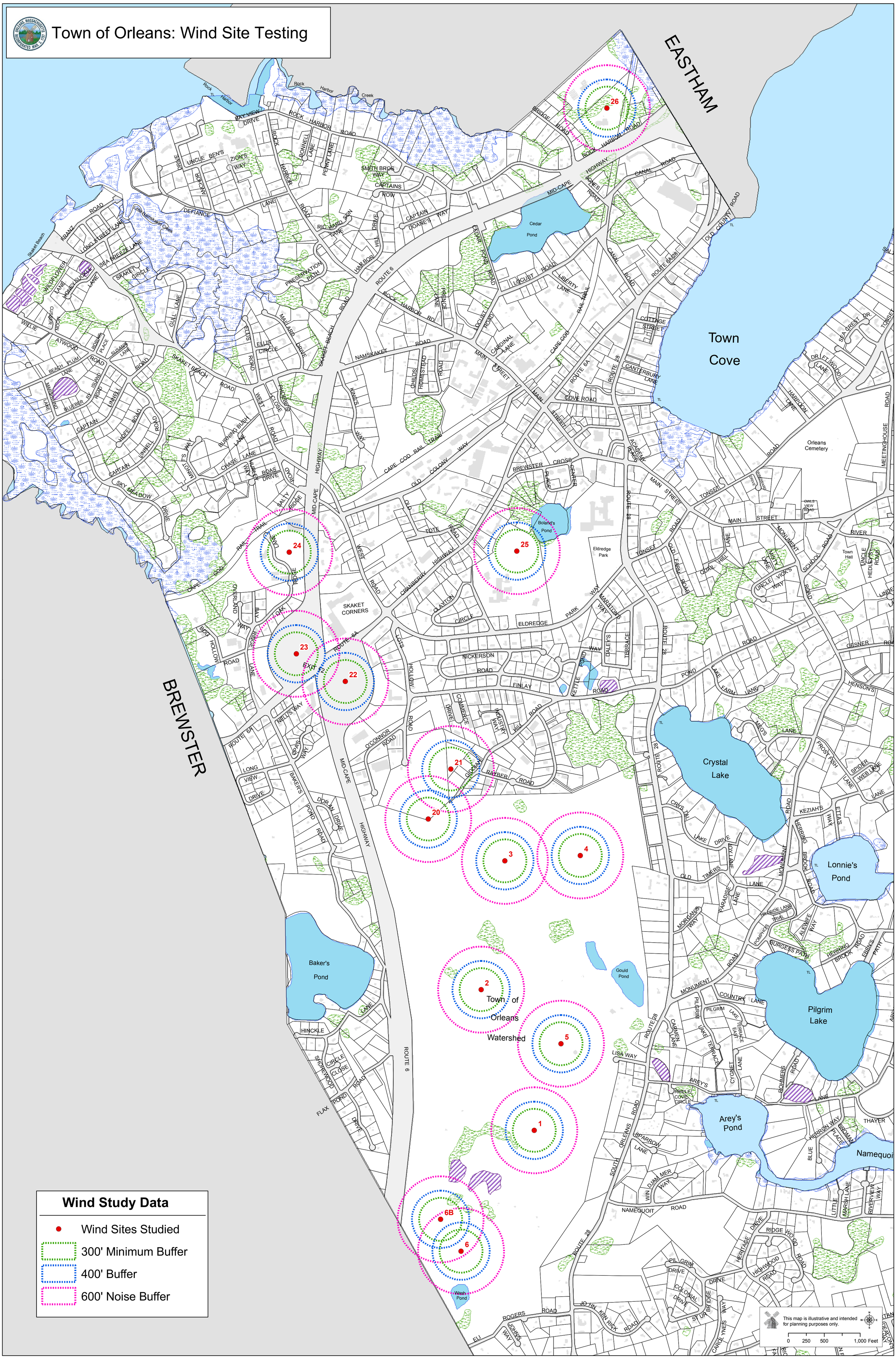
APPENDIX A:

Wind Sites Map

Town of Orleans: Wind Site Testing



Wind Study Data

- Wind Sites Studied
- 300' Minimum Buffer
- 400' Buffer
- 600' Noise Buffer

APPENDIX B:

Weston and Sampson Report Findings

Also see:

http://www.town.orleans.ma.us/Pages/OrleansMA_BComm/docs/windreport.pdf

PROJECT COST ESTIMATE
Wind Turbine Installation
Orleans, MA

Nameplate Rating, kW		600

Description		Amount
Turbine, Blades and Tower - Delivered (Elecon T-600)	$	1,100,000
Design and Permitting	$	125,000
Mobilization	$	40,000
Erosion Control Measures	$	5,000
Access Road to Turbine Site	$	75,000
Access Improvements at Water Treatment Plant	$	3,500
Improvements at Entrance	$	3,500
New Gate at Water Treatment Plant	$	2,500
Construction Staging Area	$	85,000
Chain Link Fencing	$	11,000
Electrical Duct Bank Trenching	$	30,000
Relocate Water main	$	20,000
Turbine Foundation Excavation & Backfill	$	60,000
Turbine Foundation (Concrete, Steel)	$	160,000
Electrical Interconnection	$	250,000
Electric Utility Equipment Buyout	$	125,000
Erect Wind Turbine (Crane, Rigging)	$	150,000
Commissioning, Startup and Training	$	75,000
Total	$	2,320,500
Cost per kW	$	3,868

ECONOMIC SUMMARY
Wind Turbine Installation
Orleans, MA

Turbine Size, kW	600
Project Cost	$ 2,320,500
Cost per kW	$3,868
Capacity Factor, %	28.3%
Annual Energy, kWh	1,338,703
NPV (Discount Rate of 4%)	$859,468
Net Cash Flow (Over 20 Years)	$1,439,320
BCR	1.31

Wind Turbine Pro Forma
Orleans, MA

Wind Turbine	**Turbowinds T600-48**		
Turbine size (kW)			600
Capacity Factor			28.30%
Annual Energy Production (kWh)			1,338,703
Annual Energy Use (kWh)			755,229
Retail Offset Rate (kWh)		$	0.1520
Excess Power Rate (kWh)		$	0.1520
REC value	Y1-Y10	$	0.04
REC value	Y11-Y20	$	0.03
Coincidence			100%

Net Present Value	$859,468	
Net Cash Flow	$1,439,320	
Present Value Benefit	$3,620,452	
Present Value Cost	$2,760,984	
Benefit Cost Ratio	1.31	

Tower Height	65	meters
Average Wind Speed	6.2	m/s at 65 meter
Project Term	20	years
Financing	Debt	
Energy Inflation	2.0%	
General Inflation	2.0%	
Discount Rate	4.0%	
Loan Rate	4.0%	
Project Cost	$ 2,320,500	
Simple Payback	NA	years
IRR	NA	

Existing Power Use and Cost Basis

Water Department Use: 755,229 kWh

	Avg. Rate	Total
Customer Service/Demand	0.01636	$ 12,353
Distribution	**0.01354**	$ 10,226
Transition	**0.02082**	$ 15,724
Transmission	**0.00761**	$ 5,747
Energy Use	**0.10999**	$ 83,068
Renewable Energy	0.00050	$ 378
Energy Conservation	0.00250	$ 1,888
Total Electric Cost	0.17132	$ 129,383
Value of Retail Offset	**0.15196**	
Value of Excess Power	**0.15196**	

Year	Retail Offset	Excess Power Revenue	RECs Revenue	Total Annual Revenue	Cummulative Revenue	Annual O&M	Annual Insurance	Annual Principal	Annual Interest	Total Annual Cost	Net Annual Cash Flow	Cummulative Cash Flow
1	$0	$0	$0	$0	$0	$24,000	$5,250	$77,926	$92,820	$199,996	($199,996)	($199,996)
2	$114,765	$88,665	$53,548	$256,977	$256,977	$24,480	$5,355	$81,044	$89,703	$200,581	$56,396	($143,600)
3	$117,060	$90,438	$53,548	$261,046	$518,024	$24,970	$5,462	$84,285	$86,461	$201,178	$59,868	($83,733)
4	$119,401	$92,247	$53,548	$265,196	$783,220	$25,469	$5,571	$87,657	$83,090	$201,787	$63,409	($20,323)
5	$121,789	$94,092	$53,548	$269,429	$1,052,649	$25,978	$5,683	$91,163	$79,584	$202,408	$67,021	$46,698
6	$124,225	$95,974	$53,548	$273,747	$1,326,395	$26,498	$5,796	$94,809	$75,937	$203,041	$70,706	$117,404
7	$126,709	$97,893	$53,548	$278,151	$1,604,546	$27,028	$5,912	$98,602	$72,145	$203,687	$74,464	$191,868
8	$129,244	$99,851	$53,548	$282,643	$1,887,188	$27,568	$6,031	$102,546	$68,201	$204,346	$78,297	$270,165
9	$131,828	$101,848	$53,548	$287,224	$2,174,413	$28,120	$6,151	$106,648	$64,099	$205,017	$82,207	$352,372
10	$134,465	$103,885	$53,548	$291,898	$2,466,311	$28,682	$6,274	$110,914	$59,833	$205,703	$86,195	$438,567
11	$137,154	$105,963	$40,161	$283,278	$2,749,589	$29,256	$6,400	$115,350	$55,396	$206,402	$76,876	$515,443
12	$139,897	$108,082	$40,161	$288,140	$3,037,729	$29,841	$6,528	$119,964	$50,782	$207,115	$81,025	$596,468
13	$142,695	$110,243	$40,161	$293,100	$3,330,829	$30,438	$6,658	$124,763	$45,984	$207,843	$85,257	$681,725
14	$145,549	$112,448	$40,161	$298,159	$3,628,988	$31,047	$6,791	$129,753	$40,993	$208,584	$89,574	$771,300
15	$148,460	$114,697	$40,161	$303,319	$3,932,306	$31,667	$6,927	$134,943	$35,803	$209,341	$93,977	$865,277
16	$151,429	$116,991	$40,161	$308,582	$4,240,888	$32,301	$7,066	$140,341	$30,405	$210,113	$98,469	$963,746
17	$154,458	$119,331	$40,161	$313,950	$4,554,838	$32,947	$7,207	$145,955	$24,792	$210,900	$103,050	$1,066,796
18	$157,547	$121,718	$40,161	$319,426	$4,874,264	$33,606	$7,351	$151,793	$18,953	$211,704	$107,722	$1,174,518
19	$160,698	$124,152	$40,161	$325,011	$5,199,276	$34,278	$7,498	$157,865	$12,882	$212,523	$112,489	$1,287,007
20	$163,912	$126,635	$40,161	$330,708	$5,529,984	$34,963	$7,648	$164,179	$6,567	$213,358	$117,350	$1,404,357

APPENDIX C:

PV WATTS Parameters

How to Change PVWatts Parameters

The PVWatts™ calculator allows users to substitute its default input parameters with custom values. Learn how to change the PVWatts parameters for:

- DC rating
- DC-to-AC derate factor
- Array type
- Tilt angle
- Azimuth angle
- Electricity cost.

DC Rating

The size of a photovoltaic (PV) system is its nameplate DC power rating. This is determined by adding the PV module power listed on the nameplates of the PV modules in watts and then dividing the sum by 1,000 to convert it to kilowatts (kW). PV module power ratings are for standard test conditions (STC) of 1,000 W/m² solar irradiance and 25°C PV module temperature. The default PV system size is 4 kW. This corresponds to a PV array area of approximately 35 m² (377 ft²).

Caution: For correct results, the DC rating input must be the nameplate DC power rating described above. It cannot be based on other rating conditions, such as PVUSA test conditions (PTC). PTC are defined as 1,000 W/m² plane-of-array irradiance, 20°C ambient temperature, and 1 m/s wind speed. If a user incorrectly uses a DC rating based on PTC power ratings, the energy production calculated by the PVWatts calculator will be reduced by about 12%.

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DC-to-AC Derate Factor

The PVWatts calculator multiplies the nameplate DC power rating by an overall DC-to-AC derate factor to determine the AC power rating at STC. The overall DC-to-AC derate factor accounts for losses from the DC nameplate power rating and is the mathematical product of the derate factors for the components of the PV system. The default component derate factors used by the PVWatts calculator and their ranges are listed in the table below.

Derate Factors for AC Power Rating at STC

Component Derate Factors	PVWatts Default	Range
PV module nameplate DC rating	0.950.	80–1.05
Inverter and transformer	0.920	88–0.96
Mismatch	0.980	.97–0.995

Diodes and connections	0.9950	.99–0.997
DC wiring	0.980	.97–0.99
AC wiring	0.990	.98-0.993
Soiling	0.950	.30–0.995
System availability	0.980	0.00-0.995
Shading	1.00	0.00–1.00
Sun-tracking	1.00	0.95–1.00
Age	1.00	0.70–1.00

Overall DC-to-AC derate factor0.77

The overall DC-to-AC derate factor is calculated by multiplying the component derate factors.

For the PVWATTS default values:

Overall DC to AC derate factor

= 0.95 x 0.92 x 0.98 x 0.995 x 0.98 x 0.99 x 0.95 x 0.98 x 1.00 x 1.00 x 1.00

= 0.77

The value of 0.77 means that the AC power rating at STC is 77% of the nameplate DC power rating. In most cases, 0.77 will provide a reasonable estimate. However, users can change the DC-to-AC derate factor. The first option is to enter a new overall DC-to-AC derate factor in the provided text box. The second option is to click the **Derate Factor Help** button. This provides the opportunity to change any of the component derate factors. The derate factor calculator then calculates a new overall DC-to-AC derate factor.

The component derate factors are described below.

PV module nameplate DC rating
This accounts for the accuracy of the manufacturer's nameplate rating. Field measurements of PV modules may show that they are different from their nameplate rating or that they experience light-induced degradation upon exposure. A derate factor of 0.95 indicates that testing yielded power measurements at STC that were 5% less than the manufacturer's nameplate rating.

