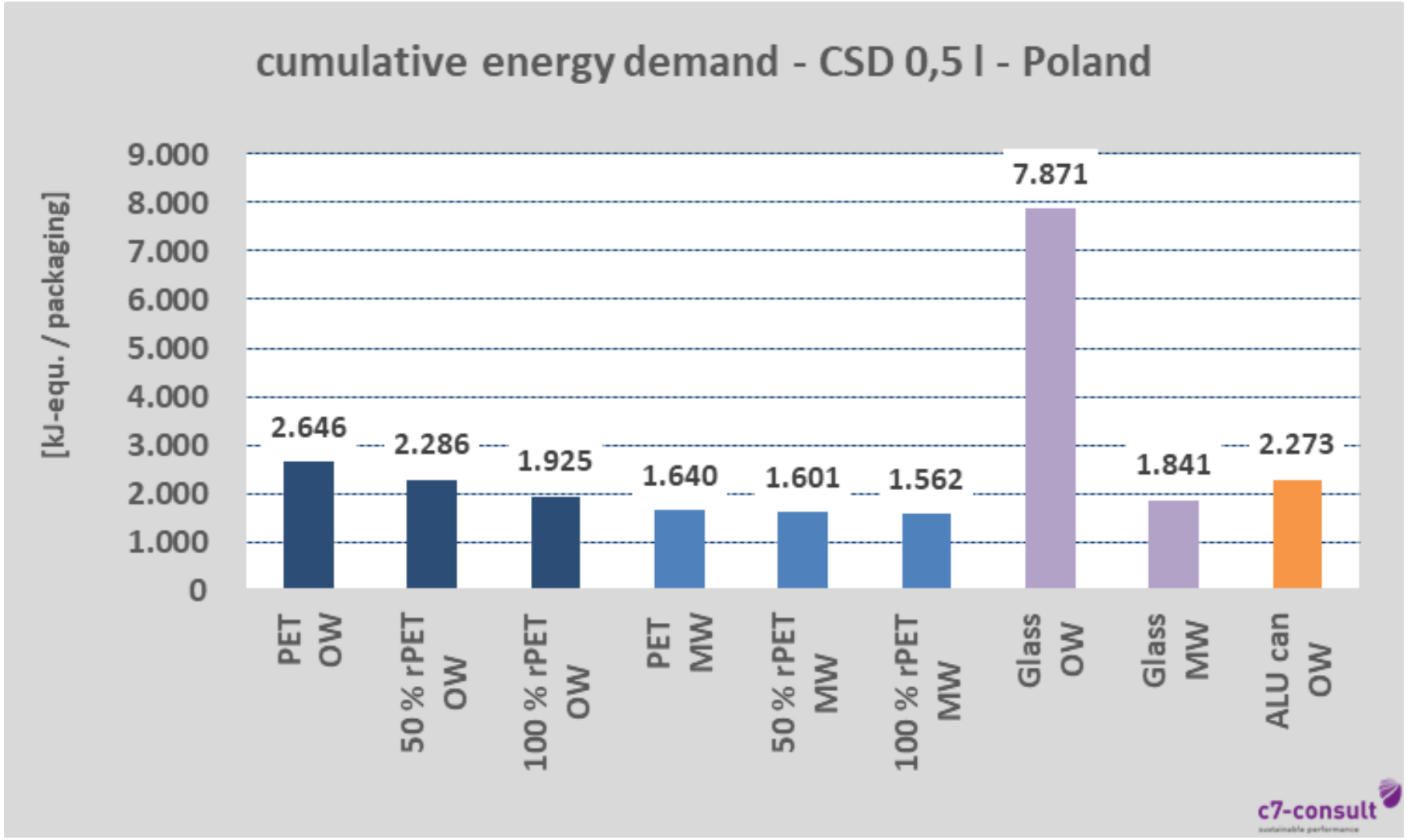
Carbonated Soft Drinks



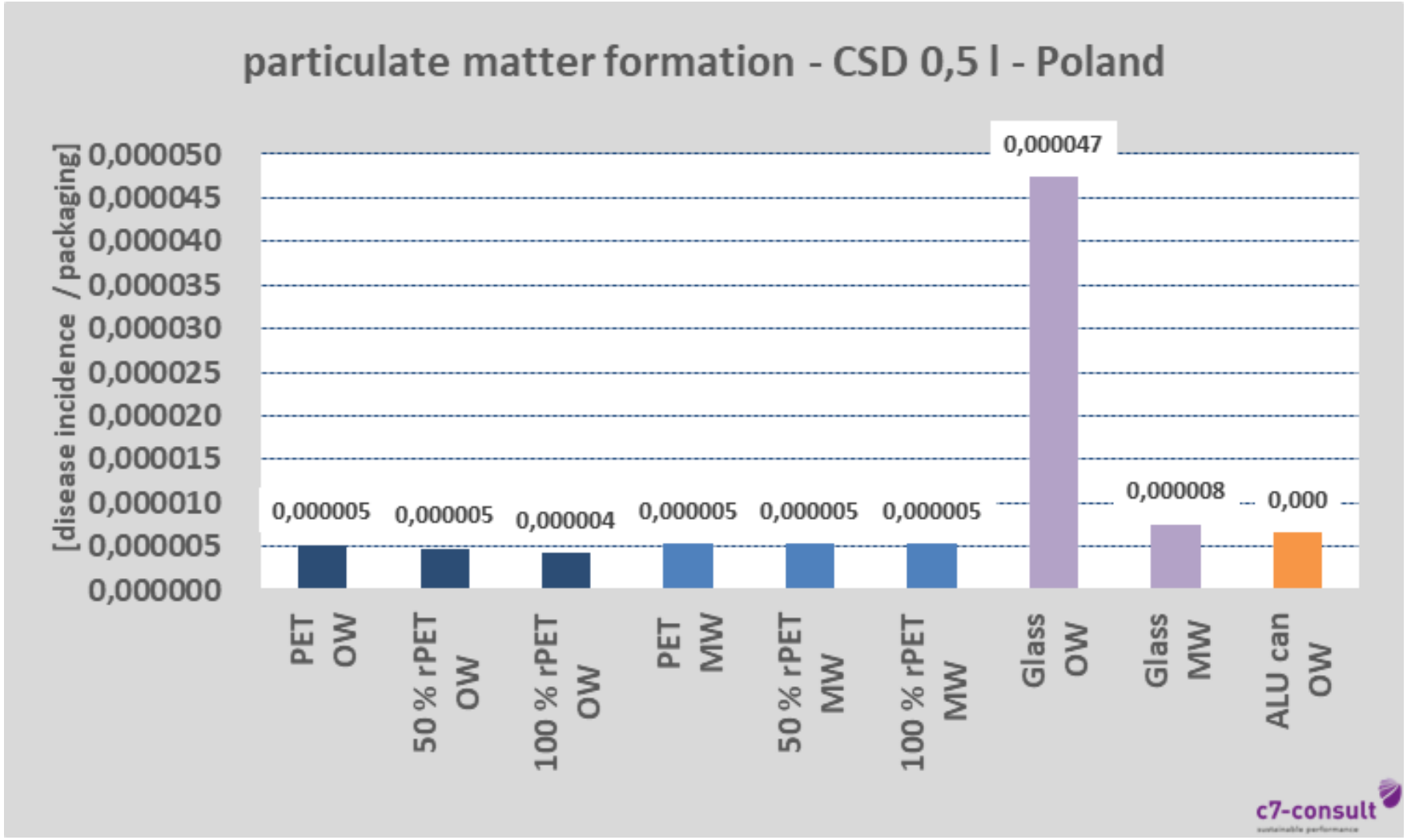
Carbonated Soft Drinks



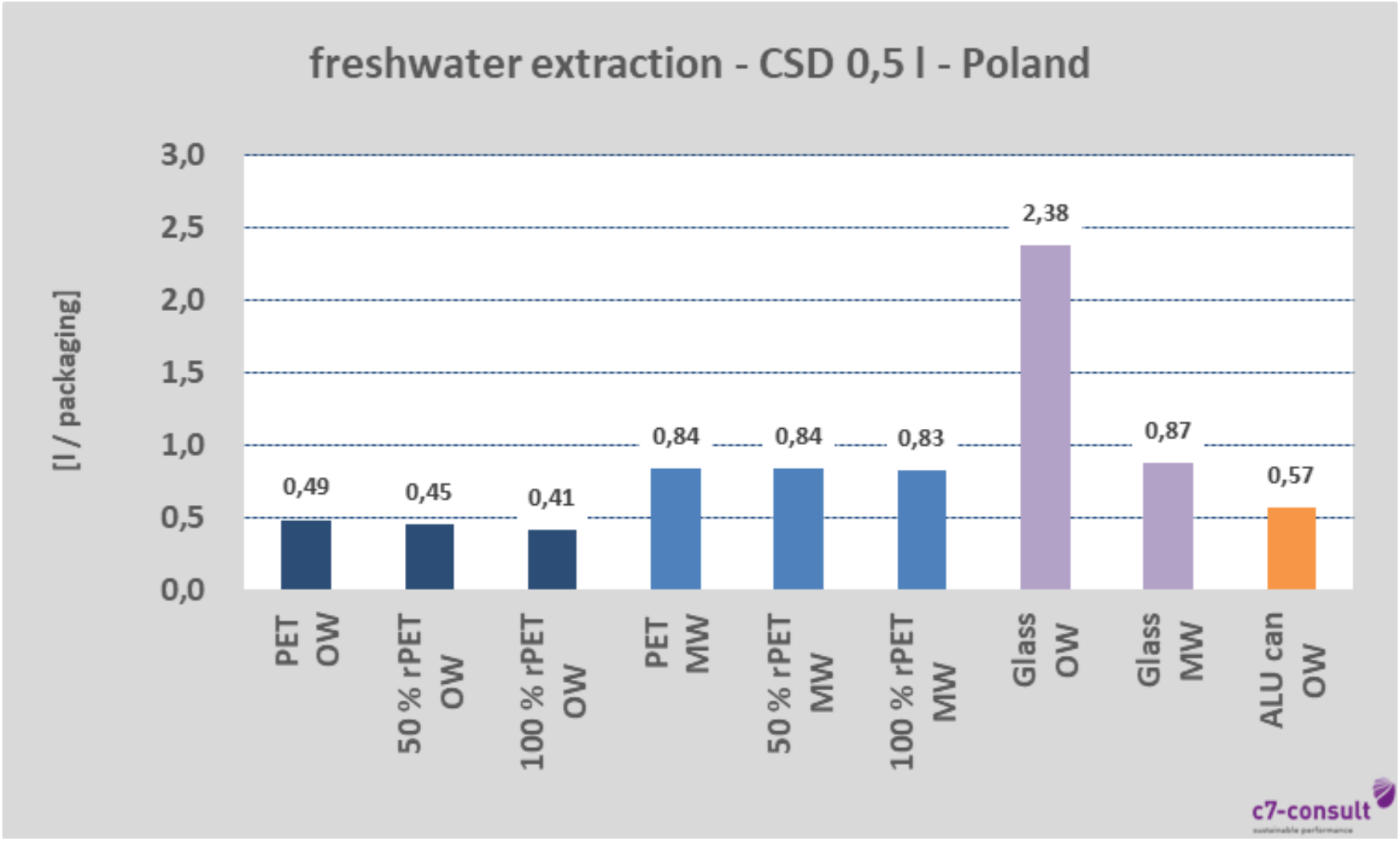
Carbonated Soft Drinks



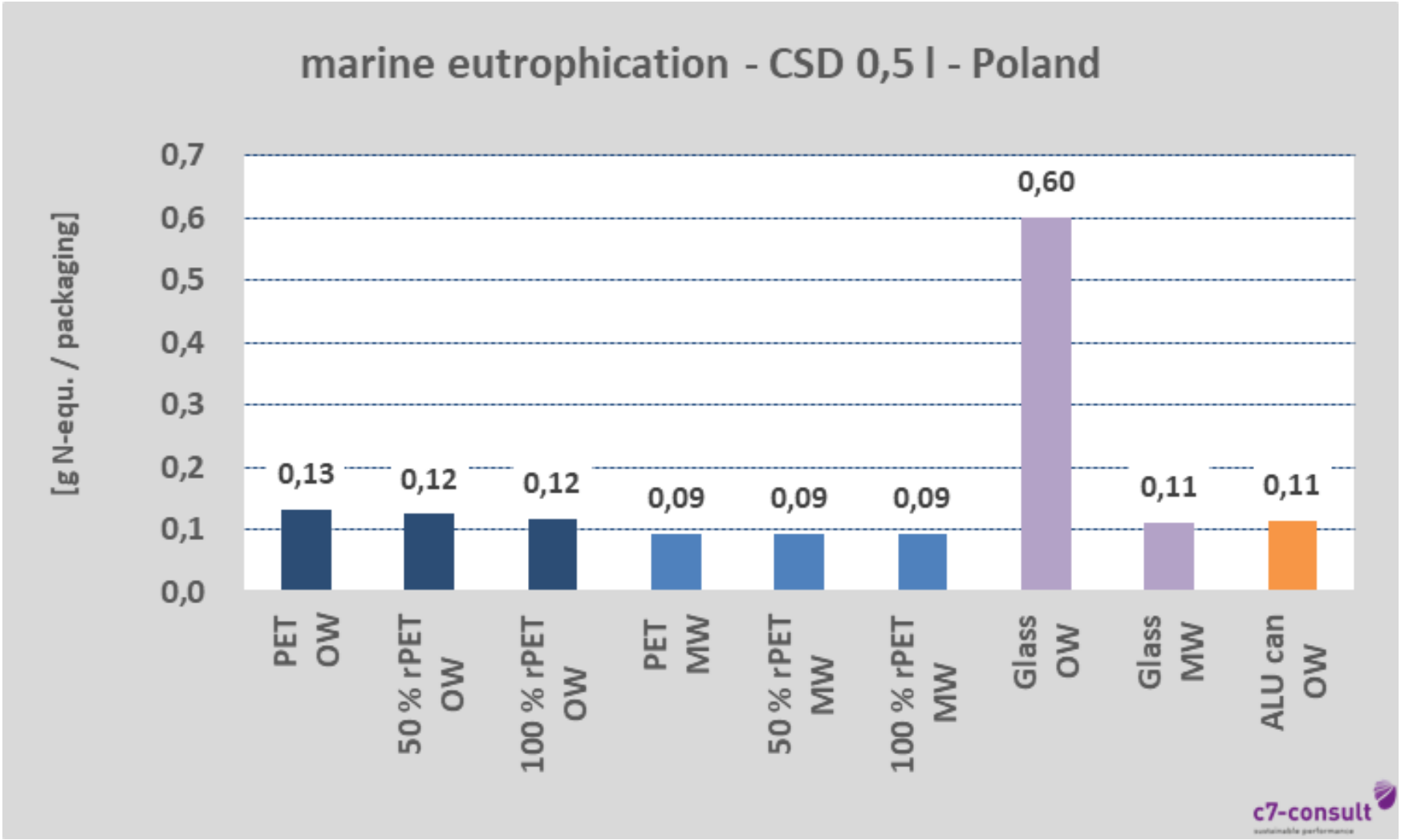
Carbonated Soft Drinks



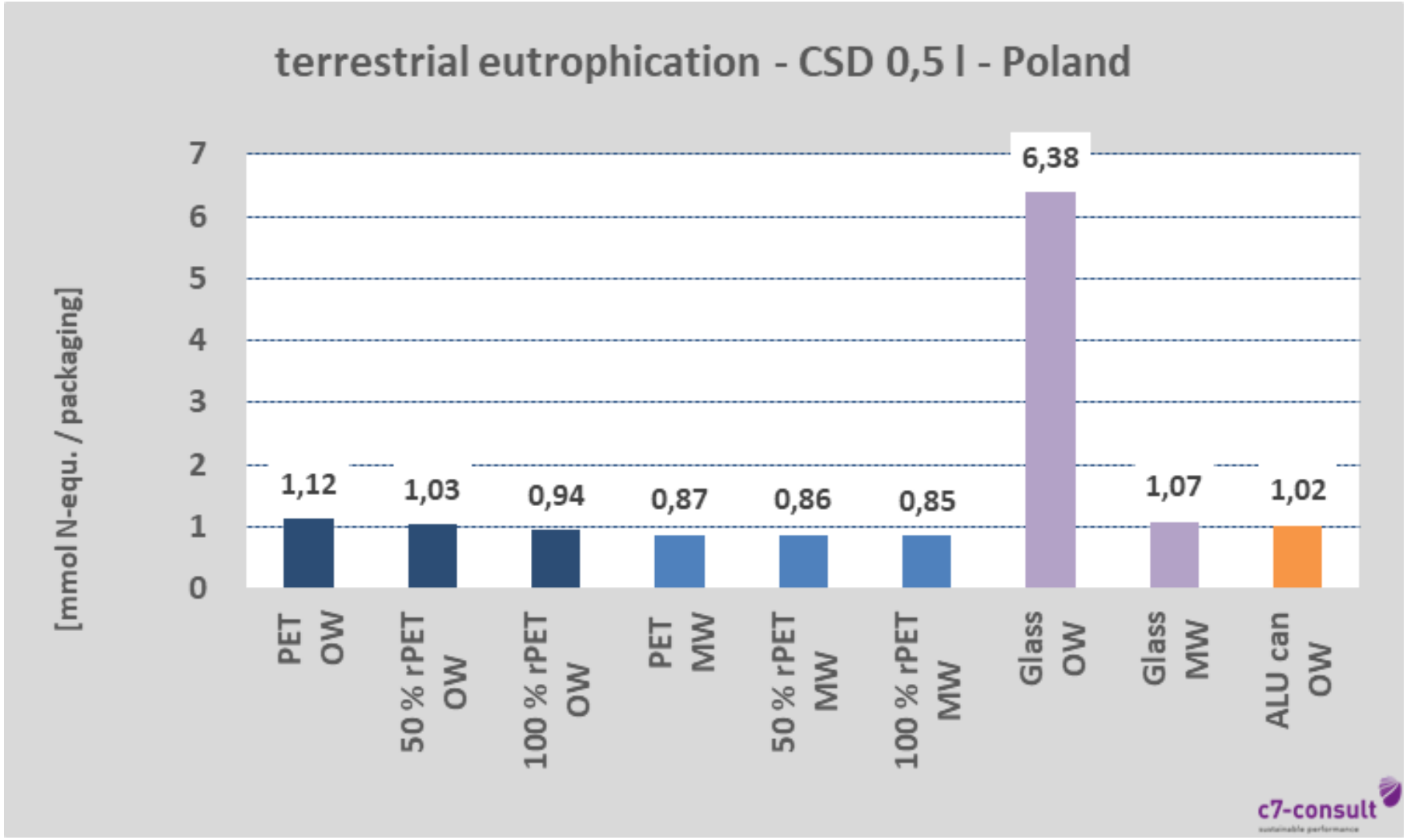
Carbonated Soft Drinks



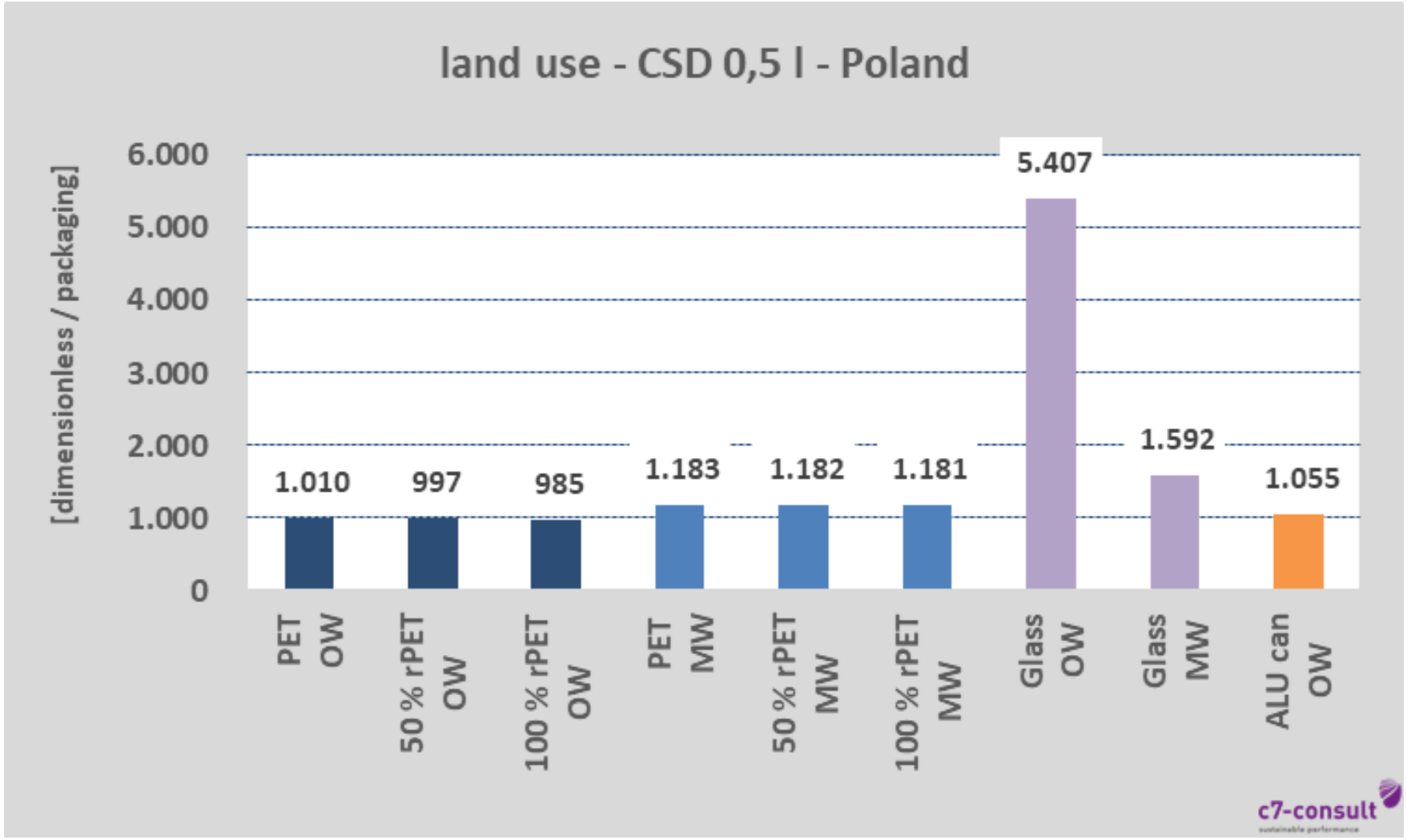
Carbonated Soft Drinks



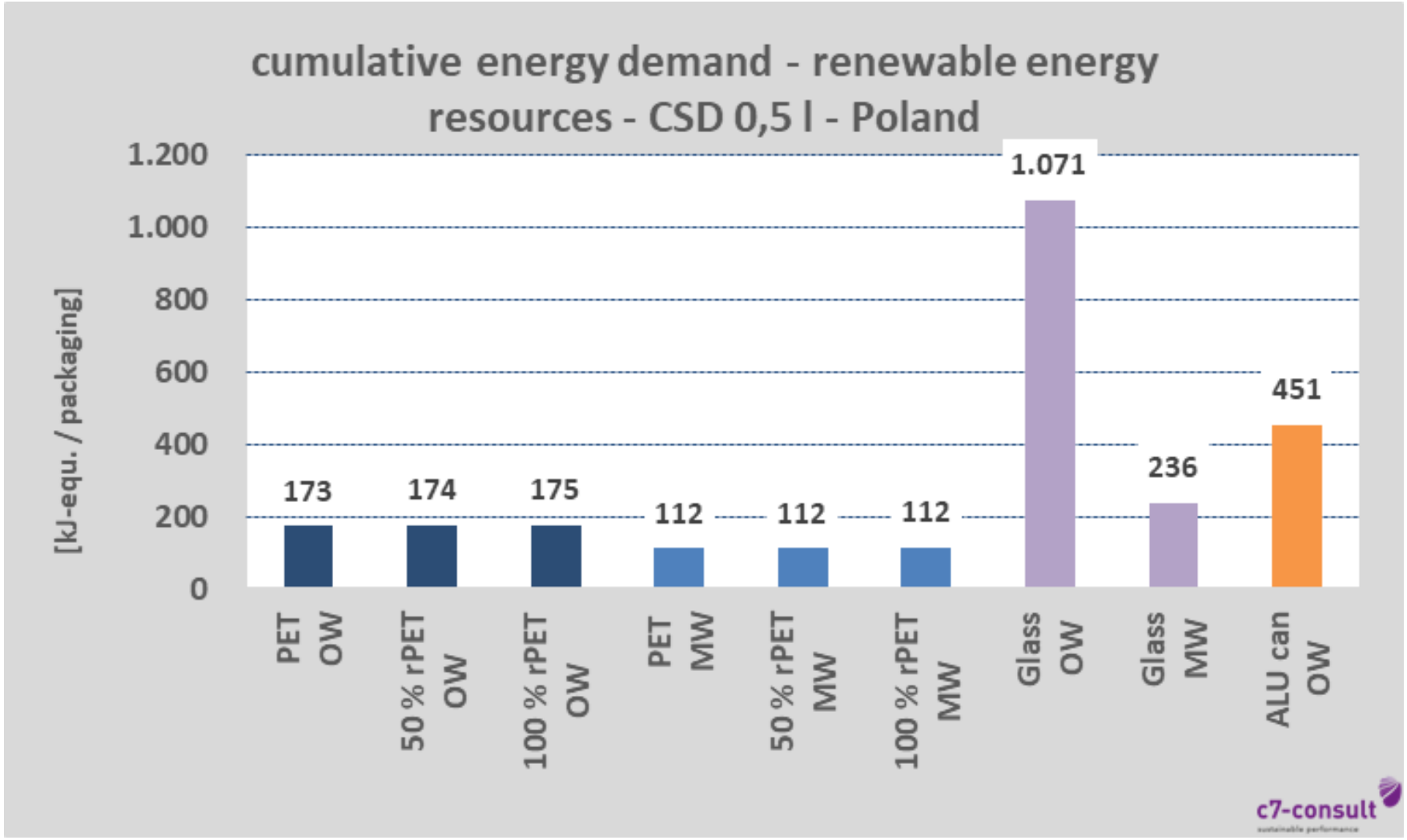
Carbonated Soft Drinks



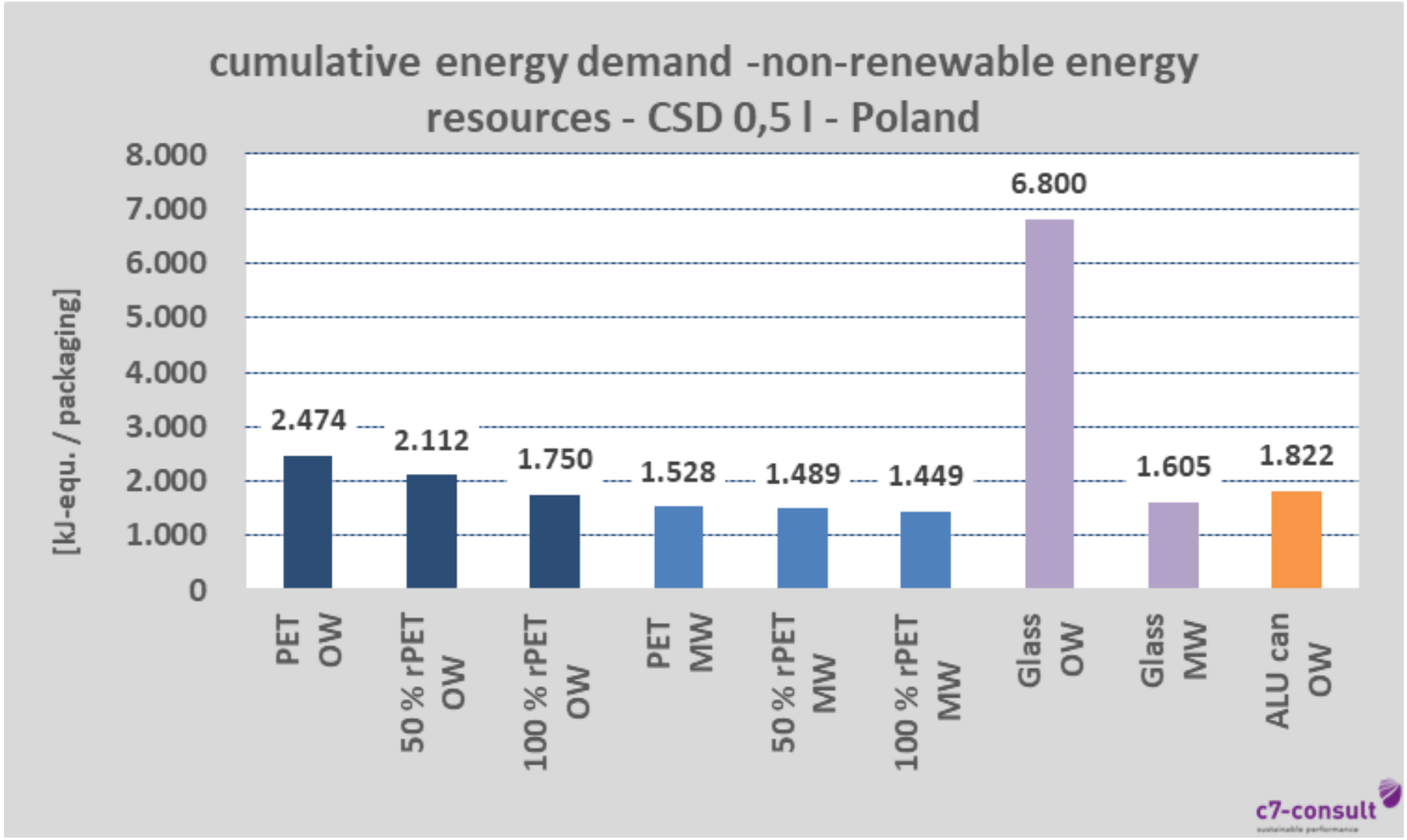
Carbonated Soft Drinks



Carbonated Soft Drinks



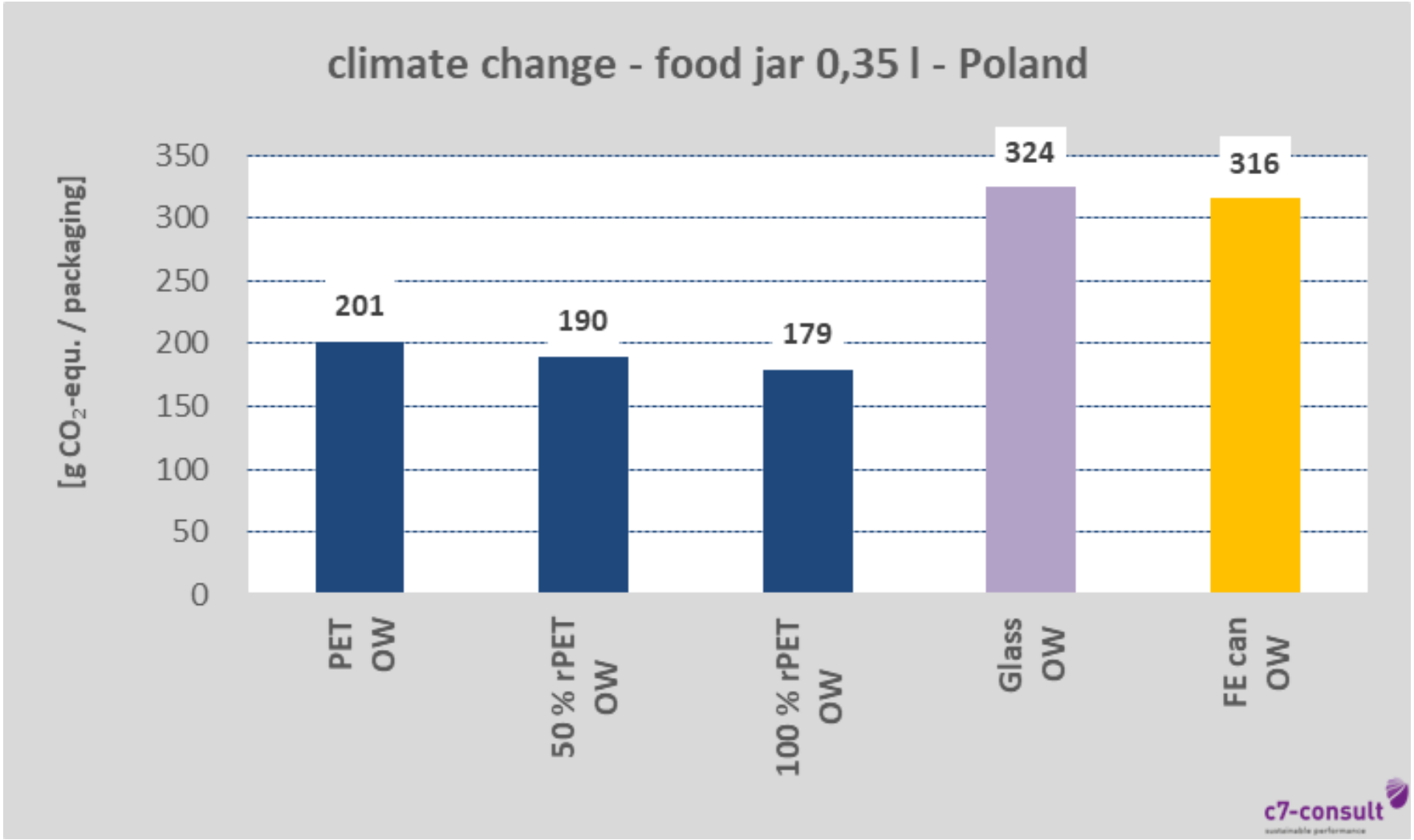
Carbonated Soft Drinks



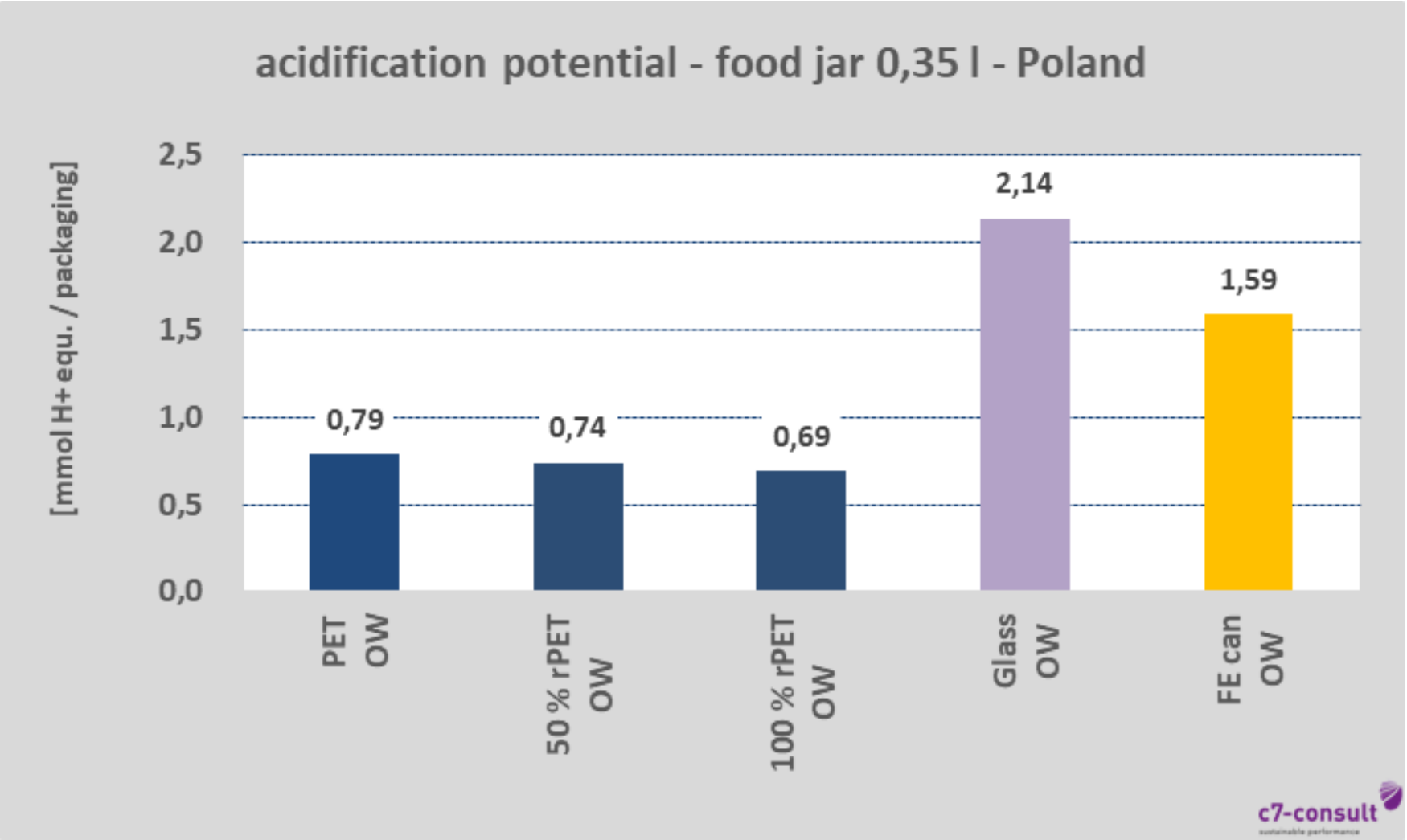
c7-consult
sustainable performance

Results Food jar 350 g

