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# Town of Lee, MA Solar Photovoltaic Project



December 5, 2011

# Ownership Options

## *Municipal Ownership vs. Third-Party Ownership*

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### ❖ Municipal Owned

- ❑ Third-party design-builds SPV array(s) on municipally-owned land/buildings. Municipality owns the array, takes 100% of the electricity output, receives net metering credits, sells environmental attributes into the market or retains the environmental attributes for internal use. Operations and maintenance support could be done in-house or subcontracted.

### ❖ Third-Party Owned

- ❑ Third-party design-build-own-operate-maintains SPV array(s) on municipally-owned land/buildings. Third-party owns the array, sells 100% of the electricity output to municipality under a negotiated long-term power purchase and lease agreement. Municipality receives net metering credits. Environmental attributes are retained by the third-party, and operations and maintenance support is provided by the third-party.



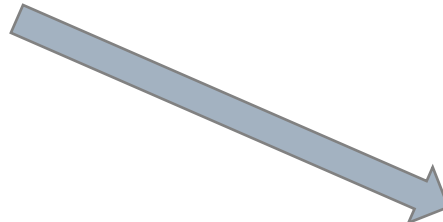
# Economic Drivers and Benefits

## *Considerations to Achieve Best Value*

Municipal Owned

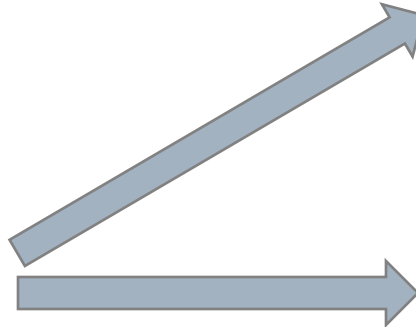


- Net Metering Credits



- Incentives from Utilities
- Incentives from Governmental Entities
- Solar renewable energy credits
- Forward capacity payments

Third-Party Owned



- Accelerated and bonus depreciation
- Investment tax rebates/credits



# Regulatory and Market Initiatives & Risks

## *Weighing the Risks with the Benefits*

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### ❖ Net Metering:

- ❑ Net Metering is the process of measuring the difference between electricity delivered by the local utility (WMECO) and the electricity generated by the host customer. Net metering allows Lee to reduce the amount of energy purchased from WMECO and the competitive supplier, and receive financial credits for excess energy exported to the grid.
- ❑ Net metering is provided for by statute and regulated by the Department of Public Utilities.
- ❑ These public policy benefits can change or be overturned.
  - DPU has recently opened two dockets.
  - Net metering benefit cap is anticipated to double for government hosted assets and a queuing process is being developed.
  - Limitations are being proposed as to the eligibility for net metering credits for generation in excess of electricity requirements.



# Net Metering

## *Calculating the Benefits*

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- ❖ The determination of benefits is calculated based on the:
  - ❑ existing rate tariff of the metered account
  - ❑ type of renewable facility (solar, wind, biomass)
  - ❑ size of system-maximum allowable is 2MW per facility
- ❖ Municipal facilities receive credits under the rate tariff from the following charges:
  - ❑ Basic service kWh
  - ❑ Distribution kWh
  - ❑ Transmission kWh
  - ❑ Transition kWh
- ❖ The determination of volume net metered back to the utility is reconciled and applied on a monthly basis to existing active accounts identified by the municipality on a schedule.
- ❖ Net metering credits can be realized by offsetting existing usage or from new generation.



# Net Metering

## *Behind the Meter Benefits*

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- ❖ Offset usage from existing connected load:
  - ❑ Applies when the solar array is interconnected to a building or existing WMECO meter and back feeds the meter.
    - An example is a solar photovoltaic array installed on the roof of a building and feeds an existing utility meter.
  - ❑ A bi-directional meter is installed to determine the amount of electricity, in kilowatt hours, that is metered back to the utility.
  - ❑ Benefits: Municipality buys fewer kWh for the building from WMECO and the competitive supplier, saving both consumption and delivery costs.
    - Generation offsetting existing facility usage is an avoided cost to existing operating costs.
    - Generation in excess of usage at the meter is defined, credits are determined and the value of the credits are applied to the utility accounts identified by the municipality.



# Net Metering

## *New Generation Benefits*

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- ❖ Applies when the solar array is interconnected to a WMECO meter that has no or limited usage.
  - ❑ An example is a solar photovoltaic array installed on a landfill and feeds a new utility meter or an existing utility meter that records limited usage (such as a remote light fixture).
- ❖ A bi-directional meter is installed to determine the amount of electricity in kilowatt hours that is metered back to the utility.
  - ❑ After consideration for any parasitic loads, the balance of the electricity generated is net metered to WMECO. Generation in excess of usage at the meter is defined, credits are determined and the value of the credits are applied to the utility accounts identified by the municipality.
- ❖ Benefits: 100% (after parasitic loads) of the generation is net metered to WMECO.



