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Review

End-of-Life Options for Bio-Based Plastics in a Circular Economy—Status Quo and Potential from a Life Cycle Assessment Perspective

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Supplementary information

Table S1. Overview identified publications without absolute values.

Bio-Based Plastic	End-of-Life Options										Source
	MR	CR	SbR	IC	D fS	IwER	InoER	AD	LFnoER	LFwER	
TPS				X [1]							Razza et al. 2010 [1]
PLA				X		X					Vercalsteren et al. 2010 [2]
PLA, TPS	X			X		X		X			Piemonte 2011 [3]
PLA	X			X							Piemonte & Gironi 2011 [4]
PLA				X					X		Shen 2011 [5]
PHB								X			Rostkowski et al. 2012 [6]
PLA		X									Tecchio et al. 2012 [7]
Bio-PE						X					Liptow & Tillman 2012 [8]
Bio-PE, PLA	X					X					Detzel et al. 2012 [9]

[1] No industrial composting, but rather degradation in soil (mulch film product application).

MR: Mechanical Recycling, CR: Chemical Recycling, SbR: Solvent based recycling, IC: Industrial Composting, DfS: Direct fuel substitution in plants[1], IwER: Incineration with Energy recovery, InoER: Incineration without energy recovery, AD: Anaerobic Digestion, LFnoER: Landfill without energy recovery, LFwER: Landfilling with energy recovery.

[1]: Describes the energetic utilization of selected waste materials with recoverable calorific value which are used outside a waste incineration plant as substitute for fossil fuels in e.g. cement plants, lime plants, coal fired power plants.

Table S2. Bio-based plastic demand.

Bio-Based Plastic	Global Demand in Tonnes [1]
TPS	18,179,760.00
PLA	19,134,700.00
PHA	42,038,900.00
Bio-based PE	72,388,760.00
Bio-based PET	9,675,050.00

[1]: calculated based on the method described in figure 2.

Table S3. Results of the literature review (87 scenarios).

Scenario NR.	Source	Bio-based plastic	End-of-life Option	CED per kg (MJ)	GWP per kg (kg CO_2-eq.)	EP per kg (kg PO_4-eq.)	AP per kg (kg SO_2eq.)	POCP per kg (kgC_2H_4 -eq.)	ODP per kg (kgCFC-11-eq.)
1	Hottle et al.	Bio-HDPE	MR	n/a	−1.060	5.10E-04	2.10E-03	1.18E-01	2.91E-08
2	Hottle et al.	Bio-HDPE	LFnoER	n/a	0.150	6.00E-05	3.00E-04	8.00E-03	5.90E-09
3	Hottle et al.	Bio-LDPE	MR	n/a	−1.096	4.10E-04	1.90E-03	1.16E-01	2.70E-08
4	Hottle et al.	Bio-LDPE	LFnoER	n/a	0.140	6.00E-05	3.00E-04	8.00E-03	6.00E-09
5	Hottle et al.	Bio-PET	MR	n/a	−1.930	8.00E-05	-3.40E-03	3.60E-02	1.28E-08
6	Hottle et al.	Bio-PET	LFnoER	n/a	0.110	1.60E-04	3.00E-04	8.00E-03	5.80E-09
7	Hottle et al.	PLA	LFnoER	n/a	2.810	1.65E-04	3.36E-04	1.11E-02	5.82E-09
8	Hottle et al.	PLA	LFnoER	n/a	0.045	1.62E-04	2.78E-04	7.94E-03	5.82E-09
9	Hottle et al.	PLA	IC	n/a	0.308	9.68E-05	1.25E-03	1.38E-02	3.72E-09
10	Hottle et al.	PLA	IC	n/a	0.308	9.68E-05	1.25E-03	1.38E-02	3.72E-09