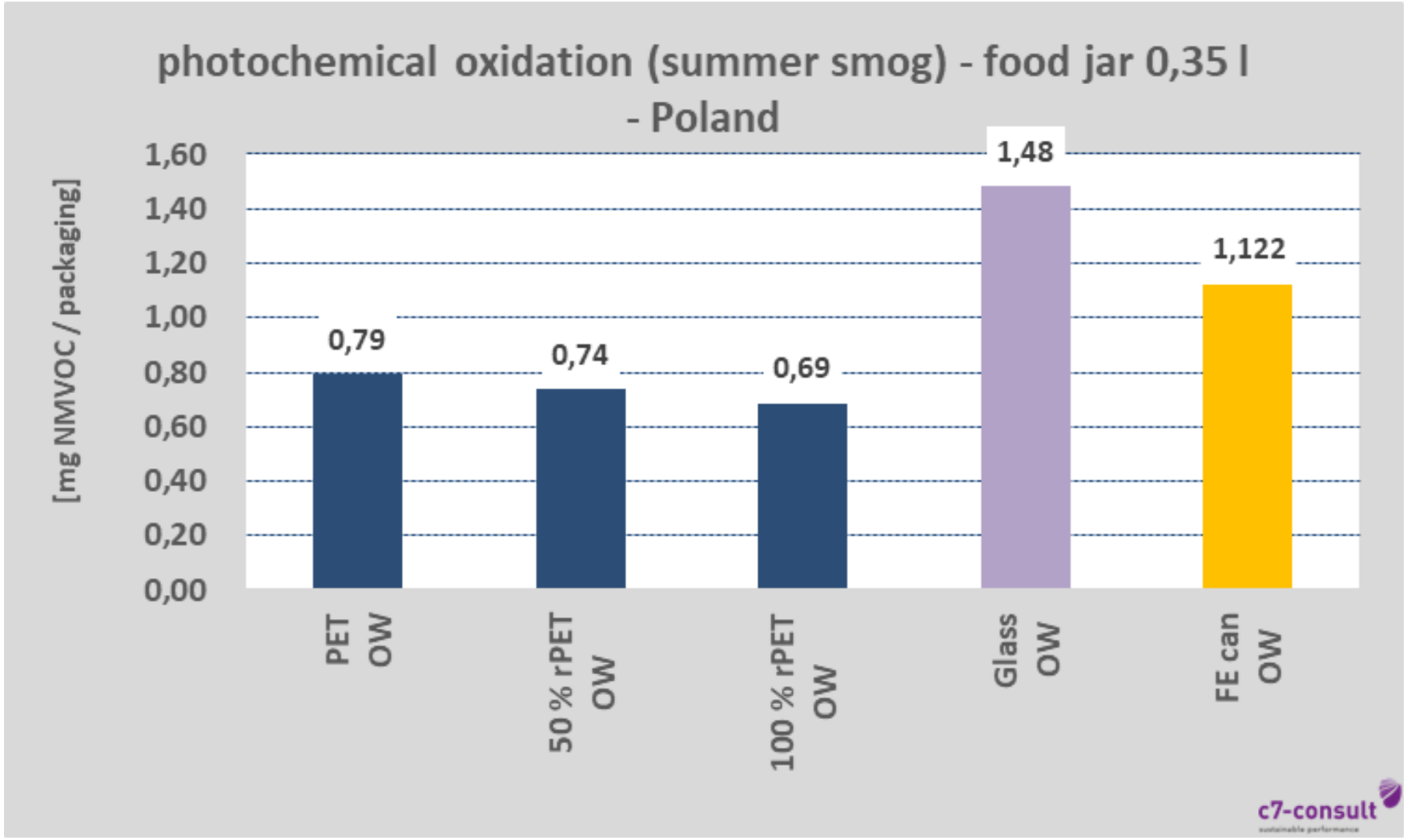
Food Jar


climate change - food jar 0,35 l - Poland
[g CO_2-equ. / packaging]
350
300
250
200
150
100
50
0
201
190
179
324
316
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

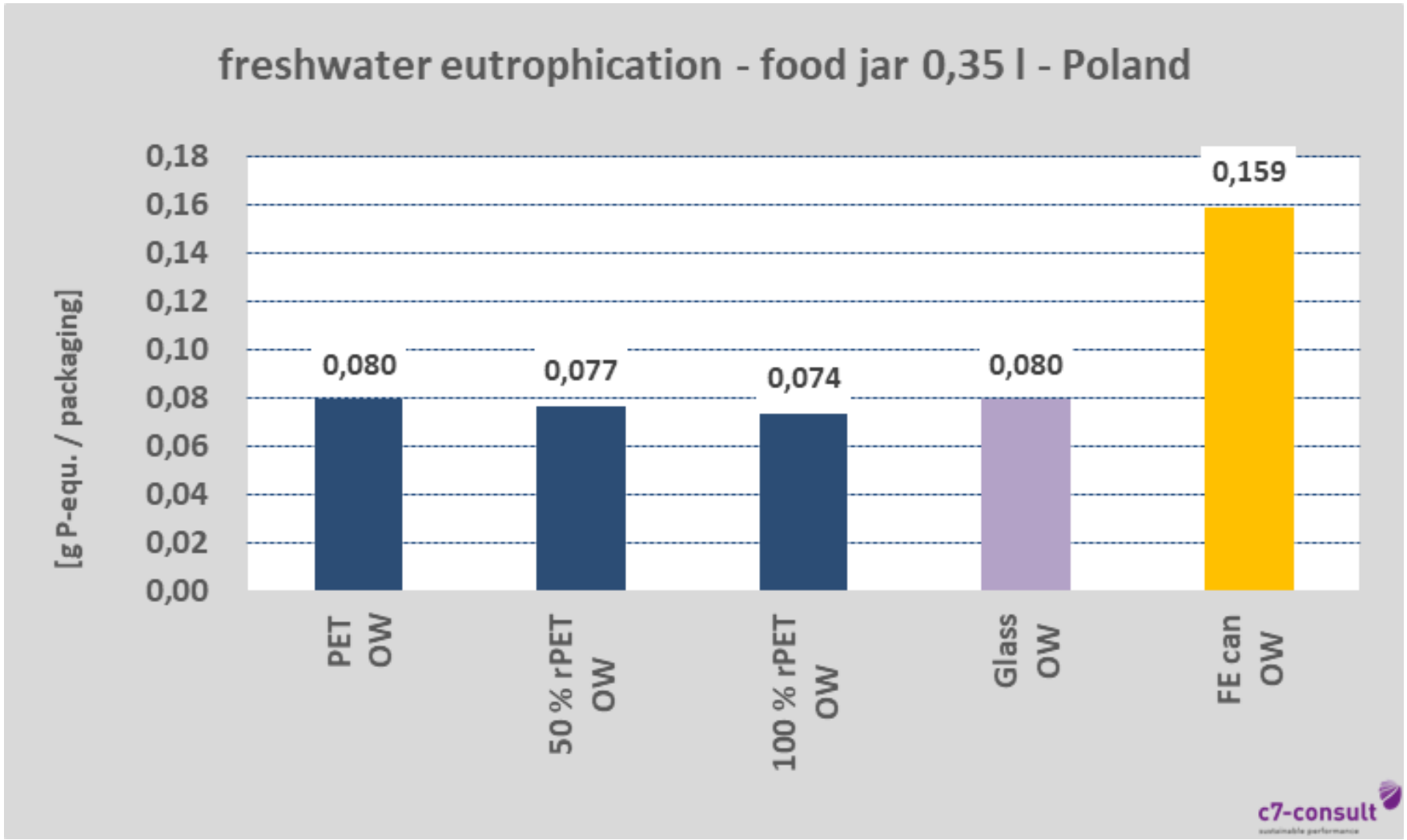
Food Jar


acidification potential - food jar 0,35 l - Poland
[mmol H+ equ. / packaging]
2,5
2,0
1,5
1,0
0,5
0,0
0,79
0,74
0,69
2,14
1,59
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

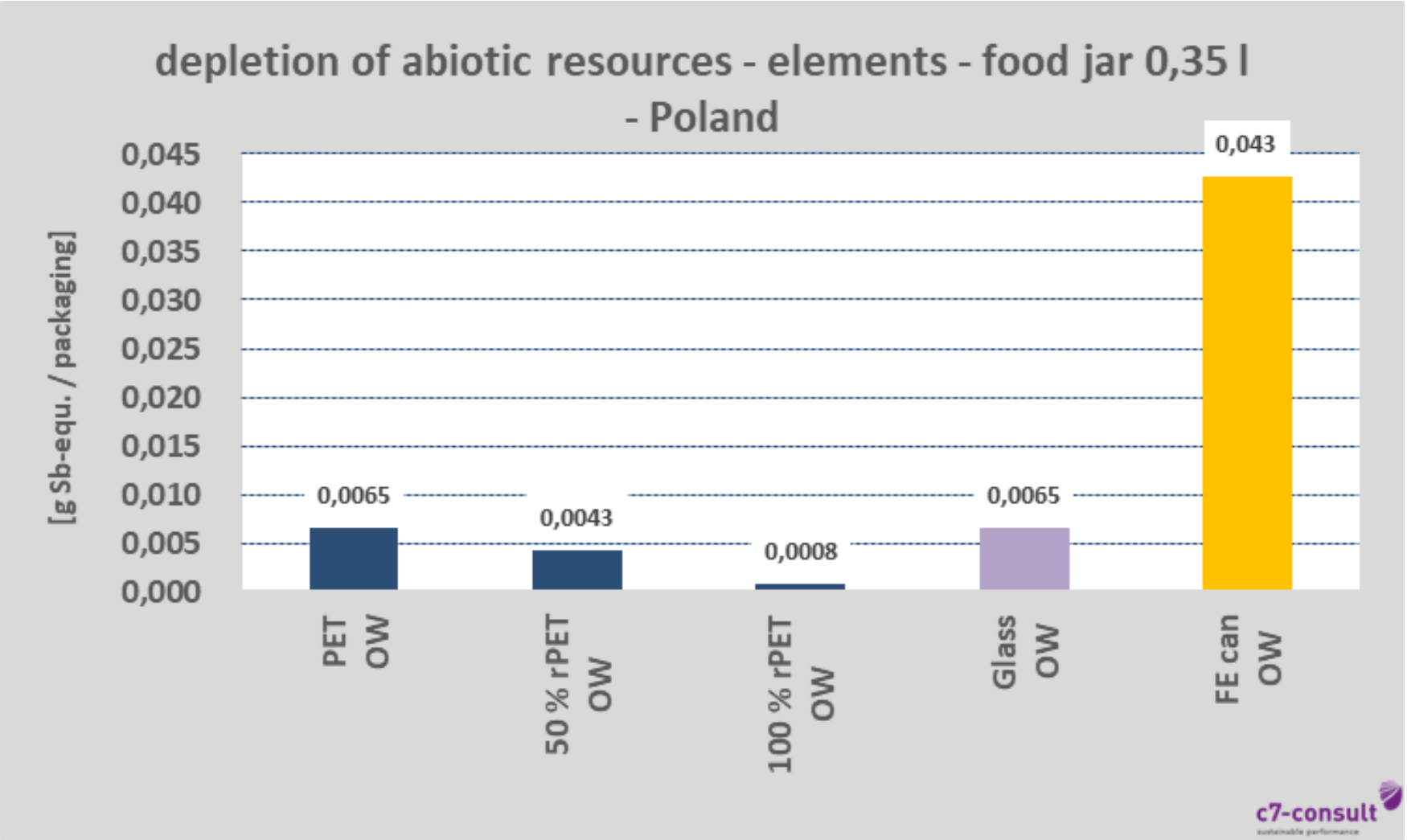
Food Jar


photochemical oxidation (summer smog) - food jar 0,35 l - Poland
[mg NMVOC / packaging]
1,60
1,40
1,20
1,00
0,80
0,60
0,40
0,20
0,00
0,79
0,74
0,69
1,48
1,122
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

