From: Mike Barg <Mike_Barg@mckinsey.com>
Subject: Demand input figures
Sent: Tue, 08 Jan 2019 16:24:34 -0600
To: "Blackshear, Victor L. - Manager Financial Planning & Rates" <blacvl@jea.com>, "Crawford, Juli E. - Director Financial Planning & Analysis" <crawje@jea.com>
Cc: "Sarah Brody" <Sarah_Brody@mckinsey.com>
20190108 Demand scenario inputs v7.xlsx

Victor and Juli,

Please find updated annual inputs for the demand forecast attached (Demand outputs > rows 13 – 15). We are working on the accompanying slide and explanations, and will send an overview of the information in Powerpoint form later this evening.

Regards,
Mike

Assumptions		Figures in $/W	Year		2018
Lifetime	20		Module	$	0.4
Discount	7%		BOS (hardware)	$	0.9
Degradation	0.30%		BOS (soft costs)	$	1.6
	[redacted]	Solar	**Total cost**	**$**	**2.9**
Battery rebate			Battery cost (pack) ($/kWh)	[redacted]	
Backup value of storage	200		Battery cost (BOS) ($/kW)		
System size (kW)	5		Battery ratio (kWh:kW)		
Roundtrip efficiency	80%		Battery cost ($/W)		
			Sample solar size (kW)		7.9
			Sample battery size (kW)	[redacted]	
			Battery:solar ratio		
			Battery cost		
		Battery	**Battery cost (post-rebate)**		
			Total turnkey (solar+storage)	**$**	**3.3**
			Capacity factor		17.3%
			O&M		12
			ITC		30%
			Cost	$	2,460
			Lifetime production		16,846.7
			LCOE		**0.146**
			Retail marginal rate		0.10
			Export credit		0.03
			Self consumption (not exported)		65%
			kWh exported		2.71
			Value of solar ($/kwh)		0.077
			Value of storage - export avoidance		0.018
			Value of storage - backup		0.026
			Value of storage ($/kwh)		0.045
			System value		**0.122**
			Solar value ($/kW/year)		117.6
			Storage value - export avoidance ($/kW/year)		27.9
			Storage value - backup ($/kW/year)		40.0
			Annual value generated (backup + gen)		**185.5**
			**Value generation assumes "backup" as monetary value c*		
x			Payback (solar + storage)		17.9
			Sensitivity		
			LCOE		

No rebate	0.154
System value	
Backup @ 100	0.109
Backup @ 300	0.135

Discount table

Values:		11.34	11.09
Year		Norm	Degraded
	1	1.00	1.00
	2	1.00	1.00
	3	1.00	0.99
	4	1.00	0.99
	5	1.00	0.99
	6	1.00	0.99
	7	1.00	0.98
	8	1.00	0.98
	9	1.00	0.98
	10	1.00	0.97
	11	1.00	0.97
	12	1.00	0.97
	13	1.00	0.96
	14	1.00	0.96
	15	1.00	0.96
	16	1.00	0.96
	17	1.00	0.95
	18	1.00	0.95
	19	1.00	0.95
	20	1.00	0.94
	21	-	-
	22	-	-
	23	-	-
	24	-	-
	25	-	-
	26	-	-
	27	-	-
	28	-	-
	29	-	-
x	30	-	-