11	Hottle et al.	TPS	LFnoER	n/a	1.250	1.89E-03	4.51E-04	8.47E-03	6.08E-09
12	Hottle et al.	TPS	IC	n/a	0.283	9.68E-05	1.25E-03	1.38E-02	3.72E-09
13	Suwanmanee et al.	PLA	LFwER	n/a	9.254	n/a	n/a	n/a	n/a
14	Suwanmanee et al.	PLA	IC	n/a	1.473	n/a	n/a	n/a	n/a
15	Rossi et al.	PLA	MR	n/a	−0.422	n/a	n/a	n/a	n/a
16	Rossi et al.	PLA	IC	n/a	1.740	n/a	n/a	n/a	n/a
17	Rossi et al.	PLA	AD	n/a	0.950	n/a	n/a	n/a	n/a
18	Rossi et al.	PLA	DfS	n/a	0.080	n/a	n/a	n/a	n/a
19	Rossi et al.	PLA	IwER	n/a	0.920	n/a	n/a	n/a	n/a
20	Rossi et al.	PLA	LFwER	n/a	0.130	n/a	n/a	n/a	n/a
21	Rossi et al.	TPS	MR	n/a	−0.550	n/a	n/a	n/a	n/a
22	Rossi et al.	TPS	IC	n/a	1.830	n/a	n/a	n/a	n/a
23	Rossi et al.	TPS	AD	n/a	0.870	n/a	n/a	n/a	n/a
24	Rossi et al.	TPS	DfS	n/a	0.260	n/a	n/a	n/a	n/a
25	Rossi et al.	TPS	IwER	n/a	1.070	n/a	n/a	n/a	n/a
26	Rossi et al.	TPS	LFwER	n/a	6.790	n/a	n/a	n/a	n/a
27	Rossi et al.	PLA	MR	n/a	0.610	n/a	n/a	n/a	n/a
28	Rossi et al.	PLA	IC	n/a	1.950	n/a	n/a	n/a	n/a
29	Rossi et al.	PLA	AD	n/a	2.220	n/a	n/a	n/a	n/a
30	Rossi et al.	PLA	DfS	n/a	1.930	n/a	n/a	n/a	n/a
31	Rossi et al.	PLA	InoER	n/a	1.880	n/a	n/a	n/a	n/a
32	Rossi et al.	TPS	MR	n/a	0.590	n/a	n/a	n/a	n/a
33	Rossi et al.	TPS	IC	n/a	2.040	n/a	n/a	n/a	n/a
34	Rossi et al.	TPS	AD	n/a	2.250	n/a	n/a	n/a	n/a
35	Rossi et al.	TPS	DfS	n/a	2.030	n/a	n/a	n/a	n/a
36	Rossi et al.	TPS	InoER	n/a	1.990	n/a	n/a	n/a	n/a
37	Rossi et al.	TPS	LFnoER	n/a	7.000	n/a	n/a	n/a	n/a
38	Gironi & Piemonte	PLA	IwER	−6.631	1.410	n/a	n/a	n/a	n/a
39	Gironi & Piemonte	PLA	LFwER	−2.451	4.664	n/a	n/a	n/a	n/a
40	Gironi & Piemonte	PLA	IC	0.385	2.574	n/a	n/a	n/a	n/a
41	Gironi & Piemonte	PLA	MR	−47.213	0.370	n/a	n/a	n/a	n/a

42	Khoo et al.	PHA	LFnoER	n/a	2.769	n/a	n/a	n/a	n/a
43	Khoo et al.	PHA	IwER	n/a	0.554	n/a	n/a	n/a	n/a
44	Khoo et al.	PHA	IC	n/a	0.365	n/a	n/a	n/a	n/a
45	Changwichan et al.	PLA	IC	n/a	2.767	1.53E-03	2.46E-02	n/a	n/a
46	Changwichan et al.	PLA	MR	n/a	0.180	1.53E-03	1.61E-02	n/a	n/a
47	Changwichan et al.	PLA	IwER	n/a	2.949	1.51E-03	2.29E-02	n/a	n/a
48	Changwichan et al.	PLA	IC	n/a	3.003	1.11E-03	2.12E-02	n/a	n/a
49	Changwichan et al.	PLA	MR	n/a	0.414	1.14E-03	1.26E-02	n/a	n/a
50	Changwichan et al.	PLA	IwER	n/a	3.200	1.11E-03	1.95E-02	n/a	n/a
51	Changwichan et al.	PHA	IC	n/a	1.620	1.25E-03	2.01E-02	n/a	n/a
52	Changwichan et al.	PHA	MR	n/a	−0.299	1.25E-03	1.40E-02	n/a	n/a
53	Changwichan et al.	PHA	IwER	n/a	1.756	1.23E-03	1.88E-02	n/a	n/a
54	Changwichan et al.	PHA	IC	n/a	1.960	7.31E-04	1.30E-02	n/a	n/a
55	Changwichan et al.	PHA	MR	n/a	0.122	7.53E-04	6.90E-03	n/a	n/a
56	Changwichan et al.	PHA	IwER	n/a	2.096	7.42E-04	1.18E-02	n/a	n/a
57	Changwichan et al.	PBS	IC	n/a	0.261	1.28E-03	1.70E-02	n/a	n/a
58	Changwichan et al.	PBS	MR	n/a	−1.825	1.30E-03	1.05E-02	n/a	n/a
59	Changwichan et al.	PBS	IwER	n/a	0.405	1.28E-03	1.57E-02	n/a	n/a
60	Changwichan et al.	PBS	IC	n/a	0.232	8.70E-04	1.05E-02	n/a	n/a
61	Changwichan et al.	PBS	MR	n/a	−1.854	8.92E-04	3.89E-03	n/a	n/a
62	Changwichan et al.	PBS	IwER	n/a	0.376	8.70E-04	9.15E-03	n/a	n/a