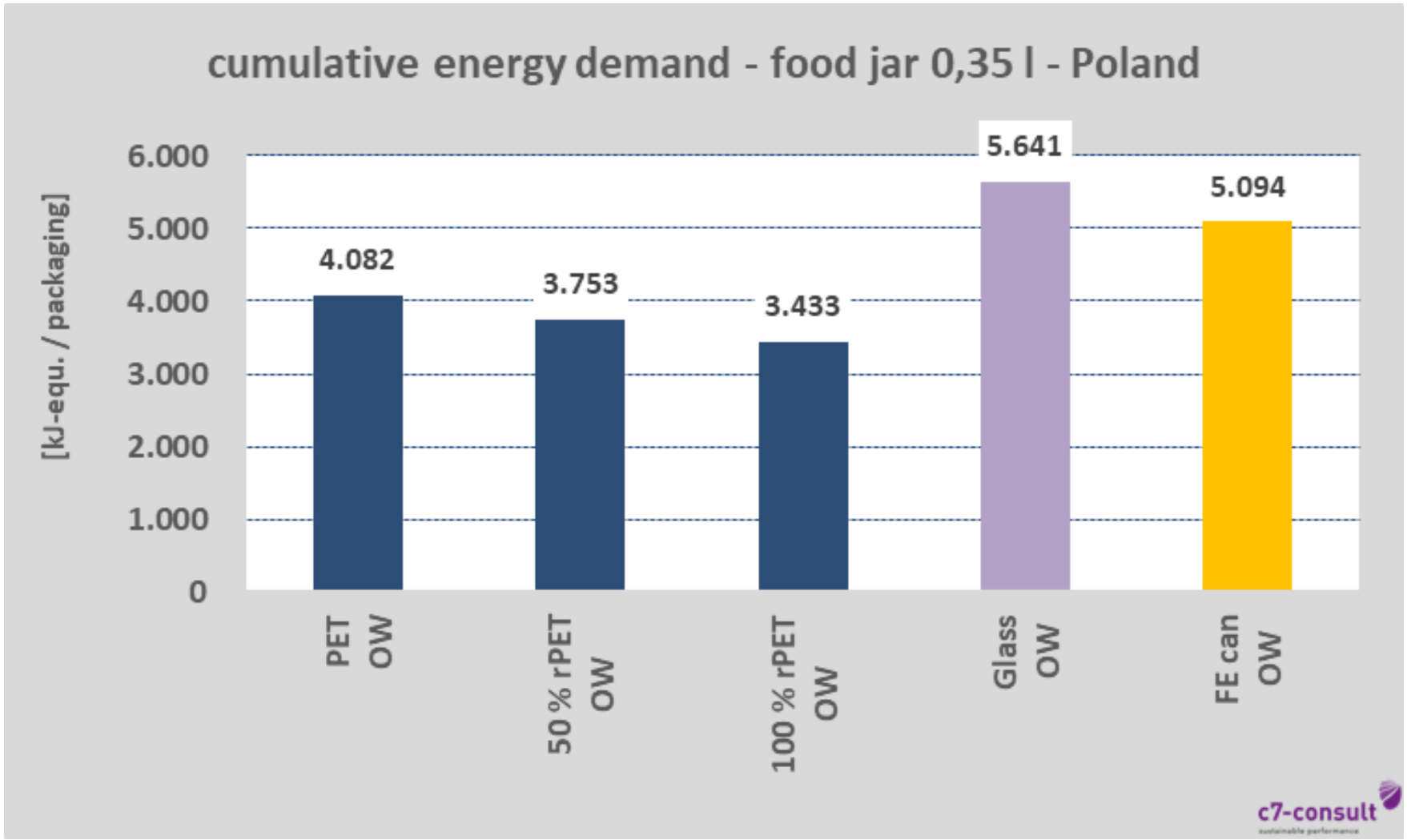
Food Jar


freshwater eutrophication - food jar 0,35 l - Poland
[g P-equ. / packaging]
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
0,080
0,077
0,074
0,080
0,159
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

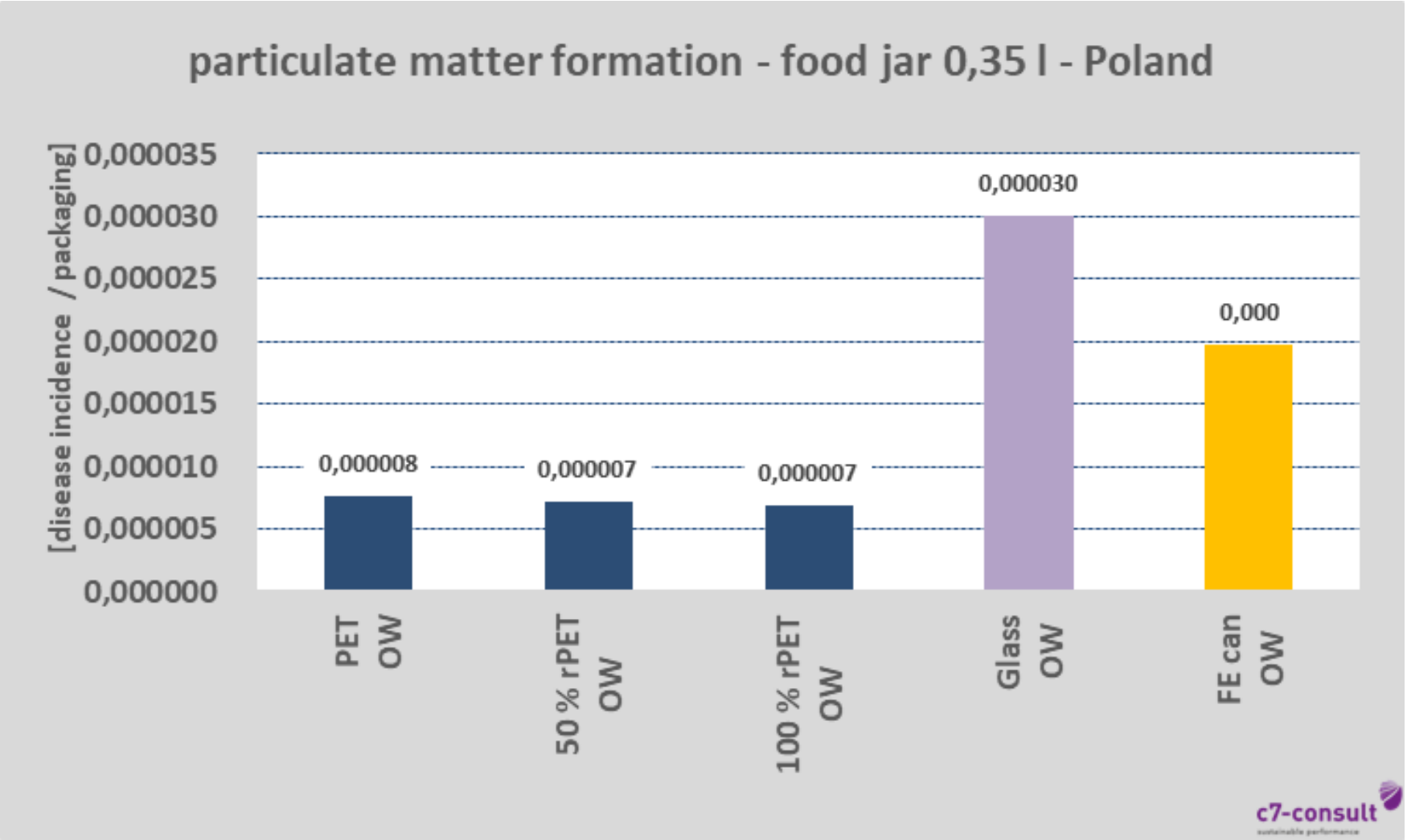
Food Jar


depletion of abiotic resources - elements - food jar 0,35 l - Poland
[g Sb-equ. / packaging]
0,045
0,040
0,035
0,030
0,025
0,020
0,015
0,010
0,005
0,000
0,0065
0,0043
0,0008
0,0065
0,043
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

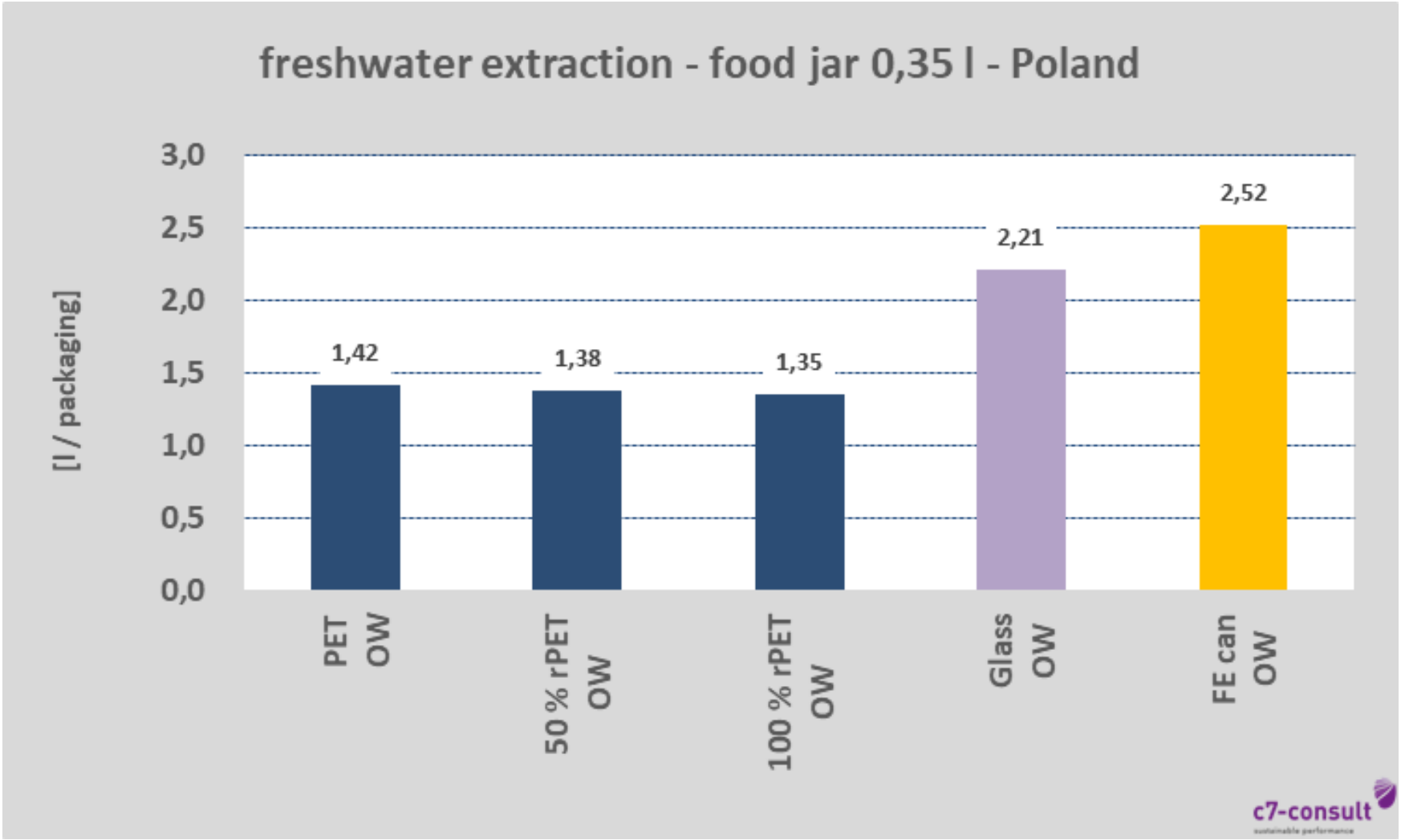
Food Jar


cumulative energy demand - food jar 0,35 l - Poland
[kJ-equ. / packaging]
6.000
5.000
4.000
3.000
2.000
1.000
0
4.082
3.753
3.433
5.641
5.094
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

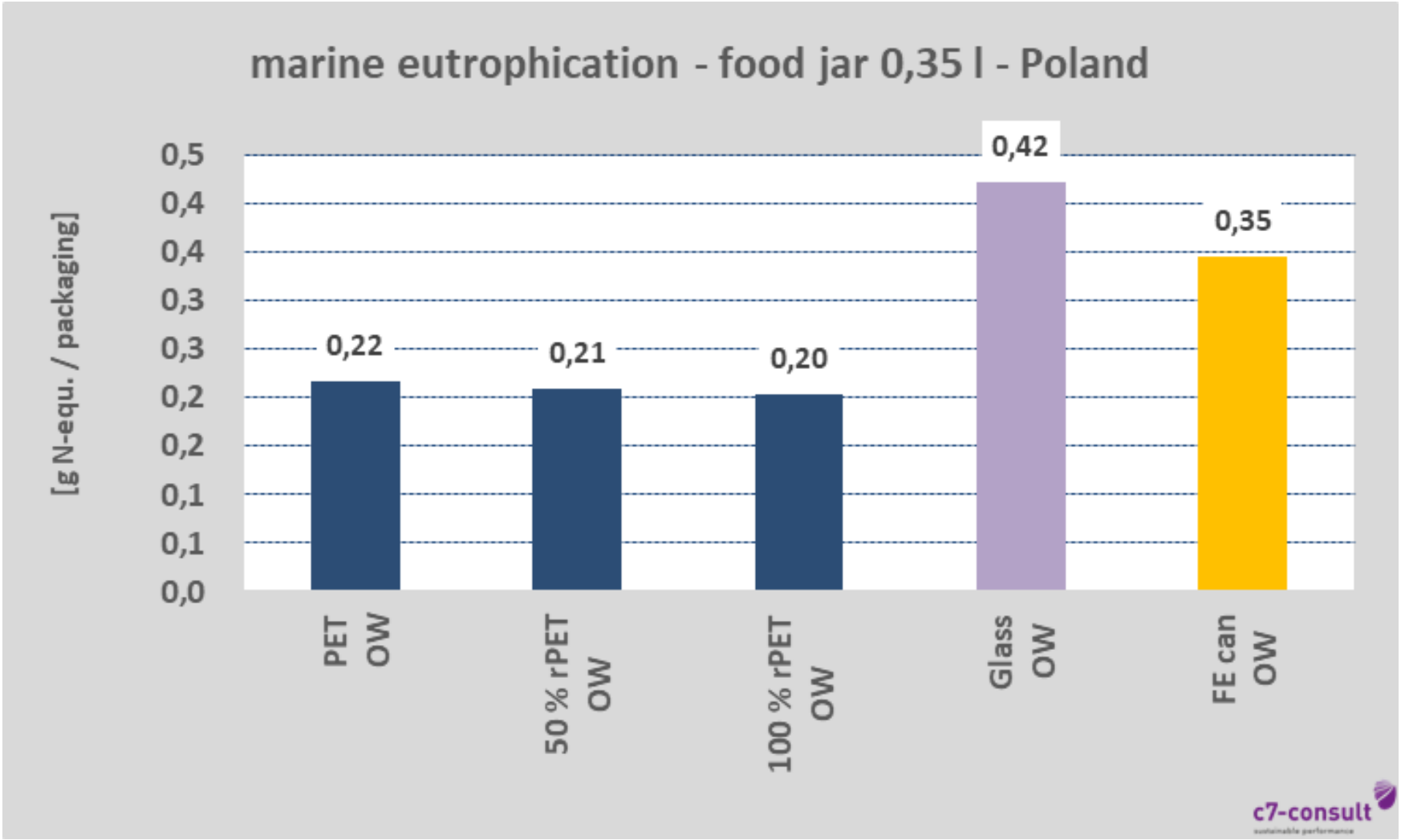
Food Jar


particulate matter formation - food jar 0,35 l - Poland
[disease incidence / packaging]
0,000035
0,000030
0,000025
0,000020
0,000015
0,000010
0,000005
0,000000
0,000008
0,000007
0,000007
0,000030
0,000
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

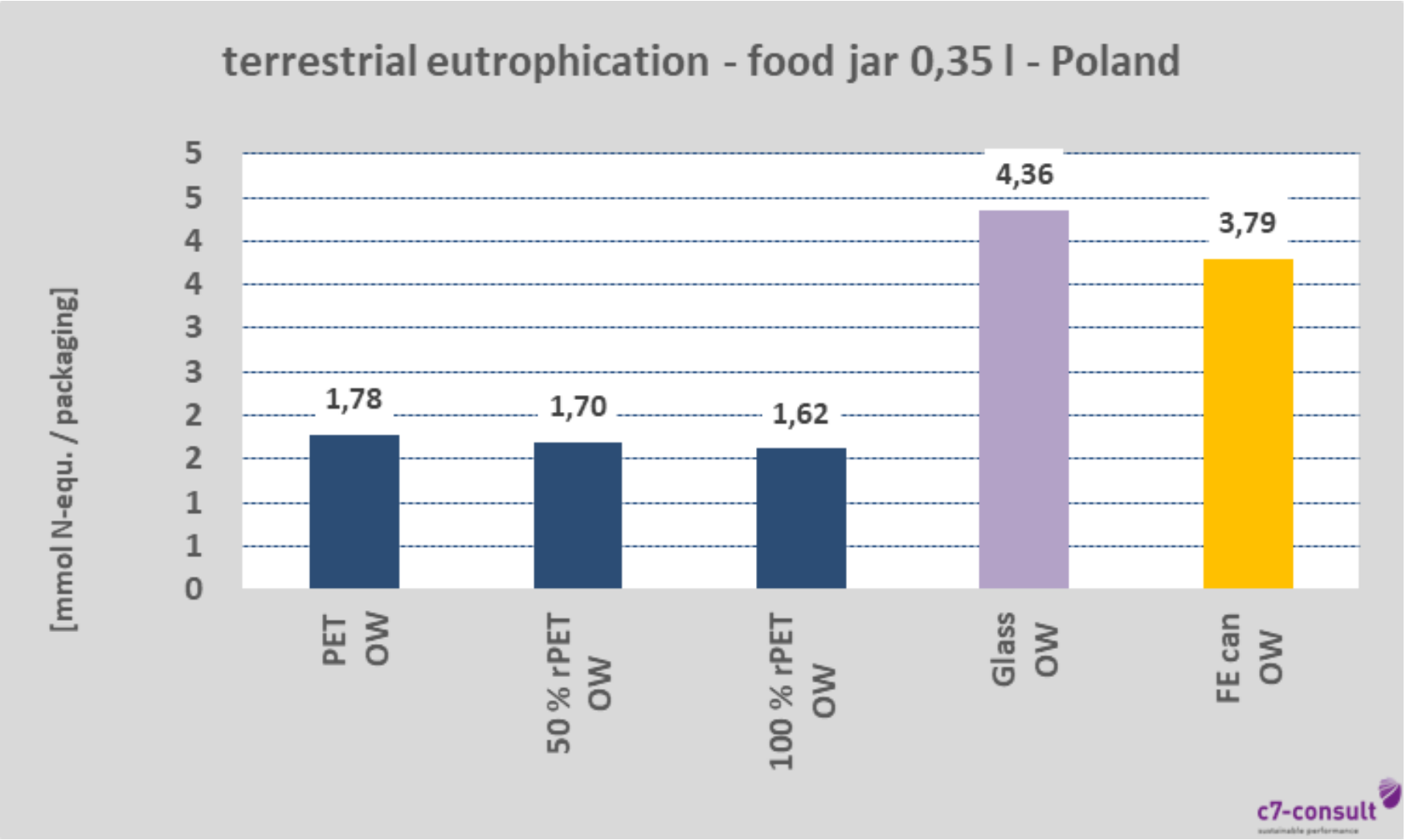
Food Jar


freshwater extraction - food jar 0,35 l - Poland
[l / packaging]
3,0
2,5
2,0
1,5
1,0
0,5
0,0
1,42
1,38
1,35
2,21
2,52
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

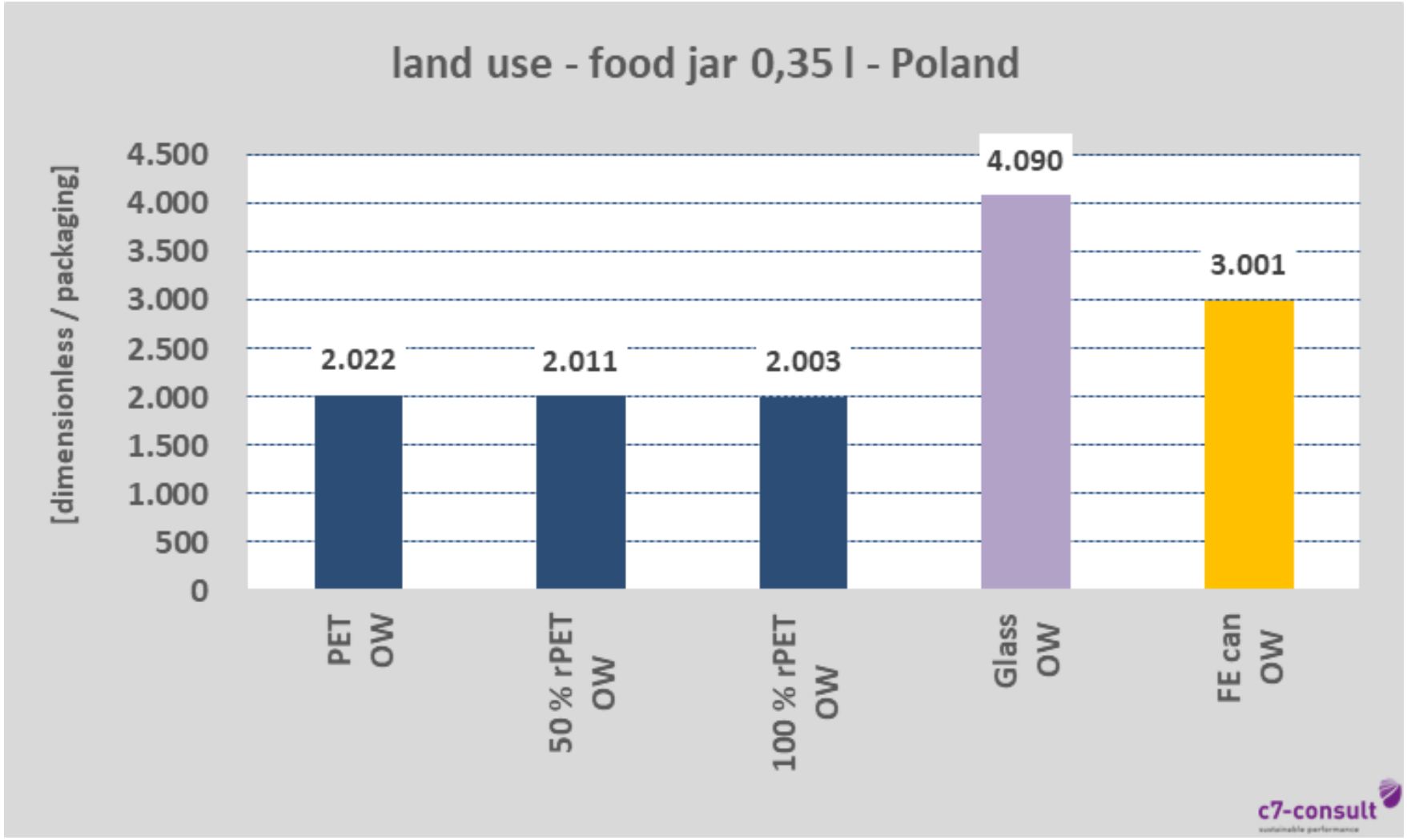
Food Jar


marine eutrophication - food jar 0,35 l - Poland
[g N-equ. / packaging]
0,5
0,4
0,4
0,3
0,3
0,2
0,2
0,1
0,1
0,0
0,22
0,21
0,20
0,42
0,35
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

