BEFORE THE GEORGIA PUBLIC SERVICE COMMISSION

SEPTEMBER 20, 2012

---

| | | |
|---|---|---|
| NOTICE OF GEORGIA SOLAR UTILITIES, INC. REQUEST TO BE AUTHORIZED AS A SOLAR UTILITY | ) | No. |

---

**PETITION OF GEORGIA SOLAR UTILITIES INCORPORATED FOR CONSIDERATION OF OUR REQUEST TO BE AUTHORIZED AS A SOLAR UTILITY, OUR ECONOMIC MODELS THAT SUPPORT OUR REQUEST AND OUR ELECTRIC RATE REDUCTION PLANS**

---

Pursuant to an October 18, 2011 Press Release of Commissioner McDonald where a call was made by him "I look forward to working with my fellow Commissioners, Commission Staff, Georgia Power (GPC), Georgia Legislators and Georgia Solar Industry experts in the immediate future to investigate and implement needed changes." Commissioner McDonald was asking for an investigation as to why the solar industry in Georgia had not developed and what changes needed to be implemented to create more solar development that would be done in the best interest of ratepayers. As part of the Georgia Solar Industry, the Principals of Georgia Solar Utilities (GaSU) undertook this investigation.

It was found that the problem with solar development in Georgia came from the management of Georgia Power (GPC). The CEO of Southern Company, Tom Fanning, stated in a Wall Street Journal article on June 8, 2012 *(#9 WSJ – "Tom Fanning, The Natural Gas Skeptic"*,) that he considered solar to be a 'niche' play. Fanning's WSJ article was published 13

days after Germany announced they had delivered 50% of the nation's entire electric demand to the grid for several hours using 22 GW's of installed solar panels (#8 *Reuters- "Germany Sets New Solar Power Record 22GW"*). Germany's sunshine is about the same intensity as Alaska. 50% of a nation's power demand from Germany's weaker sunshine is not a niche play. Much better can be done in Georgia.

GPC has controlled the utility scale solar development in Georgia. And to date, it has been prevented or quashed. Therefore GaSU is submitting a plan for meaningful change.

The first step is to recognize there is a good side to the lack of development. We have not made any 'mistakes' in our solar development. Ratepayers do not hold any liability for the cost of the early solar development. Let us keep that record. GaSU has used the wisdom of recent solar history in Germany and other locations to guide our plan.

Germany's solar development was fueled by Feed in Tariffs (FIT). A post Fukushima Japan is about to follow the same FIT pathway to fund solar development. FITs left the investor owned utilities in Germany almost bankrupt because a significant percentage of the revenue streams for the retail purchase of electricity were siphoned away from the utility companies by thousands of private interests pursuing the income of the FITs. The FIT then caused the utility companies to begin to die a death of a thousand cuts to revenues and ratepayers are left with the continuing liability to fund the additional costs for years to come. Power Purchase Agreements (PPA's) cause a similar problem.

It is GaSU's position that the damage to the income of the utilities and ratepayers accruing future financial liability to private investors does NOT serve the best interests of ratepayers. The damages and liabilities have so far been avoided by the Territorial Rights Act (TRA). However, the TRA was not intended for GPC to quash advancing technology. GaSU

also thinks that differing forms of PPA's will eventually be able to legally reach around the TRA. GPC's failure to develop Georgia's solar opportunity has only enlarged the target on the ratepayers of this state to outside interests seeking to cut in on the utilities.

GaSU also thinks that because solar is a new technology with new effects on ratepayers, there are good reasons for the GA PSC to consolidate its development into a single company that is a mirror image of GPC and is afforded the protection of the TRA.

If allowed, GaSU will proceed in a 'meaningful' way that will benefit, not damage, all Georgia utilities and ratepayers. We intend to enable Georgia to assume its rightful role as the 3rd most productive state in the USA for the generation and export of solar energy. That goal defines 'meaningful' development. Georgia's position is unique and we can become the new "Powerhouse of the South."

GaSU's plan will bring about the reduction in electric rates that solar can deliver. The mission of GaSU will be to finance, develop and contract the construction and operation of large scale solar farms. The power will be delivered to the grid in a way so it optimally interacts with all existing utilities. GaSU will not be involved in commercial and residential solar development leaving those markets to benefit from the utility scale development GaSU will create.

As support for this petition, GaSU submits the findings of its financial models of our plan for a new solar utility. In the models we would place emphasis on the viability of our Rate Reduction Fund. The profits on the sale of power could rise to $10+ billion over 40 years.

Profits can be returned to the ratepayers annually in the same way a mutual insurance company or an EMC functions. This method of returning profits will not erode the utility company's base rates or profitability.

GaSU hereby respectfully requests that the Commission agree that, pending proof of GaSU's financial viability and technical competence, the right to undertake utility scale solar development in Georgia will be granted to GaSU. Further GaSU will be authorized to begin to build a distributed solar power generation system.