Inverter and transformer
This reflects the inverter's and transformer's combined efficiency in converting DC power to AC power. A list of inverter efficiencies by manufacturer is available from the Consumer Energy Center. The inverter efficiencies include transformer-related losses when a transformer is used or required by the manufacturer.

Mismatch

The derate factor for PV module mismatch accounts for manufacturing tolerances that yield PV modules with slightly different current-voltage characteristics. Consequently, when connected together electrically, they do not operate at their peak efficiencies. The default value of 0.98 represents a loss of 2% because of mismatch.

Diodes and connections

This derate factor accounts for losses from voltage drops across diodes used to block the reverse flow of current and from resistive losses in electrical connections.

DC wiring

The derate factor for DC wiring accounts for resistive losses in the wiring between modules and the wiring connecting the PV array to the inverter.

AC wiring

The derate factor for AC wiring accounts for resistive losses in the wiring between the inverter and the connection to the local utility service.

Soiling

The derate factor for soiling accounts for dirt, snow, and other foreign matter on the surface of the PV module that prevent solar radiation from reaching the solar cells. Dirt accumulation is location- and weather-dependent. There are greater soiling losses (up to 25% for some California locations) in high-trafffic, high-pollution areas with infrequent rain. For northern locations, snow reduces the energy produced, and the severity is a function of the amount of snow and how long it remains on the PV modules. Snow remains longest when sub-freezing temperatures prevail, small PV array tilt angles prevent snow from sliding off, the PV array is closely integrated into the roof, and the roof or another structure in the vicinity facilitates snow drift onto the modules. For a roof-mounted PV system in Minnesota with a tilt angle of 23°, snow reduced the energy production during winter by 70%; a nearby roof-mounted PV system with a tilt angle of 40° experienced a 40% reduction.

System availability

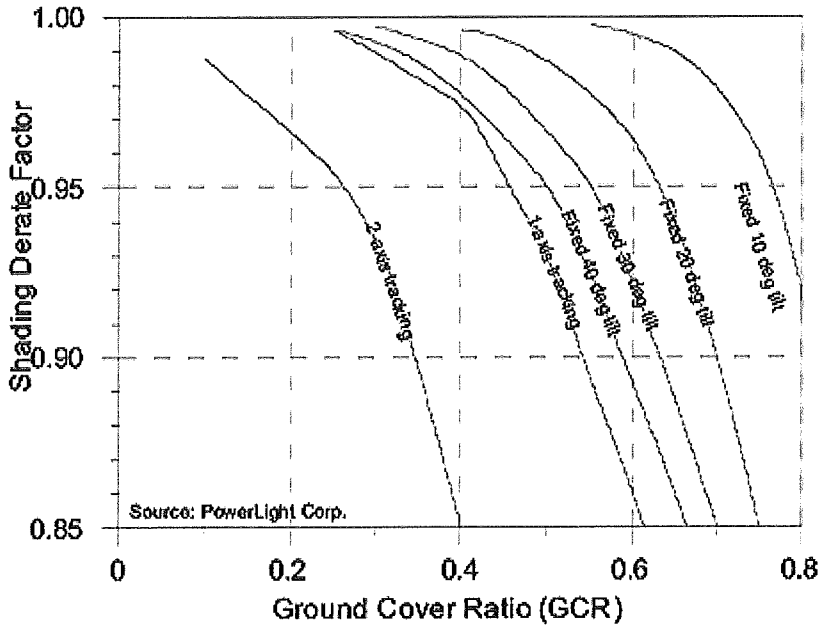
The derate factor for system availability accounts for times when the system is off because of maintenance or inverter or utility outages. The default value of 0.98 represents the system being off 2% of the year.

Shading

The derate factor for shading accounts for situations in which PV modules are shaded by nearby buildings, objects, or other PV modules and arrays. For the default value of 1.00, the PVWatts calculator assumes the PV modules are not shaded. Tools such as Solar Pathfinder can determine a derate factor for shading by buildings and objects. For PV arrays that consist of multiple rows of PV modules and array structures, the shading derate factor should account for losses that occur when one row shades an adjacent row.

The figure below shows the shading derate factor as a function of the type of PV array (fixed or tracking); the ground cover ratio (GCR), defined as the ratio of the PV array area to the total ground area; and the tilt angle for fixed PV arrays. As shown in the figure, spacing the rows further apart (smaller GCR) corresponds to a larger derate factor (smaller shading loss). For fixed PV arrays, if the tilt angle is decreased, the rows may be spaced closer together (larger GCR) to achieve the same shading derate factor. For the same value of shading derate factor, land area requirements are greatest for two-axis tracking, as indicated by its relatively low GCR values compared with those for fixed or one-axis tracking. If you know the GCR value for your PV array, the figure may be used to estimate the appropriate shading derate factor. Industry practice is to optimize the use of

space by configuring the PV system for a GCR that corresponds to a shading derate factor of 0.975 (or 2.5% loss).



Shading derate factor for multiple-row PV arrays as a function of PV array type and ground cover ratio

2. **Sun-tracking**
   The derate factor for sun-tracking accounts for losses for one- and two-axis tracking systems when the tracking mechanisms do not keep the PV arrays at the optimum orientation. For the default value of 1.00, the PVWatts calculator assumes that the PV arrays of tracking systems are always positioned at their optimum orientation and performance is not adversely affected.
3. **Age**
   The derate factor for age accounts for performance losses over time because of weathering of the PV modules. The loss in performance is typically 1% per year. For the default value of 1.00, the PVWatts calculator assumes that the PV system is in its first year of operation. For the eleventh year of operation, a derate factor of 0.90 is appropriate.

Note: Because the PVWatts overall DC-to-AC derate factor is determined for STC, a component derate factor for temperature is not part of its determination. Power corrections for PV module operating temperature are performed for each hour of the year as the PVWatts calculator reads the meteorological data for the location and computes performance. A power correction of -0.5% per degree Celsius for crystalline silicon PV modules is used.

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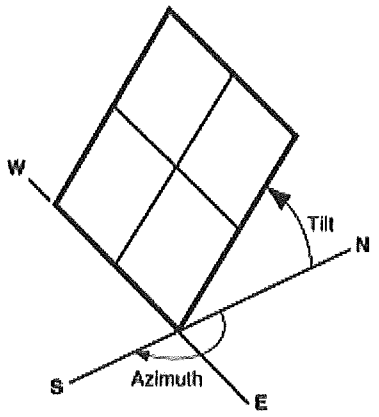
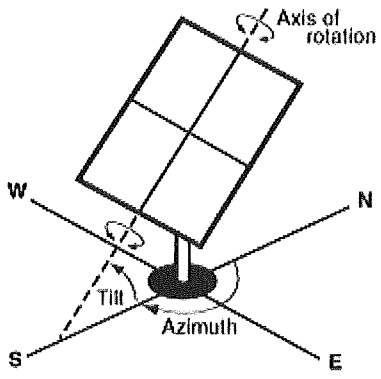
Array Type

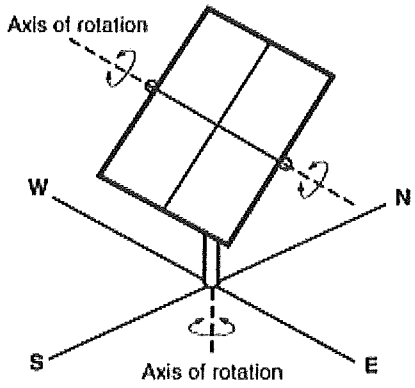
The PV array may be fixed, sun-tracking with one axis of rotation, or sun-tracking with two axes of rotation. The default value is a fixed PV array.



PV array facing south at fixed tilt.



One axis tracking PV array with axis oriented south.



Two-axis tracking PV array

Types of PV arrays

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Tilt Angle

For a fixed PV array, the tilt angle is the angle from horizontal of the inclination of the PV array (0° = horizontal, 90° = vertical). For a sun-tracking PV array with one axis of rotation, the tilt angle is the angle from horizontal of the inclination of the tracker axis. The tilt angle is not applicable for sun-tracking PV arrays with two axes of rotation.

The default value is a tilt angle equal to the station's latitude. This normally maximizes annual energy production. Increasing the tilt angle favors energy production in the winter, and decreasing the tilt angle favors energy production in the summer.

For roof-mounted PV arrays, the table below gives tilt angles for various roof pitches (in ratio of vertical rise to horizontal run).

PV Array Tilt Angle by Roof Pitch

Roof Pitch Tilt Angle (°)

4/1218.45/1222.66/1226.67/1230.38/1233.79/1236.910/1239.811/1242.512/1245.0

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Azimuth Angle

For a fixed PV array, the azimuth angle is the angle clockwise from true north that the PV array faces. For a sun-tracking PV array with one axis of rotation, the azimuth angle is the angle clockwise from true north of the axis of rotation. The azimuth angle is not applicable for sun-tracking PV arrays with two axes of rotation.

The default value is an azimuth angle of 180° (south-facing) for locations in the northern hemisphere and 0° (north-facing) for locations in the southern hemisphere. This normally maximizes energy production. For the northern hemisphere, increasing the azimuth angle favors afternoon energy production, and decreasing the azimuth angle favors morning energy production. The opposite is true for the southern hemisphere.

Azimuth Angles by Heading

Heading Azimuth Angle (°) N0 or 360NE45E90SE135S180SW225W270NW315

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Electricity Cost

7. **Version 1**
   For the United States and its territories, the default value is the average 2004 residential electric rate for the state in which the station is located (source: Energy Information Administration). For locations outside the United States, the default value is the average 2004 or 2005 residential electric rate for the country in which the station is located (sources: International Energy Agency Electricity Information 2005; International Energy Agency Energy Prices and Taxes, 4th Quarter 2005; and Eurostat Gas and Electricity Market Statistics 2005). For some countries, no electric cost information is available, and the default values are set to zero. For these countries, users should enter a value based on their knowledge. Electric costs are presented in the country's currency.
8. **Version 2**
   The default value is the average 2004 residential electric rate for the 40-km cell chosen. Note that some areas are not covered by any utility provider. For these areas, the electric rate for the nearest utility service area (source: Resource Data International) is used.

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Content Last Updated: September 25, 2007

APPENDIX D:

Town of Orleans Electricity Use by Account

Sample Town Electrical Bills

TOWN OF ORLEANS
ELECTRICITY USE
JANUARY 2007 - JANUARY 2008

Account number	from date	to date	kwh	total
15401560014	1/19/2007	2/21/2007	165	
Highway Garage	2/21/2007	3/22/2007	161	
	3/22/2007	4/23/2007	137	
	4/23/2007	5/22/2007	125	
	5/22/2007	6/21/2007	113	
	6/21/2007	7/23/2007	121	
	7/23/2007	8/21/2007	135	
	8/21/2007	9/20/2007	149	
	9/20/2007	10/22/2007	173	
	10/22/2007	11/21/2007	184	
	11/21/2007	12/20/2007	199	
	12/20/2007	1/22/2008	194	
				1,856
13949890019	2/3/2007	3/3/2007	433	
Bay Ridge Lane-	3/3/2007	4/3/2007	778	
Highway/Park	4/3/2007	5/3/2007	352	
	5/3/2007	6/3/2007	224	
	6/3/2007	7/3/2007	177	
	7/3/2007	8/3/2007	186	
	8/3/2007	9/3/2007	154	
	9/3/2007	10/3/2007	206	
	10/3/2007	11/3/2007	273	
	11/3/2007	12/3/2007	289	
	12/3/2007	1/3/2008	230	
	1/3/2008	2/3/2008	283	
				3,585
13949910015	2/3/2007	3/3/2007	1473	
Bay Ridge Lane-	3/3/2007	4/3/2007	1509	
Highway/Park	4/3/2007	5/3/2007	1263	
	5/3/2007	6/3/2007	1274	
	6/3/2007	7/3/2007	1131	
	7/3/2007	8/3/2007	1389	
	8/3/2007	9/3/2007	1293	
	9/3/2007	10/3/2007	1304	
	10/3/2007	11/3/2007	1233	
	11/3/2007	12/3/2007	1377	
	12/3/2007	1/3/2008	1748	
	1/3/2008	2/3/2008	1849	
				16,843
13951430019	2/1/2007	3/6/2007	174	
Water Tank	3/6/2007	4/4/2007	143	
	4/4/2007	5/4/2007	137	
	5/4/2007	6/5/2007	125	
	6/5/2007	7/3/2007	102	
	7/3/2007	8/3/2007	101	
	8/3/2007	9/4/2007	110	
	9/4/2007	10/3/2007	110	
	10/3/2007	11/2/2007	122	
	11/2/2007	12/4/2007	147	
	12/4/2007	1/4/2008	162	
	1/4/2008	2/4/2008	159	
				1,592
14007970016	2/1/2007	3/6/2007	400	
Water Tank	3/6/2007	4/4/2007	338	
	4/4/2007	5/5/2007	304	
	5/5/2007	6/6/2007	299	
	6/6/2007	7/10/2007	313	
	7/10/2007	8/3/2007	214	
	8/3/2007	9/4/2007	299	
	9/4/2007	10/3/2007	290	
	10/3/2007	11/2/2007	298	
	11/2/2007	12/4/2007	361	
	12/4/2007	1/4/2008	368	
	1/4/2008	2/5/2008	383	

