

# How The Solar Plant Makes Money for Rochelle Rate Payers





# Business Case – Lots of Numbers - Explained

BUSINESS CASE TREATMENT PLANT SOLAR PLANT		PA
Cost of 312 kW system after \$ 500,000 grant	\$3	
output kwh per year	4	
Value of energy produced per year at 8 c/kwh * 1.06 (line losses avoided)	\$	
Energy credits: Solar REC value/year sold into PA market	\$	
Demand value PJM capacity charge: This is the market fluctuating capacity charge from the Regions transmission grid at 40 % efficiency factor		
RMU Grid value per year - savings in demand stress of Rochelle's transmission/distribution grid at 40 % efficiency factor	yea	
Value to RMU per year:	\$	
	cum	
Cost of 10 year internal loan at 1/2 bond rate		
principal remaining	\$3	
interest at 1.34 %	(\$	
Principal payments	(\$3	
Cost	(\$3	
Net result per year	\$	
NPV (1.34 %)	\$318,656	
Simple ROI	91%	
Payback period	< 5 years	Plant has 20 years life time which creates 14 years of free energy
Cost per kwh	-\$0.0763	

Energy credits: Is not an intuitive business process; Rochelle is not claiming to be GREEN, Rochelle is RENEWABLE committed. Very few utilities of Rochelles' size has a bio-gas plant at the landfill and is also getting credit for eliminating methane absorption into the atmosphere.

RMU is an aggregator in the Pennsylvania market since two years and is making \$ 16.30 on every MWh produced by the bio-gas plant. This is some \$ 600,000 each year that the utility is using to reduce rate payer costs and goes directly into reducing Power Cost Adjustment (PCA) on your bill. In addition, Solar Energy credits at the level of \$ 50/MWh are achieved in the Pennsylvania market for the 312 kW Solar Plant.

The solar plant uses City owned Flood Plain acreage which could not be used for any other purpose. So NO farm land was used for the plant.

# Business Case – Lots of Numbers - Explained

BUSINESS CASE TREATMENT PLANT SOLAR PLANT												
Cost of 312 kW system after \$ 500,000 grant	\$350,000		rather					PA				
output kwh per year	422,000	conservative	488,000					SREC				
Value of energy produced per year at 8 c/kwh * 1.06 (line losses avoided)	\$37							value	\$50	per MWH		
Energy credits: Solar REC value/year sold into PA market	\$23											
Demand value PJM capacity charge: This is the market fluctuating capacity charge from the Regions transmission grid at 40 % efficiency factor	\$4											
RMU Grid value per year - savings in demand stress of Rochelle's transmission/distribution grid at 40 % efficiency factor	\$8											
Value to RMU per year:	\$71											
Cost of 10 year internal loan at 1/2 bond rate												
principal remaining	\$350											
interest at 1.34 %	(\$4											
Principal payments	(\$35											
Cost	(\$39											
Net result per year	\$32,202	\$32,671	\$33,140	\$33,609	\$34,078	\$34,547	\$35,016	\$35,485	\$35,954	\$36,423		
NPV (1.34 %)	\$318,656											
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Demand Value: Transmission charges have increased five (5) times in Rochelles region in the last two years and will grow. This is the cost of bringing energy to Rochelle. If Rochelle produces energy locally that charge goes away.

The region measures the peak hour of a city's demand in kw and charges that every month of the year following. This is \$ 200,000/month for RMU.

The solar plant does not produce max when that hour of demand is measured so a de-rate of 40 % is used.

RMU Grid value is the avoidance of distribution network costs due to peak demand requirements. For every kW that is added in the peak hour an investment is required to support that demand for the whole year.

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Cost of 312 kW system after \$ 500,000 grant	\$350,000		rather					PA				
output kwh per year	422,000	conservative	488,000					SREC				
Value of energy produced per year at 8 c/kwh * 1.06 (line losses avoided)	\$37,669							value	\$50	per MWH		
Energy credits: Solar REC value/year sold into PA market	\$21,100											
Demand value PJM capacity charge: This is the market fluctuating capacity charge from the Regions transmission grid at 40 % efficiency factor	\$4,567											
RMU Grid value per year - savings in demand stress of Rochelle's transmission/distribution grid at 40 % efficiency factor	\$8,556											
	year 1	year										
Value to RMU per year:	\$71,892											
	cum											
Cost of 10 year internal loan at 1/2 bond rate												
principal remaining	\$350,000											
interest at 1.34 %	(\$4,690)	(\$4,221)	(\$3,752)	(\$3,283)	(\$2,814)	(\$2,345)	(\$1,876)	(\$1,407)	(\$938)	(\$469)	sum	
Principal payments	(\$35,000)	(\$35,000)	(\$35,000)	(\$35,000)	(\$35,000)	(\$35,000)	(\$35,000)	(\$35,000)	(\$35,000)	(\$35,000)	(\$35,000)	-\$350,000
Cost	(\$39,690)	(\$39,221)	(\$38,752)	(\$38,283)	(\$37,814)	(\$37,345)	(\$36,876)	(\$36,407)	(\$35,938)	(\$35,469)		
Net result per year	\$32,202	\$32,671	\$33,140	\$33,609	\$34,078	\$34,547	\$35,016	\$35,485	\$35,954	\$36,423		
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A loan rate is applied to balance revenue vs cost. In this case that is built over 10 years (plant has a life of 20 years). After ten years there are only maintenance costs left.

As can be seen the plant pays for its own yearly expenses and produces an additional 91 % Return On Investment (ROI).

This essentially means that the cost per kWh produced is negative !

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