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The Future of Solar Fuels: When could they become competitive?

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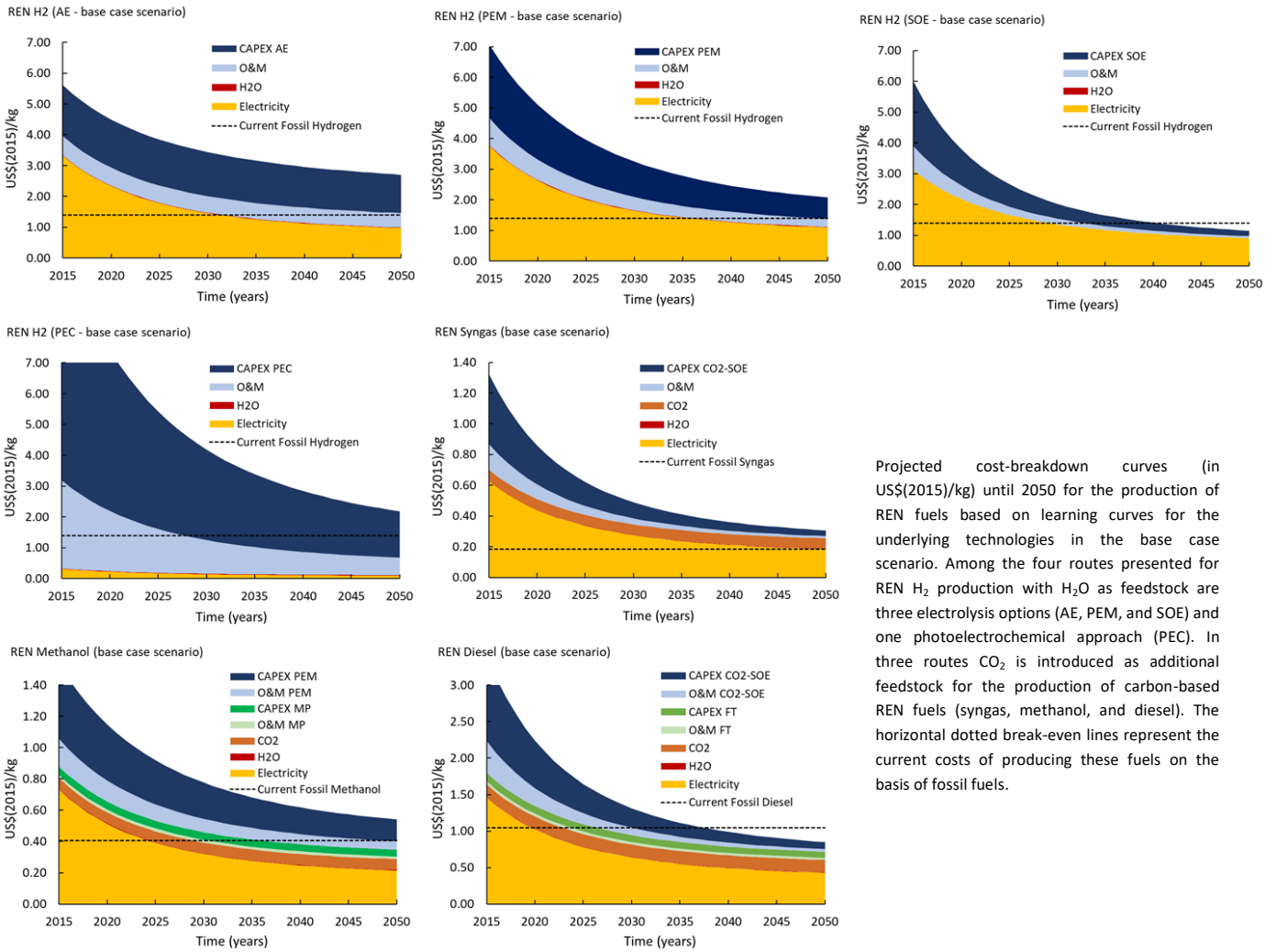
Table S1: Parameters for projecting learning curves