Account number	from date	to date	kwh	total
13954450014	1/28/2007	2/28/2007	6447	
51 Lots Hollow-	2/28/2007	3/28/2007	3883	
Transfer Station	3/28/2007	4/28/2007	2560	
	4/28/2007	5/28/2007	1523	
	5/28/2007	6/28/2007	1417	
	6/28/2007	7/28/2007	1763	
	7/28/2007	8/28/2007	1743	
	8/28/2007	9/28/2007	1358	
	9/28/2007	10/28/2007	1305	
	10/28/2007	11/28/2007	2841	
	11/28/2007	12/28/2007	4541	
	12/28/2007	1/28/2008	4784	
				34,165
13949900016	2/6/2007	3/8/2007	909	
Bay Ridge Park Barn	3/8/2007	4/6/2007	521	
	4/6/2007	5/8/2007	403	
	5/8/2007	6/7/2007	373	
	6/7/2007	7/9/2007	412	
	7/9/2007	8/7/2007	271	
	8/7/2007	9/6/2007	332	
	9/6/2007	10/5/2007	294	
	10/5/2007	11/8/2007	427	
	11/8/2007	12/6/2007	354	
	12/6/2007	1/8/2008	828	
	1/8/2008	2/7/2008	754	
				5,878
13949880010	2/6/2007	3/8/2007	501	
Bay Ridge Lane-	3/8/2007	4/6/2007	450	
Highway/Park	4/6/2007	5/8/2007	477	
	5/8/2007	6/7/2007	446	
	6/7/2007	7/9/2007	514	
	7/9/2007	8/7/2007	575	
	8/7/2007	9/6/2007	518	
	9/6/2007	10/5/2007	473	
	10/5/2007	11/8/2007	515	
	11/8/2007	12/6/2007	508	
	12/6/2007	1/8/2008	718	
	1/8/2008	2/7/2008	548	
				6,243
27315120017	1/28/2007	2/28/2007	43440	
Water Treat Plant	2/28/2007	3/28/2007	31120	
	3/28/2007	4/28/2007	30960	
	4/28/2007	5/28/2007	33440	
	5/28/2007	6/28/2007	42560	
	6/28/2007	7/28/2007	42000	
	7/28/2007	8/28/2007	41200	
	8/28/2007	9/28/2007	41280	
	9/28/2007	10/28/2007	36480	
	10/28/2007	11/28/2007	29760	
	11/28/2007	12/28/2007	27840	
	12/28/2007	1/28/2008	27680	
				427,760
15978260014	2/3/2007	3/3/2007	3058	
Water Well	3/3/2007	4/3/2007	2207	
	4/3/2007	5/3/2007	1386	
	5/3/2007	6/3/2007	1033	
	6/3/2007	7/3/2007	9652	
	7/3/2007	8/3/2007	16651	
	8/3/2007	9/3/2007	16089	
	9/3/2007	10/3/2007	3137	
	10/3/2007	11/3/2007	386	
	11/3/2007	12/3/2007	1096	
	12/3/2007	1/3/2008	2257	
	1/3/2008	2/3/2008	2534	

Account number	from date	to date	kwh	total
14007980015	1/28/2007	2/28/2007	480	
Water Well	2/28/2007	3/28/2007	2880	
	3/28/2007	4/28/2007	6880	
	4/28/2007	5/28/2007	11680	
	5/28/2007	6/28/2007	16960	
	6/28/2007	7/28/2007	18720	
	7/28/2007	8/28/2007	20000	
	8/28/2007	9/28/2007	16320	
	9/28/2007	10/28/2007	6720	
	10/28/2007	11/28/2007	800	
	11/28/2007	12/28/2007	480	
	12/28/2007	1/28/2008	480	
				102,400
14008780018	2/2/2007	3/8/2007	6125	
Water Well	3/8/2007	4/4/2007	3556	
	4/4/2007	5/4/2007	2312	
	5/4/2007	6/5/2007	2464	
	6/5/2007	7/9/2007	5319	
	7/9/2007	8/3/2007	3249	
	8/3/2007	9/6/2007	3814	
	9/6/2007	10/3/2007	3552	
	10/3/2007	11/2/2007	4060	
	11/2/2007	12/4/2007	5422	
	12/4/2007	1/4/2008	6149	
	1/4/2008	2/1/2008	5122	
				51,144
13934650014	1/28/2007	2/28/2007	5120	
COA	2/28/2007	3/28/2007	4080	
	3/28/2007	4/28/2007	4240	
	4/28/2007	5/28/2007	3760	
	5/28/2007	6/28/2007	3840	
	6/28/2007	7/28/2007	4880	
	7/28/2007	8/28/2007	5280	
	8/28/2007	9/28/2007	4400	
	9/28/2007	10/28/2007	3680	
	10/28/2007	11/28/2007	3840	
	11/28/2007	12/28/2007	4080	
	12/28/2007	1/28/2008	3920	
				51,120
14002580034	1/28/2007	2/28/2007	16120	
Town Hall	2/28/2007	3/28/2007	14480	
	3/28/2007	4/28/2007	16200	
	4/28/2007	5/28/2007	16520	
	5/28/2007	6/28/2007	19040	
	6/28/2007	7/28/2007	19600	
	7/28/2007	8/28/2007	20360	
	8/28/2007	9/28/2007	20240	
	9/28/2007	10/28/2007	17200	
	10/28/2007	11/28/2007	17080	
	11/28/2007	12/28/2007	18200	
	12/28/2007	1/28/2008	11600	
				206,640
13953930016	1/28/2007	2/28/2007	5139	
Fire Dept.	2/28/2007	3/28/2007	4374	
	3/28/2007	4/28/2007	5380	
	4/28/2007	5/28/2007	6028	
	5/28/2007	6/28/2007	7084	
	6/28/2007	7/28/2007	9046	
	7/28/2007	8/28/2007	10192	
	8/28/2007	9/28/2007	7812	
	9/28/2007	10/28/2007	5583	
	10/28/2007	11/28/2007	4805	
	11/28/2007	12/28/2007	5046	
	12/28/2007	1/28/2008	5309	
				75,798

Account number	from date	to date	kwh	total
16261480012	1/28/2007	2/28/2007	827	
Water Well	2/28/2007	3/28/2007	658	
	3/28/2007	4/28/2007	567	
	4/28/2007	5/28/2007	445	
	5/28/2007	6/28/2007	694	
	6/28/2007	7/28/2007	902	
	6/28/2007	8/28/2007	16597	
	8/28/2007	9/28/2007	11750	
	9/28/2007	10/28/2007	9161	
	10/28/2007	11/28/2007	7295	
	11/28/2007	12/28/2007	7689	
	12/28/2007	1/28/2008	8509	
				65,094
13945780016	1/28/2007	2/28/2007	3795	
Water Facility	2/28/2007	3/28/2007	2595	
	3/28/2007	4/28/2007	1864	
	4/28/2007	5/28/2007	581	
	5/28/2007	6/28/2007	148	
	6/28/2007	7/28/2007	115	
	7/28/2007	8/28/2007	127	
	8/28/2007	9/28/2007	109	
	9/28/2007	10/28/2007	171	
	10/28/2007	11/28/2007	1279	
	11/28/2007	12/28/2007	2109	
	12/28/2007	1/28/2008	2358	
				15,251
13957390019	1/28/2007	2/28/2007	8160	
Snow Library	2/28/2007	3/28/2007	7040	
	3/28/2007	4/28/2007	6640	
	4/28/2007	5/28/2007	6800	
	5/28/2007	6/28/2007	10160	
	6/28/2007	7/28/2007	11520	
	7/28/2007	8/28/2007	10400	
	8/28/2007	9/28/2007	9280	
	9/28/2007	10/28/2007	6400	
	10/28/2007	11/28/2007	6560	
	11/28/2007	12/28/2007	7360	
	12/28/2007	1/28/2008	7280	
				97,600
1540151027	1/19/2007	2/21/2007	361	
Legion	2/21/2007	3/22/2007	352	
	3/22/2007	4/23/2007	300	
	4/23/2007	5/22/2007	273	
	5/22/2007	6/21/2007	247	
	6/21/2007	7/23/2007	264	
	7/23/2007	8/21/2007	296	
	8/21/2007	9/20/2007	326	
	9/20/2007	10/22/2007	378	
	10/22/2007	11/21/2007	402	
	11/21/2007	12/20/2007	435	
	12/20/2007	1/22/2008	424	
				4,058
15401130016	1/19/2007	2/21/2007	275	
Fire Station	2/21/2007	3/22/2007	268	
	3/22/2007	4/23/2007	228	
	4/23/2007	5/22/2007	208	
	5/22/2007	6/21/2007	188	
	6/21/2007	7/23/2007	201	
	7/23/2007	8/21/2007	225	
	8/21/2007	9/20/2007	248	
	9/20/2007	10/22/2007	288	
	10/22/2007	11/21/2007	306	
	11/21/2007	12/20/2007	331	
	12/20/2007	1/22/2008	323	
				3,089

Account number	from date	to date	kwh	total
13953650010	2/1/2007	3/6/2007	423	
Harbormaster Office	3/6/2007	4/4/2007	347	
	4/4/2007	5/4/2007	272	
	5/4/2007	6/5/2007	262	
	6/5/2007	7/3/2007	241	
	7/3/2007	8/3/2007	319	
	8/3/2007	9/4/2007	298	
	9/4/2007	10/3/2007	281	
	10/3/2007	11/2/2007	290	
	11/2/2007	12/4/2007	322	
	12/4/2007	1/4/2008	431	
	1/4/2008	2/4/2008	421	
				3,907
13953690016	1/3/2007	2/1/2007	7380	
Police	2/1/2007	3/6/2007	8820	
	3/6/2007	4/4/2007	10800	
	4/4/2007	5/4/2007	7200	
	5/4/2007	6/5/2007	9060	
	6/5/2007	7/3/2007	9840	
	7/3/2007	8/3/2007	12480	
	8/3/2007	9/4/2007	11340	
	9/4/2007	10/3/2007	12780	
	10/3/2007	11/2/2007	9960	
	11/2/2007	12/4/2007	9300	
	12/4/2007	1/4/2008	8700	
	1/4/2008	2/4/2008	8640	
				126,300
Total this column				645,052

Account number	from date	to date	kwh	total
13954290014	1/28/2007	2/28/2007	24360	
Orleans Elementary	2/28/2007	3/28/2007	21960	
	3/28/2007	4/28/2007	19840	
	4/28/2007	5/28/2007	16440	
	5/28/2007	6/28/2007	14760	
	6/28/2007	7/28/2007	9160	
	7/28/2007	8/28/2007	10480	
	8/28/2007	9/28/2007	16120	
	9/28/2007	10/28/2007	16880	
	10/28/2007	11/28/2007	19040	
	11/28/2007	12/28/2007	22800	
	12/28/2007	1/28/2008	23280	
				215,120
Total this column				933,744

Grand Total	1,578,796

NSTAR

Bill Summary

My Bill
- Bill Summary (Home)
- Bill Detail
- Usage Detail
- Bill Messages
- Print-Friendly Bill

Payments
- Pay Now
- Pay Multiple Accounts
- Recurring Schedule
- Transaction Activity
- Terms & Conditions

My Profile
- Linked Accounts
- Bank Accounts
- Customer Settings

Account Nickname: 292 RTE-28

Account Number: 2731512001[illegible]

Customer: towater

Settings | Log Out | E-Bill FAQ

Current Balance: $6,103.49 Pay Now Add a Bank Account

"Go Paperless" and enjoy hassle free, paperless billing.

Bill Higher Than Usual?
Billing Rights
Budget Billing
Customer Communications
Home Analyzer
Mailing Address Change
Make a Comment
Report a Payment
Set Up a Payment Plan
Stop Service
Transfer Service
Update Telephone Number
Understanding Your Bill

Billing Period: Aug 5, 2008

NSTAR Bill Summary

Download

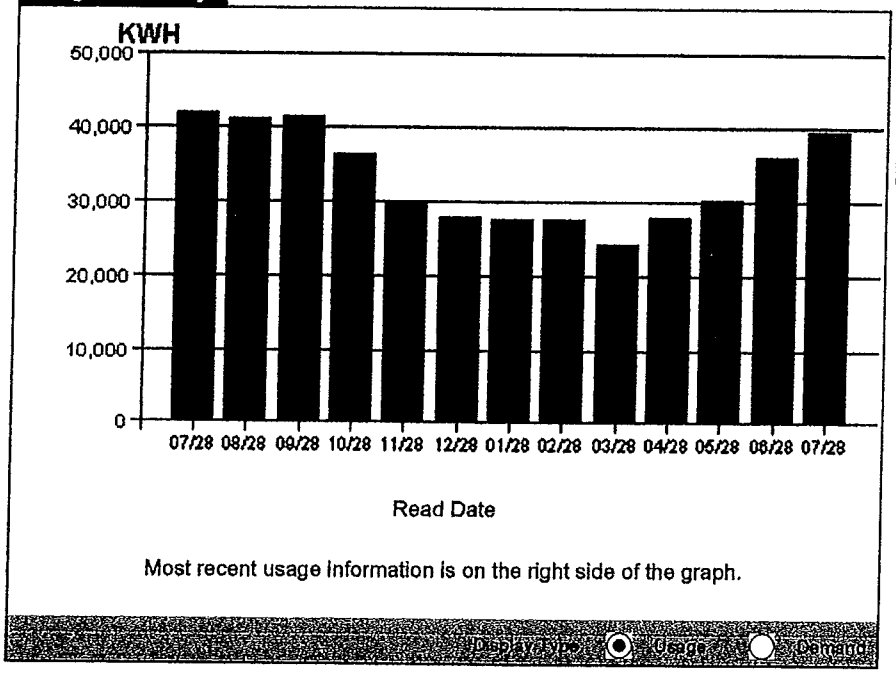
Account Number	**2731 512 0017**
Billing Date	**Aug 5, 2008**
Next Read Date	Sep 3, 2008
Previous Bill	4,370.91
Payments - Thank You	-5,381.47
Total Delivery Charges	2,419.00
Delivery Svcs Balance	**$1,408.44**

Supplier Bill Summary

Download

Previous Bill	7,308.09
Payments - Thank You	-7,308.09
Current Supplier Charges	4,338.01
Supplier Balance	**$4,338.01**

Usage Summary



Read Date

Most recent usage information is on the right side of the graph.