63	Choi et al.	PLA	IwER	n/a	3.181	n/a	n/a	n/a	n/a
64	Choi et al.	PLA	LFnoER	n/a	0.001	n/a	n/a	n/a	n/a
65	Papong et al.	PLA	IC	16.03	−0.592	n/a	n/a	n/a	n/a
66	Papong et al.	PLA	IwER	−99.03	−3.525	n/a	n/a	n/a	n/a
67	Papong et al.	PLA	LFnoER	19.53	68.325	n/a	n/a	n/a	n/a
68	Papong et al.	PLA	LFwER	−85.43	22.855	n/a	n/a	n/a	n/a
69	Papong et al.	PLA	CR	−49.33	−1.183	n/a	n/a	n/a	n/a
70	Cosate de Andrade et al.	PLA	MR	4	0.329	n/a	n/a	n/a	n/a
71	Cosate de Andrade et al.	PLA	CR	9	0.888	n/a	n/a	n/a	n/a
72	Cosate de Andrade et al.	PLA	IC	43	3.025	n/a	n/a	n/a	n/a
73	Maga et al.	PLA	MR	−21.544	−0.786	n/a	-3.42E-03	-2.75E-03	-5.00E-10
74	Maga et al.	PLA	MR	−25.013	−0.893	n/a	-3.97E-03	-3.16E-03	0.00E+00
75	Maga et al.	PLA	CR	43.543	−1.488	n/a	-7.00E-03	-2.14E-03	-1.03E-09
76	Maga et al.	PLA	SbR	−43.182	−1.519	n/a	-7.17E-03	-5.65E-03	2.10E-10
77	Maga et al.	PLA	IwER	−2.601	−0.403	n/a	3.34E-04	3.19E-04	2.00E-10
78	Maga et al.	PLA	IwER	−10.380	−0.698	n/a	-8.20E-04	-5.60E-04	0.00E+00
79	Ingrao et al.	PLA	IC	n/a	0.215	n/a	n/a	n/a	n/a
80	Hermann et al.	Bio-PE	IwER	n/a	1.700	n/a	n/a	n/a	n/a
81	Hermann et al.	Bio-PE	LFwER	n/a	0.100	n/a	n/a	n/a	n/a
82	Hermann et al.	Bio-PE	IwER	n/a	1.750	n/a	n/a	n/a	n/a
83	Hermann et al.	Bio-PE	LFwER	n/a	0.119	n/a	n/a	n/a	n/a
84	Hermann et al.	PLA	IwER	n/a	1.211	n/a	n/a	n/a	n/a
85	Hermann et al.	PLA	LFwER	n/a	0.974	n/a	n/a	n/a	n/a
86	Hermann et al.	PLA	IC	n/a	2.000	n/a	n/a	n/a	n/a

87	Hermann et al.	PLA	AD	n/a	0.992	n/a	n/a	n/a	n/a

Table S4. Average, minimum and maximum values of the literature review per bio-based plastic type and end-of-life option.

