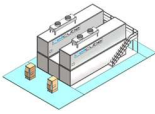
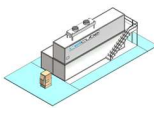
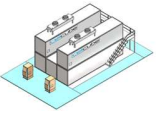
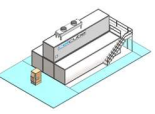
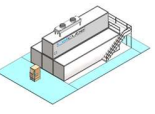
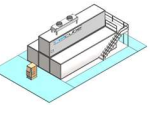
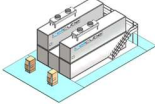
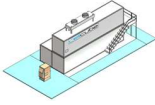
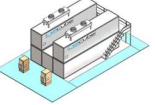
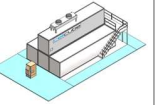
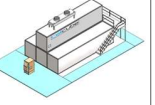
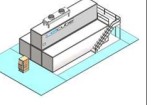


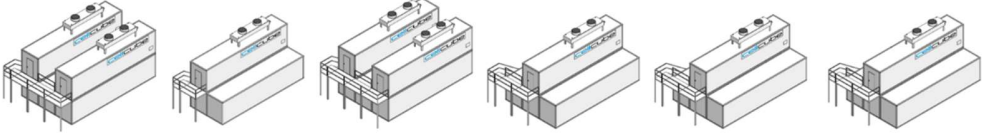
Preliminary AC Data Sheet - CellCube Series Release 4.2

Technical Data							
Type		FB 667-4	FB 333-4	FB 500-5	FB 333-8	FB 250-10	FB 200-14
No. of Power Units (top containers)		2	1	2	1	1	1
No. of Energy Units (bottom containers)		3	2	3	3	3	3
Number of inverters rated / incl. over-rating		1 / 2	1 / 1	1 / 2	1 / 1	1 / 1	1 / 1
Inverter type		EPC Power CAB1000 2L.1					
Battery technology		Vanadium Redox Flow Battery					
Technical performance data	1)						
Power Ratings AC	2)						
Rated charge / discharge AC power		667 kW	333 kW	500 kW	333 kW	250 kW	200 kW
Max. charge / discharge AC power (Overtopping)		200 % / 150 %	200 % / 150 %	267 % / 200 %	200 % / 150 %	267 % / 200 %	333 % / 250 %
Energy Ratings AC	3)						
Max. Usable energy at AC POC @ 50% constant AC power							
Auxiliary energy deducted		2,945 kWh	1,473 kWh	2,945 kWh	2,945 kWh	2,945 kWh	2,945 kWh
Usable energy at AC POC @ 100% constant rated AC power							
Auxiliary energy not deducted		2,660 kWh	1,330 kWh	2,857 kWh	2,660 kWh	2,857 kWh	3,004 kWh
Auxiliary energy deducted	4)	2,585 kWh	1,293 kWh	2,755 kWh	2,585 kWh	2,755 kWh	2,876 kWh
Discharge time AC, Begin-of-life		3.9 hrs	3.9 hrs	5.5 hrs	7.8 hrs	11.0 hrs	14.4 hrs
Usable energy at AC POC @ const. max. AC power (Overtopping)							
Auxiliary energy not deducted		2,150 kWh	1,075 kWh	2,150 kWh	2,150 kWh	2,150 kWh	2,150 kWh
Auxiliary energy deducted		2,100 kWh	1,050 kWh	2,100 kWh	2,100 kWh	2,100 kWh	2,100 kWh
Discharge time AC, Begin-of-life		2.1 hrs	2.1 hrs	2.1 hrs	4.2 hrs	4.2 hrs	4.2 hrs
Battery performance AC							
Max. RTE (AC) incl. Aux		71%	71%	71%	71%	71%	71%
Typ. RTE (AC) incl. Aux @ rated AC power		68%	68%	71%	68%	71%	71%
Typ. RTE (AC) incl. Aux @ max. AC power (Overtopping)		63%	63%	63%	63%	63%	63%
Cycle life		> 20,000 @ 100% DOD					
Annual energy degradation		Average <0,5%/year; max. 10% over 25 years lifetime					
Energy storage interface							
Max. power per inverter		700 kVA					
Max. AC current per inverter		1,255 A					
AC connection		325 V, 50 or 60 Hz, IT-Grid					
Grid voltage levels	5)	via Transformer up to 30 kV					
Protection AC side		Fuses, Type 2 Surge Protection, Automatic AC disconnection					
Response time (time to accomplish full power step)		< 5 ms					
AC auxiliary connection (Inverter + CellCube)		380 ... 415 V, 50/60 Hz, 3P+N+PE, TN-S-grid					
Auxiliary power incl. inverter (average / max.)	6)	20 / 56 kW	10 / 28 kW	18 / 56 kW	10 / 28 kW	9 / 28 kW	9 / 28 kW
Communication		MODBUS TCP/IP					
Operational functionalities		Grid Forming, Grid Following, UPS, Fast Frequency Response, Synthetic Inertia, Blackstart					