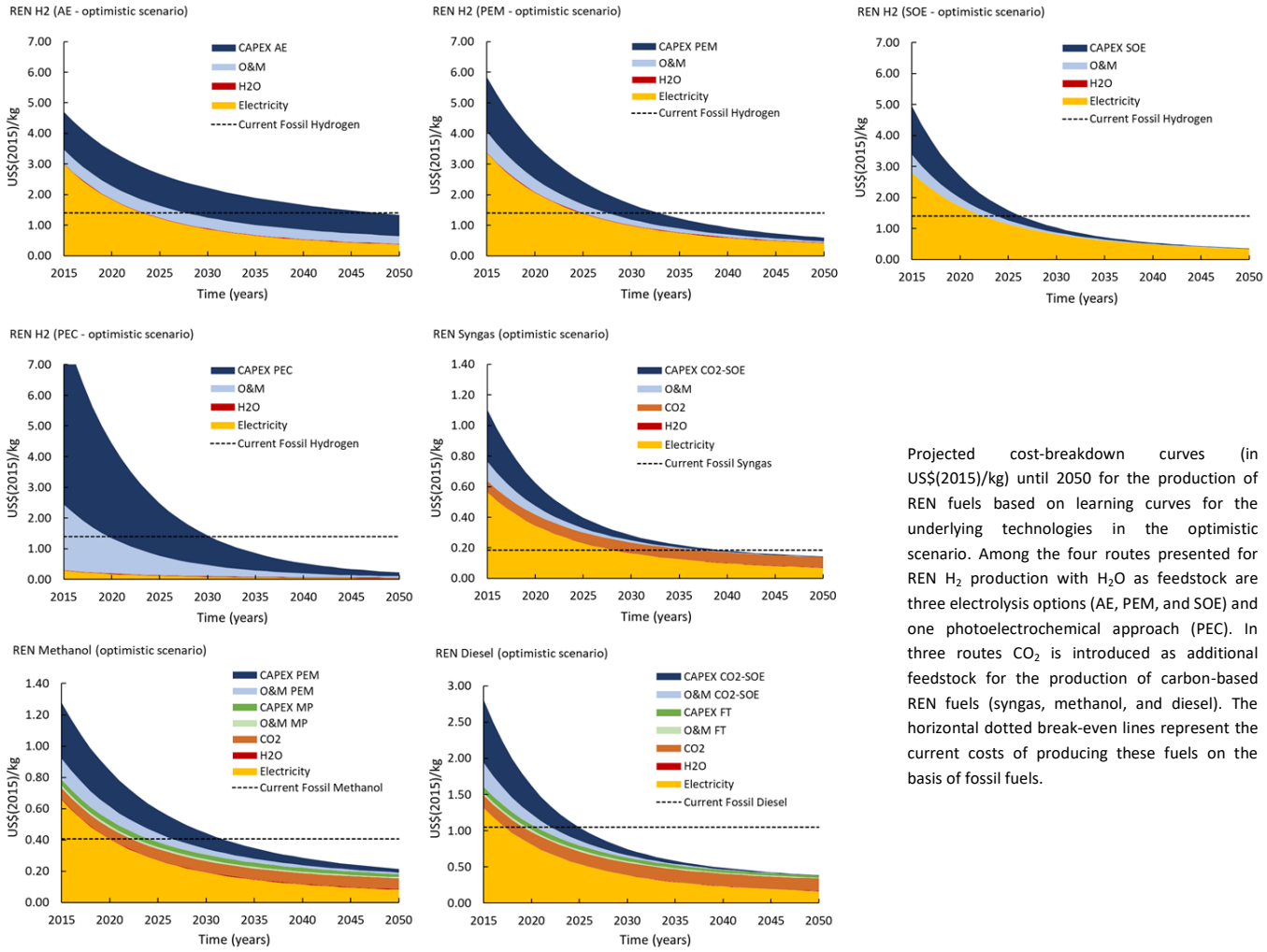
	Optimistic	Base	Conservative		Optimistic	Base	Conservative
AE				**CO2-SOE**			
CAPEX (2015$/kWe)	825	1100	1375	(2015$/kWe)	1613	2150	2688
LR	0.21	0.18	0.15	LR	0.30	0.27	0.24
CAGR (%)	5	4	3	CAGR (%)	38	33	28
DF	1	0.98	0.96	DF	0.99	0.96	0.93
PEM				**MP**			
CAPEX (2015$/kWe)	1125	1500	1875	(2015$/kWth)	450	600	750
LR	0.24	0.21	0.18	LR	0.13	0.10	0.07
CAGR (%)	26	21	16	CAGR (%)	12	7	2
DF	0.99	0.96	0.93	DF	0.99	0.96	0.93
SOE				**FT**			
CAPEX (2015$/kWe)	1500	2000	2500	(2015$/kWth)	450	600	750
LR	0.30	0.27	0.24	LR	0.15	0.10	0.03
CAGR (%)	38	33	28	CAGR (%)	18	13	8
DF	0.99	0.96	0.93	DF	0.99	0.96	0.93
PEC				**Solar PV**			
CAPEX (2015$/kWH2)	2250	3000	3750	(2015$/kWh)	0.057	0.063	0.070
LR	0.23	0.2	0.17	LR	0.25	0.23	0.21
CAGR (%)	40	30	20	CAGR (%)	30	25	20
DF	0.99	0.96	0.93	DF	0.96	0.94	0.92

Figure S1: Projected cost-breakdown curves for REN fuel production in the base case scenario



Projected cost-breakdown curves (in US$(2015)/kg) until 2050 for the production of REN fuels based on learning curves for the underlying technologies in the base case scenario. Among the four routes presented for REN H_2 production with H_2O as feedstock are three electrolysis options (AE, PEM, and SOE) and one photoelectrochemical approach (PEC). In three routes CO_2 is introduced as additional feedstock for the production of carbon-based REN fuels (syngas, methanol, and diesel). The horizontal dotted break-even lines represent the current costs of producing these fuels on the basis of fossil fuels.

Figure S2: Projected cost-breakdown curves for REN fuel production in the most optimistic scenario



Projected cost-breakdown curves (in US$(2015)/kg) until 2050 for the production of REN fuels based on learning curves for the underlying technologies in the optimistic scenario. Among the four routes presented for REN H_2 production with H_2O as feedstock are three electrolysis options (AE, PEM, and SOE) and one photoelectrochemical approach (PEC). In three routes CO_2 is introduced as additional feedstock for the production of carbon-based REN fuels (syngas, methanol, and diesel). The horizontal dotted break-even lines represent the current costs of producing these fuels on the basis of fossil fuels.