GaSU further requests that the PSC agree the Putnam 80 MW project and similar other projects up to 500 MW's be started as a beginning point for the distributed generation system.

I. SUMMARY OF SOME IMPORTANT ISSUES:

DEMAND FOR SOLAR POWER -

The 2011 Annual Report of GPC states that 62% of the source of the generation of electricity in GA came from coal. Due to coal's rising environmental costs, we consider the 'reduction in use of coal' a method for solar power to be absorbed by the grid. Hence we felt there could be sufficient demand to start our financial models at 2 GW's. Due to the capacity factor of solar this will be about 5% of GPC's total generation.

This amount of solar power can be adjusted to an amount the PSC feels is appropriate.

RISING ENVIRONMENTAL COSTS OF COAL

GaSU is not an expert on the environmental issues of coal. But we feel the cost of using coal is rising and that the true cost of coal's environmental impact may not be reflected in our electric bill. Solar brings a guarantee of the safest, most stable and reasonably priced electricity available to the grid with no environmental impact.

We have attached the Executive Summary of a recent publication by Caroline Burkhard Golin, PhD Candidate at the School of Public Policy, Georgia Institute of Technology. It is *Towards the Full Cost of Coal: A review of the recent literature assessing the negative health care externalities associated with coal-fired electricity production.* (Attachment #10)

The findings were delivered at Solar Power International 2012, September 12, 2012 by Lee Peterson, Senior Manager for Reznick Group. Reznick Group has been named to INSIDE Public Accounting's Best of the Best Firms list for 2012. Reznick's reputation in the renewable energy industry is one of the best in the country.

The GA Tech review used Georgia as a sample state and calculated the health care costs associated with coal-fired power production in Georgia based upon the literature below.

1) The Center for Health and Global Environment at Harvard Medical School (CHGE - Epstien, et al., 2011)
2) Environmental Protection Agency (U.S. EPA, 2011)
3) The National Institute for Environmental Health and Sciences (Gohlke et al. , 2011)
4) Economists Nicholas Z. Muller, Robert Mendelsohn, and William Nordhaus (MMN))

The results reveal that the true costs of coal are not reflected in our electric bills. GaSU does rely upon Reznick Group's reputation to assume that Reznick does concur with the findings. The report shows that the environmental and health costs of coal could run 3.2¢/kWh to 16¢/kWh based upon proximity to the generating plant.

The Mission statement of the GA PSC is clear, "to ensure that consumers receive safe, reliable and reasonably priced…" electric services. Solar now fulfills the 'safe and reasonably priced' requirements of the PSC's mission much better than coal. Once capital costs are paid out, today solar produces a kWh for about the same cost /kWh as the fuel cost of coal alone.

Reliability can be easily maintained with the existing generation capacity of GPC using traditional methods. So the lower capacity factor of solar is not an impediment to embracing it as a significant component of Georgia's power portfolio. Hence to presume solar should be used to begin to reduce the use of coal in this state for power generation is a reasonable and prudent decision.

## A SHORT HISTORY OF GaSU

Many methods of financing solar energy are used worldwide today. GaSU was involved in the development and analysis of GPC's Large Scale Solar (LSS) of 50 MW's. Our client won

30 MW's of the offering. GaSU's principals had to financially model the LSS many different ways. The Power Purchase Agreement (PPA) GPC used to obtain solar power proved to a more expensive way to purchase power than if GPC owned the solar asset. The accrued value of the solar asset that is purchased by the PPA was lost to the ratepayers. Further the PPA investors require a higher investment yield than what can be financed under leases or bonds.

Within 3 months of closing out the LSS, we followed up with a new offer to GPC of 90 MW's of solar power through a self-build solar array. This structure was shovel ready, GPC captured all of the energy, all of the Solar Renewable Energy Credits, featured lower interest rates and GPC kept the asset. Once paid out, much less expensive solar energy was created to be blended back into GPC's power portfolio. This structure was a much better deal for ratepayers. GPC declined the offer. GPC's refusal to proceed on the 90 MW's revealed the problem with placing utility scale solar energy development in the hands and control of GPC. When offered a less expensive way to obtain solar power, GPC declined.

Hence, absent any GPC agreement to proceed on our 90 MW offer, we were left to figure out how to best serve the interests of ratepayers without GPC's participation. Based upon GPC's total generation and purchased power of 92 billion KWHs, we modeled 2 GW's of solar farms that would produce 4 billion KWHs in the same way we had proposed the 90 MW's to GPC. But this time we replaced GPC ownership with GaSU ownership.