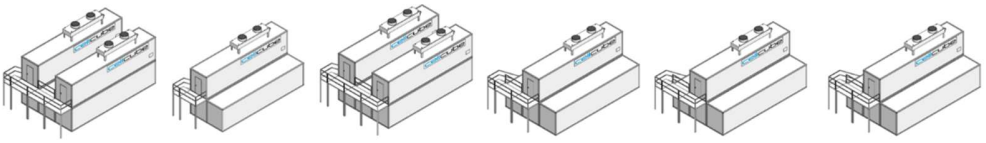
Preliminary AC Data Sheet - CellCube Series Release 4.2

Technical Data							
Type		FB 667-4	FB 333-4	FB 500-5	FB 333-8	FB 250-10	FB 200-14
General							
Design lifetime CellCube		25 years; > 20,000 cycles @ 100% DOD					
Design life inverter		20 years					
Electrolyte solution		Water based vanadium electrolyte, non-flammable, re-usable					
Noise emission	7)	< 68 dB(A)	< 65 dB(A)	< 68 dB(A)	< 65 dB(A)	< 65 dB(A)	< 65 dB(A)
Max. elevation CellCube		up to 2,000m, others on request					
Max. elevation inverter		up to 1,000 m without derating, 1,000 to 2,000 m with derating, others on request					
Compliance Battery	8)	IEC/EN 62932; UL 1973 (pending); UL9540A (pending)					
Compliance Inverter		UL 1741; C22.2 No. 107.1-16; IEC 62477-1; IEC 62909-1; FCC Part 15 subpart B; IEC/EN 61000-6-2, 6-4; EN 55011; CISPR 32; CISPR 11; IEEE C37.90.2					
Compliance BESS	8)	UL 9540 (pending)					
Utility interconnect		UL 1741 (SA); IEEE 1547-2003; CA Rule 21; Hawaii Rule 14; AS4777.2; VDE-AR-N 4110/4120; EN 50549-2					
Ambient temperature range CellCube		-15 °C ... + 45 °C ; optional: +10 °C ... + 35 °C					
Temperature management CellCube (depending on 24 hrs daily average ambient temperature)	9)	< 27 °C @ 2 cycles per day, Power < 150 % 27-29 °C @ 1 cycles per day, Power < 150 %			< 27 °C @ 1 cycle per day, Power < 150 % ≤ 26 °C @ 1 cycle per day, Power ≥ 150 %		
Temperature derating inverter		1.7% per degree C from +40 to +55 °C					
Mechanical data							
Enclosure type	10)	40' ISO HC-containers with C3 coating Inverter: Cold-rolled steel, CS type B, e-coated and powder painted (C2 coating)					
Footprint for exemplary layout incl. inverter		21.3 m x 12.3 m	21.3 m x 9.9 m	21.3 m x 12.3 m			
Height with cooling system		7.5 m					
Total weight in operation		266 t	136 t	266 t	246 t	246 t	246 t
Degree of protection		IP 54					
1) All data measured at an average electrolyte temperature of 35 °C and an ambient air temperature of 25 °C. Data measured with a tolerance of ±5%.				6) Depending on SOC, power, temperature			
2) Power ratings at nominal voltage and PF = 1				7) Sound pressure level at 10 m distance			
3) POC = Point of connection = AC terminals of inverter (w/o transformer)				8) Other compliances or Field Evaluations available on request			
4) Refers to "rated energy"				9) Other temperature management options available on request. One cycle is equivalent to the turnover of rated energy			
5) Project specific design, optionally available on request				10) Other coating options available on request			