Display Type: Usage Demand

Last 5 Transactions

Date	Amount
01/20/2009	-$5,481.86
01/14/2009	$6,345.60
12/23/2008	$43.68
12/23/2008	-$5,378.72
12/01/2008	-$6,574.17

All Transaction Activity

Account Nickname: 292 RTE-28

Account Number: 27[illegible]2007

Customer Service | Log Out | E-Bill FAQ

Bill Detail

Display Billing Period: Aug 5, 2008

My Bill
- Bill Summary (Home)
- Bill Detail
- Usage Detail
- Bill Messages
- Print-Friendly Bill

Payments
- Pay Now
- Pay Multiple Accounts
- Recurring Schedule
- Transaction Activity
- Terms & Conditions

My Profile
- Linked Accounts
- Bank Accounts
- Customer Settings

Utility Charges

Download

Delivery Services	Customer Charge					5.53
	Distribution Demand Charges					
	1st 10 KW	No Charge				0.00
	Over 10 KW	4.86	X	131.6	KW	639.58
	Distribution Energy Charges					
	1st 2300 KWH	.04111	X	2300	KWH	94.55
	Over 2300 KWH	.01184	X	37140	KWH	439.74
	Transition *	.02082	X	39440	KWH	821.14
	Transmission	.00761	X	39440	KWH	300.14
	Renewable Energy	.00050	X	39440	KWH	19.72
	Energy Conservation	.00250	X	39440	KWH	98.60
	Delivery Services Total					**2419.00**

Supplier Charges

Download

Supplier Account Number
134665

Conedison Solutions
701 Westchester Ave
Suite 300 East
White Plains Ny 10604
(800)381-9192

Previous Bill						7,308.09
Payments - Thank You						-7,308.09
Current Supplier Charges						4,338.01
Supplier Balance						**$4,338.01**
Supplier Activity Detail						
Rate CLC NMUNI06 Jun 28, 2008 - Jul 28, 2008						
Energy Charge	.109990	X	39440	KWH		4,338.01
Current Supplier Charges						**$4,338.01**

Bill Messages

The following messages pertain to your account:

* PART OF WHAT WE COLLECT IN THE TRANSITION
CHARGE IS OWNED BY CEC FUNDING LLC
CHARGES ARE SUBJECT TO 1.12% INTEREST
AFTER 55 DAYS.

NSTAR

Bill Summary

My Bill
- Bill Summary (Home)
- Bill Detail
- Usage Detail
- Bill Messages
- Print-Friendly Bill

Payments
- Pay Now
- Pay Multiple Accounts
- Recurring Schedule
- Transaction Activity
- Terms & Conditions

My Profile
- Linked Accounts
- Bank Accounts
- Customer Settings

Account Nickname: 292 RTE-28

Account Number: 2731 5120 0017

Customer: towater

Settings | Log On | E-Bill FAQ

Current Balance: $6,103.49 Pay Now Add a Bank Account

"Go Paperless" and enjoy hassle free, paperless billing.

Billing Period: Jan 7, 2009

Bill Higher Than Usual?
Billing Rights
Budget Billing
Customer Communications
Home Analyzer
Mailing Address Change
Make a Comment
Report a Payment
Set Up a Payment Plan
Stop Service
Transfer Service
Update Telephone Number
Understanding Your Bill

NSTAR Bill Summary

Download

Account Number	**2731 512 0017**
Billing Date	**Jan 7, 2009**
Next Read Date	Feb 3, 2009
Previous Bill	1,085.24
Payment - Thank You	-1,992.66
Other Charges	43.68
Total Delivery Charges	2,235.17
Delivery Svcs Balance	**$1,371.43**

Supplier Bill Summary

Download

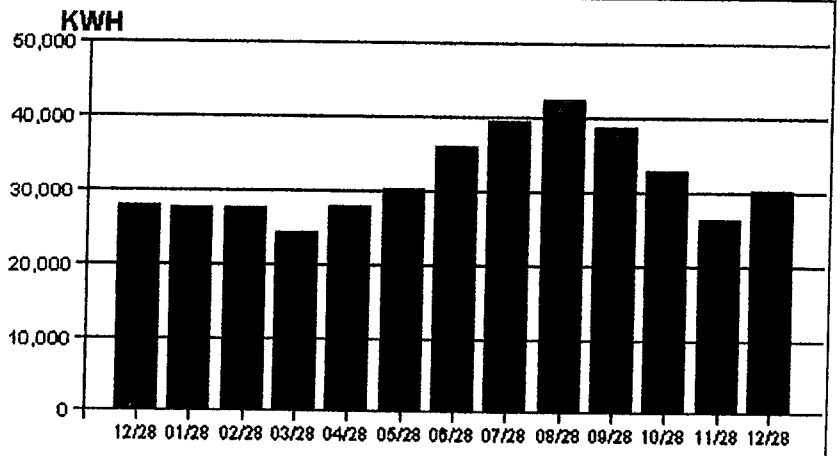
Previous Bill	3,386.06
Payment - Thank You	-3,386.06
Current Supplier Charges	3,868.32
Supplier Balance	**$3,868.32**

Last 5 Transactions

Date	Amount
01/20/2009	-$5,481.86
01/14/2009	$6,345.60
12/23/2008	$43.68
12/23/2008	-$5,378.72
12/01/2008	-$6,574.17

All Transaction Activity

Usage Summary



Read Date

Most recent usage information is on the right side of the graph.

Display Type: Usage Demand

Bill Detail

My Bill
Bill Summary (Home)
Bill Detail
Usage Detail
Bill Messages
Print-Friendly Bill
Payments
Pay Now
Pay Multiple Accounts
Recurring Schedule
Transaction Activity
Terms & Conditions
My Profile
Linked Accounts
Bank Accounts
Customer Settings

Account Nickname: 292 RTE-28

Account Number: [redacted]

Customer: [redacted]
Settings | Log Out | E-Bill FAQ

Display Billing Period: Jan 7, 2009

Utility Charges

Download

Delivery Services	Customer Charge					5.53
	Distribution Demand Charges					
	1st 10 KW	No Charge				0.00
	Over 10 KW	4.86	X	176.4	KW	857.30
	Distribution Energy Charges					
	1st 2300 KWH	.04111	X	2300	KWH	94.55
	Over 2300 KWH	.01184	X	27860	KWH	329.86
	Transition *	.02082	X	30160	KWH	627.93
	Transmission	.00761	X	30160	KWH	229.52
	Renewable Energy	.00050	X	30160	KWH	15.08
	Energy Conservation	.00250	X	30160	KWH	75.40
	Delivery Services Total					**2235.17**

Supplier Charges

Download

Supplier Account Number
134665

Conedison Solutions
701 Westchester Ave
Suite 300 East
White Plains Ny 10604
(800)381-9192

Previous Bill					3,386.06
Payment - Thank You					-3,386.06
Current Supplier Charges					3,868.32
Supplier Balance					**$3,868.32**
Supplier Activity Detail					
Rate CLC NMUNI06 Nov 28, 2008 - Dec 28, 2008					
Energy Charge	.128260	X	30160	KWH	3,868.32
Current Supplier Charges					**$3,868.32**

Other Charges or Credits

Download

Misapplied Payment	20.73
Misapplied Payment	7.37
Misapplied Payment	15.58
Current Other Charges	**43.68**

Bill Messages

The following messages pertain to your account.

* PART OF WHAT WE COLLECT IN THE TRANSITION
CHARGE IS OWNED BY CEC FUNDING LLC
CHARGES ARE SUBJECT TO 1.12% INTEREST
AFTER 55 DAYS.

DIGGING? HITTING AN UNDERGROUND WIRE OR PIPE CAN BE ANGEROUS. THAT'S WHY STATE L REQUIRES YOU OR YOUR CONTRACTO O CALL DIG SAFE AT 888-DI AFE AT LEAST THREE BUSINESS DAYS PRIOR TO DIGGING. FOR MORE INFORMATION VISIT WWW.DIGSAFE.COM.

1152

Account Number	Billing Date	Next Read Date
1393 465 0014	Jan 7, 2009	Feb 3, 2009

Service Provided to

ORLEANS COUNCIL ON AGING
150 ROCK-HARBOR RD
ORLEANS MA 02653

Account Summary

Previous Bill	266.84
Payment - Thank You	-266.84
Total Delivery Charges	248.25
Delivery Svcs Balance	**$248.25**

Electricity Used

Rate 33-General - Annual
Meter 5090467

Dec 28, 2008 Actual Read		1561
Nov 28, 2008 Actual Read	-	1521
		40
Multiplied by Constant	X	80
30 Day Billed Use		3200

5090467	KWH	DMD
12/28	3200	17.6
11/28	3360	20.0
10/28	3040	19.2
09/28	4240	28.8
08/28	5280	37.6
07/28	5360	32.8
06/28	4320	36.0
05/28	3120	16.0
04/28	3440	16.0
03/28	3520	18.4
02/28	4080	20.
01/28	3920	16.
12/28	4080	19.

Cost of Electricity

Delivery Services			
Customer Charge			5.53
Distribution Demand Charges			
1st 10 KW	No Charge		0.00
Over 10 KW	4.86 X	7.6 KW	36.94
Distribution Energy Charges			
1st 2300 KWH	.04111 X	2300 KWH	94.55
Over 2300 KWH	.01184 X	900 KWH	10.66
Transition *	.02082 X	3200 KWH	66.62
Transmission	.00761 X	3200 KWH	24.35
Renewable Energy	.00050 X	3200 KWH	1.60
Energy Conservation	.00250 X	3200 KWH	8.00
Delivery Services Total			**248.25**

** PART OF WHAT WE COLLECT IN THE TRANSITION CHARGE IS OWNED BY CEC FUNDING LLC*

CHARGES ARE SUBJECT TO 1.12% INTEREST AFTER 25 DAYS.

VENDOR # 8252 | INVOICE # 1393465 0014

FUND COA | DEPT. 01541002 | ACCT. # 521100 | ARTICLE

JAN 21 2009

I hereby certify that I have approved this purchase, matched it with the related purchase order if applicable, and that it has been checked for proper quantities, price and clerical accuracy.

SIGNATURE

AMOUNT TO PAY $658.68

NSTAR

CUSTOMER SERVICE CENTER 800-592-2000
FOR BUSINESS CUSTOMERS 800-340-9822

APPENDIX E:

Loan Current Value Worksheets (Solar)

Section 2 - Ten-Year Loan – Present Value

The positive cumulative cash flow occurs over the last 16- years of the 30-year life. The current value may be calculated by adjusting each year from the start of positive cash flow to its current value.

Year	Inflation Factor	Cash Flow	Current Value
14	1.9799303	5959	3009.7
15	2.0789274	7113	3421.5
17	2.2920173	(2777)	(1272.2)
18	2,4066136	7716	3366.5
19	2.5269442	8036	3339.1
20	2.6532914	8372	3313.0
21	2.7859559	8723	3287.7
22	2.9252536	9090	3262.8
23	3.0715162	9474	3238.7
24	3.225092	9876	3215.4
25	3,3863466	10294	3191.8
26	3.5556639	10732	3169.2
27	3.73347	11190	3147.0
28	3,9201193	11669	3125.5
29	4.116125	12169	3104.2
30	4.3219314	13237	3062.8
Sum			$50057.7

Section2 - Twenty- Year Loan – Present Value

The positive cumulative cash flow occurs over the entire 30-year design life. The current value may be calculated by adjusting each year of the design life.

Year	Inflation Factor	Cash Flow	Current Value
1	1.05	(3)	-2.86
2	1.1025	155	140.6
3	1.1576	320	276.4
4	1.2155	493	405.6
5	1.2763	673	527.3
6	1.3401	862	643.2
7	1.4071	1059	752.6
8	1.4775	1265	856.2
9	1.5513	1481	954.7
10	1.6289	1706	1047.3
11	1.710.3	1942	1135.4
12	1.7959	2188	1218.4
13	1.8856	2446	1297.2
14	1.9800	2715	1371.2
15	2.0789	2997	1441.6
16	2.1829	(6894)	-3158.2

17	2.2920	3598	1569.8
18	2.4066	3920	1628.8
19	2,5269	4256	1684.2
20	2,6533	4607	1736.3
21	2.7860	9090	3262.8
22	2.9253	9474	3238.6
23	3.0715	9875	3215.7
24	3.2251	10294	3191.8
25	3.3863	10732	3169.2
26	3.5557	11190	3147.1
27	3.7335	11689	3130.9
28	3.9201	12169	3104.3
29	4.1161	12691	3083.3
30	4.3219	13237	3062.8
Sum			$ 52496.8

APPENDIX F:

MTC Solar Model: Scenario Results

Scenario A

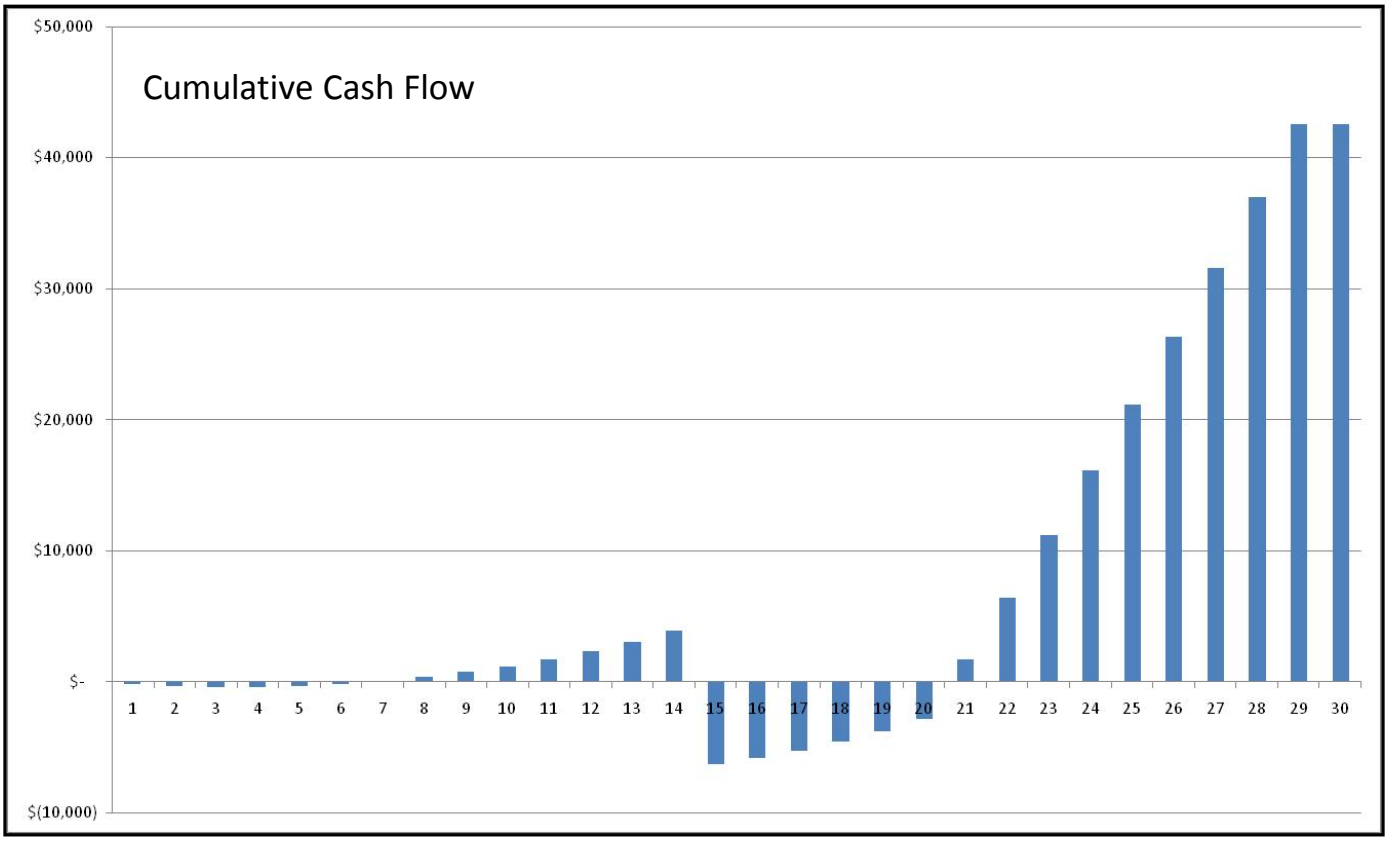
Key

Entry Cells	
Cells Draw Data from Another Worksheet	
Calculation Cells (Not for Entry)	

Select Taxable or Non-Taxable Entity	Non-Taxable	
Project and Customer Cost Assumptions		
Solar Photovoltaic System Size	14,760	Watts (DC STC)
Total System Cost/Watt	$ 7.79	$/Watt (DC STC)
Total System Cost	$ 114,980	
MTC Rebate Assumptions		
MTC Scenario A: Non-Taxable Rebate	$ 4.500	$/Watt (DC STC)
Scenario A Rebate	$ 66,420	
MTC Scenario B: Taxable Rebate	$ 4.500	$/Watt (DC STC)
Scenario B Rebate	$ 66,420	
Project Performance and Savings/ Cost Assumptions		
Annual Net Capacity Factor	14.0%	kW (DC STC) to kWh AC
Annual Production Degradation	0.50%	%
Project Life	29	Years
Electricity Revenue (Avoided Costs)	$ 0.17	$/kWh
Electricity Revenue (Avoided Costs) Annual Adjustor	3.0%	%
Renewable Energy Certificate (REC) Revenue	$ 0.03	$/kWh
REC Revenue Annual Adjustor	0.0%	%
REC Revenue Term	15	Years (must be equal to or less than project life)
Annual Operations and Maintenance Cost	$ 250	$/Year
Annual Operations and Maintenance Adjustor	3.0%	%
Future Inverter Replacement Cost	$ 0.75	$/Watt (DC STC)
Inverter Life, Replace Every X Years	15	Year (must be equal to or less than project life)

Financing Assumptions

% Financed w/ Cash	0%
% Financed w/ Loan	100%
Loan Interest Rate	4%
Loan Period	20
Scenario A Net Cost	$ 48,560



Scenario B

Key

Entry Cells	
Cells Draw Data from Another Worksheet	
Calculation Cells (Not for Entry)	

Select Taxable or Non-Taxable Entity	Non-Taxable

Project and Customer Cost Assumptions

Solar Photovoltaic System Size	14,760	Watts (DC STC)
Total System Cost/Watt	$ 7.79	$/Watt (DC STC)
Total System Cost	$ 114,980	

MTC Rebate Assumptions

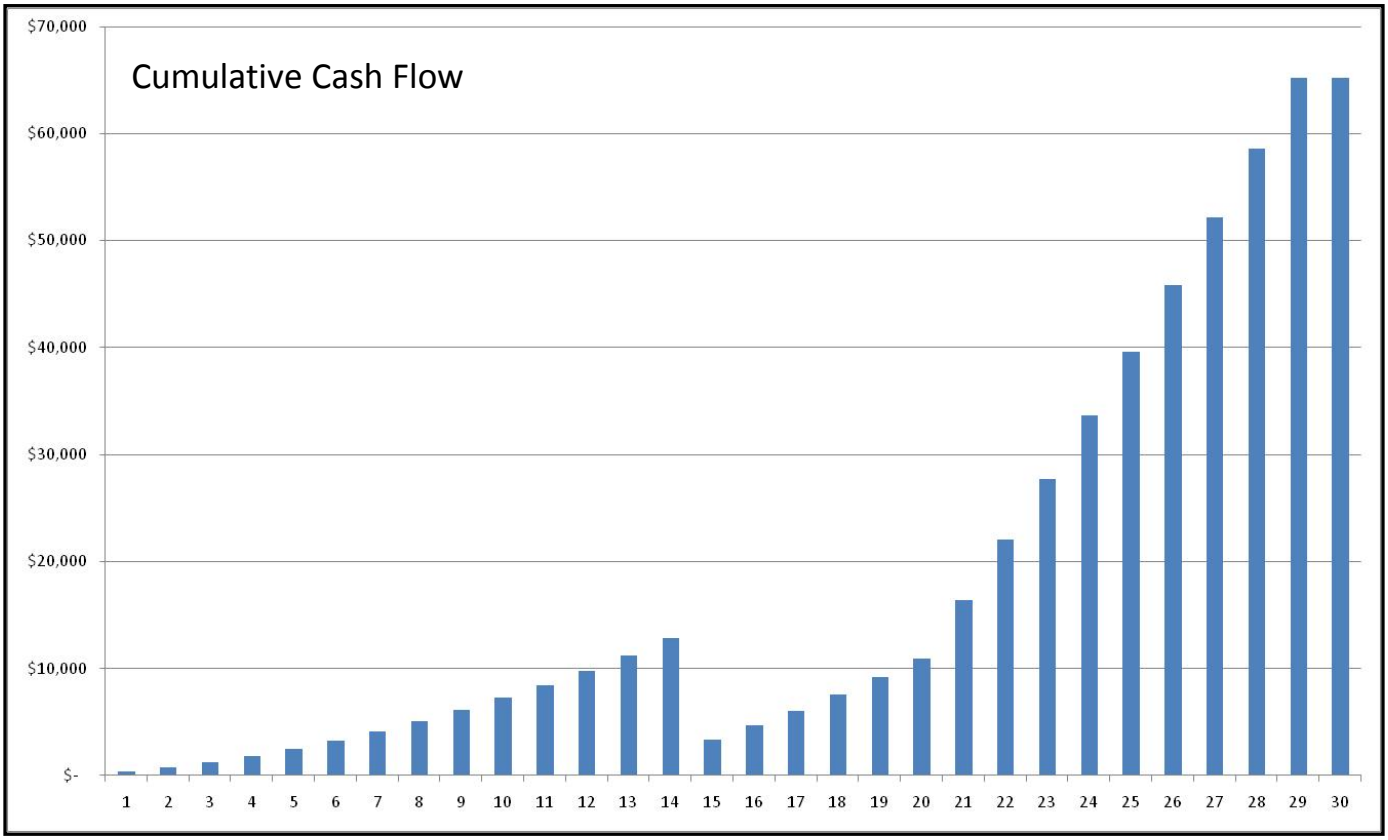
MTC Scenario A: Non-Taxable Rebate	$ 4.500	$/Watt (DC STC)
Scenario A Rebate	$ 66,420	
MTC Scenario B: Taxable Rebate	$ 4.500	$/Watt (DC STC)
Scenario B Rebate	$ 66,420	

Project Performance and Savings/ Cost Assumptions

Annual Net Capacity Factor	14.0%	kW (DC STC) to kWh AC
Annual Production Degradation	0.50%	%
Project Life	29	Years
Electricity Revenue (Avoided Costs)	$ 0.20	$/kWh
Electricity Revenue (Avoided Costs) Annual Adjustor	3.0%	%
Renewable Energy Certificate (REC) Revenue	$ 0.03	$/kWh
REC Revenue Annual Adjustor	0.0%	%
REC Revenue Term	15	Years (must be equal to or less than project life)
Annual Operations and Maintenance Cost	$ 250	$/Year
Annual Operations and Maintenance Adjustor	3.0%	%
Future Inverter Replacement Cost	$ 0.75	$/Watt (DC STC)
Inverter Life, Replace Every X Years	15	Year (must be equal to or less than project life)

Financing Assumptions

% Financed w/ Cash	0%
% Financed w/ Loan	100%
Loan Interest Rate	4%
Loan Period	20
Scenario A Net Cost	$ 48,560



Scenario C

Key

Entry Cells	
Cells Draw Data from Another Worksheet	
Calculation Cells (Not for Entry)	

Select Taxable or Non-Taxable Entity	Non-Taxable	

Project and Customer Cost Assumptions

Solar Photovoltaic System Size	14,760	Watts (DC STC)
Total System Cost/Watt	$ 7.79	$/Watt (DC STC)
Total System Cost	$ 114,980	

MTC Rebate Assumptions

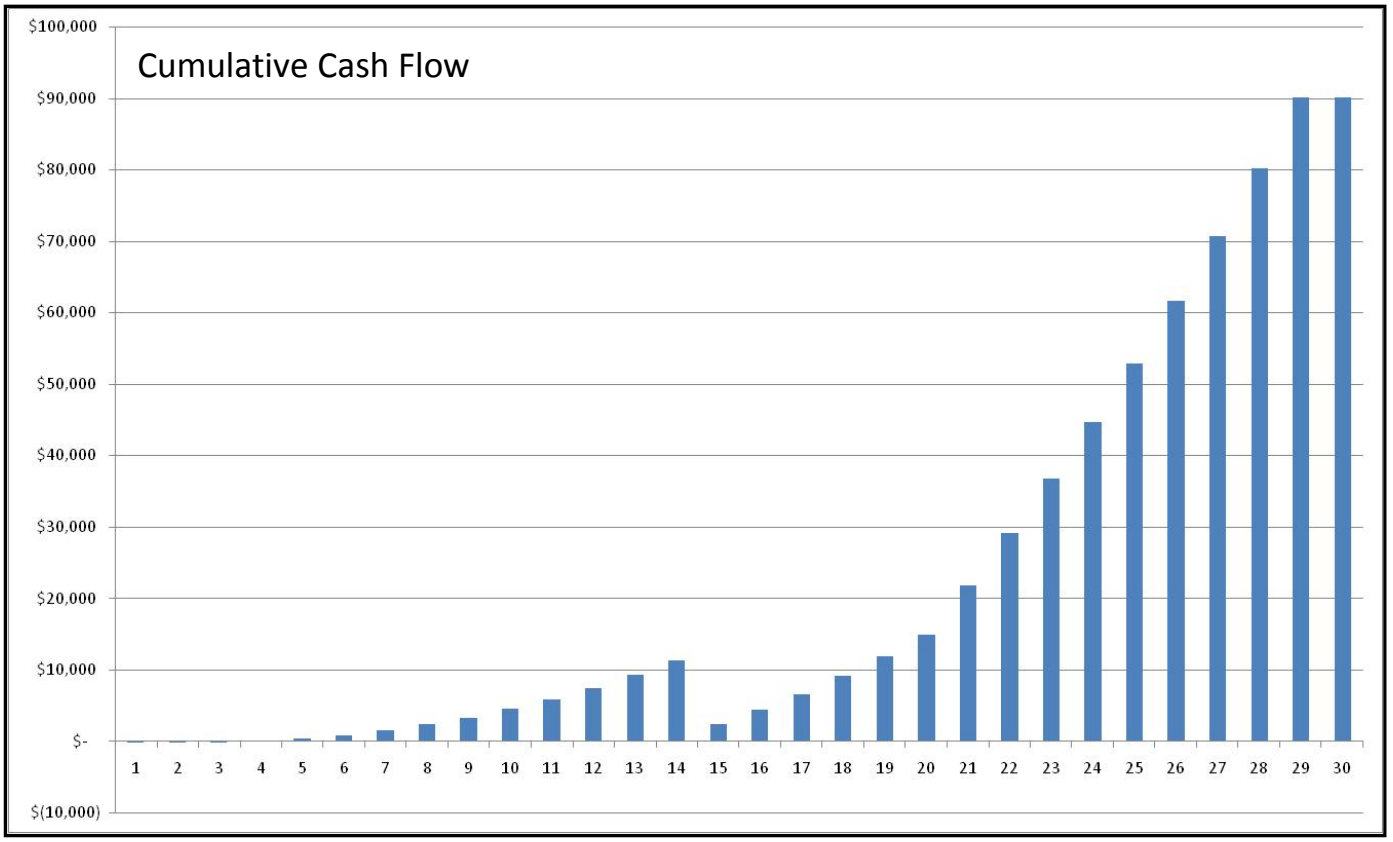
MTC Scenario A: Non-Taxable Rebate	$ 4.500	$/Watt (DC STC)
Scenario A Rebate	$ 66,420	
MTC Scenario B: Taxable Rebate	$ 4.500	$/Watt (DC STC)
Scenario B Rebate	$ 66,420	