When we replaced GPC's control of solar power generation with a new company that has no legacy issues and possessed all of the rights and privileges given to GPC's monopoly, the new solar utility company was able to generate enough profits in the model to:

1) Set up a Rate Reduction Fund for the ratepayers. The funds for this are earned when GaSU does not have to bear the cost of purchasing coal, burning the coal and the paying the increasing environmental liabilities.
2) Pay GPC the profits on their lost revenues through grid access charges.
3) Create an entirely new industry, farming photons, which will match Georgia's largest agricultural products.
4) Dramatically expand the existing solar components industries of Georgia as we build 2 GW's of solar panels, the steel dual axis tracking systems and the related materials necessary to provide to the solar installation industry as construction progresses.
5) Create many new jobs in the solar installation industry as GaSU, through an RFP process, builds the entire 2 GW solar farm system.
6) Increase state and local revenues with jobs, materials sales and a new industry.
7) Brings a guarantee of the safest, most stable and reasonably priced electricity available to the grid.
8) Most importantly, the profits from solar will tend to remain in Georgia with the owners of the electric meters of Georgia's electric companies.

The change in corporate structures clearly identified the best way for Georgia to obtain solar energy. This change solved many problems in the way people have sought to finance solar. GaSU's structure 'is' in the best interests of ratepayers, far better than any current proposals.

## II. ASSUMPTIONS USED IN THE FINANCIAL MODELS

The assumptions are factored into the models and into the Business Plan of GaSU. They are essential in order for the GaSU to deliver on its Business Plan.

Georgia Solar Utilities, Inc. Assumptions:

1. Be independent of the investor owned utility.
2. Have transmission rights to the electric grid for which it should pay a value equivalent to the profits that the utility will lose to the sale of solar energy.
3. Be able to sell solar power on the grid at retail rates.
4. Have the same credit available from the rate-payers as the investor owned utility.
5. Be able to bill through the utility to which it pays for access to the grid.
6. Make a yearly settlement with ratepayers that 'check the solar box' with a solar dividend to help reduce their electric rates.
7. Help prevent erosion of electric rates to utility company.

All of the above will serve to create healthy competition among the monopolies and avoid the need for subsidies to solar. Allowing GaSU to compete on equal footing with GPC is all that is necessary to create a robust solar industry and to harvest an abundant GA resource.

We modeled 2 GW's of distributed solar farms that are completely built by 2016. Each model starts at different retail rates. One scenario starts selling at 12.9 cents/kWh, the other at 16 cents/kWh. This plan can start with an initial agreement for 500 MW's.

What emerges from this plan is that, other than the 30% Federal Investment Tax Credit, no Solar Renewable Energy Credits or other subsidies are necessary to begin profitable operations. The plan is based upon 20 – 25 year bonds at currently available corporate bond rates. This funding is available.

In the models you can see that solar energy financially overwhelms the fossil fuel based power generation. The sharing of GaSU profits through access fees with the utilities protects their investment from financial stress of outside investors with PPA's or Feed in Tariffs from draining their revenues leaving them no access to the profits. Protection for coal and natural gas fueled generation plants is extended so long as those plants remain in the best interests of rate payers.

This method of acquiring solar energy solves many financial problems and creates an efficiency reward to rate-payers. It further minimizes the investor owned utility's ability to levy what is becoming a fuel/carbon tax destined to land in its own coffers.

## III. FINANCIAL MODELS AND EXPLANATION OF SPREAD SHEET MODELS

The financial models are two versions of two prices per kWh in 2016. One is based upon $.128/kWh and the other is $.16/kWh. It is assumed that the entire 2 GW's is operational by 2016 so that the entire system is subject to the Federal 1603 Investment Tax Credit.

Explanation of Spread Sheet items:

1) **Electric Costs per KW-H 2% rise/yr. –**

   The value is the projected value in 2016. It escalates 2%/annum from that point forward.

2) **Bond/lease payments** –

   Term of bond or lease is 20 or 25 years.

3) **Operations and Maint** -

   Varies over time based upon age of the array. Sufficient funds are allowed to keep the array near full power.

4) **Grid access / Trans costs $.02/kWh** –

Fees paid to GPC to offset the profits on the losses of revenues to solar. They also get the benefit of not having to burn the coal.

5) **Depreciation not calculated because MACRS disappears.**

Depreciation will be used once it is known how much to calculate. None shown in analysis.

6) **Value of Energy Produced by PV** –

The yearly power production times the escalating price per kWh.

7) **GA Solar Utilities Inc. 11.5% -**

GaSU's earnings on revenues for the sale of solar power.

8) **Rate Reduction Funds –**

Profits resulting that are over and above the costs listed above. These funds are returned to ratepayers annually.