# Impacts of the Proposed Project

## *Assumptions and Applications*

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### ❖ Current Annual Usage Requirements:

- ❑ Town Facilities: Ambulance, Fire, DPW, Library , Wastewater, Water Treatment, Elementary School and Memorial High School.
- ❑ 2,893,779 kilowatt hours per year.

### ❖ Proposed Projects:

- ❑ Wastewater Treatment: 1,328,071 kilowatt hours per year
- ❑ Water Treatment: 119,304 kilowatt hours per year
- ❑ Landfill: 547,394 kilowatt hours per year
- ❑ Farm: 899,010 kilowatt hours per year
- ❑ Total generation: 2,893,779

### ❑ Illustrative Financial Benefits:

- ❑ At 2.5% annual energy escalation, 20 year benefit is about \$2.3 million.
- ❑ At 0% annual energy escalation, 20 year benefit is about \$785,000.



# Financial Impacts of the Proposed Project

## *First Year Benefits by Project Location*

	A	B	C	D	E	F
Town of Lee	Generation (kWh)	Est. Net Metering Benefit (\$)	Est. Avoided Costs Benefits (\$)	Broadway Proposed Unit Fee 2012	Broadway Proposed Fee (\$)	Net Financial First Year Benefit (\$) [1]
	kWh			(Years 1-10)	(A*D)	(B+C)-E
Lee Wastewater	1,328,071	\$13,268	\$128,082	\$0.0753	\$100,004	\$41,346
Lee Water Treatment	119,304	\$0	\$12,781	\$0.0753	\$8,984	\$3,797
Lee Landfill	547,394	\$52,079	\$0	\$0.0753	\$41,219	\$10,860
Lee Farm/Golf	899,010	\$85,532	\$0	\$0.0753	\$67,695	\$17,836
<b>Total</b>	<b>2,893,779</b>	<b>\$150,879</b>	<b>\$140,863</b>		<b>\$217,902</b>	<b>\$73,840</b>

[1] Net financial first year benefit is applied to other Municipal Accounts.



**20-Year Economic Analysis with Energy and Net Metering Escalating at 2.5%**

	A	B	C	D	E	F	G
Town of Lee	Generation (kWh) [1]	Broadway Proposed Rate (\$/kWh)	Broadway Proposed Fee (\$)	Est. WMECO Net Metering Value (\$)	Est. Avoided Cost Benefits (\$) [3]	Estimated Net Financial Benefit (\$)	Est. Benefit of Generation (kWh)
Year			(A*B)			(D+E)-C	(F/A)
1	2,893,779	\$0.0753	\$217,902	\$150,879	\$140,863	\$73,840	\$0.0255
2	2,879,310	\$0.0753	\$216,812	\$153,878	\$143,662	\$80,728	\$0.0280
3	2,864,914	\$0.0753	\$215,728	\$156,936	\$146,518	\$87,726	\$0.0306
4	2,850,589	\$0.0753	\$214,649	\$160,055	\$149,430	\$94,836	\$0.0333
5	2,836,336	\$0.0753	\$213,576	\$163,237	\$152,400	\$102,060	\$0.0360
6	2,822,154	\$0.0753	\$212,508	\$166,481	\$155,429	\$109,401	\$0.0388
7	2,808,044	\$0.0753	\$211,446	\$169,790	\$158,518	\$116,862	\$0.0416
8	2,794,003	\$0.0753	\$210,388	\$173,164	\$161,668	\$124,444	\$0.0445
9	2,780,033	\$0.0753	\$209,337	\$176,606	\$164,881	\$132,151	\$0.0475
10	2,766,133	\$0.0753	\$208,290	\$180,116	\$168,158	\$139,985	\$0.0506
11	2,752,303	\$0.0900	\$247,707	\$183,696	\$171,501	\$107,489	\$0.0391
12	2,738,541	\$0.0918	\$251,398	\$187,347	\$174,909	\$110,858	\$0.0405
13	2,724,848	\$0.0936	\$255,144	\$191,070	\$178,385	\$114,312	\$0.0420
14	2,711,224	\$0.0955	\$258,946	\$194,868	\$181,931	\$117,853	\$0.0435
15	2,697,668	\$0.0974	\$262,804	\$198,741	\$185,547	\$121,484	\$0.0450
16	2,684,180	\$0.0994	\$266,720	\$202,691	\$189,235	\$125,206	\$0.0466
17	2,670,759	\$0.1014	\$270,694	\$206,719	\$192,996	\$129,021	\$0.0483
18	2,657,405	\$0.1034	\$274,727	\$210,828	\$196,831	\$132,932	\$0.0500
19	2,644,118	\$0.1054	\$278,820	\$215,018	\$200,743	\$136,941	\$0.0518
20	2,630,897	\$0.1076	\$282,975	\$219,291	\$204,733	\$141,050	\$0.0536
<b>Total</b>	<b>55,207,238</b>		<b>\$4,780,570</b>	<b>\$3,661,409</b>	<b>\$3,418,337</b>	<b>\$2,299,177</b>	<b>\$0.0416</b>

[1] Assumes production degrades by 0.5% annually.