Project Performance and Savings/ Cost Assumptions

Annual Net Capacity Factor	14.0%	kW (DC STC) to kWh AC
Annual Production Degradation	0.50%	%
Project Life	29	Years
Electricity Revenue (Avoided Costs)	$ 0.17	$/kWh
Electricity Revenue (Avoided Costs) Annual Adjustor	5.0%	%
Renewable Energy Certificate (REC) Revenue	$ 0.03	$/kWh
REC Revenue Annual Adjustor	0.0%	%
REC Revenue Term	15	Years (must be equal to or less than project life)
Annual Operations and Maintenance Cost	$ 250	$/Year
Annual Operations and Maintenance Adjustor	3.0%	%
Future Inverter Replacement Cost	$ 0.75	$/Watt (DC STC)
Inverter Life, Replace Every X Years	15	Year (must be equal to or less than project life)

Financing Assumptions

% Financed w/ Cash	0%
% Financed w/ Loan	100%
Loan Interest Rate	4%
Loan Period	20
Scenario A Net Cost	$ 48,560



Scenario D

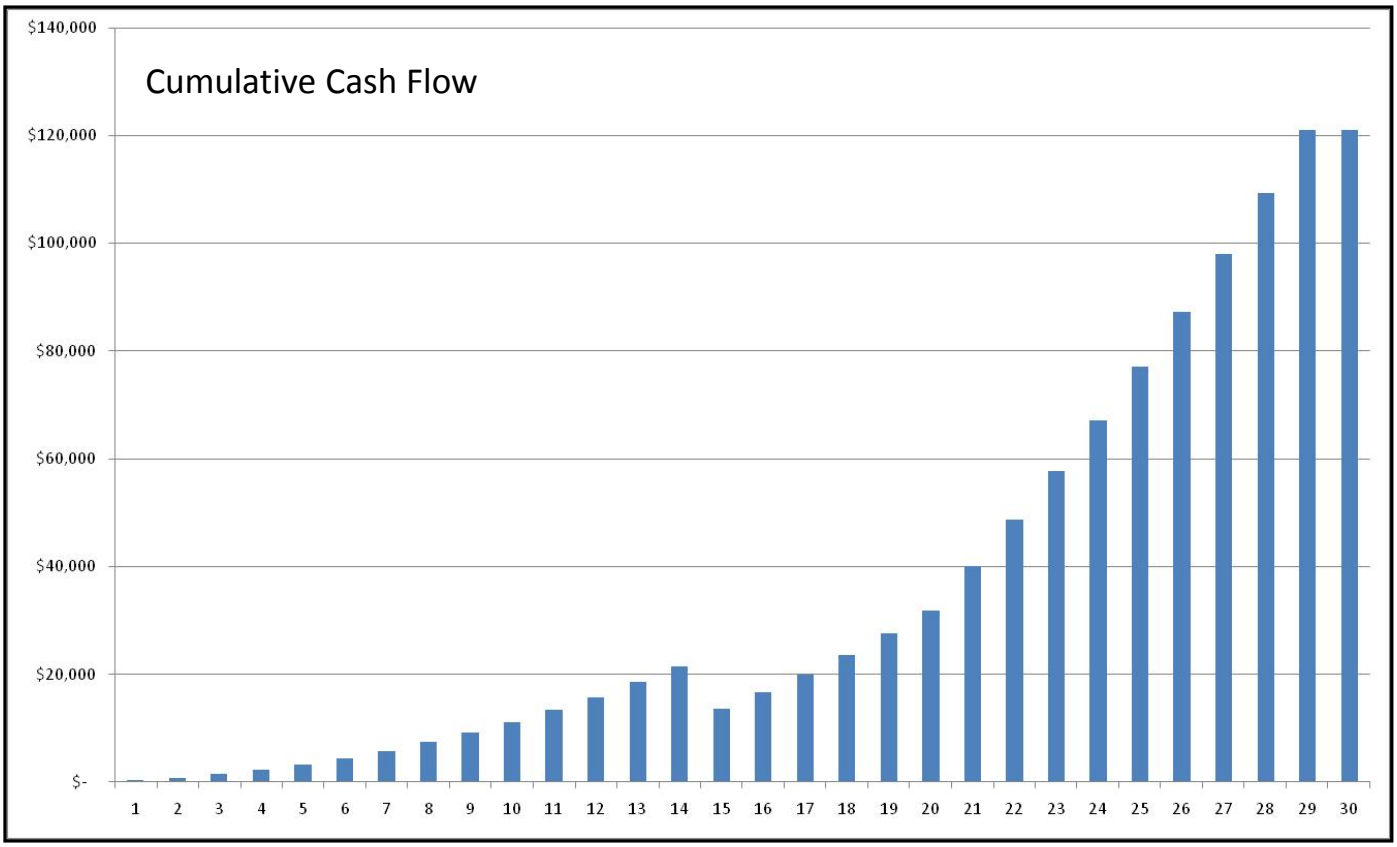
Key

Entry Cells	
Cells Draw Data from Another Worksheet	
Calculation Cells (Not for Entry)	

Select Taxable or Non-Taxable Entity	Non-Taxable	
Project and Customer Cost Assumptions		
Solar Photovoltaic System Size	14,760	Watts (DC STC)
Total System Cost/Watt	$ 7.79	$/Watt (DC STC)
Total System Cost	$ 114,980	
MTC Rebate Assumptions		
MTC Scenario A: Non-Taxable Rebate	$ 4.500	$/Watt (DC STC)
Scenario A Rebate	$ 66,420	
MTC Scenario B: Taxable Rebate	$ 4.500	$/Watt (DC STC)
Scenario B Rebate	$ 66,420	
Project Performance and Savings/ Cost Assumptions		
Annual Net Capacity Factor	14.0%	kW (DC STC) to kWh AC
Annual Production Degradation	0.50%	%
Project Life	29	Years
Electricity Revenue (Avoided Costs)	$ 0.20	$/kWh
Electricity Revenue (Avoided Costs) Annual Adjustor	5.0%	%
Renewable Energy Certificate (REC) Revenue	$ 0.03	$/kWh
REC Revenue Annual Adjustor	0.0%	%
REC Revenue Term	15	Years (must be equal to or less than project life)
Annual Operations and Maintenance Cost	$ 250	$/Year
Annual Operations and Maintenance Adjustor	3.0%	%
Future Inverter Replacement Cost	$ 0.75	$/Watt (DC STC)
Inverter Life, Replace Every X Years	15	Year (must be equal to or less than project life)

Financing Assumptions

% Financed w/ Cash	0%
% Financed w/ Loan	100%
Loan Interest Rate	4%
Loan Period	20
Scenario A Net Cost	$ 48,560



Scenario E

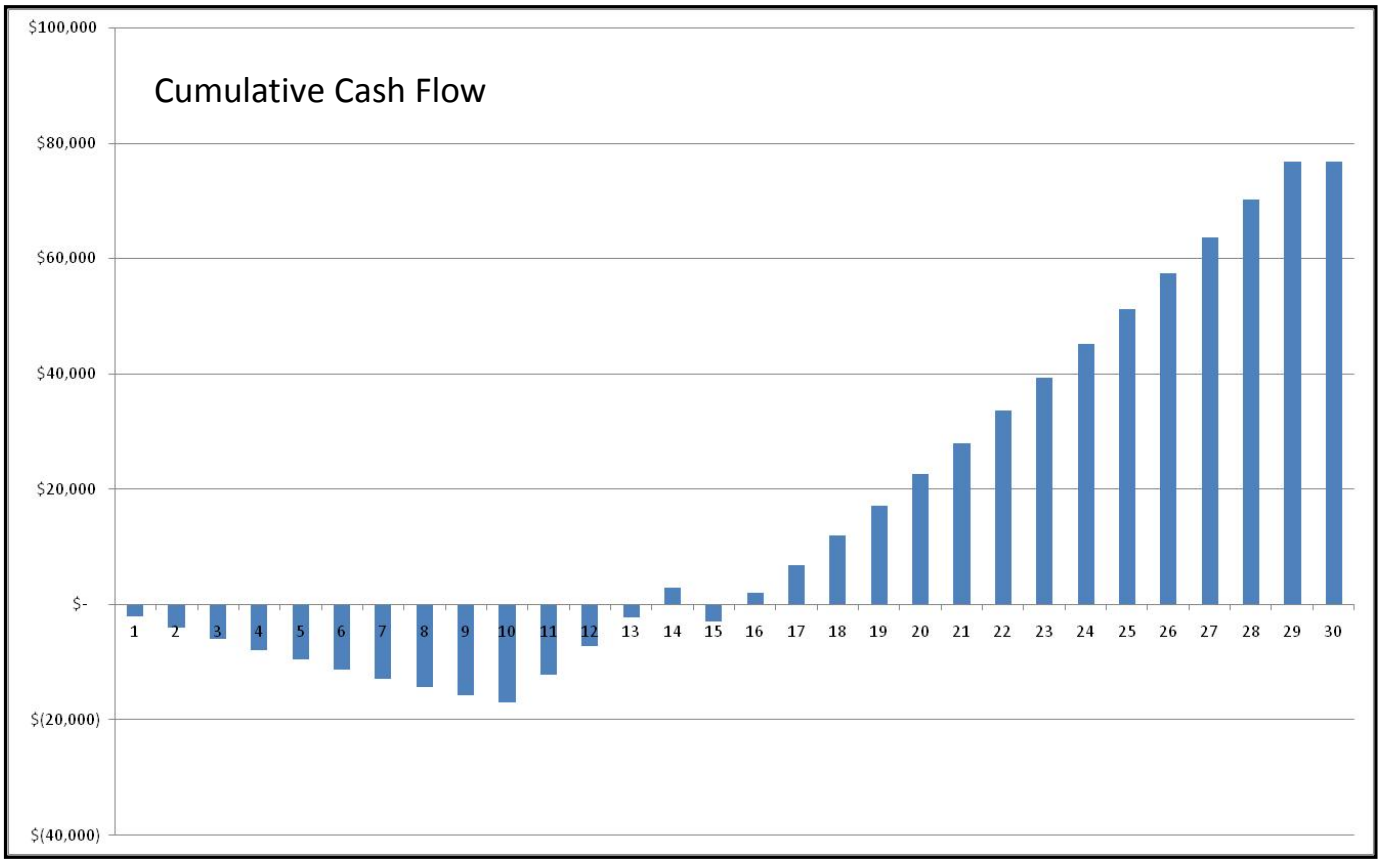
Key

Entry Cells	
Cells Draw Data from Another Worksheet	
Calculation Cells (Not for Entry)	

Select Taxable or Non-Taxable Entity	Non-Taxable	
Project and Customer Cost Assumptions		
Solar Photovoltaic System Size	14,760	Watts (DC STC)
Total System Cost/Watt	$ 7.79	$/Watt (DC STC)
Total System Cost	$ 114,980	
MTC Rebate Assumptions		
MTC Scenario A: Non-Taxable Rebate	$ 4.500	$/Watt (DC STC)
Scenario A Rebate	$ 66,420	
MTC Scenario B: Taxable Rebate	$ 4.500	$/Watt (DC STC)
Scenario B Rebate	$ 66,420	
Project Performance and Savings/ Cost Assumptions		
Annual Net Capacity Factor	14.0%	kW (DC STC) to kWh AC
Annual Production Degradation	0.50%	%
Project Life	29	Years
Electricity Revenue (Avoided Costs)	$ 0.20	$/kWh
Electricity Revenue (Avoided Costs) Annual Adjustor	3.0%	%
Renewable Energy Certificate (REC) Revenue	$ 0.03	$/kWh
REC Revenue Annual Adjustor	0.0%	%
REC Revenue Term	15	Years (must be equal to or less than project life)
Annual Operations and Maintenance Cost	$ 250	$/Year
Annual Operations and Maintenance Adjustor	3.0%	%
Future Inverter Replacement Cost	$ 0.75	$/Watt (DC STC)
Inverter Life, Replace Every X Years	15	Year (must be equal to or less than project life)

Financing Assumptions

% Financed w/ Cash	0%
% Financed w/ Loan	100%
Loan Interest Rate	4%
Loan Period	10
Scenario A Net Cost	$ 48,560



Scenario F

Key

Entry Cells	
Cells Draw Data from Another Worksheet	
Calculation Cells (Not for Entry)	

Select Taxable or Non-Taxable Entity: Non-Taxable

Project and Customer Cost Assumptions

Solar Photovoltaic System Size	14,760	Watts (DC STC)
Total System Cost/Watt	$ 7.79	$/Watt (DC STC)
Total System Cost	$ 114,980	