INDEX OF MODELS

1) **First model** - 2 GW's, starting at $.129/kWh in 2016; $6.3 bb bonds at 4.75%, 25 year terms; 1/3rd of available ITC Applied (10% ITC, not 30%)

2) **Second model** - 2 GW's, starting at $.16/kWh in 2016; $6.3 bb bonds at 4.75% 25 year terms; 1/3rd of available ITC Applied (10% ITC, not 30%)

3) **Third model** - 2 GW's, starting at $.129/kWh in 2016; $5.6 bb bonds at 4.75% 20 year terms; 2/3rds of available ITC Applied (20% ITC, not 30%)

4) **Fourth Model** - 2 GW's, starting at $.16/kWh in 2016; $5.6 bb bonds at 4.75%, 20 year terms; 2/3rds of available ITC Applied (20% ITC, not 30%)

5) **Fifth Model** – This model looks backward for 2 years to show how the same opportunity looked 2 ½ years ago. 2 GW's, starting at $.134/kWh in 2016; $6.36 bb bonds at 4.75%, 25 year terms; 30% Cash Grant applied

## 2 GWs Dual Axis Photovoltaic System

## FIRST YEAR

## $.129/kWh 2016
## GA Solar Utilities Inc

**Georgia Solar Utilities, Inc. (GaSU)**
*"Shining a light on Georgia's future"*

| **Variables** | | **2016** | |
|---|---|---|---|
| Total System Size (watts) | | 2,000,000,000 | watts |
| Insolation Value (annual peak sun hours per day.) | | 6.60 | |
| Capacity Factor | | 27.50% | |
| Electric Sales retail | **$** | **0.129** | kWh |
| Tax Burden (%) | | 30% | |
| REC Compensation Rate (per KW-H) | $ | - | kWh |
| Installation Cost per Watt | **$** | **3.50** | /watt |
| Installation Cost / kWh | $ | 1.334 | |

| **Electrical Power Production & RECs** | | | |
|---|---|---|---|
| Annual Power Generated (KW-H) | | 4,721,640,000 | kWh's |
| Value of Solar electricity | $ | 609,091,560 | |

| **Financial Analysis** | | |
|---|---|---|
| Total System up front cost (installed) | **$** | **7,000,000,000** |
| **10**% Federal Business Energy ITC | $ | (700,000,000) |
| **Cost After Rebates, Bond Amounts** | **$** | **6,300,000,000** |
| | | |
| Tax Benefit of Depreciation | | |
| Value of Energy First year | $ | (609,091,560) |
| Value of SRECs First Year | $ | - |
| **Actual Net System Cost after FIRST YEAR** | **$** | **5,690,908,440** |

| | |
|---|---|
| **System Cost Returned First Year** | **19%** |
| **Tons of CO2 Offset per year (2.3 lbs/kw-h. EPA)** | **5,429,886** |