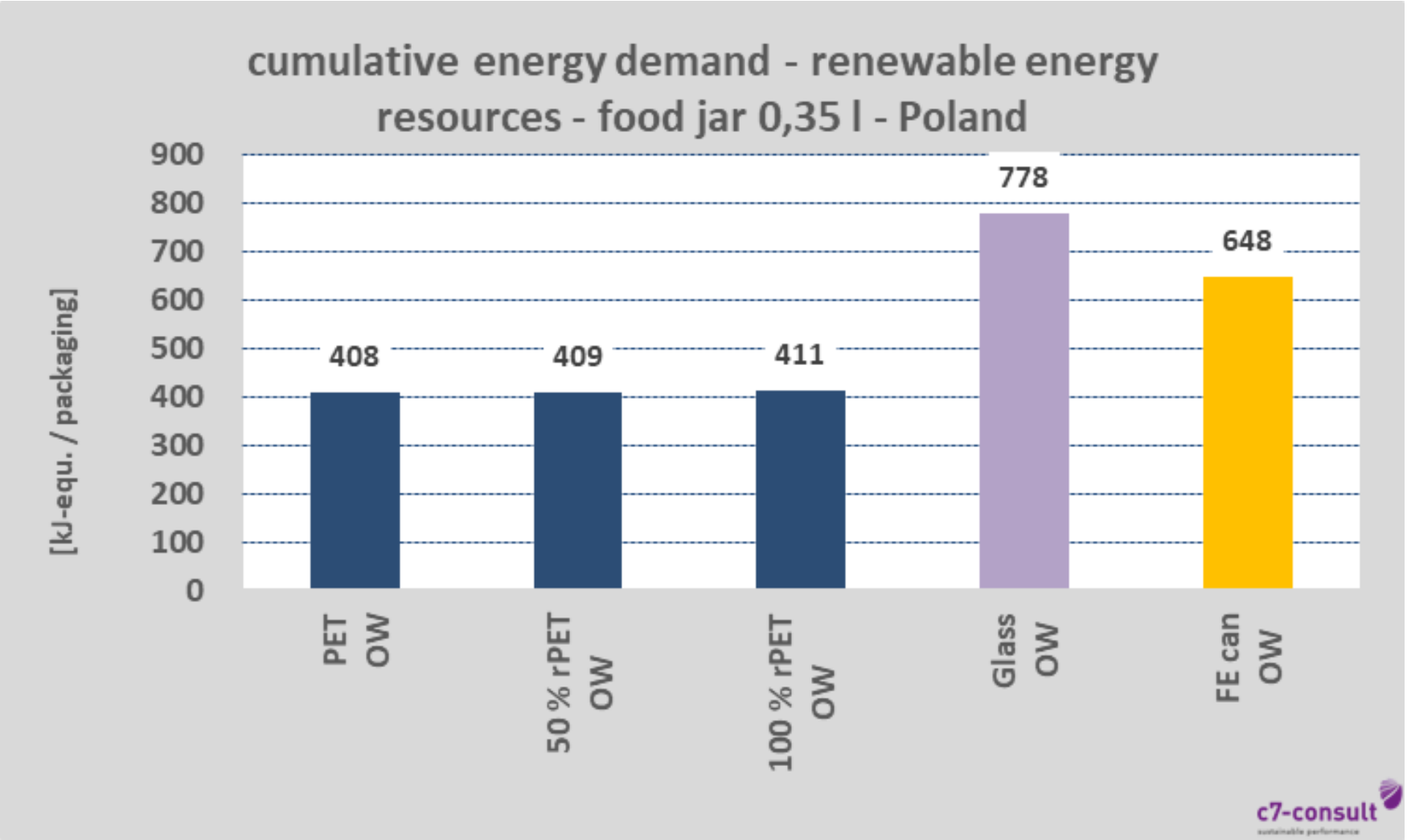
Food Jar


terrestrial eutrophication - food jar 0,35 l - Poland
[mmol N-equ. / packaging]
0
1
1
2
2
3
3
4
4
5
5
1,78
1,70
1,62
4,36
3,79
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

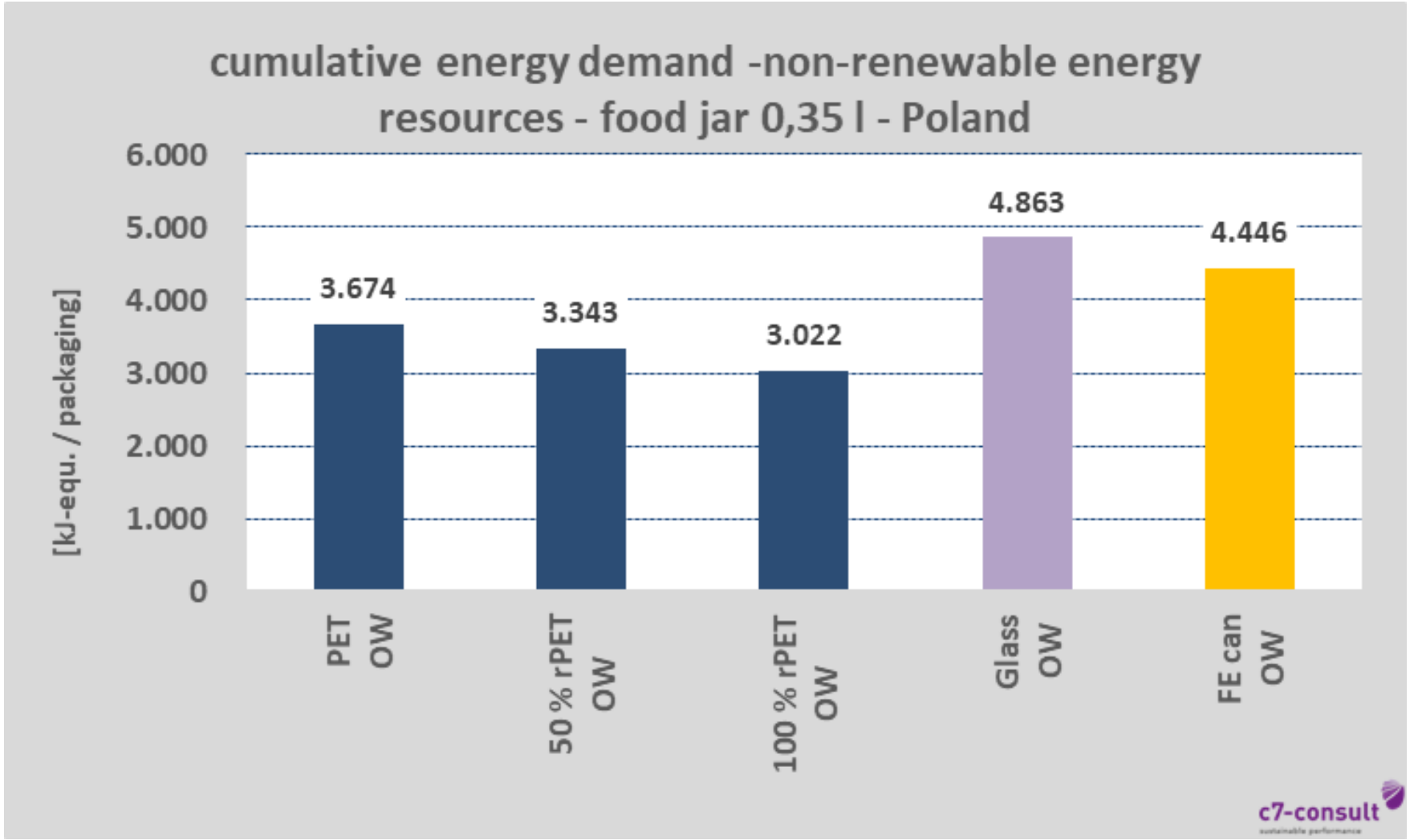
Food Jar


land use - food jar 0,35 l - Poland
[dimensionless / packaging]
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
500
0
2.022
2.011
2.003
4.090
3.001
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

Food Jar


cumulative energy demand - renewable energy resources - food jar 0,35 l - Poland
[kJ-equ. / packaging]
900
800
700
600
500
400
300
200
100
0
408
409
411
778
648
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

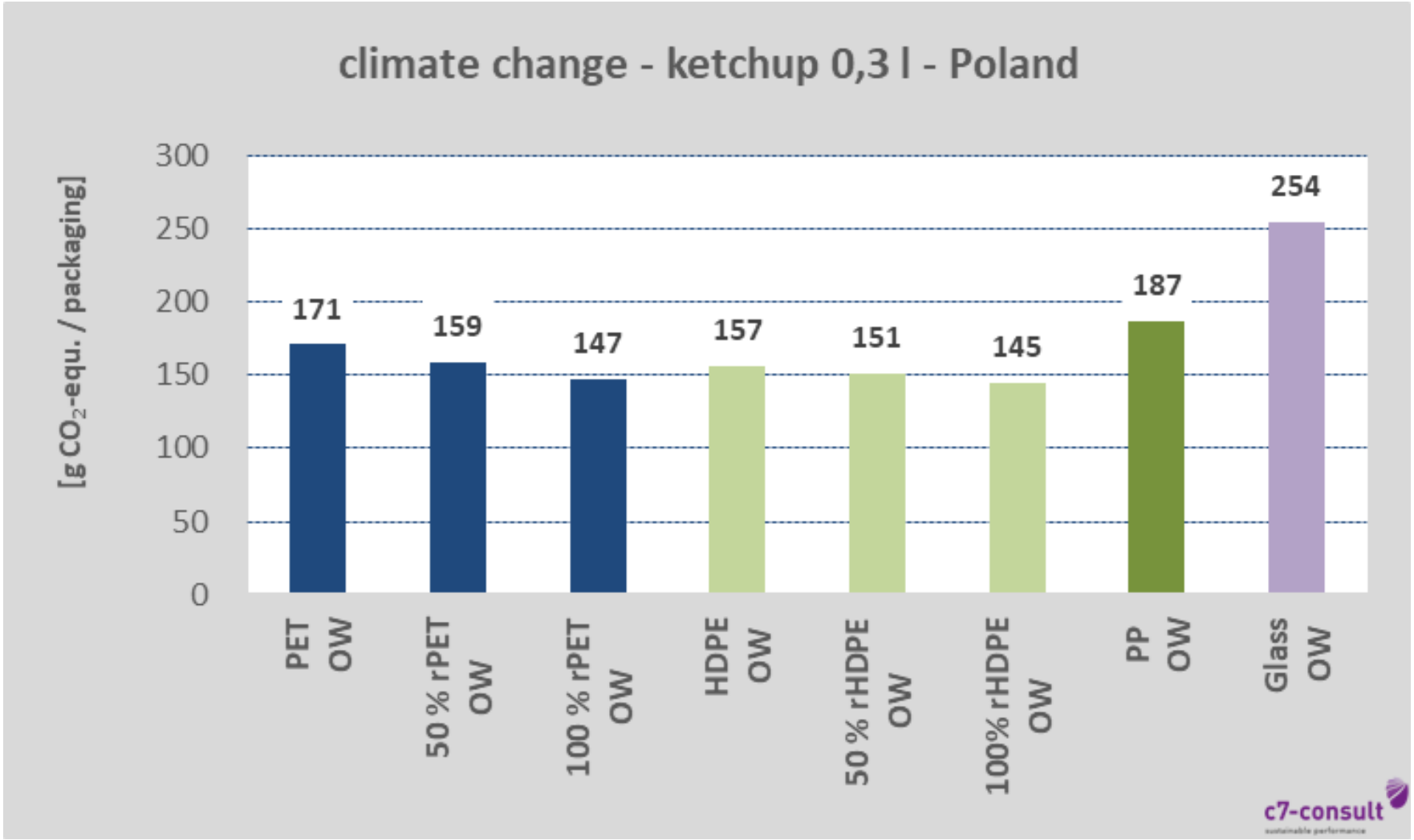
Food Jar


cumulative energy demand -non-renewable energy resources - food jar 0,35 l - Poland
[kJ-equ. / packaging]
6.000
5.000
4.000
3.000
2.000
1.000
0
3.674
3.343
3.022
4.863
4.446
PET OW
50 % rPET OW
100 % rPET OW
Glass OW
FE can OW
c7-consult

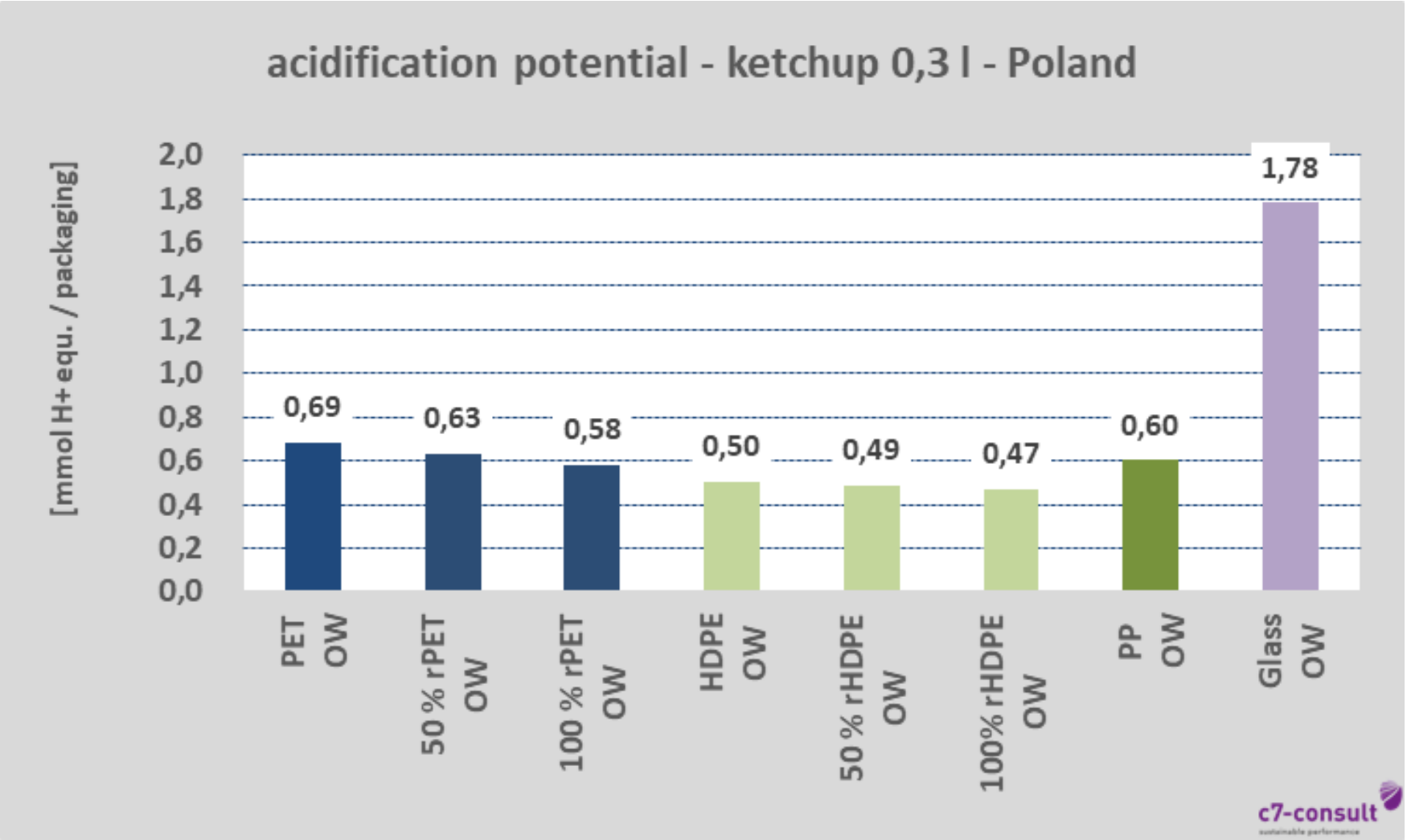
c7-consult
sustainable performance

Results Ketchup 300 ml

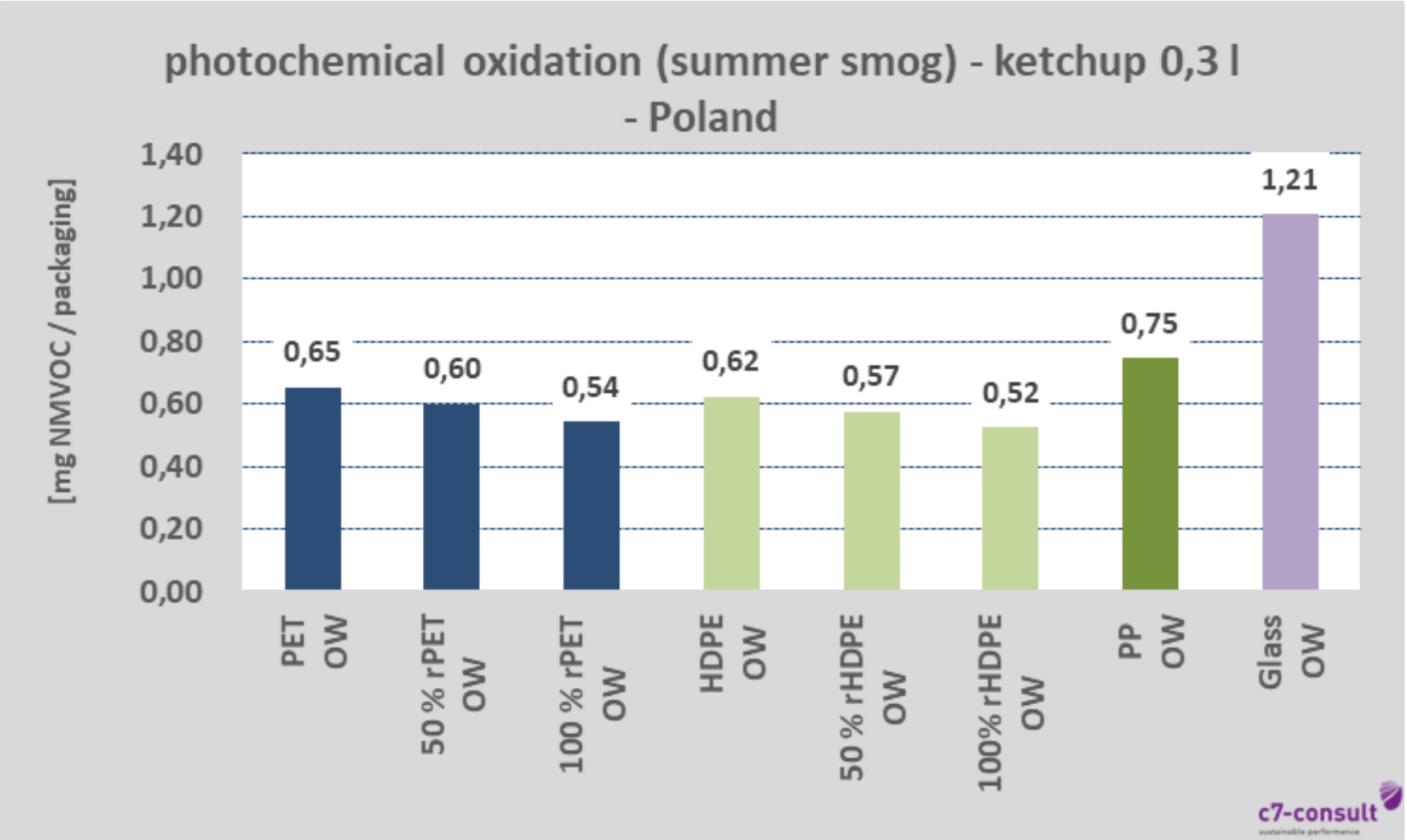
Ketchup


climate change - ketchup 0,3 l - Poland
[g CO2-equ. / packaging]
300
250
200
150
100
50
0
171
159
147
157
151
145
187
254
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

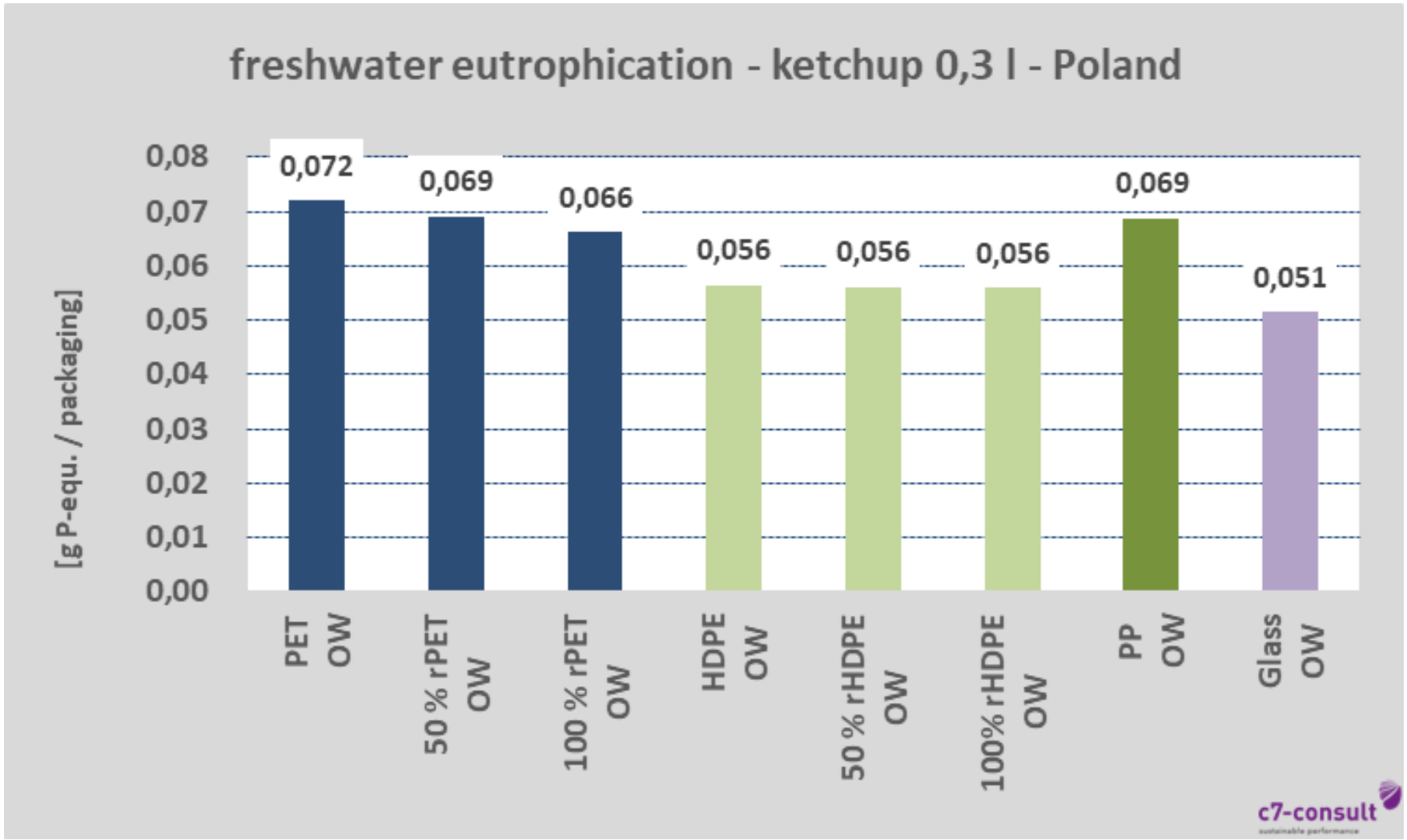
Ketchup


acidification potential - ketchup 0,3 l - Poland
[mmol H+ equ. / packaging]
2,0
1,8
1,6
1,4
1,2
1,0
0,8
0,6
0,4
0,2
0,0
0,69
0,63
0,58
0,50
0,49
0,47
0,60
1,78
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