MTC Rebate Assumptions

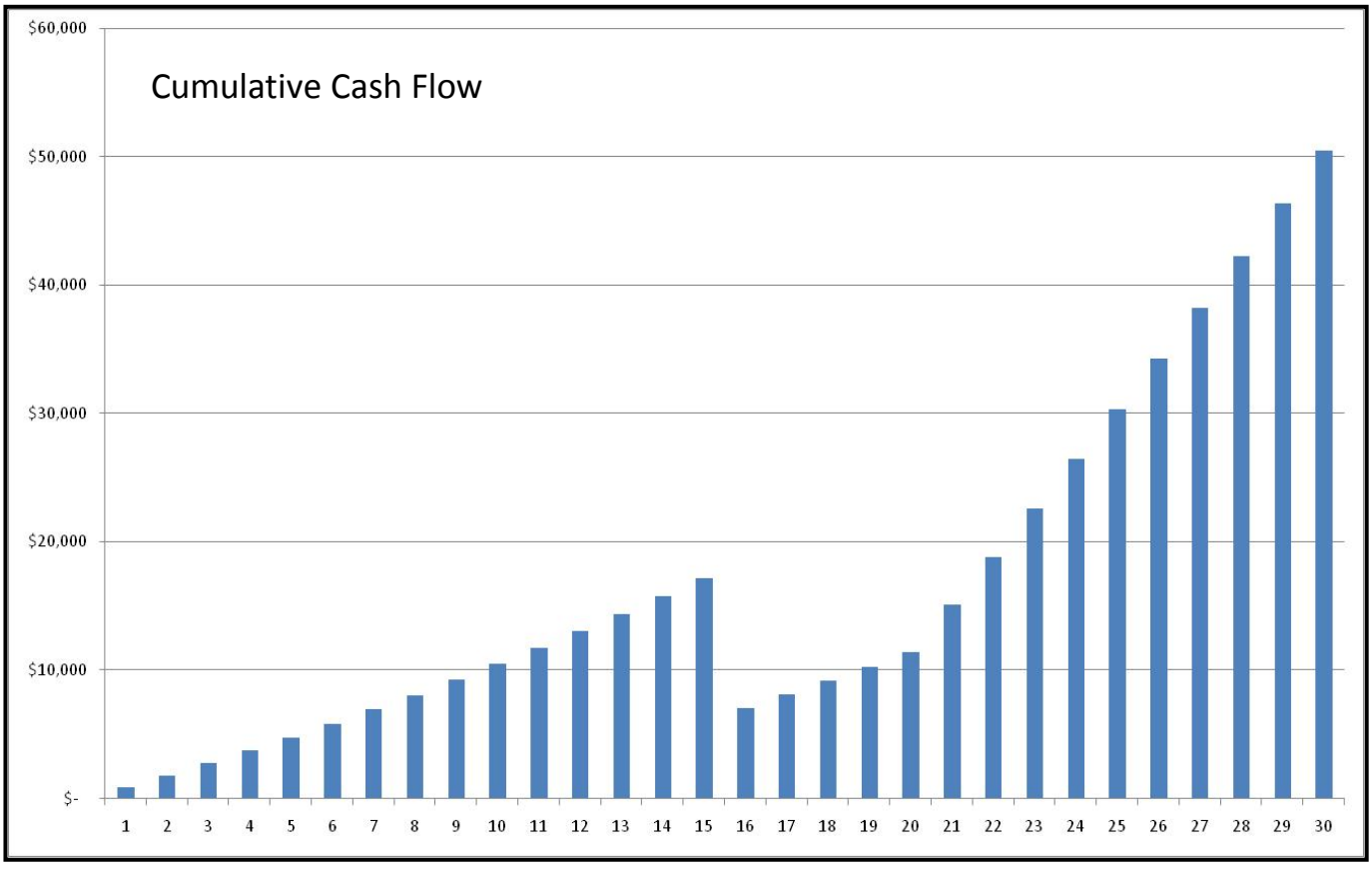
MTC Scenario A: Non-Taxable Rebate	$ 5.500	$/Watt (DC STC)
Scenario A Rebate	$ 81,180	
MTC Scenario B: Taxable Rebate	$ 5.500	$/Watt (DC STC)
Scenario B Rebate	$ 81,180	

Project Performance and Savings/ Cost Assumptions

Annual Net Capacity Factor	14.0%	kW (DC STC) to kWh AC
Annual Production Degradation	0.50%	%
Project Life	30	Years
Electricity Revenue (Avoided Costs)	$ 0.17	$/kWh
Electricity Revenue (Avoided Costs) Annual Adjustor	2.0%	%
Renewable Energy Certificate (REC) Revenue	$ 0.03	$/kWh
REC Revenue Annual Adjustor	0.0%	%
REC Revenue Term	15	Years (must be equal to or less than project life)
Annual Operations and Maintenance Cost	$ 250	$/Year
Annual Operations and Maintenance Adjustor	3.0%	%
Future Inverter Replacement Cost	$ 0.75	$/Watt (DC STC)
Inverter Life, Replace Every X Years	16	Year (must be equal to or less than project life)

Financing Assumptions

% Financed w/ Cash	0%
% Financed w/ Loan	100%
Loan Interest Rate	4%
Loan Period	20
Scenario A Net Cost	$ 33,800



Scenario G

Key

Entry Cells	
Cells Draw Data from Another Worksheet	
Calculation Cells (Not for Entry)	

Select Taxable or Non-Taxable Entity: Non-Taxable

Project and Customer Cost Assumptions

Solar Photovoltaic System Size	14,760	Watts (DC STC)
Total System Cost/Watt	$ 7.79	$/Watt (DC STC)
Total System Cost	$ 114,980	

MTC Rebate Assumptions

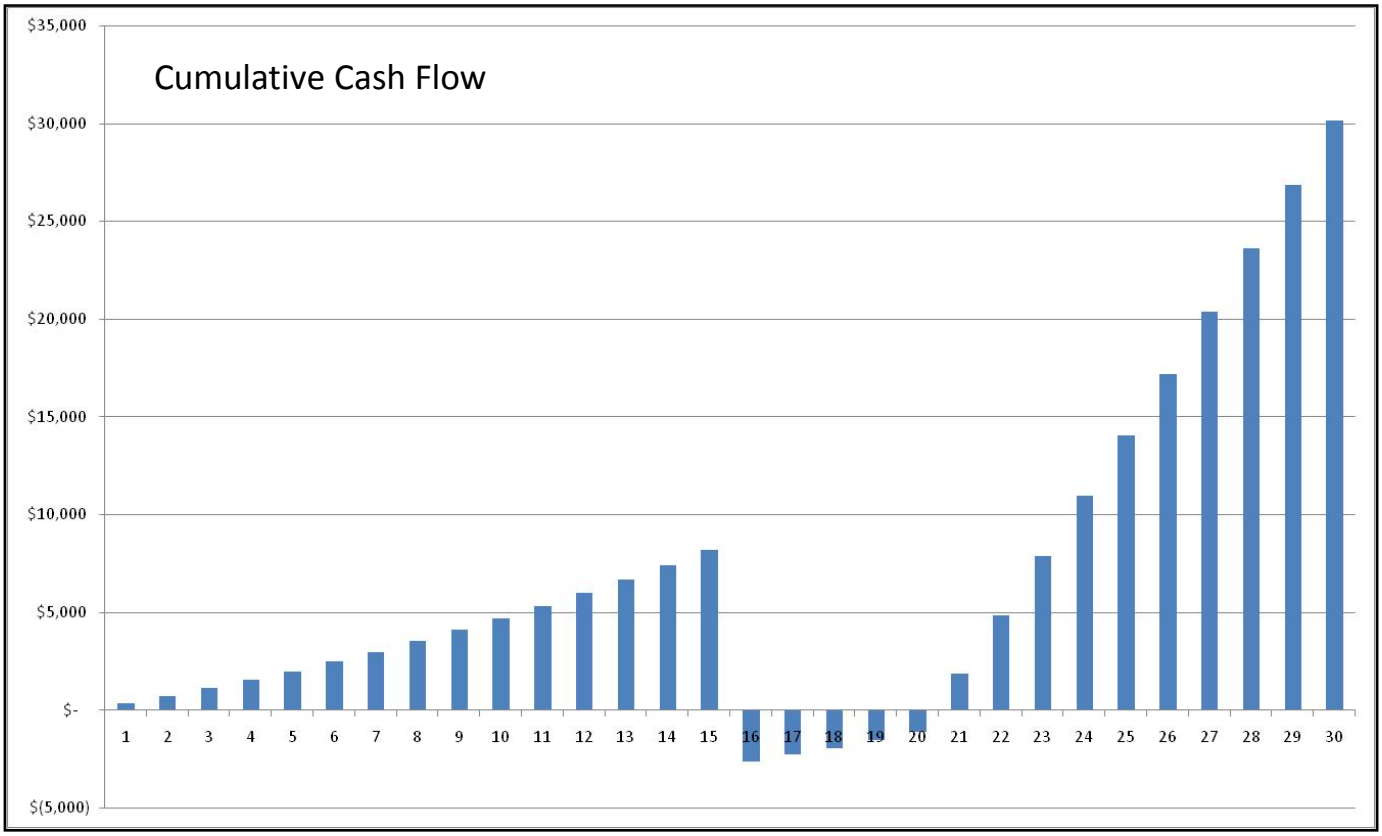
MTC Scenario A: Non-Taxable Rebate	$ 5.500	$/Watt (DC STC)
Scenario A Rebate	$ 81,180	
MTC Scenario B: Taxable Rebate	$ 5.500	$/Watt (DC STC)
Scenario B Rebate	$ 81,180	

Project Performance and Savings/ Cost Assumptions

Annual Net Capacity Factor	14.0%	kW (DC STC) to kWh AC
Annual Production Degradation	0.50%	%
Project Life	30	Years
Electricity Revenue (Avoided Costs)	$ 0.14	$/kWh
Electricity Revenue (Avoided Costs) Annual Adjustor	2.0%	%
Renewable Energy Certificate (REC) Revenue	$ 0.03	$/kWh
REC Revenue Annual Adjustor	0.0%	%
REC Revenue Term	15	Years (must be equal to or less than project life)
Annual Operations and Maintenance Cost	$ 250	$/Year
Annual Operations and Maintenance Adjustor	3.0%	%
Future Inverter Replacement Cost	$ 0.75	$/Watt (DC STC)
Inverter Life, Replace Every X Years	16	Year (must be equal to or less than project life)

Financing Assumptions

% Financed w/ Cash	0%
% Financed w/ Loan	100%
Loan Interest Rate	4%
Loan Period	20
Scenario A Net Cost	$ 33,800



Scenario H

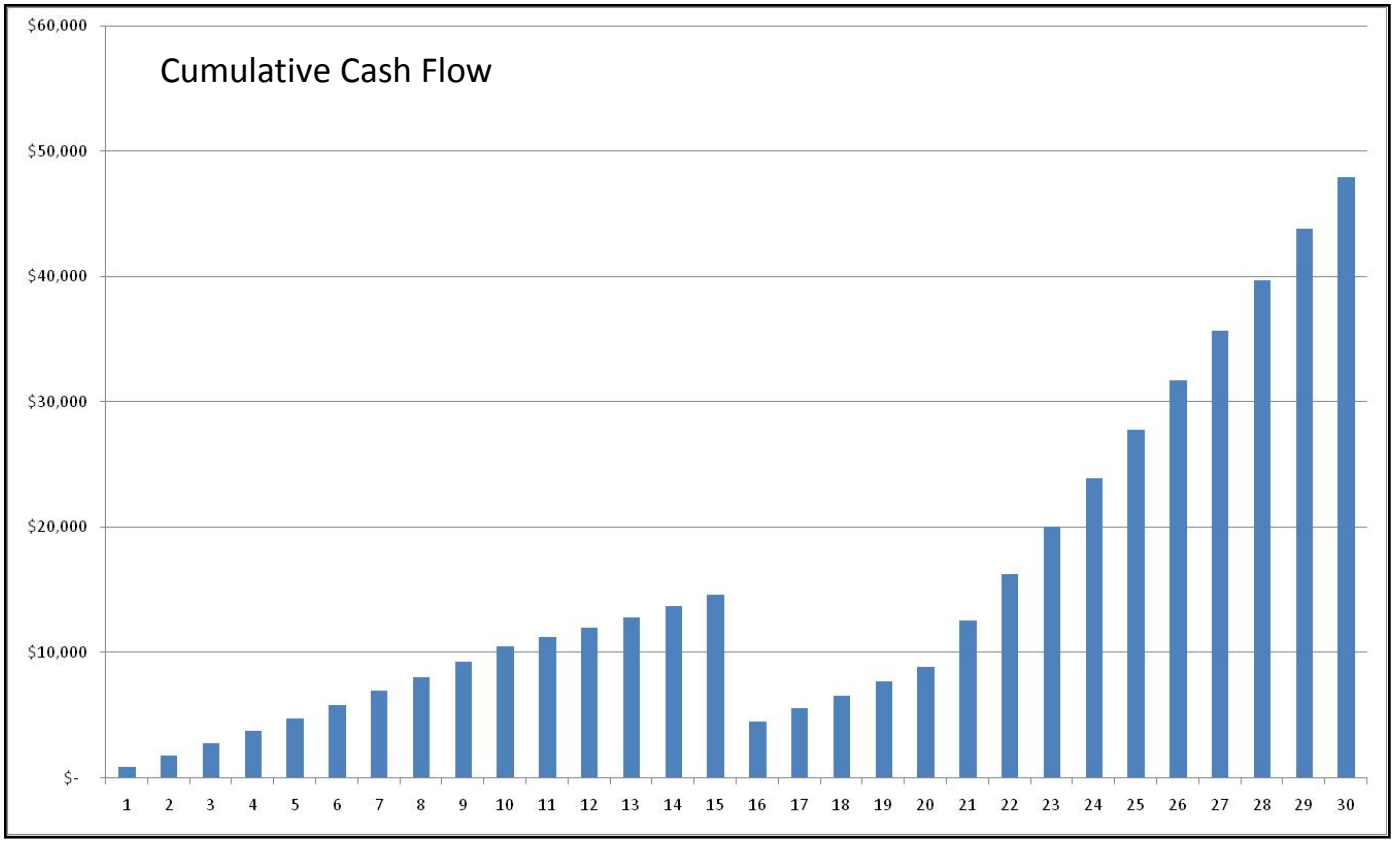
Key

Entry Cells	
Cells Draw Data from Another Worksheet	
Calculation Cells (Not for Entry)	