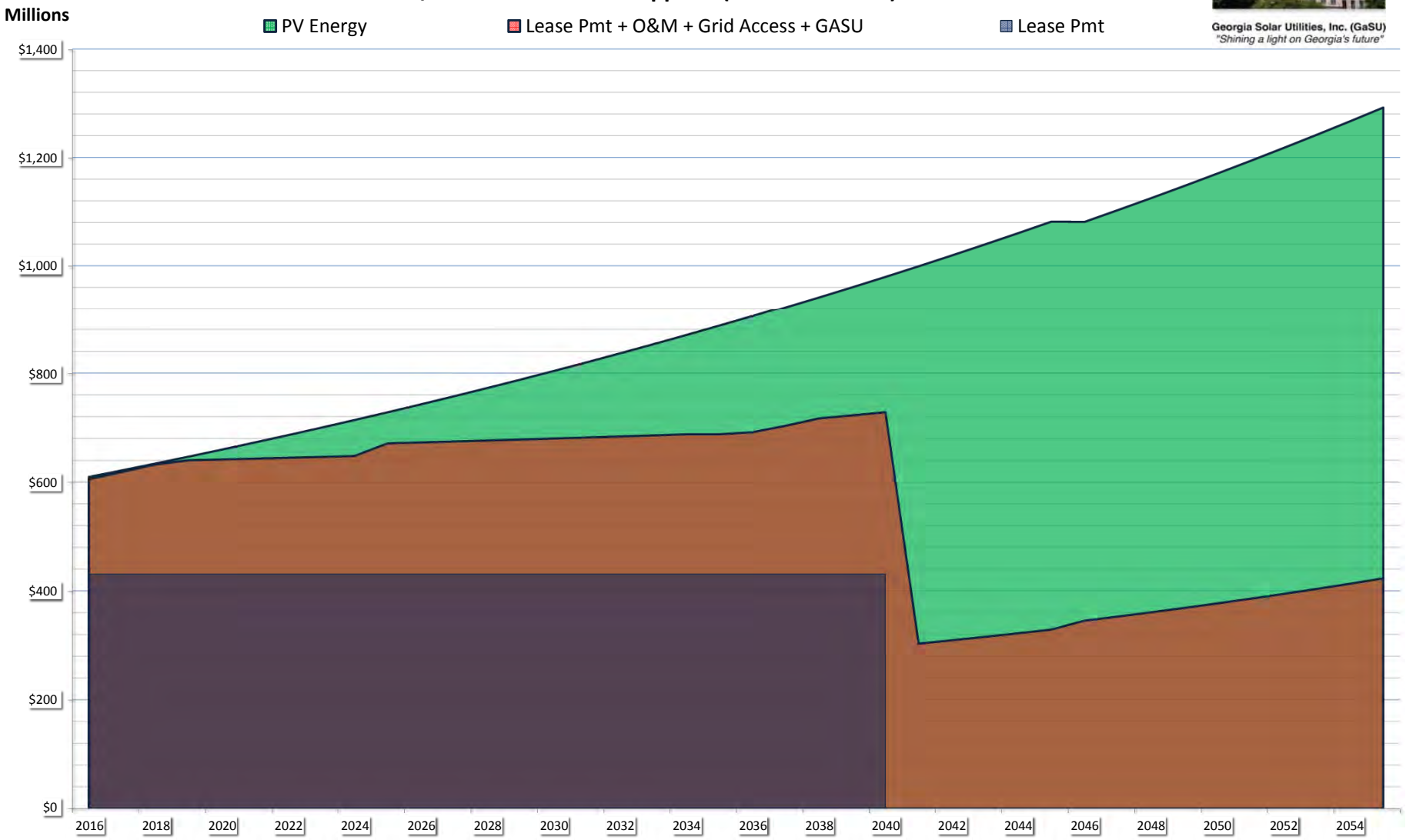
**2 GW's, $.129/kWh in 2016**

**$6.3 bb, 4.75% bonds, 25 year terms**

**1/3rd of available ITC Applied (10% of the 30%)**

Georgia Solar Utilities, Inc. (GaSU)

*"Shining a light on Georgia's future"*



## Financial Totals

| CUMULATIVE in BILLIONS | 30 Year in billions | 40 Year in billions |
|---|---|---|
| Energy Production | $ 24,313 | $ 36,152 |
| 25 Year Bond Payments | $ (10,775) | $ (10,775) |
| Accumulated O & M | $ (1,946) | $ (3,463) |
| Grid access / Trans costs | $ (2,833) | $ (3,777) |
| GA Solar Utilities Inc 11.5% | $ (2,701) | $ (4,062) |
| Rate Reduction Funds | $ 6,058 | $ 14,074 |

**GA Solar Utilities Inc** — **$.129/kWh 2016**

**2 GWs Dual Axis Photovoltaic System** — **1 - 40 Years**

**NO SRECS**

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** | **2025** |
| Electric Costs per KW-H 2% rise/yr | **$ 0.129** | **$ 0.132** | **$ 0.134** | **$ 0.137** | **$ 0.140** | **$ 0.142** | **$ 0.145** | **$ 0.148** | **$ 0.151** | **$ 0.154** |
| **Bond payments $6.3 bb** | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 |
| Operations and Maint - ($20K/yr/MW) | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Depreciation MACRS | | | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Value of Energy Produced by PV | $ (609,091,560) | $ (621,273,391) | $ (633,698,859) | $ (646,372,836) | $ (659,300,293) | $ (672,486,299) | $ (685,936,025) | $ (699,654,745) | $ (713,647,840) | $ (727,920,797) |
| **GaSU escalates to 11.5% Gross** | $ 39,590,951 | $ 52,808,238 | $ 66,538,380 | $ 74,332,876 | $ 75,819,534 | $ 77,335,924 | $ 78,882,643 | $ 80,460,296 | $ 82,069,502 | $ 83,710,892 |
| **Rate Reduction Funds** | **$ 4,059,083** | **$ 3,023,628** | **$ 1,718,954** | **$ 6,598,435** | **$ 18,039,234** | **$ 29,708,849** | **$ 41,611,857** | **$ 53,752,924** | **$ 66,136,813** | **$ 78,768,380** |
| **Tons of CO2 Offset cumulative** | **5,429,886** | **10,859,772** | **16,289,658** | **21,719,544** | **27,149,430** | **32,579,316** | **38,009,202** | **43,439,088** | **48,868,974** | **54,298,860** |

| | Year 11 | Year 12 | Year 13 | Year 14 | Year 15 | Year 16 | Year 17 | Year 18 | Year 19 | Year 20 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2025** | **2026** | **2027** | **2028** | **2029** | **2030** | **2031** | **2032** | **2033** | **2034** |
| Electric Costs per kWh 2% rise/yr | **$ 0.157** | **$ 0.160** | **$ 0.164** | **$ 0.167** | **$ 0.170** | **$ 0.174** | **$ 0.177** | **$ 0.181** | **$ 0.184** | **$ 0.188** |
| **Bond payments $6.3 bb** | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 |
| Operations and Maint ($30K/yr/MW) | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Depreciation | | | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Value of Energy Produced by PV | $ (742,479,213) | $ (757,328,797) | $ (772,475,373) | $ (787,924,881) | $ (803,683,378) | $ (819,757,046) | $ (836,152,187) | $ (852,875,230) | $ (869,932,735) | $ (887,331,390) |
| **GaSU 11.5% Gross** | $ 85,385,109 | $ 87,092,812 | $ 88,834,668 | $ 90,611,361 | $ 92,423,588 | $ 94,272,060 | $ 96,157,501 | $ 98,080,651 | $ 100,042,265 | $ 102,043,110 |
| **Rate Reduction Funds** | **$ 71,652,578** | **$ 84,794,460** | **$ 98,199,180** | **$ 111,871,994** | **$ 125,818,264** | **$ 140,043,460** | **$ 154,553,160** | **$ 169,353,054** | **$ 184,448,945** | **$ 199,846,755** |