Bio-based plastics	End-of-life option	CED per kg (MJ)	GWP per kg (kg CO2-eq.)	GWP (incl. Biogenic carbon) per kg (kg CO2-eq.)	EP per kg (kg PO4-eq.)	Terrestrial Eutrophication per kg (Mol N-eq.)	Marine Eutrophication per kg (kg N-eq.)	Freshwater Eutrophication per kg (kg P-eq.)	AP per kg (kg SO2-eq.)	POCP per kg (kg C2H4-eq.)	ODP per kg (kg CFC-11-eq.)
Bio-HDPE min	MR		-1.06E+00		5.10E-04				2.10E-03	1.18E-01	2.91E-08
Bio-HDPE max	MR		-1.06E+00		5.10E-04				2.10E-03	1.18E-01	2.91E-08
Bio-HDPE	MR		-1.06E+00		5.10E-04				2.10E-03	1.18E-01	2.91E-08
Bio-HDPE min	CR										
Bio-HDPE max	CR										
Bio-HDPE average	CR										
Bio-HDPE min	SbR										
Bio-HDPE max	SbR										
Bio-HDPE average	SbR										
Bio-HDPE min	IC										
Bio-HDPE max	IC										
Bio-HDPE average	IC										
Bio-HDPE min	DfS										
Bio-HDPE max	DfS										
Bio-HDPE average	DfS										
Bio-HDPE min	IwER		1.50E-01		6.00E-05				3.00E-04	8.00E-03	5.90E-09
Bio-HDPE max	IwER		1.50E-01		6.00E-05				3.00E-04	8.00E-03	5.90E-09
Bio-HDPE average	IwER		1.50E-01		6.00E-05				3.00E-04	8.00E-03	5.90E-09
Bio-HDPE min	InoER										
Bio-HDPE max	InoER										
Bio-HDPE average	InoER										
Bio-HDPE min	AD										
Bio-HDPE max	AD										
Bio-HDPE average	AD										
Bio-HDPE min	LFnoER										
Bio-HDPE max	LFnoER										
Bio-HDPE average	LFnoER										
Bio-HDPE min	LFwER										
Bio-HDPE max	LFwER										
Bio-HDPE average	LFwER										

Bio-LDPE min	MR		-1.10E+00		4.10E-04				1.90E-03	1.16E-01	2.70E-08
Bio-LDPE max	MR		-1.10E+00		4.10E-04				1.90E-03	1.16E-01	2.70E-08
Bio-LDPE	MR		-1.10E+00		4.10E-04				1.90E-03	1.16E-01	2.70E-08
Bio-LDPE min	CR										
Bio-LDPE max	CR										
Bio-LDPE average	CR										
Bio-LDPE min	SbR										
Bio-LDPE max	SbR										
Bio-LDPE average	SbR										
Bio-LDPE min	IC										
Bio-LDPE max	IC										
Bio-LDPE average	IC										
Bio-LDPE min	DfS										
Bio-LDPE max	DfS										
Bio-LDPE average	DfS										
Bio-LDPE min	IwER										
Bio-LDPE max	IwER										
Bio-LDPE average	IwER										
Bio-LDPE min	InoER										
Bio-LDPE max	InoER										
Bio-LDPE average	InoER										
Bio-LDPE min	AD										
Bio-LDPE max	AD										
Bio-LDPE average	AD										
Bio-LDPE min	LFnoER		1.50E-01		6.00E-05				3.00E-04	8.00E-03	5.90E-09
Bio-LDPE max	LFnoER		1.50E-01		6.00E-05				3.00E-04	8.00E-03	5.90E-09
Bio-LDPE average	LFnoER		1.50E-01		6.00E-05				3.00E-04	8.00E-03	5.90E-09
Bio-LDPE min	LFwER										
Bio-LDPE max	LFwER										
Bio-LDPE average	LFwER										
Bio-PE min	MR										
Bio-PE max	MR										
Bio-PE	MR										
Bio-PE min	CR										
Bio-PE max	CR										
Bio-PE average	CR										
Bio-PE min	SbR										
Bio-PE max	SbR										
Bio-PE average	SbR										
Bio-PE min	IC										
Bio-PE max	IC										
Bio-PE average	IC										

Bio-PE min	DfS										
Bio-PE max	DfS										
Bio-PE average	DfS										
Bio-PE min	IwER		1.70E+00								
Bio-PE max	IwER		1.75E+00								
Bio-PE average	IwER		1.73E+00								
Bio-PE min	InoER										
Bio-PE max	InoER										
Bio-PE average	InoER										
Bio-PE min	AD										
Bio-PE max	AD										
Bio-PE average	AD										
Bio-PE min	LFnoER										
Bio-PE max	LFnoER										
Bio-PE average	LFnoER										
Bio-PE min	LFwER		1.00E-01								
Bio-PE max	LFwER		1.19E-01								
Bio-PE average	LFwER		1.09E-01								
Bio-PET min	MR		-1.93E+00						-3.40E-03	3.60E-02	1.28E-08
Bio-PET max	MR		-1.93E+00						-3.40E-03	3.60E-02	1.28E-08
Bio-PET	MR		-1.93E+00						-3.40E-03	3.60E-02	1.28E-08
Bio-PET min	CR										
Bio-PET max	CR										
Bio-PET average	CR										
Bio-PET min	SbR										
Bio-PET max	SbR										
Bio-PET average	SbR										
Bio-PET min	IC										
Bio-PET max	IC										
Bio-PET average	IC										
Bio-PET min	DfS										
Bio-PET max	DfS										
Bio-PET average	DfS										
Bio-PET min	IwER										
Bio-PET max	IwER										
Bio-PET average	IwER										
Bio-PET min	InoER										
Bio-PET max	InoER										
Bio-PET average	InoER										
Bio-PET min	AD										
Bio-PET max	AD										
Bio-PET average	AD										

