APPENDIX

TABLE A1
ELECTROLYZER MODEL PARAMETERS

Parameter	Value	Parameter	Value
Frequency Dead band ($\pm f_d$)	$\pm$15 mHz	Static Droop (R_{droop})	5%
Frequency Measurement delay (T_m)	0.1 s	Power & Current measurement delays (T_{me})	0.02 s
Limiters (RF_{min}/RF_{max})	0 /0.3 pu	Response delay (T_{dc})	0.1s
Current controller q-axis proportional gain (K_{piq})	1	PQ controller proportional gain (K_{pq})	1
Current controller q-axis integral gain (K_{iiq})	0.01	PQ controller integral gain (K_{iq})	0.01
Current controller delay (T_{qq})	0.01s	Rated active and apparent power(P_{rat}/S_{rat})	200MW/220MVA
$q-axis$ current controller limits ($I_{q_{max}}/I_{d_{min}}$)	0/-1	Minimum operational power (q_{min})	20MW

TABLE A2
ELECTROLYZER STACK PARAMETERS

Parameter	Value	Parameter	Value
Reference temperature (T_o)	$293K$	Curve fitting parameter (k)	0.0395 VA^{-1}
Faraday constant (F)	96,487 C mol^{-1}	Resistant coefficient (dRt)	-0.003812 Ω°C^{-1}
Ideal gas constant (R)	0.0821 atm K^{-1} mol^{-1}	Resistance of the PEM subsystem (Rio)	0.326 Ω
Initial pressure (po)	1 atm	Reversible potrntial (Vrevo)	1.476 V

TABLE A3
FUEL CELL MODEL PARAMETERS

Parameter	Value	Parameter	Value
Frequency dead band ($\pm f_d$)	$\pm$15 mHz	Static Droop (R_{droop})	5%
Frequency Measurement delay (T_m)	0.1 s	Current controller q-axis integral gain (K_{iiq})	0.01
Current controller q-axis proportional gain (K_{piq})	1	PQ controller proportional gain (K_{pq})	1
Current controller q-axis integral gain (K_{iiq})	0.01	PQ controller integral gain (K_{iq})	0.01
Current controller delay (T_{qq})	0.01s	Voltage controller proportional gain (K_{qv})	2
Voltage and power measurement delay(T_{me})	0.01s	Voltage controller integral gain (K_{iv})	0.1
Lag-lag filter gain (T_{bl})	1	$q-axis$ current controller limits (I_{q-max})	1
Lead-lag filter gain (T_{al})	10	$q-axis$ current controller limits (I_{q-min})	0.2

TABLE A4
FUEL CELL STACK PARAMETERS

Parameter	Value	Parameter	Value
Mass heat capacity (mc_p)	4304 J/C°	Activation energy for reaction (E_{ar})	1800 J/mol
Partial pressure of hydrogen (p_{H_2})	1.35 atm	Gas constant (R_g)	8.3143 $J/molK$
Partial pressure of oxygen (p_{O_2})	1.00 atm	Activation energy for anode (E_{aA})	5344 K/mol
Initial resistance (R_0)	0.1537 Ω	Initial voltage (A_0)	0.15911 V

TABLE A5
FULL-CONVERTER SOLAR-PV GENERATOR PARAMETERS

Parameter	Value	Parameter	Value	Parameter	Value
generator	500 MW	v_T	550 MV	T_p	5.5 s
$\pm f_d$	$\pm$15 mHz	T_m	1 s	K_d / K_p	20