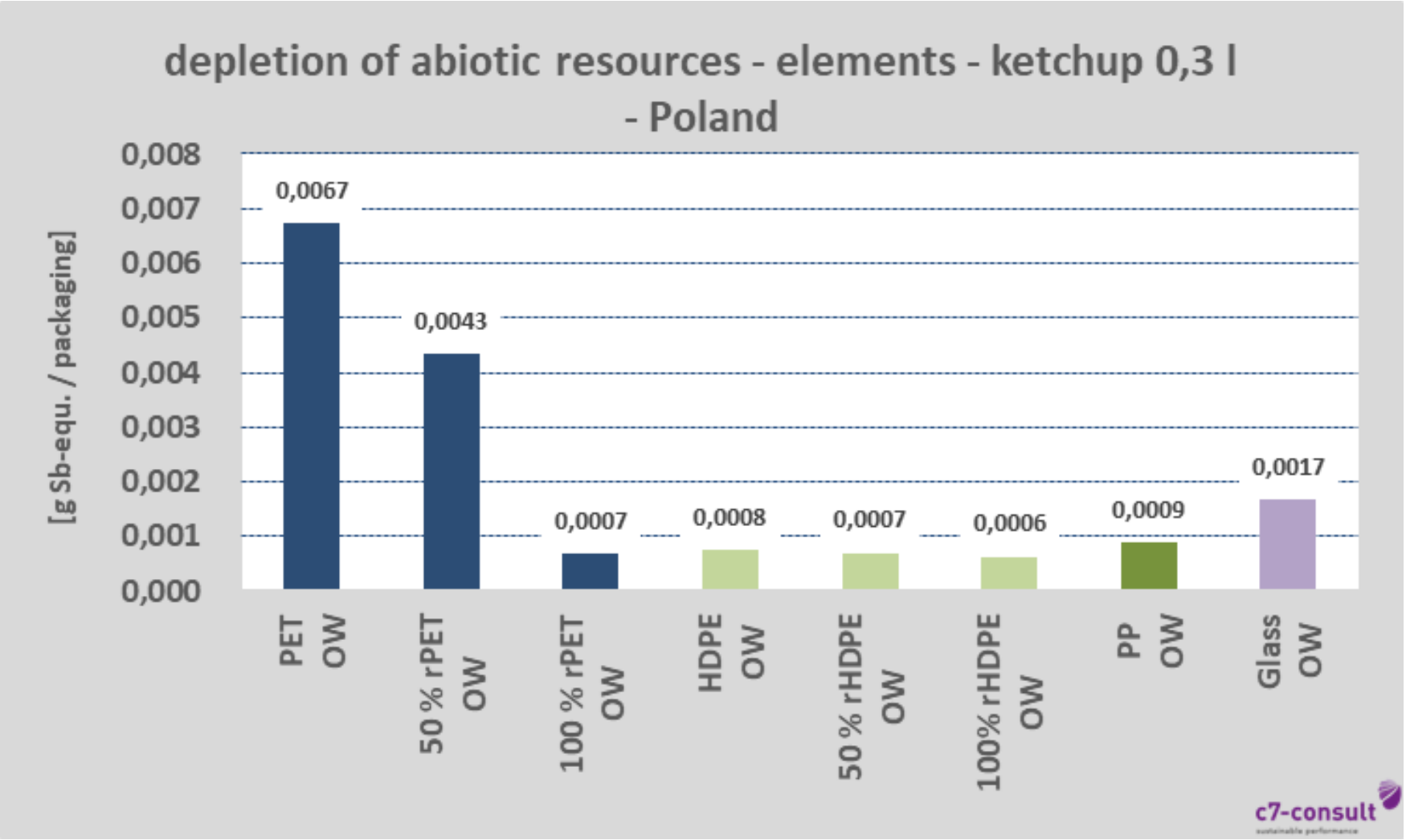
Ketchup


photochemical oxidation (summer smog) - ketchup 0,3 l - Poland
[mg NMVOC / packaging]
1,40
1,20
1,00
0,80
0,60
0,40
0,20
0,00
0,65
0,60
0,54
0,62
0,57
0,52
0,75
1,21
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

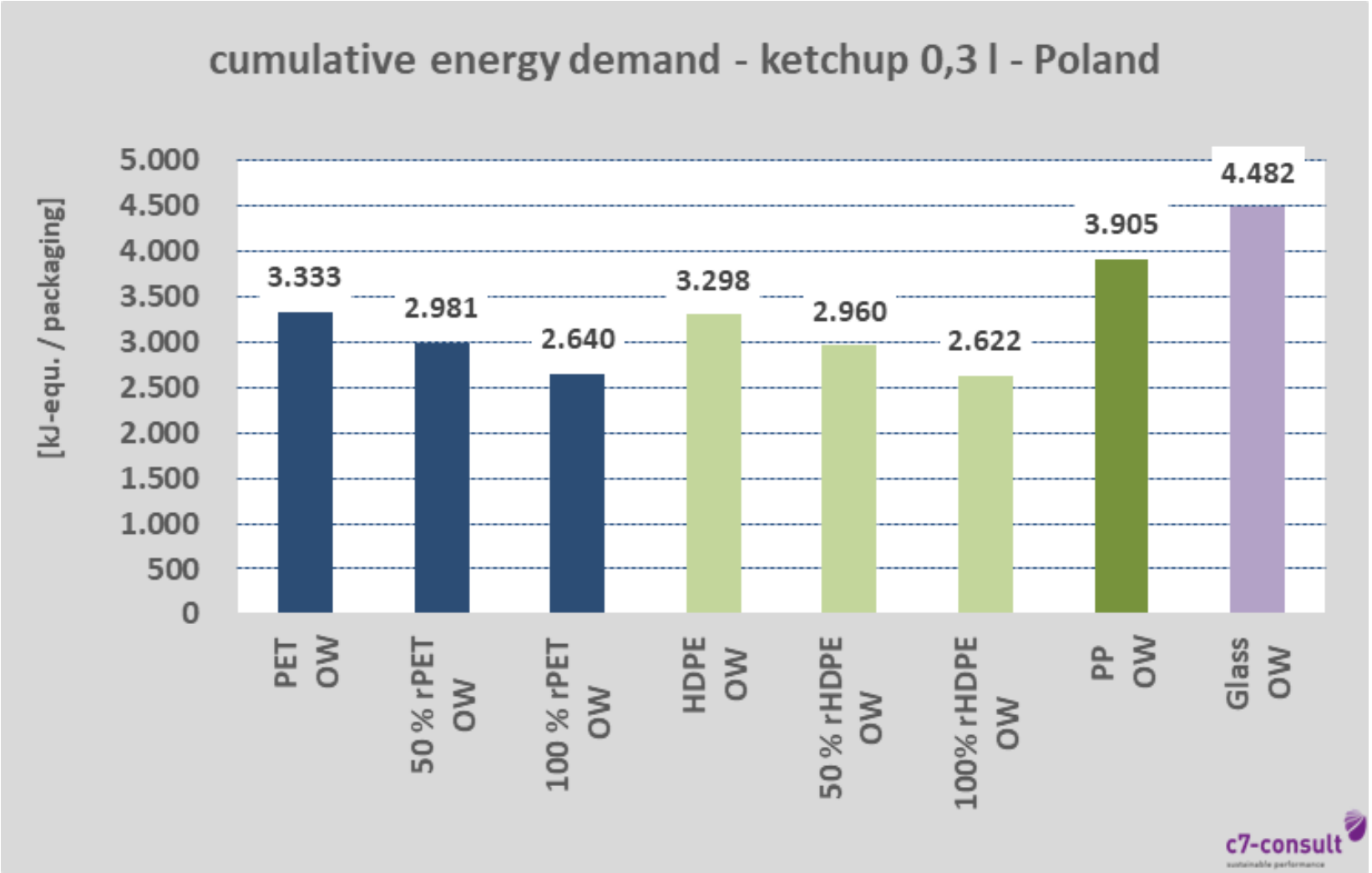
Ketchup


freshwater eutrophication - ketchup 0,3 l - Poland
[g P-equ. / packaging]
0,08
0,07
0,06
0,05
0,04
0,03
0,02
0,01
0,00
0,072
0,069
0,066
0,056
0,056
0,056
0,069
0,051
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

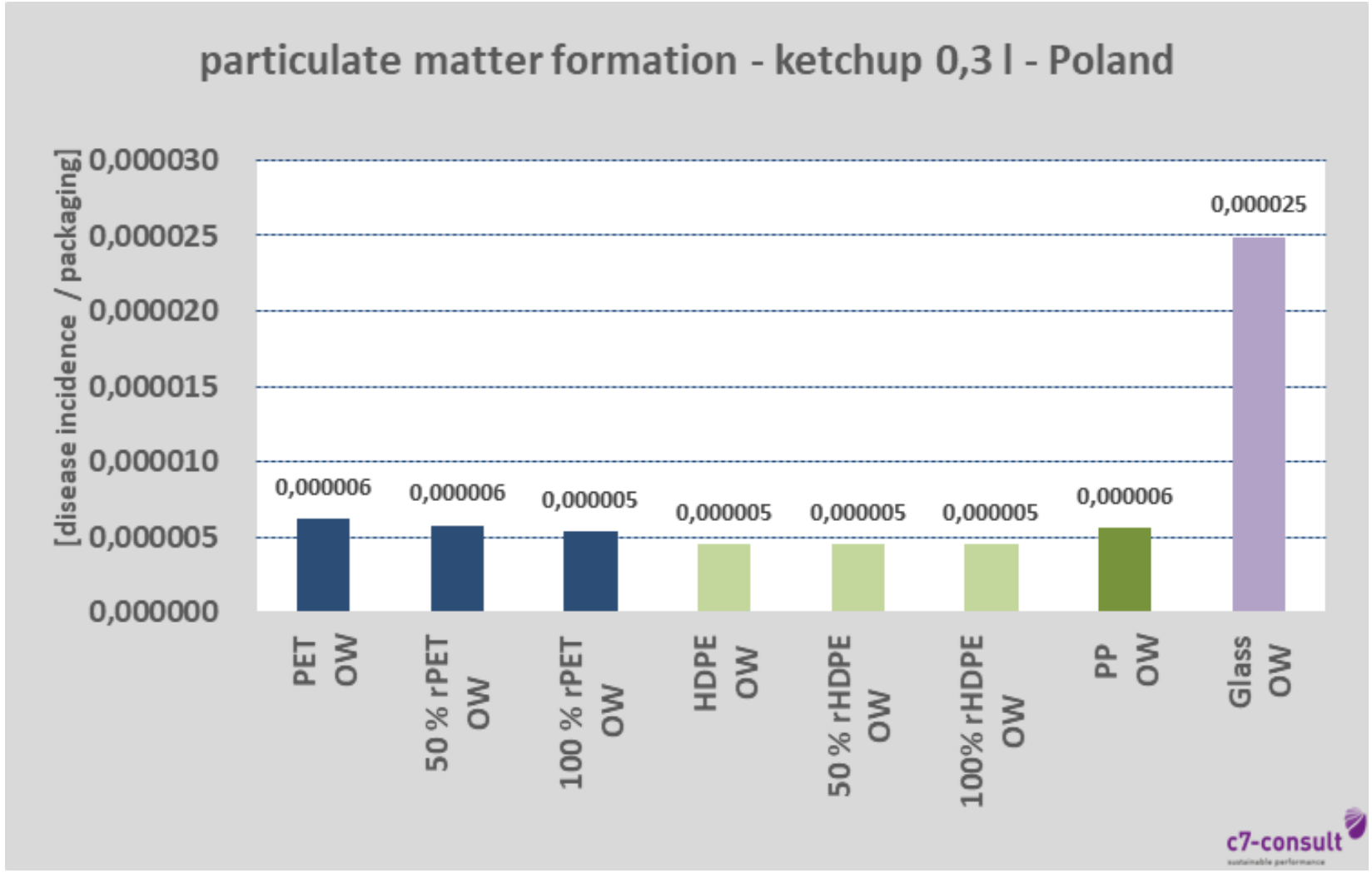
Ketchup


depletion of abiotic resources - elements - ketchup 0,3 l - Poland
[g Sb-equ. / packaging]
0,008
0,007
0,006
0,005
0,004
0,003
0,002
0,001
0,000
0,0067
0,0043
0,0007
0,0008
0,0007
0,0006
0,0009
0,0017
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

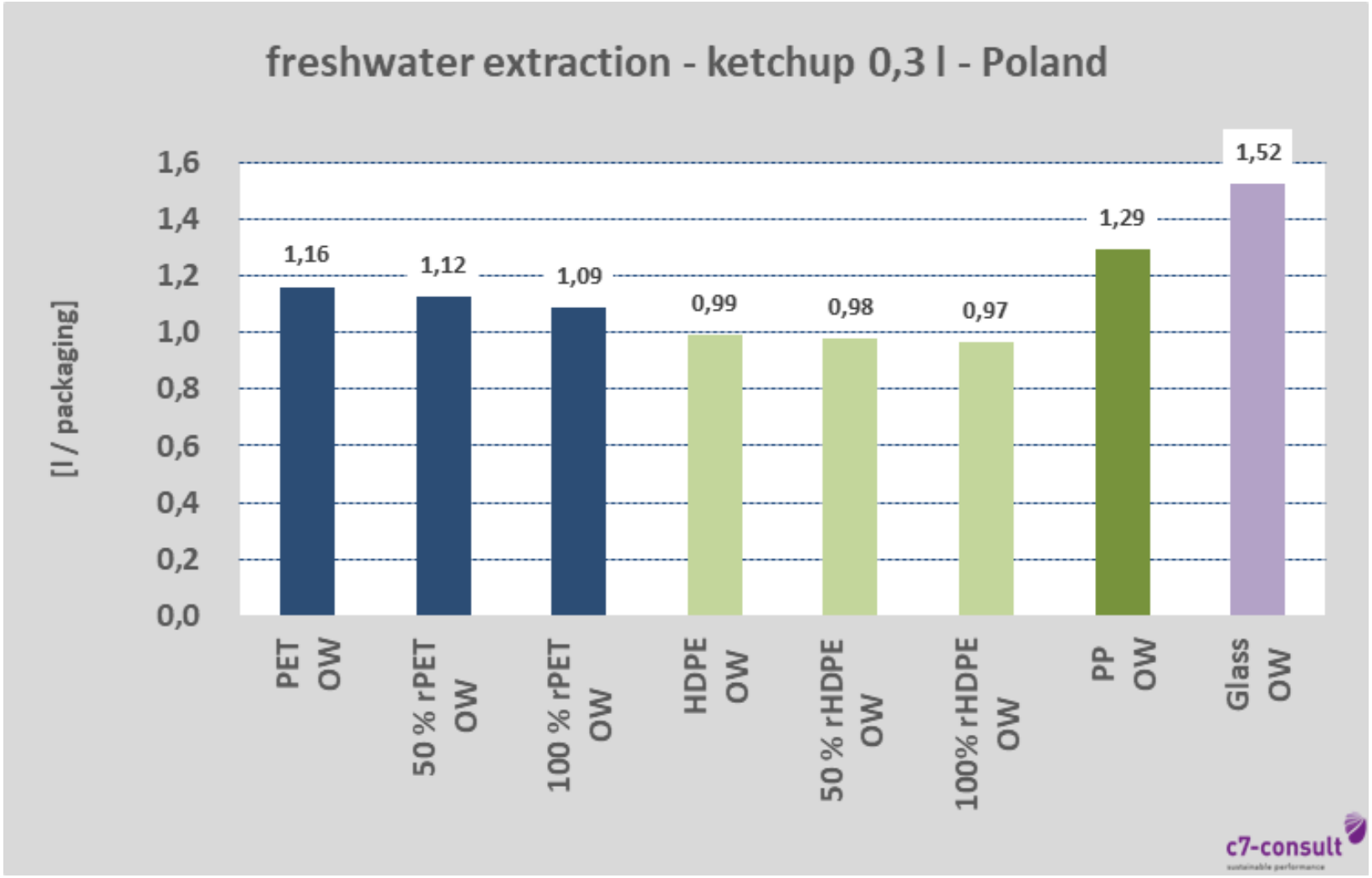
Ketchup


cumulative energy demand - ketchup 0,3 l - Poland
[kJ-equ. / packaging]
5.000
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
500
0
3.333
2.981
2.640
3.298
2.960
2.622
3.905
4.482
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

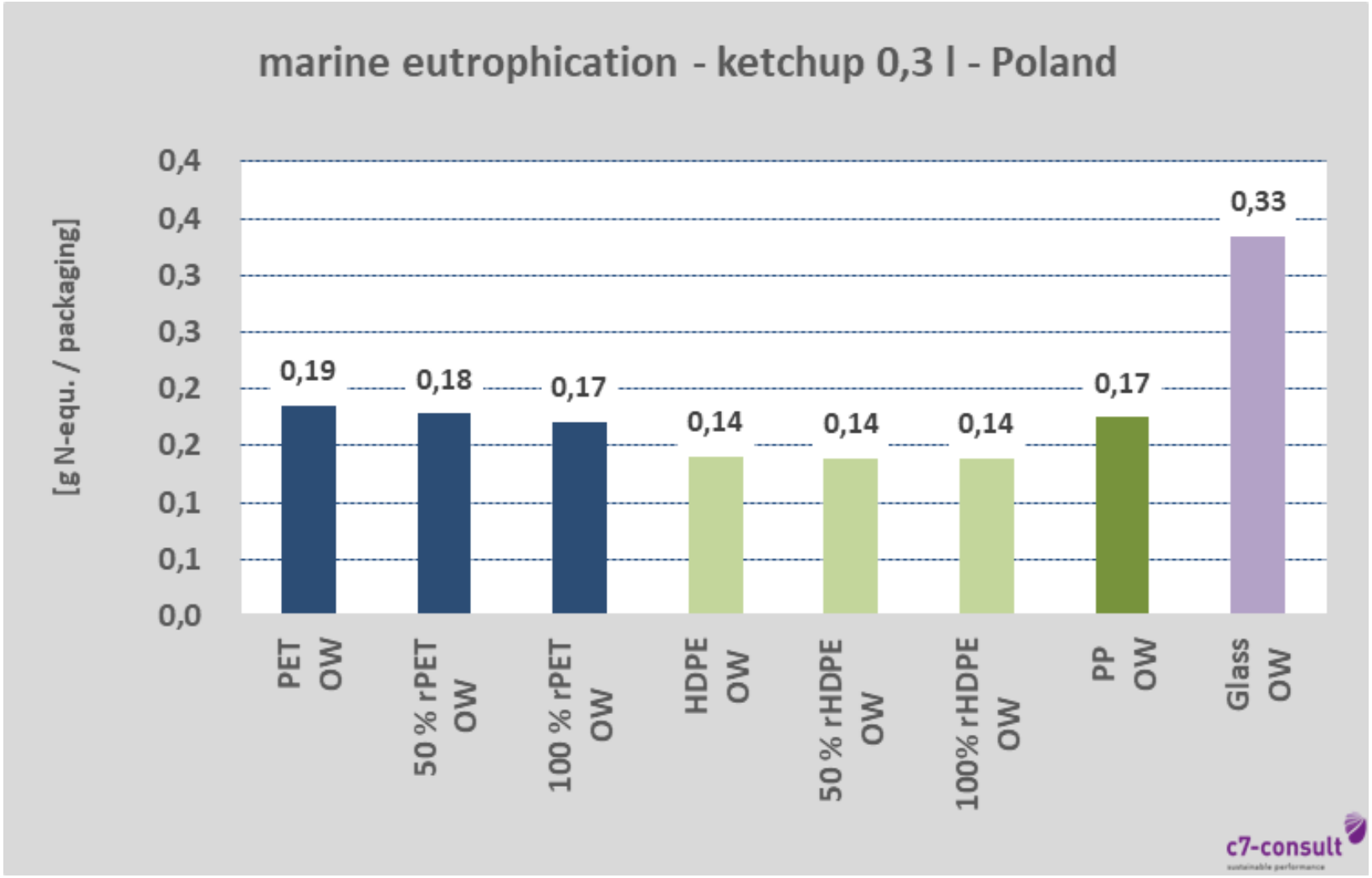
Ketchup


particulate matter formation - ketchup 0,3 l - Poland
[disease incidence / packaging]
0,000030
0,000025
0,000020
0,000015
0,000010
0,000005
0,000000
0,000006
0,000006
0,000005
0,000005
0,000005
0,000005
0,000006
0,000025
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

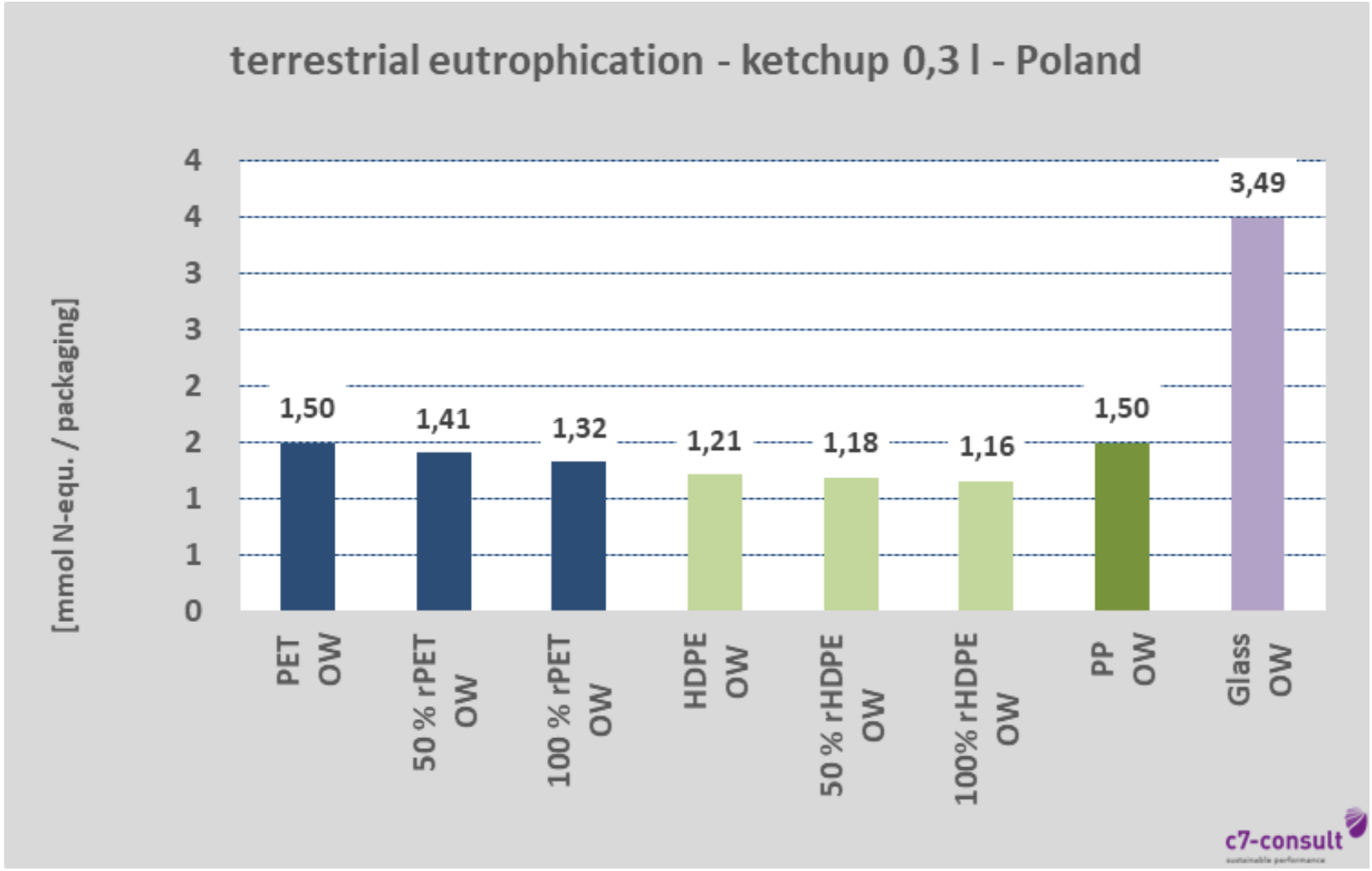
Ketchup


freshwater extraction - ketchup 0,3 l - Poland
[l / packaging]
1,6
1,4
1,2
1,0
0,8
0,6
0,4
0,2
0,0
1,16
1,12
1,09
0,99
0,98
0,97
1,29
1,52
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