| | Year 21 | Year 22 | Year 23 | Year 24 | Year 25 | Year 26 | Year 27 | Year 28 | Year 29 | Year 30 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2035** | **2036** | **2037** | **2038** | **2039** | **2040** | **2041** | **2042** | **2043** | **2044** |
| Electric Costs per kWh 2% rise/yr | **$ 0.19** | **$ 0.196** | **$ 0.199** | **$ 0.203** | **$ 0.207** | **$ 0.212** | **$ 0.216** | **$ 0.220** | **$ 0.225** | **$ 0.229** |
| **Bond Payments** | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | | $ - | $ - | $ - | $ - |
| Operations and Maint ($50K/MW/yr) | $ 66,000,000 | $ 75,900,000 | $ 87,285,000 | $ 90,776,400 | $ 94,407,456 | $ 98,183,754 | $ 102,111,104 | $ 106,195,549 | $ 110,443,371 | $ 114,861,105 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Value of Energy Produced by PV | $ (868,874,897) | $ (886,252,395) | $ (903,977,443) | $ (922,056,991) | $ (940,498,131) | $ (959,308,094) | $ (978,494,256) | $ (998,064,141) | $ (1,018,025,424) | $ (1,038,385,932) |
| **GaSU 11.5% Gross** | $ 99,920,613 | $ 101,919,025 | $ 103,957,406 | $ 106,036,554 | $ 108,157,285 | $ 110,320,431 | $ 112,526,839 | $ 114,777,376 | $ 117,072,924 | $ 119,414,382 |
| **Rate Reduction Funds** | **$ 177,512,758** | **$ 182,991,844** | **$ 187,293,512** | **$ 199,802,512** | **$ 212,491,865** | **$ 656,371,109** | **$ 669,423,512** | **$ 682,658,416** | **$ 696,076,329** | **$ 709,677,645** |

| | Year 31 | Year 32 | Year 33 | Year 34 | Year 35 | Year 36 | Year 37 | Year 38 | Year 39 | Year 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2045** | **2046** | **2047** | **2048** | **2049** | **2050** | **2051** | **2052** | **2053** | **2054** |
| Electric Costs per kWh 2% rise/yr | **$ 0.23** | **$ 0.238** | **$ 0.243** | **$ 0.248** | **$ 0.253** | **$ 0.258** | **$ 0.263** | **$ 0.268** | **$ 0.274** | **$ 0.279** |
| 2% Degradation factor | | | | | | | | | | |
| Operations and Maint ($80K/MW/yr) | $ 126,347,216 | $ 131,401,105 | $ 136,657,149 | $ 142,123,435 | $ 147,808,372 | $ 153,720,707 | $ 159,869,535 | $ 166,264,317 | $ 172,914,889 | $ 179,831,485 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Value of Energy Produced by PV | $ (1,081,219,352) | $ (1,102,843,739) | $ (1,124,900,614) | $ (1,147,398,626) | $ (1,170,346,599) | $ (1,193,753,531) | $ (1,217,628,601) | $ (1,241,981,173) | $ (1,266,820,797) | $ (1,292,157,213) |
| **GaSU 11.5% Gross** | $ 124,340,225 | $ 126,827,030 | $ 129,363,571 | $ 131,950,842 | $ 134,589,859 | $ 137,281,656 | $ 140,027,289 | $ 142,827,835 | $ 145,684,392 | $ 148,598,079 |
| **Rate Reduction Funds** | **$ 736,099,111** | **$ 750,182,804** | **$ 764,447,094** | **$ 778,891,549** | **$ 793,515,568** | **$ 808,318,368** | **$ 823,298,977** | **$ 838,456,222** | **$ 853,788,716** | **$ 869,294,848** |