Select Taxable or Non-Taxable Entity	Non-Taxable	
Project and Customer Cost Assumptions		
Solar Photovoltaic System Size	14,760	Watts (DC STC)
Total System Cost/Watt	$ 7.79	$/Watt (DC STC)
Total System Cost	$ 114,980	
MTC Rebate Assumptions		
MTC Scenario A: Non-Taxable Rebate	$ 5.500	$/Watt (DC STC)
Scenario A Rebate	$ 81,180	
MTC Scenario B: Taxable Rebate	$ 5.500	$/Watt (DC STC)
Scenario B Rebate	$ 81,180	
Project Performance and Savings/ Cost Assumptions		
Annual Net Capacity Factor	14.0%	kW (DC STC) to kWh AC
Annual Production Degradation	0.50%	%
Project Life	30	Years
Electricity Revenue (Avoided Costs)	$ 0.17	$/kWh
Electricity Revenue (Avoided Costs) Annual Adjustor	2.0%	%
Renewable Energy Certificate (REC) Revenue	$ 0.03	$/kWh
REC Revenue Annual Adjustor	0.0%	%
REC Revenue Term	10	Years (must be equal to or less than project life)
Annual Operations and Maintenance Cost	$ 250	$/Year
Annual Operations and Maintenance Adjustor	3.0%	%
Future Inverter Replacement Cost	$ 0.75	$/Watt (DC STC)
Inverter Life, Replace Every X Years	16	Year (must be equal to or less than project life)

Financing Assumptions

% Financed w/ Cash	0%
% Financed w/ Loan	100%
Loan Interest Rate	4%
Loan Period	20
Scenario A Net Cost	$ 33,800



Scenario I

Key

Entry Cells	
Cells Draw Data from Another Worksheet	
Calculation Cells (Not for Entry)	

Select Taxable or Non-Taxable Entity: Non-Taxable

Project and Customer Cost Assumptions

Solar Photovoltaic System Size	14,760	Watts (DC STC)
Total System Cost/Watt	$ 7.79	$/Watt (DC STC)
Total System Cost	$ 114,980	

MTC Rebate Assumptions

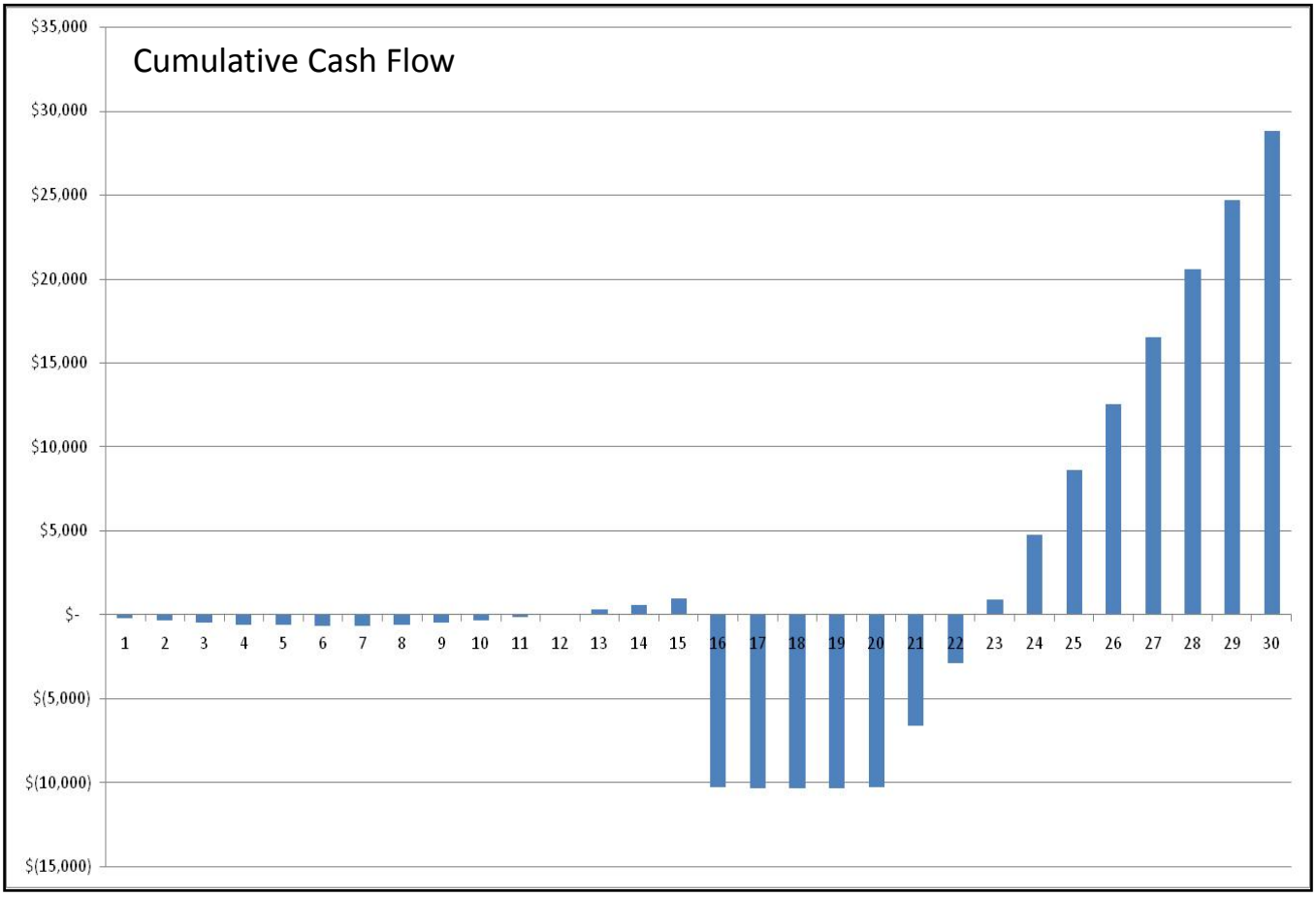
MTC Scenario A: Non-Taxable Rebate	$ 4.500	$/Watt (DC STC)
Scenario A Rebate	$ 66,420	
MTC Scenario B: Taxable Rebate	$ 4.500	$/Watt (DC STC)
Scenario B Rebate	$ 66,420	

Project Performance and Savings/ Cost Assumptions

Annual Net Capacity Factor	14.0%	kW (DC STC) to kWh AC
Annual Production Degradation	0.50%	%
Project Life	30	Years
Electricity Revenue (Avoided Costs)	$ 0.17	$/kWh
Electricity Revenue (Avoided Costs) Annual Adjustor	2.0%	%
Renewable Energy Certificate (REC) Revenue	$ 0.03	$/kWh
REC Revenue Annual Adjustor	0.0%	%
REC Revenue Term	15	Years (must be equal to or less than project life)
Annual Operations and Maintenance Cost	$ 250	$/Year
Annual Operations and Maintenance Adjustor	3.0%	%
Future Inverter Replacement Cost	$ 0.75	$/Watt (DC STC)
Inverter Life, Replace Every X Years	16	Year (must be equal to or less than project life)

Financing Assumptions

% Financed w/ Cash	0%
% Financed w/ Loan	100%
Loan Interest Rate	4%
Loan Period	20
Scenario A Net Cost	$ 48,560



Solar Wrights Study: 10 Year Loan

Key

Entry Cells	
Cells Draw Data from Another Worksheet	
Calculation Cells (Not for Entry)	

Select Taxable or Non-Taxable Entity — Non-Taxable

Project and Customer Cost Assumptions

Solar Photovoltaic System Size	14,760	Watts (DC STC)
Total System Cost/Watt	$ 7.79	$/Watt (DC STC)
Total System Cost	$ 114,980	

MTC Rebate Assumptions

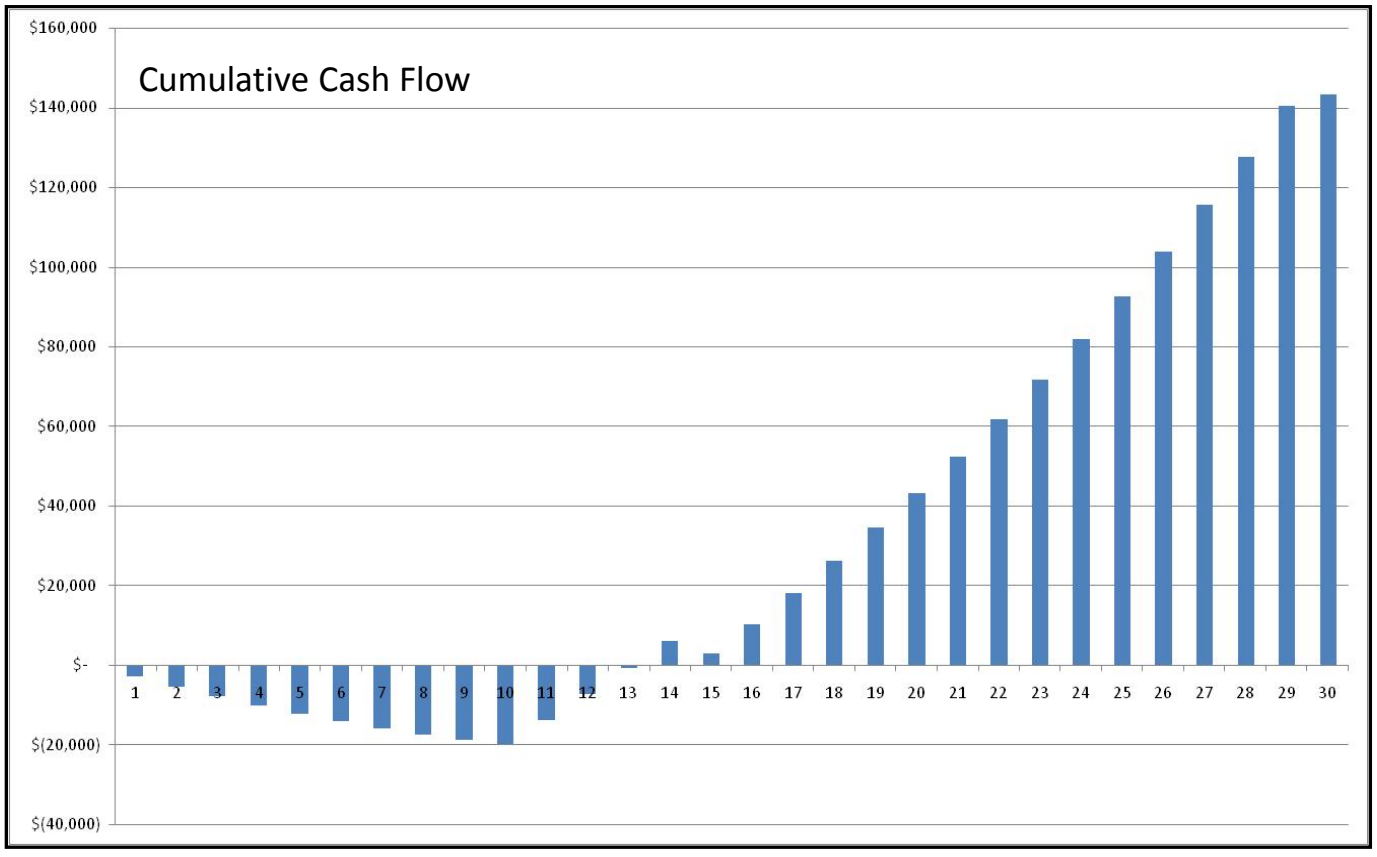
MTC Scenario A: Non-Taxable Rebate	$ 4.000	$/Watt (DC STC)
Scenario A Rebate	$ 59,040	
MTC Scenario B: Taxable Rebate	$ 4.000	$/Watt (DC STC)
Scenario B Rebate	$ 59,040	

Project Performance and Savings/ Cost Assumptions

Annual Net Capacity Factor	14.0%	kW (DC STC) to kWh AC
Annual Production Degradation	0.50%	%
Project Life	30	Years
Electricity Revenue (Avoided Costs)	$ 0.20	$/kWh
Electricity Revenue (Avoided Costs) Annual Adjusto	5.0%	%
Renewable Energy Certificate (REC) Revenue	$ 0.03	$/kWh
REC Revenue Annual Adjustor	0.0%	%
REC Revenue Term	30	Years (must be equal to or less than project life)
Annual Operations and Maintenance Cost	$ 50	$/Year
Annual Operations and Maintenance Adjustor	3.0%	%
Future Inverter Replacement Cost	$ 0.69	$/Watt (DC STC)
Inverter Life, Replace Every X Years	15	Year (must be equal to or less than project life)

Financing Assumptions

% Financed w/ Cash	0%
% Financed w/ Loan	100%
Loan Interest Rate	4%
Loan Period	10
Scenario A Net Cost	$ 55,940



Solar Wrights Study: 20 Year Loan

Key

Entry Cells	
Cells Draw Data from Another Worksheet	
Calculation Cells (Not for Entry)	

Select Taxable or Non-Taxable Entity — Non-Taxable

Project and Customer Cost Assumptions

Solar Photovoltaic System Size	14,760	Watts (DC STC)
Total System Cost/Watt	$ 7.79	$/Watt (DC STC)
Total System Cost	$ 114,980	

MTC Rebate Assumptions

MTC Scenario A: Non-Taxable Rebate	$ 4.000	$/Watt (DC STC)
Scenario A Rebate	$ 59,040	
MTC Scenario B: Taxable Rebate	$ 4.000	$/Watt (DC STC)
Scenario B Rebate	$ 59,040	

Project Performance and Savings/ Cost Assumptions

Annual Net Capacity Factor	14.0%	kW (DC STC) to kWh AC
Annual Production Degradation	0.50%	%
Project Life	30	Years
Electricity Revenue (Avoided Costs)	$ 0.20	$/kWh
Electricity Revenue (Avoided Costs) Annual Adjusto	5.0%	%
Renewable Energy Certificate (REC) Revenue	$ 0.03	$/kWh
REC Revenue Annual Adjustor	0.0%	%
REC Revenue Term	30	Years (must be equal to or less than project life)
Annual Operations and Maintenance Cost	$ 50	$/Year
Annual Operations and Maintenance Adjustor	3.0%	%
Future Inverter Replacement Cost	$ 0.69	$/Watt (DC STC)
Inverter Life, Replace Every X Years	15	Year (must be equal to or less than project life)

Financing Assumptions

% Financed w/ Cash	0%
% Financed w/ Loan	100%
Loan Interest Rate	4%
Loan Period	20
Scenario A Net Cost	$ 55,940