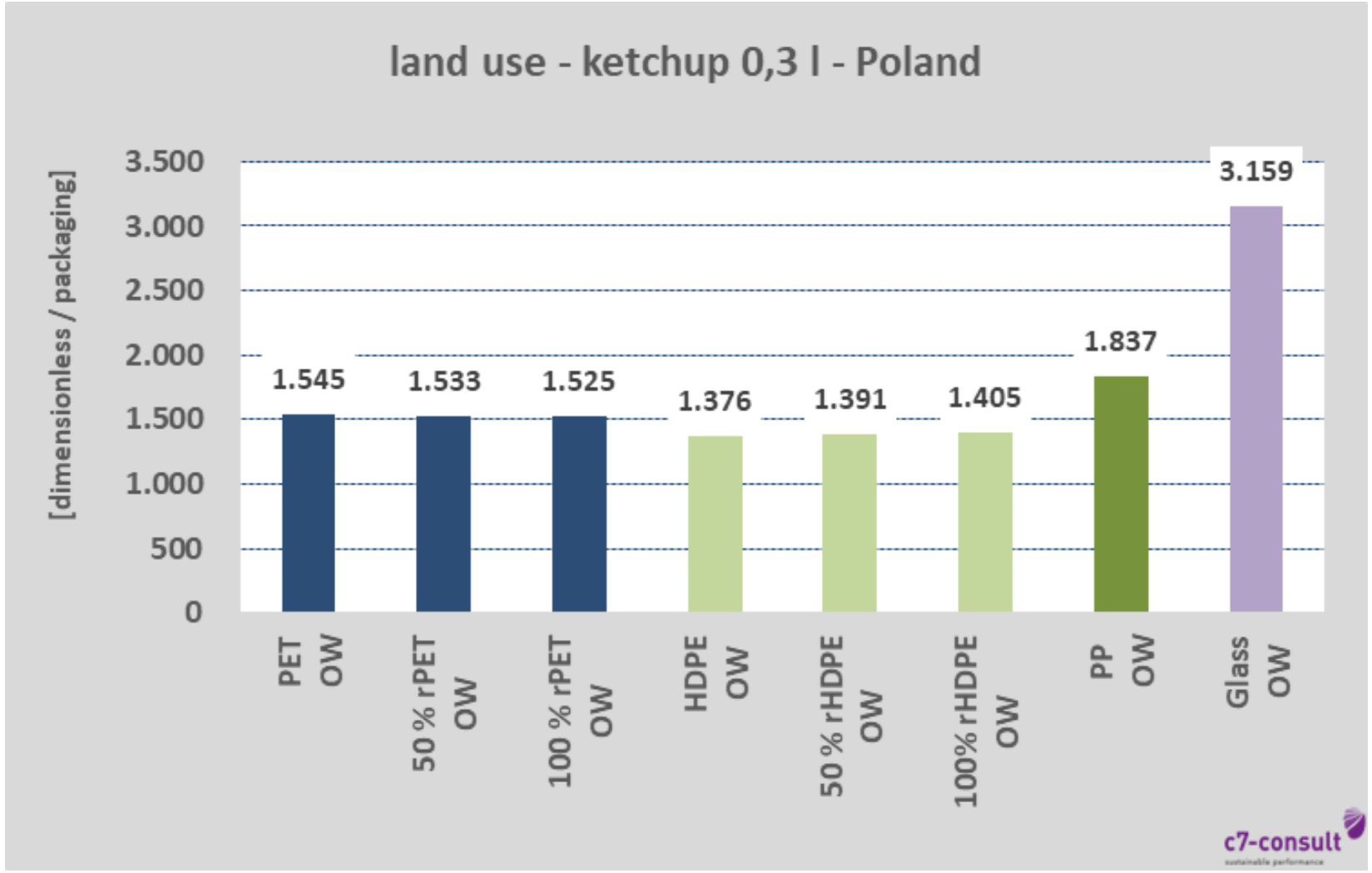
Ketchup


marine eutrophication - ketchup 0,3 l - Poland
[g N-equ. / packaging]
0,4
0,4
0,3
0,3
0,2
0,2
0,1
0,1
0,0
0,19
0,18
0,17
0,14
0,14
0,14
0,17
0,33
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

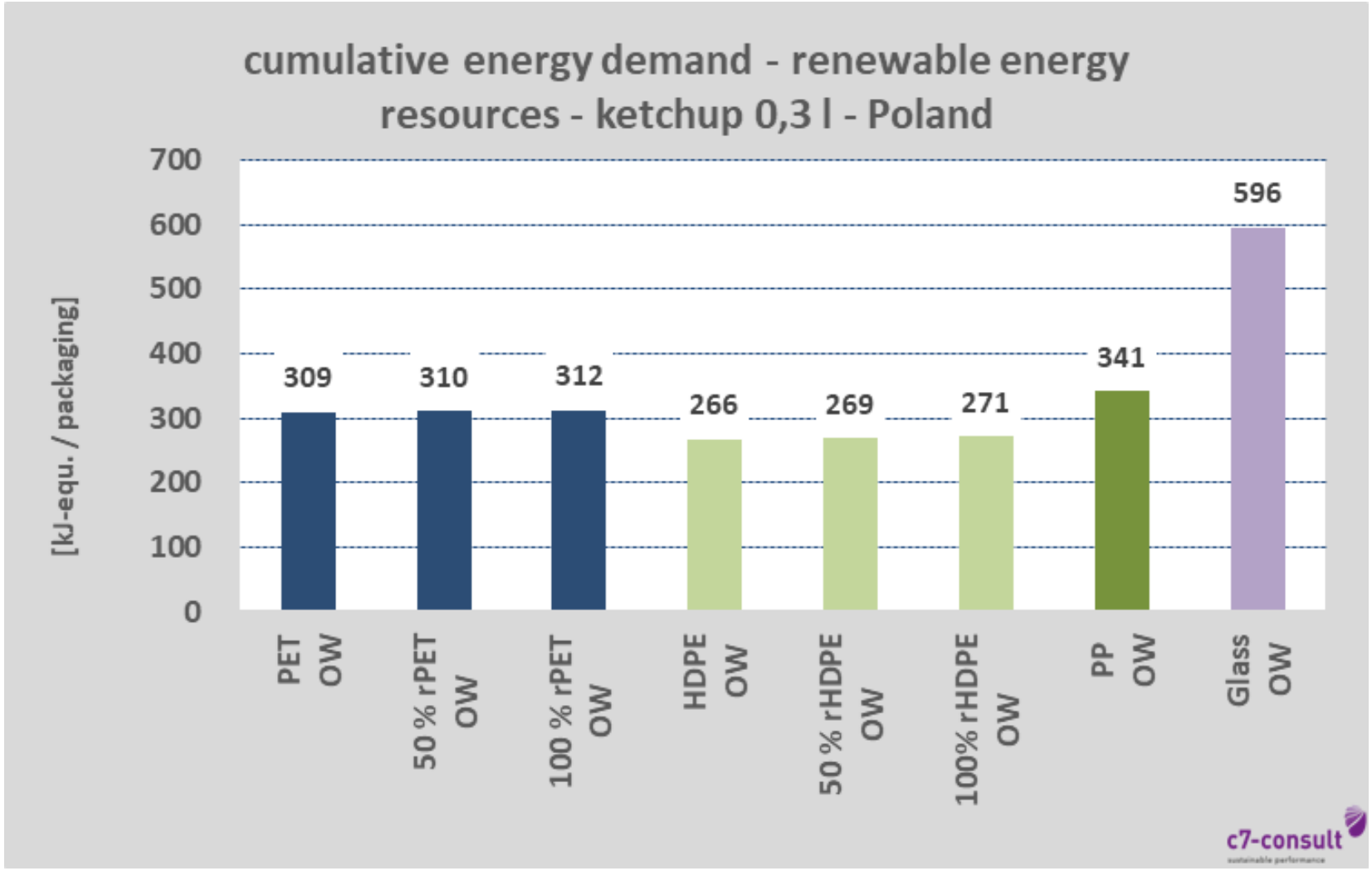
Ketchup


terrestrial eutrophication - ketchup 0,3 l - Poland
[mmol N-equ. / packaging]
4
4
3
3
2
2
1
1
0
1,50
1,41
1,32
1,21
1,18
1,16
1,50
3,49
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

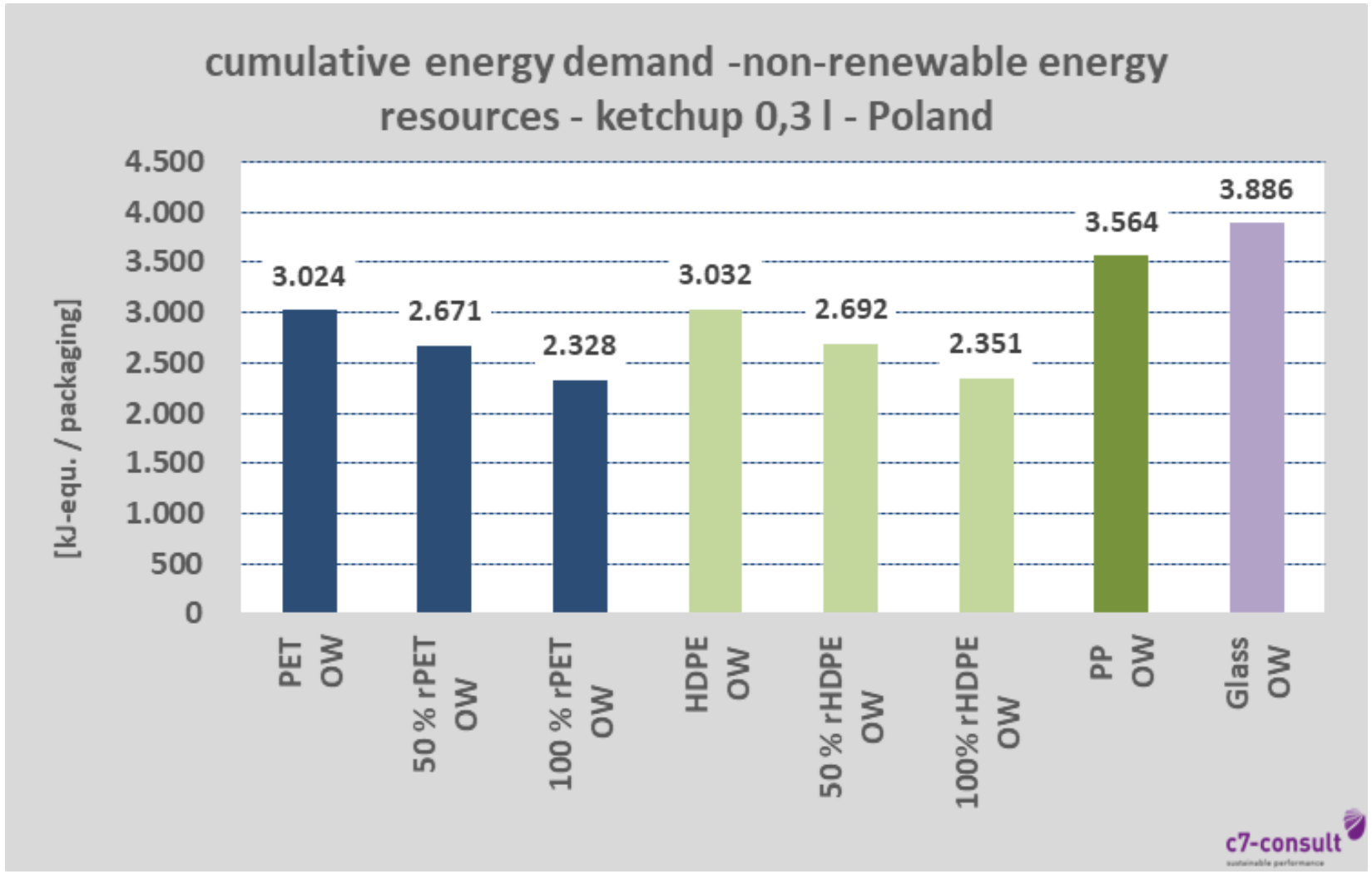
Ketchup


land use - ketchup 0,3 l - Poland
[dimensionless / packaging]
3.500
3.000
2.500
2.000
1.500
1.000
500
0
1.545
1.533
1.525
1.376
1.391
1.405
1.837
3.159
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

Ketchup


cumulative energy demand - renewable energy resources - ketchup 0,3 l - Poland
[kJ-equ. / packaging]
700
600
500
400
300
200
100
0
309
310
312
266
269
271
341
596
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

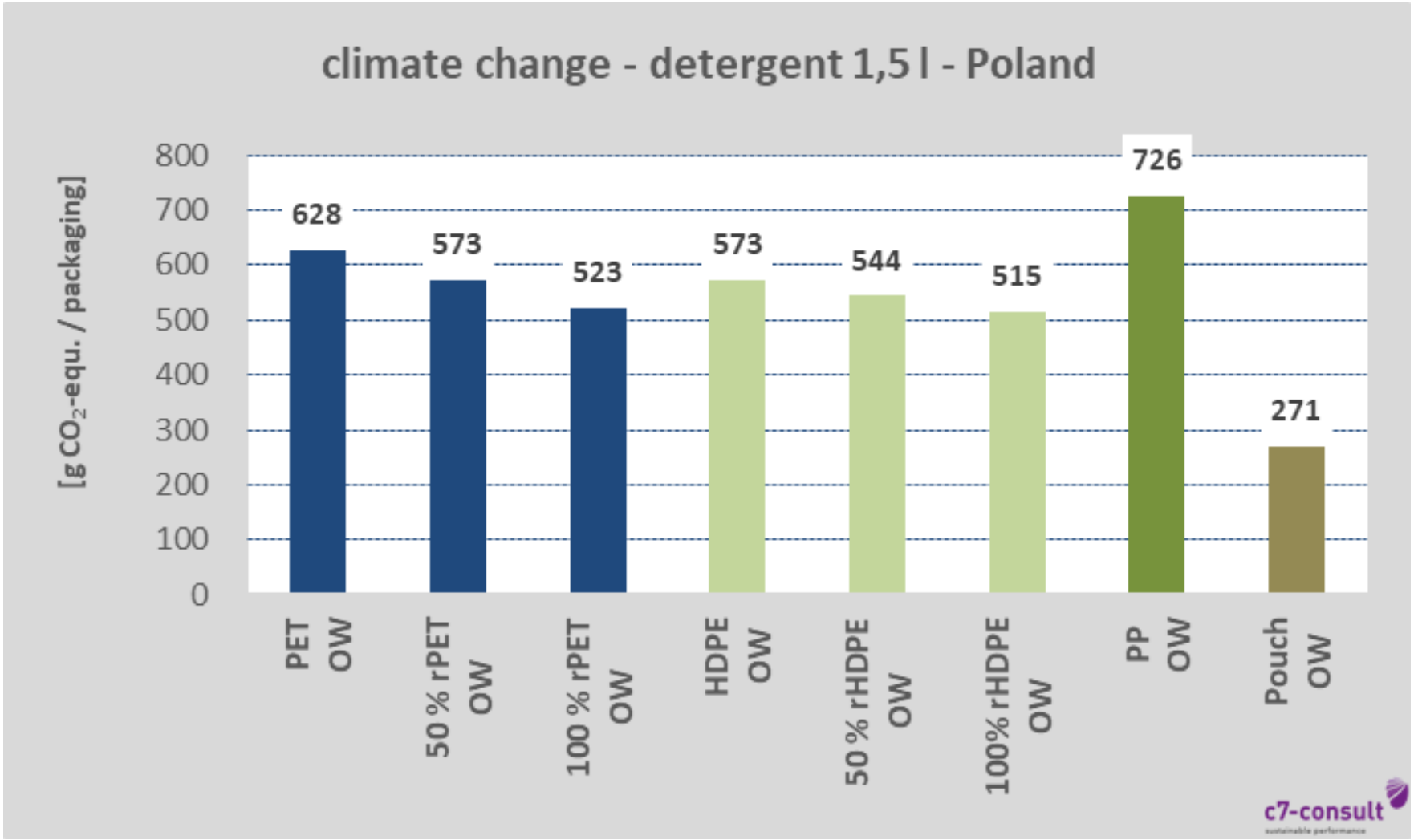
Ketchup


cumulative energy demand -non-renewable energy resources - ketchup 0,3 l - Poland
[kJ-equ. / packaging]
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
500
0
3.024
2.671
2.328
3.032
2.692
2.351
3.564
3.886
PET OW
50 % rPET OW
100 % rPET OW
HDPE OW
50 % rHDPE OW
100% rHDPE OW
PP OW
Glass OW
c7-consult