[2] Assumes overall utility net metering value escalates at 2.5% per year.

[3] Represents anticipated savings for electricity generated that would otherwise have been purchased and delivered from WMECO and supplier.

**20-Year Economic Analysis with Energy and Net Metering Escalating at 0%**

	A	B	C	D	E	F	G
Town of Lee	Generation (kWh) [1]	Broadway Proposed Rate (\$/kWh)	Broadway Proposed Fee (\$)	Est. WMECO Net Metering Value (\$)	Est. Avoided Cost Benefits (\$) [3]	Estimated Net Financial Benefit (\$)	Est. Benefit of Generation (kWh)
Year			(A*B)			(D+E)-C	(F/A)
1	2,893,779	\$0.0753	\$217,902	\$150,879	\$140,863	\$73,840	\$0.0255
2	2,879,310	\$0.0753	\$216,812	\$150,125	\$140,158	\$73,471	\$0.0255
3	2,864,914	\$0.0753	\$215,728	\$149,374	\$139,458	\$73,104	\$0.0255
4	2,850,589	\$0.0753	\$214,649	\$148,627	\$138,760	\$72,738	\$0.0255
5	2,836,336	\$0.0753	\$213,576	\$147,884	\$138,067	\$72,375	\$0.0255
6	2,822,154	\$0.0753	\$212,508	\$147,145	\$137,376	\$72,013	\$0.0255
7	2,808,044	\$0.0753	\$211,446	\$146,409	\$136,689	\$71,653	\$0.0255
8	2,794,003	\$0.0753	\$210,388	\$145,677	\$136,006	\$71,294	\$0.0255
9	2,780,033	\$0.0753	\$209,337	\$144,949	\$135,326	\$70,938	\$0.0255
10	2,766,133	\$0.0753	\$208,290	\$144,224	\$134,649	\$70,583	\$0.0255
11	2,752,303	\$0.0900	\$247,707	\$143,503	\$133,976	\$29,772	\$0.0108
12	2,738,541	\$0.0918	\$251,398	\$142,785	\$133,306	\$24,693	\$0.0090
13	2,724,848	\$0.0936	\$255,144	\$142,071	\$132,640	\$19,567	\$0.0072
14	2,711,224	\$0.0955	\$258,946	\$141,361	\$131,976	\$14,392	\$0.0053
15	2,697,668	\$0.0974	\$262,804	\$140,654	\$131,316	\$9,167	\$0.0034
16	2,684,180	\$0.0994	\$266,720	\$139,951	\$130,660	\$3,891	\$0.0014
17	2,670,759	\$0.1014	\$270,694	\$139,251	\$130,007	-\$1,436	-\$0.0005
18	2,657,405	\$0.1034	\$274,727	\$138,555	\$129,357	-\$6,816	-\$0.0026
19	2,644,118	\$0.1054	\$278,820	\$137,862	\$128,710	-\$12,249	-\$0.0046
20	2,630,897	\$0.1076	\$282,975	\$137,173	\$128,066	-\$17,736	-\$0.0067
<b>Total</b>	<b>55,207,238</b>		<b>\$4,780,570</b>	<b>\$2,878,460</b>	<b>\$2,687,366</b>	<b>\$785,256</b>	<b>\$0.0142</b>

[1] Assumes production degrades by 0.5% annually.

[2] Assumes overall utility net metering value escalates at 0% per year.

[3] Represents anticipated savings for electricity generated that would otherwise have been purchased and delivered from WMECO and supplier.

# Anticipated Opportunities

## *Generation Beyond Municipal Requirements*

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- ❖ Generate electricity beyond municipal requirements and net meter benefits to taxpayers.
  - ❑ Broadway anticipates an additional generation potential in Lee of about 5,000,000 kWh/year in excess of municipal requirements from the Farm.
  - ❑ Excess generation could be net metered as a non-municipal facility to Lee residents at a lower net metered rate from WMECO.
    - About \$0.01/kWh lower rate.
  - ❑ The Town of Lee would be the host of the system and Town residents would opt-in to receive the net metering benefits.
    - Town is pursuing discussions with WMECO to determine whether the utility would instead issue a check for the credit to offset Town operating costs.
    - Current WMECO policy does not support issuing checks.
  - ❑ Allowable under current Net Metering Tariff .



# Thank You

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