## 2 GWs Dual Axis Photovoltaic System

## FIRST YEAR

## $.16/kWh 2016
## GA Solar Utilities Inc

**Georgia Solar Utilities, Inc. (GaSU)**
*"Shining a light on Georgia's future"*

| **Variables** | | **2016** | |
|---|---|---|---|
| Total System Size (watts) | | 2,000,000,000 | watts |
| Insolation Value (annual peak sun hours per day.) | | 6.60 | |
| Capacity Factor | | 27.50% | |
| Electric Sales retail | **$** | **0.160** | kWh |
| Tax Burden (%) | | 30% | |
| REC Compensation Rate (per KW-H) | $ | - | kWh |
| Installation Cost per Watt | **$** | **3.50** | /watt |
| Installation Cost / kWh | $ | 1.334 | |

| **Electrical Power Production & RECs** | | | |
|---|---|---|---|
| Annual Power Generated (KW-H) | | 4,721,640,000 | kWh's |
| Value of Solar electricity | $ | 755,462,400 | |

| **Financial Analysis** | | |
|---|---|---|
| Total System up front cost (installed) | **$** | **7,000,000,000** |
| **10**% Federal Business Energy ITC | $ | (700,000,000) |
| **Cost After Rebates, Bond Amounts** | **$** | **6,300,000,000** |
| | | |
| Tax Benefit of Depreciation | | |
| Value of Energy First year | $ | (755,462,400) |
| Value of SRECs First Year | $ | - |
| **Actual Net System Cost after FIRST YEAR** | **$** | **5,544,537,600** |

| | |
|---|---|
| **System Cost Returned First Year** | **21%** |
| **Tons of CO2 Offset per year (2.3 lbs/kw-h. EPA)** | **5,429,886** |

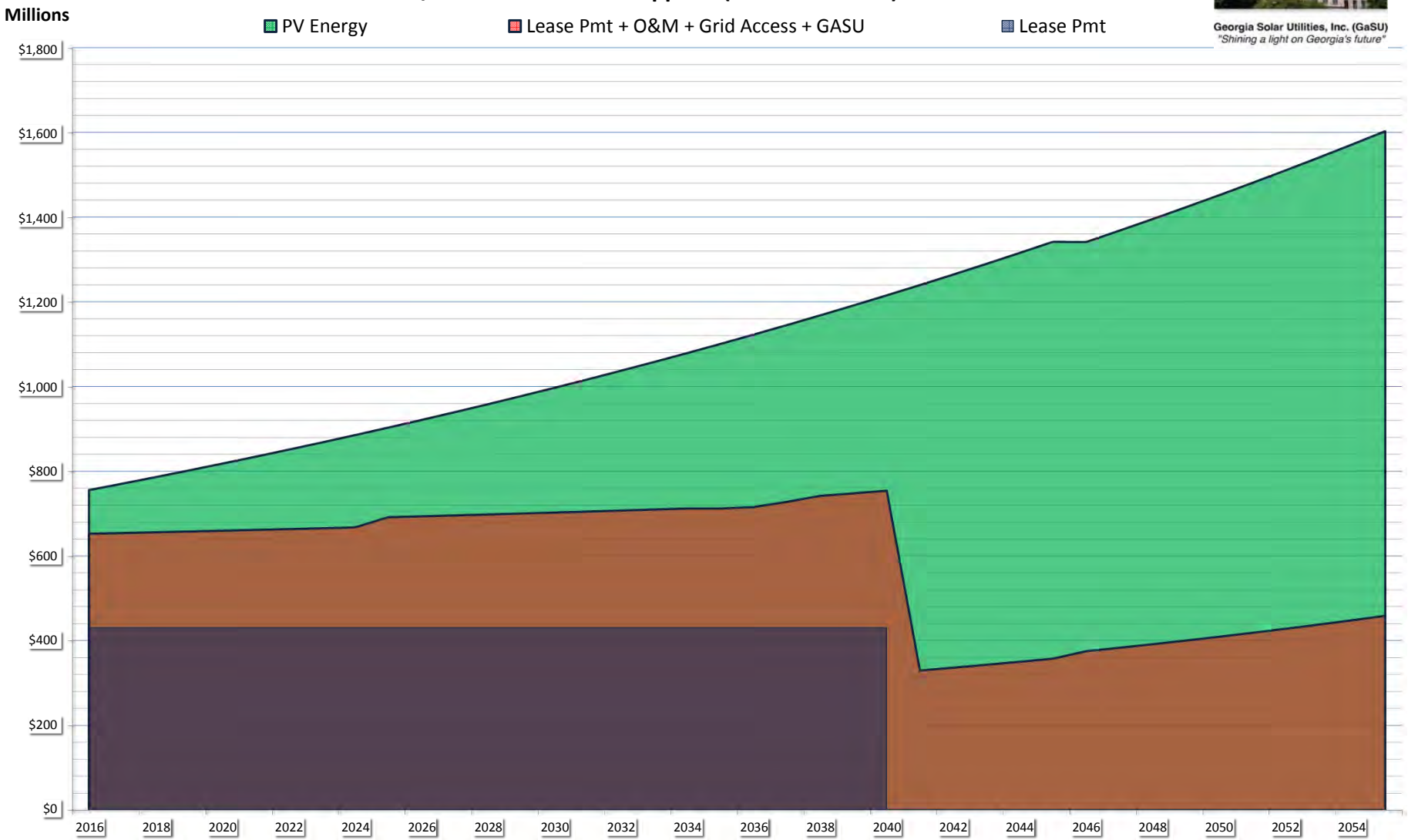
**2 GW's, $.16/kWh in 2016**

**$6.3 bb, 4.75% bonds, 25 year terms**

**1/3rd of available ITC Applied (10% of the 30%)**

Georgia Solar Utilities, Inc. (GaSU)