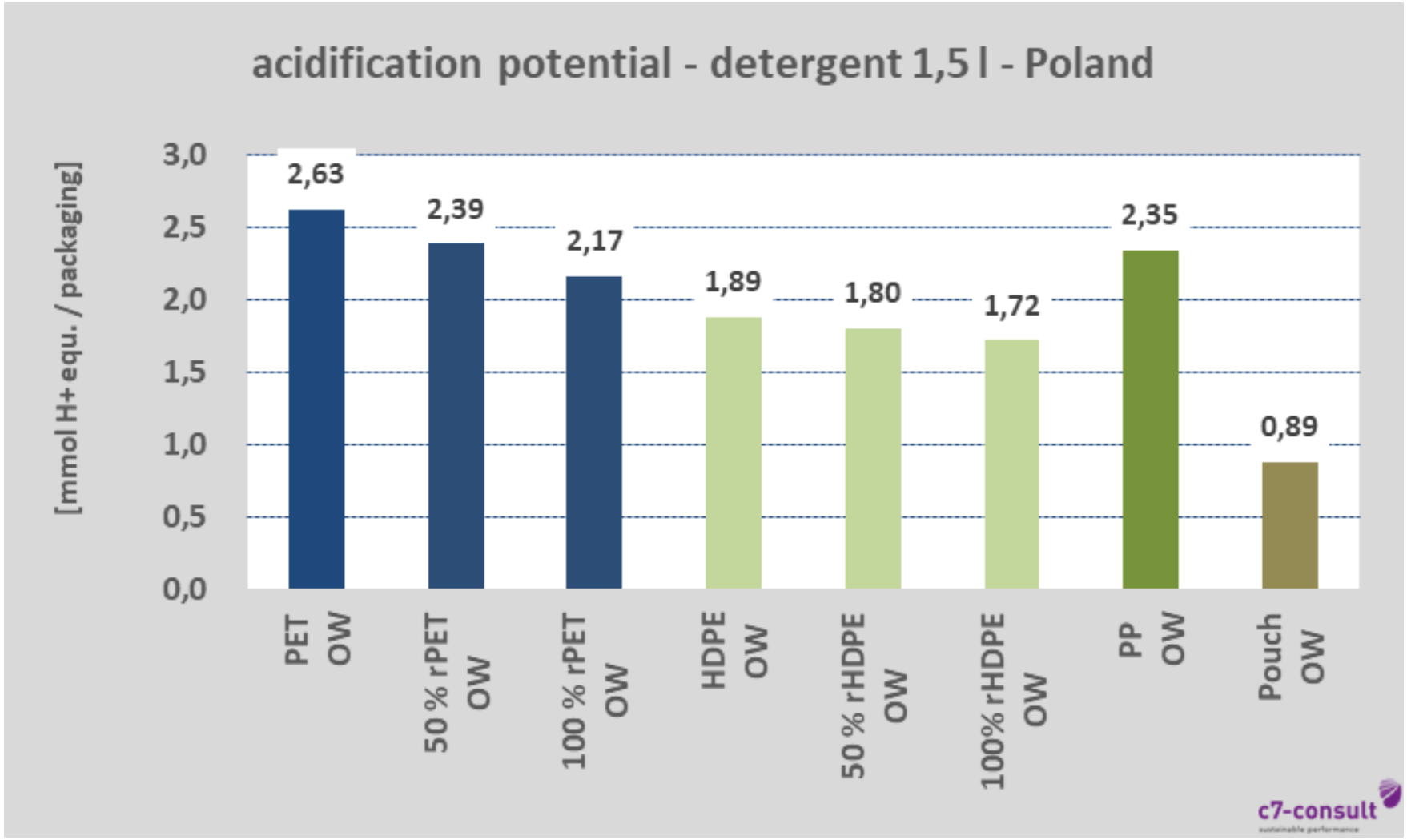
c7-consult
sustainable performance

Results Liquid Detergent 1.5 l

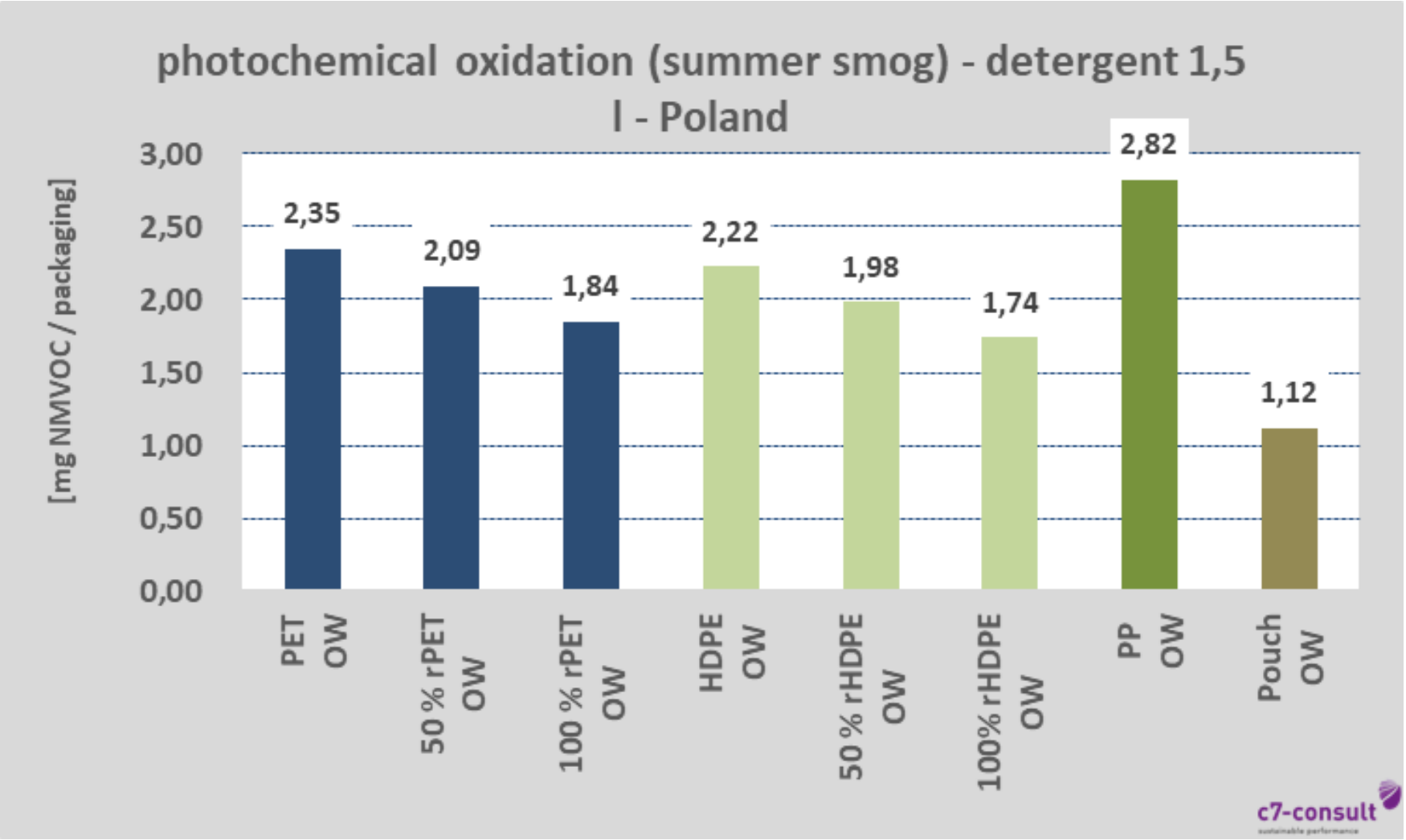
Liquid Detergent



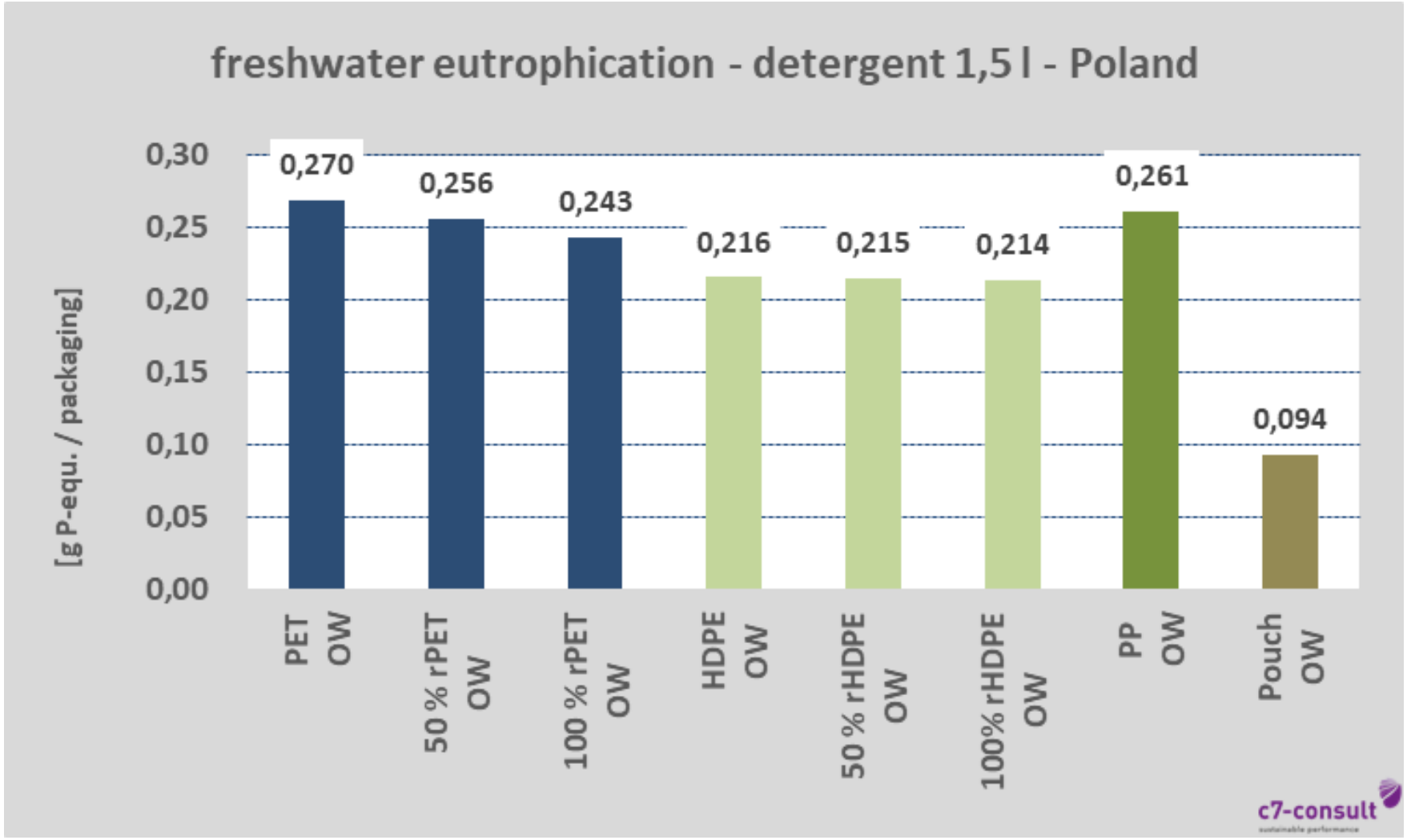
Liquid Detergent



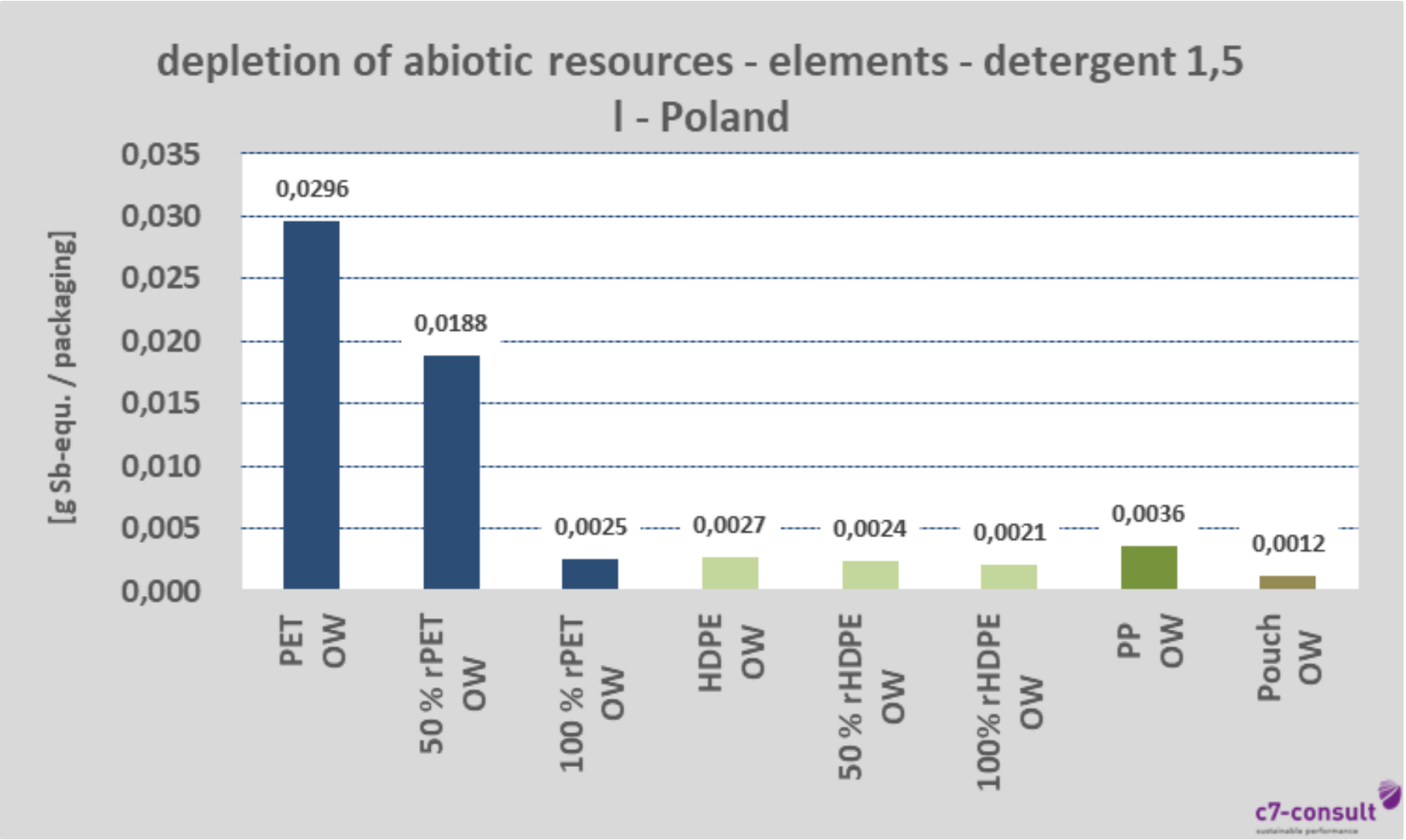
Liquid Detergent



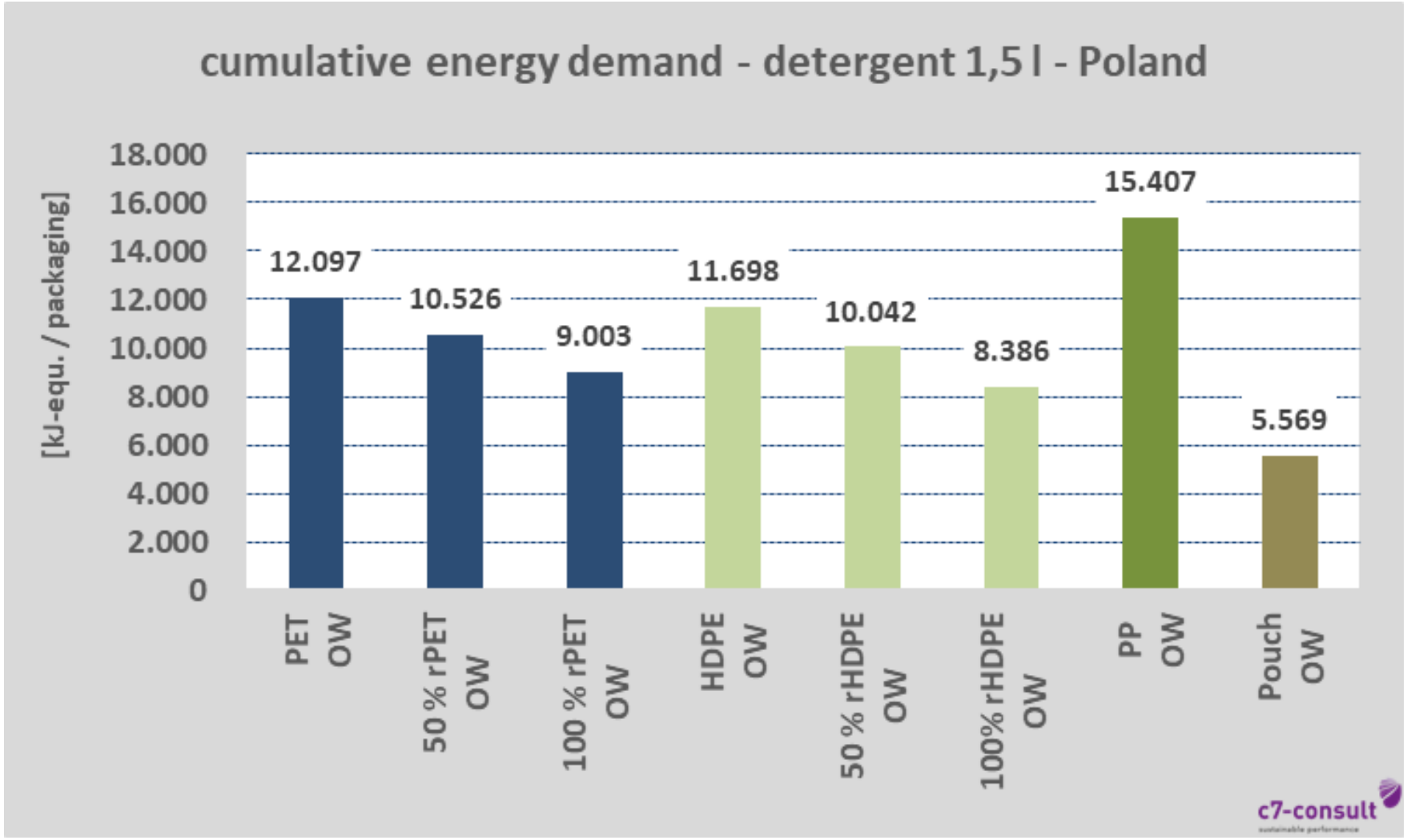
Liquid Detergent



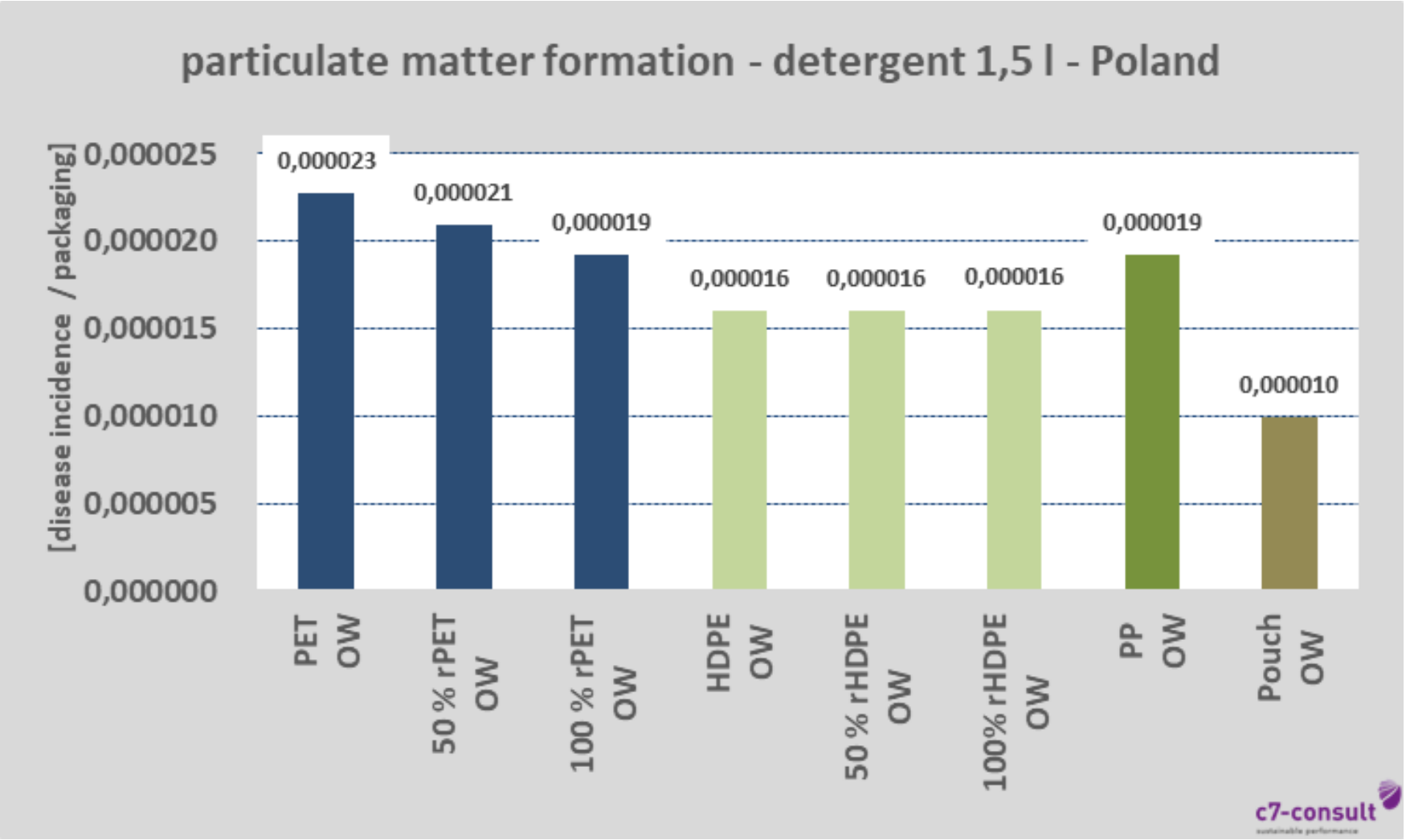
Liquid Detergent



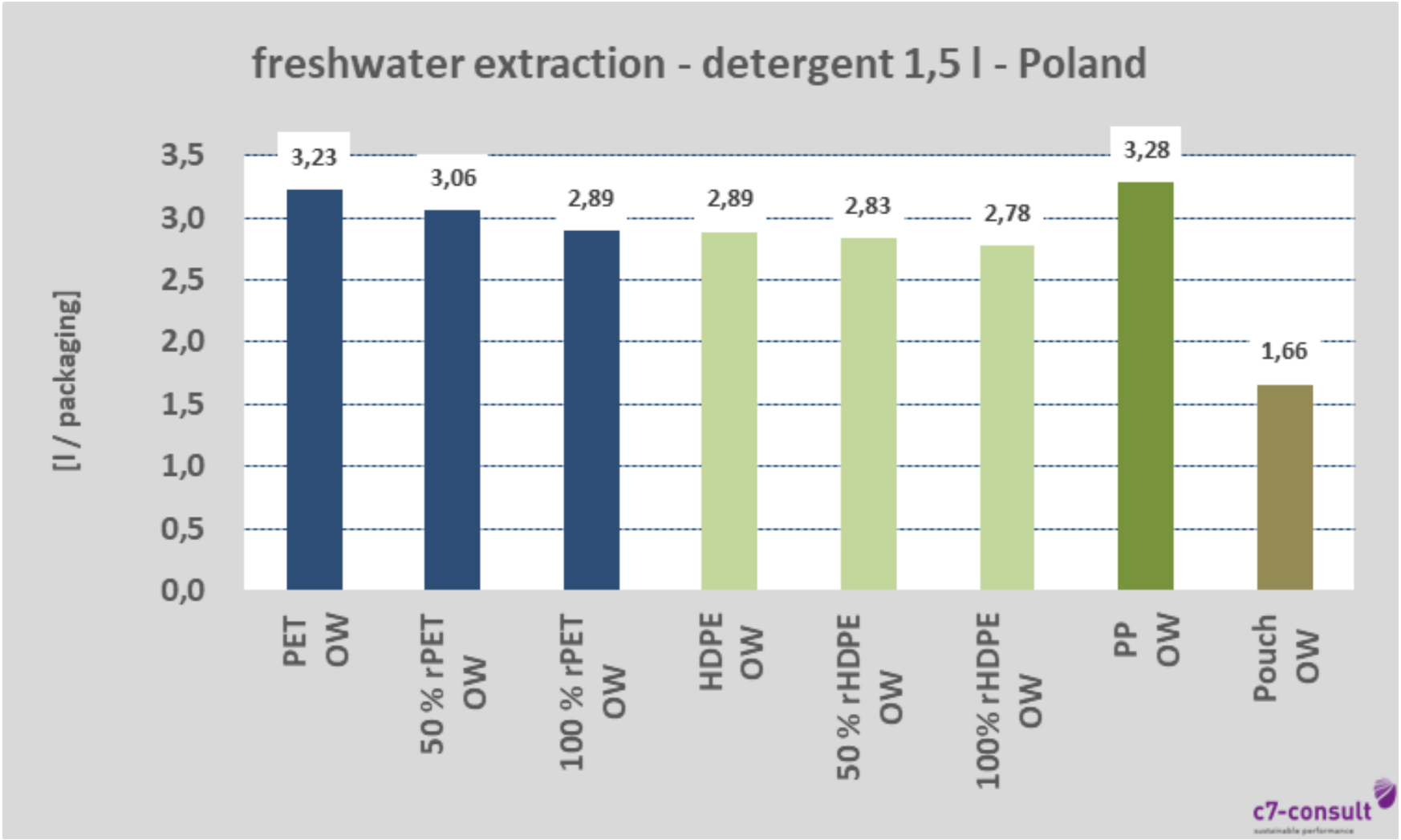
Liquid Detergent



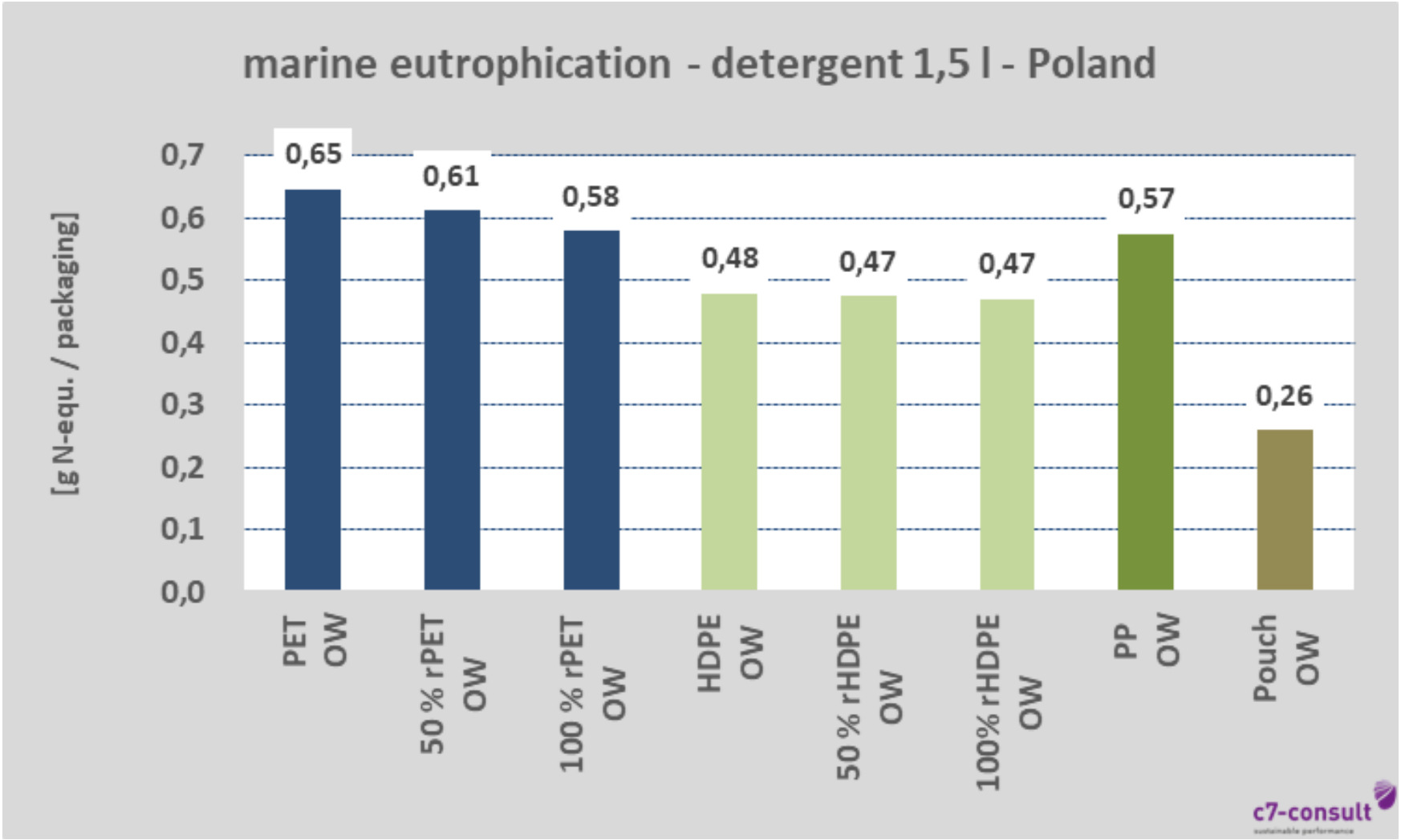
Liquid Detergent



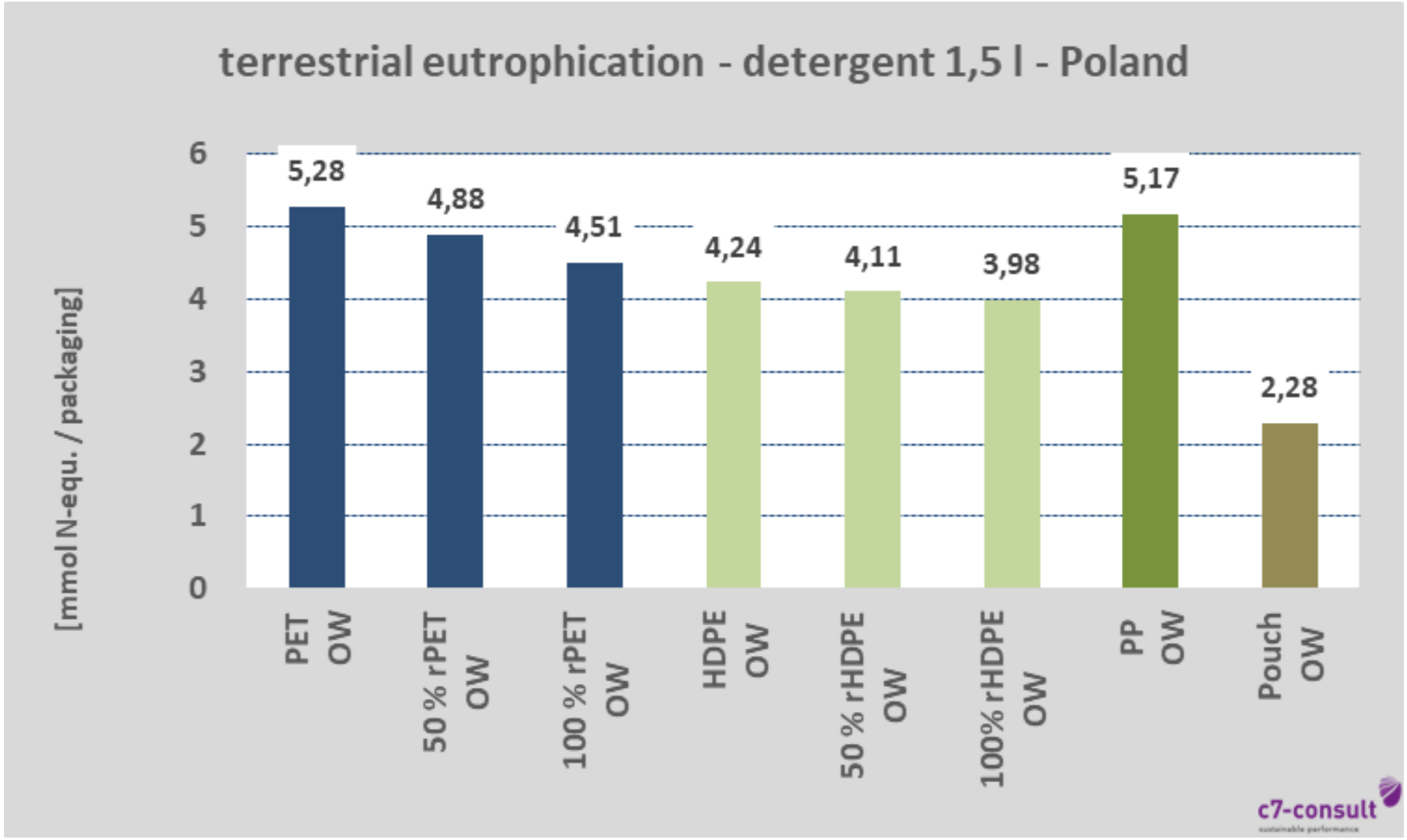
Liquid Detergent



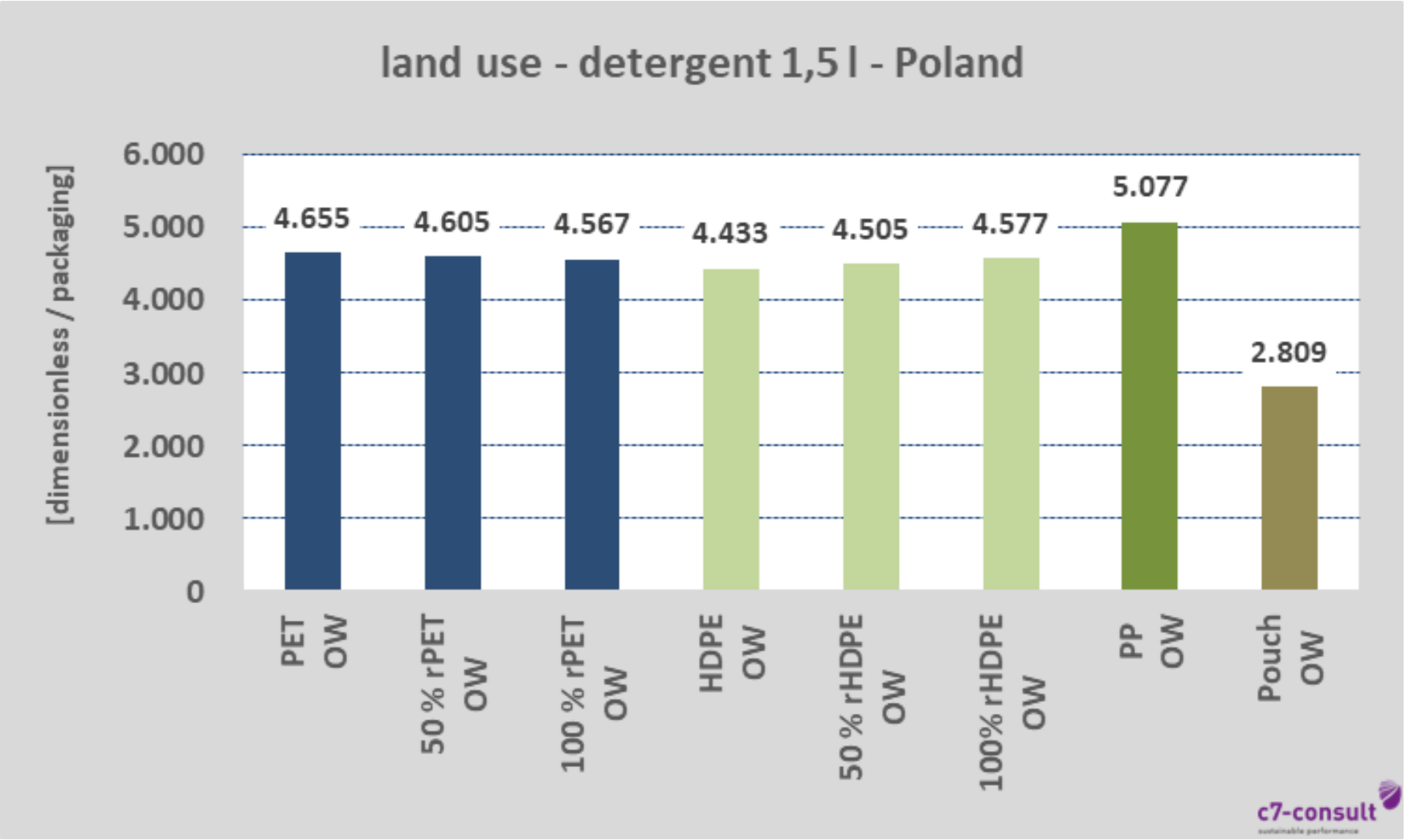
Liquid Detergent



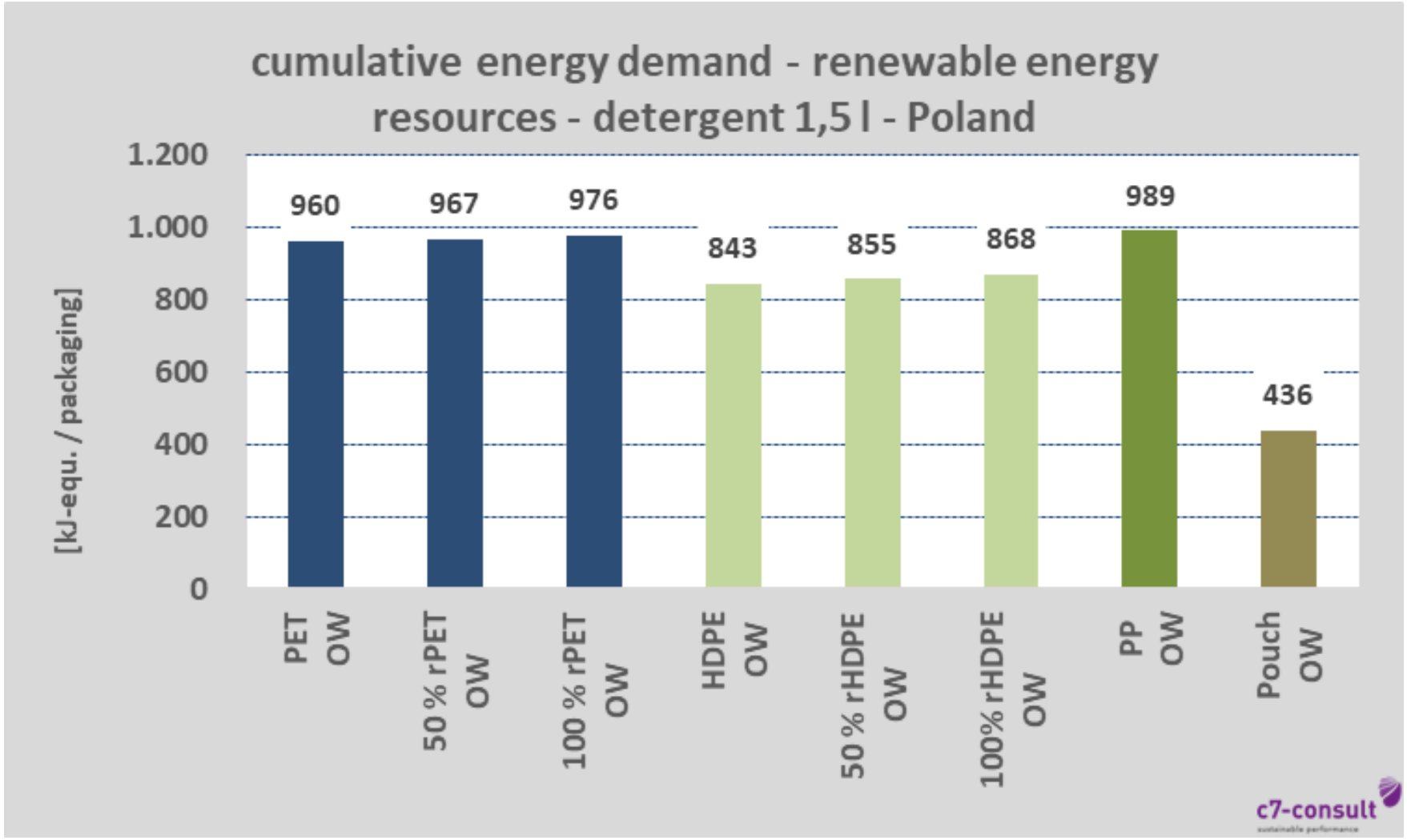
Liquid Detergent



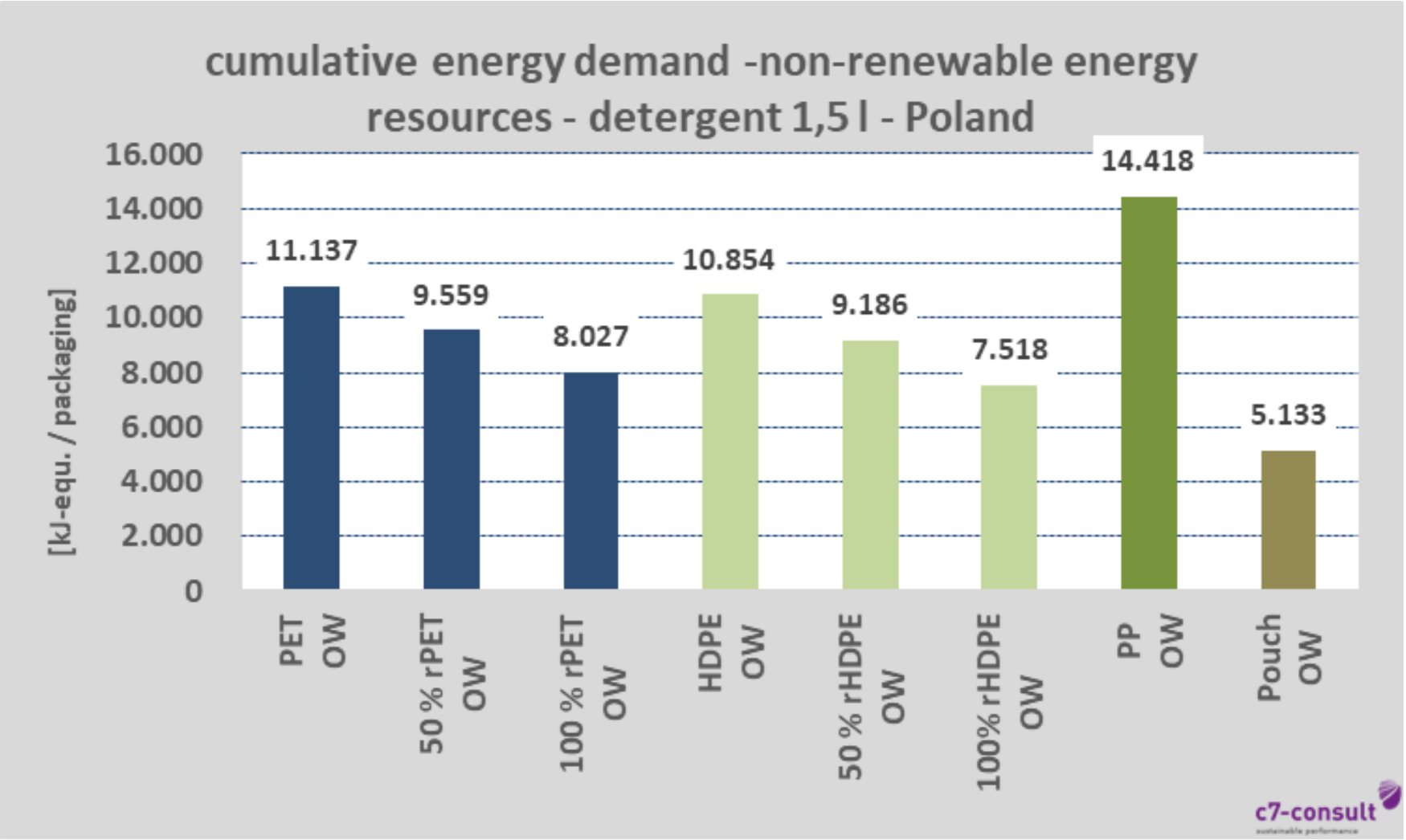
Liquid Detergent



Liquid Detergent



Liquid Detergent



c7-consult
sustainable performance

Summary

Summary - water

water	[/ 1,0 l]	PET OW	rPET 50% OW	rPET 100% OW	PET MW	rPET 50% MW	rPET 100% MW	Glass OW	Glass MW
climate change	[g CO_2-eq /]	182	167	152	106	104	102	552	144
acidification potential	[mmol H+ eq /]	0,73	0,66	0,60	0,36	0,35	0,34	4,29	0,58
photochemical oxidation (summer smog)	[mg NMVOC /]	0,70	0,62	0,55	0,47	0,46	0,45	2,74	0,69
freshwater eutrophication	[g P-eq /]	0,073	0,069	0,065	0,027	0,026	0,026	0,079	0,027
marine eutrophication	[g N-eq /]	0,18	0,17	0,16	0,11	0,10	0,10	0,71	0,16
terrestrial eutrophication	[mmol N-eq /]	1,50	1,39	1,28	1,02	1,00	0,99	7,84	1,62
abiotic depletion potential: elements (ultimate reserves)	[mg Sb-eq /]	0,008	0,006	0,004	0,001	0,001	0,000	0,003	0,001
particulate matter formation	[disease incidence /]	0,0000068	0,0000063	0,0000057	0,0000064	0,0000063	0,0000062	0,0000622	0,0000120
water	[l /]	0,79	0,74	0,70	0,77	0,76	0,75	1,75	0,83
land use	[dimensionless /]	1.546	1.531	1.516	1.669	1.667	1.665	6.254	2.476
cumulative energy demand	[kJ-eq /]	3.556	3.120	2.684	2.020	1.964	1.908	9.655	2.568
cumulative energy demand - renewable energy resources	[kJ-eq /]	257	258	260	178	178	178	1.097	254
cumulative energy demand - non-renewable energy resources	[kJ-eq /]	3.300	2.862	2.424	1.843	1.786	1.730	8.558	2.313

Summary - milk

milk	[/ 1,0 l]	PET OW	rPET 50% OW	rPET 100% OW	HDPE	rHDPE 50%	rHDPE 100%	Glass OW	Glass MW	Carton
climate change	[g CO_2-eq /]	197	184	171	151	146	140	551	165	142
acidification potential	[mmol H+ eq /]	0,84	0,78	0,73	0,55	0,53	0,52	4,13	0,77	0,52
photochemical oxidation (summer smog)	[mg NMVOC /]	0,75	0,68	0,62	0,59	0,55	0,50	2,62	0,73	0,55
freshwater eutrophication	[g P-eq /]	0,083	0,079	0,076	0,058	0,058	0,058	0,106	0,039	0,054
marine eutrophication	[g N-eq /]	0,21	0,20	0,19	0,15	0,15	0,15	0,73	0,19	0,18
terrestrial eutrophication	[mmol N-eq /]	1,78	1,68	1,59	1,33	1,30	1,28	7,82	1,94	1,42
abiotic depletion potential: elements (ultimate reserves)	[mg Sb-eq /]	0,008	0,006	0,002	0,001	0,001	0,001	0,005	0,003	0,000
particulate matter formation	[disease incidence /]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
water	[l /]	1,06	1,02	0,98	0,88	0,87	0,86	2,67	1,01	1,57
land use	[dimensionless /]	1.725	1.713	1.703	1.662	1.675	1.689	6.502	2.602	2.540
cumulative energy demand	[kJ-eq /]	3.722	3.339	2.968	2.920	2.610	2.299	9.461	2.941	2.546
cumulative energy demand - renewable energy resources	[kJ-eq /]	305	307	309	272	274	277	1.216	313	432
cumulative energy demand - non-renewable energy resources	[kJ-eq /]	3.417	3.033	2.659	2.648	2.335	2.023	8.245	2.629	2.114

Summary - juice

c7-consult
sustainable performance

juice	[/ 0,5 l]	PET OW	rPET 50% OW	rPET 100% OW	Glass OW	Glass MW	Carton
climate change	[g CO_2-eq /]	197	180	163	600	160	179
acidification potential	[mmol H+ eq /]	0,81	0,73	0,65	4,68	0,70	0,63
photochemical oxidation (summer smog)	[mg NMVOC /]	0,75	0,67	0,59	2,97	0,76	0,70
freshwater eutrophication	[g P-eq /]	0,079	0,075	0,071	0,088	0,031	0,066
marine eutrophication	[g N-eq /]	0,19	0,18	0,17	0,77	0,18	0,22
terrestrial eutrophication	[mmol N-eq /]	1,59	1,47	1,34	8,51	1,81	1,72
abiotic depletion potential: elements (ultimate reserves)	[mg Sb-eq /]	0,009	0,007	0,004	0,003	0,001	0,001
particulate matter formation	[disease incidence /]	0,000	0,000	0,000	0,000	0,000	0,000
water	[l /]	0,70	0,65	0,60	2,03	0,92	2,09
land use	[dimensionless /]	1.452	1.435	1.418	6.742	2.863	3.007
cumulative energy demand	[kJ-eq /]	3.849	3.354	2.859	10.635	3.005	3.321
cumulative energy demand - renewable energy resources	[kJ-eq /]	246	247	249	1.254	372	579
cumulative energy demand - non-renewable energy resources	[kJ-eq /]	3.604	3.107	2.610	9.380	2.633	2.741

Summary - beer

beer	[/ 0,5 l]	PET OW	rPET 50% OW	rPET 100% OW	Glass OW	Glass MW	ALU can
climate change	[g CO_2-eq /]	189	170	153	348	83	113
acidification potential	[mmol H+ eq /]	0,82	0,74	0,66	2,67	0,36	0,58
photochemical oxidation (summer smog)	[mg NMVOC /]	0,69	0,60	0,52	1,70	0,38	0,42
freshwater eutrophication	[g P-eq /]	0,083	0,079	0,074	0,062	0,021	0,059
marine eutrophication	[g N-eq /]	0,18	0,17	0,16	0,46	0,09	0,11
terrestrial eutrophication	[mmol N-eq /]	1,50	1,37	1,24	4,96	0,93	0,99
abiotic depletion potential: elements (ultimate reserves)	[mg Sb-eq /]	0,010	0,006	0,001	0,002	0,001	0,000
particulate matter formation	[disease incidence /]	0,000	0,000	0,000	0,000	0,000	0,000
water	[l /]	0,65	0,60	0,54	1,61	0,70	0,57
land use	[dimensionless /]	1.276	1.259	1.245	4.151	1.490	1.020