Preliminary DC Data Sheet - CellCube Series Release 4.2

Technical Data							
Type		FB 667-4	FB 333-4	FB 500-5	FB 333-8	FB 250-10	FB 200-14
No. of Power Units (top containers)		2	1	2	1	1	1
No. of Energy Units (bottom containers)		3	2	3	3	3	3
Battery technology		Vanadium Redox Flow Battery					
Technical performance data	1)						
Power Ratings DC							
Rated charge / discharge DC power		637 / 697 kW	318 / 348 kW	475 / 526 kW	318 / 348 kW	237 / 263 kW	188 / 212 kW
Max. charge / discharge DC power (Overtopping)		200 % / 150 %	200 % / 150 %	267% / 200 %	200 % / 150 %	267% / 200 %	333% / 250 %
Energy Ratings DC	2)						
Max. Usable energy at DC POC @ 50% constant DC power							
Auxiliary energy deducted		3,030 kWh	1,515 kWh	3,030 kWh	3,030 kWh	3,030 kWh	3,030 kWh
Usable energy at DC POC @ 100% constant rated DC power							
Auxiliary energy not deducted		2,700 kWh	1,350 kWh	2,900 kWh	2,700 kWh	2,900 kWh	3,050 kWh
Auxiliary energy deducted	3)	2,640 kWh	1,320 kWh	2,820 kWh	2,640 kWh	2,820 kWh	2,950 kWh
Discharge time DC, Begin-of-life		3.9 hrs	3.9 hrs	5.5 hrs	7.8 hrs	11.0 hrs	14.4 hrs
Usable energy at DC POC @ constant max. DC power (Overtopping)							
Auxiliary energy not deducted		2220 kWh	1110 kWh	2220 kWh	2220 kWh	2220 kWh	2220 kWh
Auxiliary energy deducted		2180 kWh	1090 kWh	2180 kWh	2180 kWh	2180 kWh	2180 kWh
Discharge time DC, Begin-of-life		2.1 hrs	2.1 hrs	2.1 hrs	4.2 hrs	4.2 hrs	4.2 hrs
Battery performance DC							
Max. RTE (DC) incl. Aux		75%	75%	75%	75%	75%	75%
Typ. RTE (DC) incl. Aux @ rated DC power		72%	72%	75%	72%	75%	75%
Typ. RTE (DC) incl. Aux @ max. DC power (Overtopping)		67%	67%	67%	67%	67%	67%
Cycle life		> 20,000 @ 100% DOD					
Annual energy degradation		Average <0,5%/year; max. 10% over 25 years lifetime					
Battery interface							
DC connection		530 ... 910 V, IT-Grid					
Max. DC current		2x 1,000 A	1,000 A	2x 1,000 A	1,000 A	1,000 A	1,000 A
Protection DC side		Fuses, insulation monitoring, surge protection device, main switch					
Response time at DC-terminals		< 1 ms					
AC connection		380 ... 415 V, 50/60 Hz, 3P+N+PE, TN-S-grid					
Auxiliary power (average / max)	4)	16 / 40 kW	8 / 20 kW	14 / 40 kW	8 / 20 kW	7 / 20 kW	7 / 20 kW
Communication		MODBUS TCP/IP					

Preliminary DC Data Sheet - CellCube Series Release 4.2

Technical Data							
Type		FB 667-4	FB 333-4	FB 500-5	FB 333-8	FB 250-10	FB 200-14
General							
Design lifetime		25 years; > 20,000 cycles @ 100% DOD					
Electrolyte solution		Water based vanadium electrolyte, non-flammable, re-usable					
Noise emission	5)	< 48 dB(A)	< 45 dB(A)	< 48 dB(A)	< 45 dB(A)	< 45 dB(A)	< 45 dB(A)
Max. elevation		up to 2,000m, others on request					
Compliance	6)	IEC/EN 62932; UL 1973 (pending); UL9540A (pending)					
Ambient temperature range		-15 °C ... + 45 °C ; optional: +10 °C ... + 35 °C					
Temperature management (depending on 24 hrs daily average ambient temperature)	7)	< 27 °C @ 2 cycles per day, Power < 150 % 27-29 °C @ 1 cycles per day, Power < 150 % < 26 °C @ 2 cycles per day, Power ≥ 150 % 26-28 °C @ 1 cycles per day, Power ≥ 150 %			≤ 27 °C @ 1 cycle per day, Power < 150 % ≤ 26 °C @ 1 cycle per day, Power ≥ 150 %		
Mechanical data							
Enclosure type	8)	40' ISO HC-containers with C3 coating					
Footprint (w/o stairs) L x W		12.2 m x 7.4 m	12.2 m x 4.9 m	12.2 m x 7.4 m	12.2 m x 7.4 m	12.2 m x 7.4 m	12.2 m x 7.4 m
Height with cooling system		7.5 m					
Total weight in operation		265 t	135 t	265 t	245 t	245 t	245 t
Degree of protection		IP 54					
¹⁾ All data measured at an average electrolyte temperature of 35 °C and an ambient air temperature of 25 °C. Data measured with a tolerance of ±5%.				⁵⁾ Sound pressure level at 10 m distance			
²⁾ POC = Point of connection = DC terminals of Battery				⁶⁾ Other compliances or Field Evaluations available on request			
³⁾ Refers to "rated energy"				⁷⁾ Other temperature management options available on request. One cycle is equivalent to the turnover of rated energy			
⁴⁾ Depending on SOC, power, temperature				⁸⁾ Other coating options available on request			