Bio-PET min	LFnoER		1.10E-01		1.60E-04				3.00E-04	8.00E-03	5.80E-09
Bio-PET max	LFnoER		1.10E-01		1.60E-04				3.00E-04	8.00E-03	5.80E-09
Bio-PET average	LFnoER		1.10E-01		1.60E-04				3.00E-04	8.00E-03	5.80E-09
Bio-PET min	LFwER										
Bio-PET max	LFwER										
Bio-PET average	LFwER										
PBS min	MR		-1.85E+00		8.92E-04				3.89E-03		
PBS max	MR		-1.82E+00		1.30E-03				1.05E-02		
PBS	MR		-1.84E+00		1.10E-03				7.17E-03		
PBS min	CR										
PBS max	CR										
PBS average	CR										
PBS min	SbR										
PBS max	SbR										
PBS average	SbR										
PBS min	IC		2.32E-01		8.70E-04				1.05E-02		
PBS max	IC		2.61E-01		1.28E-03				1.70E-02		
PBS average	IC		2.46E-01		1.08E-03				1.38E-02		
PBS min	DfS										
PBS max	DfS										
PBS average	DfS										
PBS min	IwER										
PBS max	IwER										
PBS average	IwER										
PBS min	InoER										
PBS max	InoER										
PBS average	InoER										
PBS min	AD										
PBS max	AD										
PBS average	AD										
PBS min	LFnoER										
PBS max	LFnoER										
PBS average	LFnoER										
PBS min	LFwER										
PBS max	LFwER										
PBS average	LFwER										
PHA min	MR		-2.99E-01		7.53E-04				6.90E-03		
PHA max	MR		1.22E-01		1.25E-03				1.40E-02		
PHA	MR		-8.85E-02		1.00E-03				1.04E-02		
PHA min	CR										
PHA max	CR										
PHA average	CR										