cumulative energy demand	[kJ-eq /]	3.642	3.107	2.588	6.126	1.514	2.233
cumulative energy demand - renewable energy resources	[kJ-eq /]	261	263	266	786	178	450
cumulative energy demand - non-renewable energy resources	[kJ-eq /]	3.382	2.844	2.321	5.340	1.336	1.783

Summary - CSD

CSD	[/ 0,5 l]	PET OW	rPET 50% OW	rPET 100% OW	PET MW	rPET 50% MW	rPET 100% MW	Glass OW	Glass MW	ALU can
climate change	[g CO_2-eq /]	138	125	113	90	89	88	453	100	116
acidification potential	[mmol H+ eq /]	0,58	0,53	0,47	0,32	0,32	0,31	3,36	0,44	0,59
photochemical oxidation (summer smog)	[mg NMVOC /]	0,52	0,46	0,40	0,39	0,39	0,38	2,17	0,45	0,43
freshwater eutrophication	[g P-eq /]	0,058	0,055	0,052	0,027	0,027	0,027	0,087	0,027	0,059
marine eutrophication	[g N-eq /]	0,13	0,12	0,12	0,09	0,09	0,09	0,60	0,11	0,11
terrestrial eutrophication	[mmol N-eq /]	1,12	1,03	0,94	0,87	0,86	0,85	6,38	1,07	1,02
abiotic depletion potential: elements (ultimate reserves)	[mg Sb-eq /]	0,007	0,005	0,003	0,001	0,001	0,000	0,002	0,000	0,000
particulate matter formation	[disease incidence /]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
water	[l /]	0,49	0,45	0,41	0,84	0,84	0,83	2,38	0,87	0,57
land use	[dimensionless /]	1.010	997	985	1.183	1.182	1.181	5.407	1.592	1.055
cumulative energy demand	[kJ-eq /]	2.646	2.286	1.925	1.640	1.601	1.562	7.871	1.841	2.273
cumulative energy demand - renewable energy resources	[kJ-eq /]	173	174	175	112	112	112	1.071	236	451
cumulative energy demand - non-renewable energy resources	[kJ-eq /]	2.474	2.112	1.750	1.528	1.489	1.449	6.800	1.605	1.822

Summary - food

food	[/ 0,35 l]	PET OW	rPET 50% OW	rPET 100% OW	Glass OW	Fe can
climate change	[g CO_2-eq /]	201	190	179	324	316
acidification potential	[mmol H+ eq /]	0,79	0,74	0,69	2,14	1,59
photochemical oxidation (summer smog)	[mg NMVOC /]	0,79	0,74	0,69	1,48	1,12
freshwater eutrophication	[g P-eq /]	0,080	0,077	0,074	0,080	0,159
marine eutrophication	[g N-eq /]	0,22	0,21	0,20	0,42	0,35
terrestrial eutrophication	[mmol N-eq /]	1,78	1,70	1,62	4,36	3,79
abiotic depletion potential: elements (ultimate reserves)	[mg Sb-eq /]	0,007	0,004	0,001	0,006	0,043
particulate matter formation	[disease incidence /]	0,000	0,000	0,000	0,000	0,000
water	[l /]	1,42	1,38	1,35	2,21	2,52
land use	[dimensionless /]	2.022	2.011	2.003	4.090	3.001
cumulative energy demand	[kJ-eq /]	4.082	3.753	3.433	5.641	5.094
cumulative energy demand - renewable energy resources	[kJ-eq /]	408	409	411	778	648
cumulative energy demand - non-renewable energy resources	[kJ-eq /]	3.674	3.343	3.022	4.863	4.446

Summary - ketchup

c7-consult
sustainable performance

ketchup	[/ 0,3 l]	PET OW	rPET 50% OW	rPET 100% OW	HDPE	rHDPE 50%	rHDPE 100%	PP	Glass OW
climate change	[g CO_2-eq /]	171	159	147	157	151	145	187	254
acidification potential	[mmol H+ eq /]	0,69	0,63	0,58	0,50	0,49	0,47	0,60	1,78
photochemical oxidation (summer smog)	[mg NMVOC /]	0,65	0,60	0,54	0,62	0,57	0,52	0,75	1,21
freshwater eutrophication	[g P-eq /]	0,072	0,069	0,066	0,056	0,056	0,056	0,069	0,051
marine eutrophication	[g N-eq /]	0,19	0,18	0,17	0,14	0,14	0,14	0,17	0,33
terrestrial eutrophication	[mmol N-eq /]	1,50	1,41	1,32	1,21	1,18	1,16	1,50	3,49
abiotic depletion potential: elements (ultimate reserves)	[mg Sb-eq /]	0,007	0,004	0,001	0,001	0,001	0,001	0,001	0,002
particulate matter formation	[disease incidence /]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
water	[l /]	1,16	1,12	1,09	0,99	0,98	0,97	1,29	1,52
land use	[dimensionless /]	1.545	1.533	1.525	1.376	1.391	1.405	1.837	3.159
cumulative energy demand	[kJ-eq /]	3.333	2.981	2.640	3.298	2.960	2.622	3.905	4.482
cumulative energy demand - renewable energy resources	[kJ-eq /]	309	310	312	266	269	271	341	596
cumulative energy demand - non-renewable energy resources	[kJ-eq /]	3.024	2.671	2.328	3.032	2.692	2.351	3.564	3.886

Summary – liquid detergent

c7-consult
sustainable performance

liquid detergent	[/ 1,5 l]	PET OW	rPET 50% OW	rPET 100% OW	HDPE	rHDPE 50%	rHDPE 100%	PP	Pouch
climate change	[g CO_2-eq /]	628	573	523	573	544	515	726	271
acidification potential	[mmol H+ eq /]	2,63	2,39	2,17	1,89	1,80	1,72	2,35	0,89
photochemical oxidation (summer smog)	[mg NMVOC /]	2,35	2,09	1,84	2,22	1,98	1,74	2,82	1,12
freshwater eutrophication	[g P-eq /]	0,270	0,256	0,243	0,216	0,215	0,214	0,261	0,094
marine eutrophication	[g N-eq /]	0,65	0,61	0,58	0,48	0,47	0,47	0,57	0,26
terrestrial eutrophication	[mmol N-eq /]	5,28	4,88	4,51	4,24	4,11	3,98	5,17	2,28
abiotic depletion potential: elements (ultimate reserves)	[mg Sb-eq /]	0,030	0,019	0,003	0,003	0,002	0,002	0,004	0,001
particulate matter formation	[disease incidence /]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
water	[l /]	3,23	3,06	2,89	2,89	2,83	2,78	3,28	1,66
land use	[dimensionless /]	4.655	4.605	4.567	4.433	4.505	4.577	5.077	2.809
cumulative energy demand	[kJ-eq /]	12.097	10.526	9.003	11.698	10.042	8.386	15.407	5.569
cumulative energy demand - renewable energy resources	[kJ-eq /]	960	967	976	843	855	868	989	436
cumulative energy demand - non-renewable energy resources	[kJ-eq /]	11.137	9.559	8.027	10.854	9.186	7.518	14.418	5.133

THANK YOU
for your attention

c7-consult

sustainable performance

c7-consult e.U. **A-**2453 Sommerein, Lindau 21 **T** +43 2168 62 861 **E** office@c7-consult.at **W** www.c7-consult.at

MEMBER OF TEAM ZF