	2019	2020	2021	2022	2023	2024	2025	2026
	$ 0.4	$ 0.3	$ 0.3	$ 0.3	$ 0.3	$ 0.3	$ 0.3	$ 0.2
	$ 0.8	$ 0.8	$ 0.8	$ 0.7	$ 0.7	$ 0.7	$ 0.6	$ 0.6
	$ 1.5	$ 1.3	$ 1.2	$ 1.1	$ 1.0	$ 0.9	$ 0.8	$ 0.7
	$ 2.7	**$ 2.5**	**$ 2.3**	**$ 2.1**	**$ 2.0**	**$ 1.8**	**$ 1.7**	**$ 1.6**
[redacted]								
	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
[redacted]								
	$ 3.1	**$ 2.8**	**$ 2.6**	**$ 2.4**	**$ 2.3**	**$ 2.1**	**$ 2.0**	**$ 1.8**
	17.3%	17.3%	17.3%	17.3%	17.3%	17.3%	17.3%	17.3%
	12	12	12	12	12	12	12	12
	30%	26%	22%	0%	0%	0%	0%	0%
	$ 2,278	$ 2,220	$ 2,179	$ 2,571	$ 2,400	$ 2,240	$ 2,091	$ 1,967
	16,846.7	16,846.7	16,846.7	16,846.7	16,846.7	16,846.7	16,846.7	16,846.7
	0.135	**0.132**	**0.129**	**0.153**	**0.142**	**0.133**	**0.124**	**0.117**
	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
	65%	65%	65%	65%	65%	65%	65%	65%
	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71
	0.079	0.079	0.079	0.079	0.079	0.079	0.080	0.080
	0.019	0.018	0.018	0.018	0.018	0.018	0.018	0.017
	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
	0.045	0.045	0.045	0.044	0.044	0.044	0.044	0.044
	0.124	**0.124**	**0.124**	**0.124**	**0.124**	**0.124**	**0.124**	**0.124**
	119.4	119.7	119.9	120.2	120.4	120.7	120.9	121.2
	28.3	28.0	27.8	27.5	27.3	27.0	26.8	26.5
	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	187.7	**187.7**	**187.7**	**187.7**	**187.7**	**187.7**	**187.7**	**187.7**
:ontribution								
	16.3	15.0	14.0	13.0	12.1	11.2	10.4	9.8

x

0.142	0.138	0.136	0.160	0.150	0.140	0.130	0.123
0.110	0.112	0.113	0.115	0.116	0.118	0.119	0.121
0.137	0.138	0.140	0.141	0.143	0.144	0.146	0.147

x

	2027	2028	2029	2030
	$ 0.2	$ 0.2	$ 0.2	$ 0.2
	$ 0.6	$ 0.6	$ 0.5	$ 0.5
	$ 0.7	$ 0.6	$ 0.6	$ 0.5
	$ 1.5	**$ 1.4**	**$ 1.3**	**$ 1.2**
[redacted]				
	7.9	7.9	7.9	7.9
[redacted]				
	$ 1.7	**$ 1.6**	**$ 1.5**	**$ 1.4**
	17.3%	17.3%	17.3%	17.3%
	12	12	12	12
	0%	0%	0%	0%
	$ 1,851	$ 1,744	$ 1,644	$ 1,550
	16,846.7	16,846.7	16,846.7	16,846.7
	0.110	**0.104**	**0.098**	**0.092**
	0.10	0.10	0.10	0.10
	0.03	0.03	0.04	0.04
	65%	65%	65%	65%
	2.71	2.71	2.71	2.71
	0.080	0.080	0.080	0.081
	0.017	0.017	0.017	0.017
	0.026	0.026	0.026	0.026
	0.044	0.043	0.043	0.043
	0.124	**0.124**	**0.124**	**0.124**
	121.5	121.7	122.0	122.3
	26.2	26.0	25.7	25.4
	40.0	40.0	40.0	40.0
	187.7	**187.7**	**187.7**	**187.7**
	9.1	8.6	8.0	7.5 x

0.115	0.109	0.103	0.097
	x		
0.123	0.124	0.126	0.128
0.149	0.151	0.152	0.154

Notes
-5.2%
-4.3%
-9.2%

From McK battery cost perspective
From McK battery cost perspective
Tesla Powerwall 2 as basis for ratio

From https://www.seia.org/research-resources/solar-photovoltaic-technology
Assuming avg. battery install size grows to 10/20 kw/kwh (Tesla = 13.5 kwh today)

There's a $2k cap, but cap isn't reached by the time it's economic

PVWatts, Jacksonville, 20* tilt, 10% losses

Source: https://www.jea.com/My_Account/Rates/
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x x