PHA min	SbR										
PHA max	SbR										
PHA average	SbR										
PHA min	IC		3.65E-01		7.31E-04				1.30E-02		
PHA max	IC		1.96E+00		1.25E-03				2.01E-02		
PHA average	IC		1.31E+00		9.89E-04				1.65E-02		
PHA min	DfS										
PHA max	DfS										
PHA average	DfS										
PHA min	IwER		5.54E-01		7.42E-04				1.18E-02		
PHA max	IwER		2.10E+00		1.23E-03				1.88E-02		
PHA average	IwER		1.47E+00		9.84E-04				1.53E-02		
PHA min	InoER										
PHA max	InoER										
PHA average	InoER										
PHA min	AD										
PHA max	AD										
PHA average	AD										
PHA min	LFnoER		2.77E+00								
PHA max	LFnoER		2.77E+00								
PHA average	LFnoER		2.77E+00								
PHA min	LFwER										
PHA max	LFwER										
PHA average	LFwER										
PLA min	MR	-4.72E+01	-8.93E-01	-5.70E-02	1.14E-03	-1.22E-02	-1.31E-03	-1.00E-05	-3.97E-03	-3.16E-03	-5.00E-10
PLA max	MR	4.00E+00	6.10E-01	-1.27E-02	1.53E-03	-1.07E-02	-1.14E-03	-4.80E-06	1.61E-02	-2.75E-03	
PLA	MR	-2.24E+01	-2.48E-02	-3.49E-02	1.34E-03	-1.14E-02	-1.22E-03	-7.40E-06	5.33E-03	-2.95E-03	-2.50E-10
PLA min	CR	-4.93E+01	-1.49E+00	9.90E-02		-2.26E-02	-2.69E-03	-1.20E-05	-7.00E-03	-2.14E-03	-1.03E-09
PLA max	CR	4.35E+01	8.88E-01	9.90E-02		-2.26E-02	-2.69E-03	-1.20E-05	-7.00E-03	-2.14E-03	-1.03E-09
PLA average	CR	1.07E+00	-5.94E-01	9.90E-02		-2.26E-02	-2.69E-03	-1.20E-05	-7.00E-03	-2.14E-03	-1.03E-09
PLA min	SbR	-4.32E+01	-1.52E+00	1.66E-02		-2.21E-02	-2.38E-03	-1.00E-05	-7.17E-03	-5.65E-03	2.10E-10
PLA max	SbR	-4.32E+01	-1.52E+00	1.66E-02		-2.21E-02	-2.38E-03	-1.00E-05	-7.17E-03	-5.65E-03	2.10E-10
PLA average	SbR	-4.32E+01	-1.52E+00	1.66E-02		-2.21E-02	-2.38E-03	-1.00E-05	-7.17E-03	-5.65E-03	2.10E-10
PLA min	IC	3.85E-01	-5.92E-01		9.68E-05				1.25E-03	1.38E-02	3.72E-09
PLA max	IC	4.30E+01	3.03E+00		1.53E-03				2.46E-02	1.38E-02	3.72E-09
PLA average	IC	1.98E+01	1.56E+00		7.09E-04				1.21E-02	1.38E-02	3.72E-09
PLA min	DfS		8.00E-02								
PLA max	DfS		1.93E+00								
PLA average	DfS		1.01E+00								
PLA min	IwER	-9.90E+01	-3.53E+00	1.12E+00	1.11E-03	-1.95E-03	-2.30E-04	-1.62E-06	-8.20E-04	-5.60E-04	
PLA max	IwER	-2.60E+00	3.20E+00	1.17E+00	1.51E-03	1.52E-03	1.42E-04	-2.00E-07	2.29E-02	3.19E-04	2.00E-10
PLA average	IwER	-2.97E+01	9.16E-01	1.15E+00	1.31E-03	-2.15E-04	-4.40E-05	-9.10E-07	1.05E-02	-1.21E-04	1.00E-10

PLA min	InoER		1.88E+00								
PLA max	InoER		1.88E+00								
PLA average	InoER		1.88E+00								
PLA min	AD		9.50E-01								
PLA max	AD		2.22E+00								
PLA average	AD		1.39E+00								
PLA min	LFnoER	19.53	9.68E-04		1.62E-04				2.78E-04	7.94E-03	5.82E-09
PLA max	LFnoER	19.53	6.83E+01		1.65E-04				3.36E-04	1.11E-02	5.82E-09
PLA average	LFnoER	19.53	1.78E+01		1.64E-04				3.07E-04	9.52E-03	5.82E-09
PLA min	LFwER	-8.54E+01	1.30E-01								
PLA max	LFwER	-2.45E+00	2.29E+01								
PLA average	LFwER	-4.39E+01	7.58E+00								
TPS min	MR		-5.50E-01								
TPS max	MR		5.90E-01								
TPS	MR		2.00E-02								
TPS min	CR										
TPS max	CR										
TPS average	CR										
TPS min	SbR										
TPS max	SbR										
TPS average	SbR										
TPS min	IC		2.83E-01		9.68E-05				1.25E-03	1.38E-02	3.72E-09
TPS max	IC		2.04E+00		9.68E-05				1.25E-03	1.38E-02	3.72E-09
TPS average	IC		1.38E+00		9.68E-05				1.25E-03	1.38E-02	3.72E-09
TPS min	DfS		2.60E-01								
TPS max	DfS		2.03E+00								
TPS average	DfS		1.15E+00								
TPS min	IwER		1.07E+00								
TPS max	IwER		1.07E+00								
TPS average	IwER		1.07E+00								
TPS min	InoER		1.99E+00								
TPS max	InoER		1.99E+00								
TPS average	InoER		1.99E+00								
TPS min	AD		8.70E-01								
TPS max	AD		2.25E+00								
TPS average	AD		1.56E+00								
TPS min	LFnoER		1.25E+00		1.89E-03				4.51E-04	8.47E-03	6.08E-09
TPS max	LFnoER		7.00E+00		1.89E-03				4.51E-04	8.47E-03	6.08E-09
TPS average	LFnoER		4.13E+00		1.89E-03				4.51E-04	8.47E-03	6.08E-09
TPS min	LFwER		6.79E+00								
TPS max	LFwER		6.79E+00								
TPS average	LFwER		6.79E+00								

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