*"Shining a light on Georgia's future"*



## Financial Totals

| CUMULATIVE in BILLIONS | 30 Year in billions | 40 Year in billions |
|---|---|---|
| Energy Production | $ 30,156 | $ 44,840 |
| 25 Year Bond Payments | $ (10,775) | $ (10,775) |
| Accumulated O & M | $ (1,946) | $ (3,463) |
| Grid access / Trans costs | $ (2,833) | $ (3,777) |
| GA Solar Utilities Inc 11.5% | $ (3,381) | $ (5,070) |
| Rate Reduction Funds | $ 11,221 | $ 21,755 |

**GA Solar Utilities Inc** **$.16/kWh 2016**

**2 GWs Dual Axis Photovoltaic System** **1 - 40 Years**

**NO SRECS**

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** | **2025** |
| Electric Costs per KW-H 2% rise/yr | **$ 0.160** | **$ 0.163** | **$ 0.166** | **$ 0.170** | **$ 0.173** | **$ 0.177** | **$ 0.180** | **$ 0.184** | **$ 0.187** | **$ 0.191** |
| **Bond payments $6.3 bb** | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 |
| Operations and Maint - ($20K/yr/MW) | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Depreciation MACRS | | | $ - | $ - | $ - | | $ - | $ - | $ - | $ - |
| Value of Energy Produced by PV | $ (755,462,400) | $ (770,571,648) | $ (785,983,081) | $ (801,702,743) | $ (817,736,797) | $ (834,091,533) | $ (850,773,364) | $ (867,788,831) | $ (885,144,608) | $ (902,847,500) |
| **GaSU escalates to 11.5% Gross** | $ 86,878,176 | $ 88,615,740 | $ 90,388,054 | $ 92,195,815 | $ 94,039,732 | $ 95,920,526 | $ 97,838,937 | $ 99,795,716 | $ 101,791,630 | $ 103,827,463 |
| **Rate Reduction Funds** | **$ 103,142,699** | **$ 116,514,383** | **$ 130,153,501** | **$ 144,065,402** | **$ 158,255,541** | **$ 172,729,482** | **$ 187,492,902** | **$ 202,551,591** | **$ 217,911,453** | **$ 233,578,512** |
| **Tons of CO2 Offset cumulative** | **5,429,886** | **10,859,772** | **16,289,658** | **21,719,544** | **27,149,430** | **32,579,316** | **38,009,202** | **43,439,088** | **48,868,974** | **54,298,860** |

| | Year 11 | Year 12 | Year 13 | Year 14 | Year 15 | Year 16 | Year 17 | Year 18 | Year 19 | Year 20 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2025** | **2026** | **2027** | **2028** | **2029** | **2030** | **2031** | **2032** | **2033** | **2034** |
| Electric Costs per kWh 2% rise/yr | **$ 0.195** | **$ 0.199** | **$ 0.203** | **$ 0.207** | **$ 0.211** | **$ 0.215** | **$ 0.220** | **$ 0.224** | **$ 0.229** | **$ 0.233** |
| **Bond payments $6.3 bb** | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 |
| Operations and Maint ($30K/yr/MW) | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Depreciation | | | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Value of Energy Produced by PV | $ (920,904,450) | $ (939,322,539) | $ (958,108,990) | $ (977,271,170) | $ (996,816,593) | $ (1,016,752,925) | $ (1,037,087,983) | $ (1,057,829,743) | $ (1,078,986,338) | $ (1,100,566,065) |
| **GaSU 11.5% Gross** | $ 105,904,012 | $ 108,022,092 | $ 110,182,534 | $ 112,386,185 | $ 114,633,908 | $ 116,926,586 | $ 119,265,118 | $ 121,650,420 | $ 124,083,429 | $ 126,565,097 |
| **Rate Reduction Funds** | **$ 229,558,913** | **$ 245,858,922** | **$ 262,484,931** | **$ 279,443,460** | **$ 296,741,160** | **$ 314,384,813** | **$ 332,381,340** | **$ 350,737,797** | **$ 369,461,384** | **$ 388,559,442** |

| | Year 21 | Year 22 | Year 23 | Year 24 | Year 25 | Year 26 | Year 27 | Year 28 | Year 29 | Year 30 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2035** | **2036** | **2037** | **2038** | **2039** | **2040** | **2041** | **2042** | **2043** | **2044** |
| Electric Costs per kWh 2% rise/yr | **$ 0.24** | **$ 0.243** | **$ 0.247** | **$ 0.252** | **$ 0.257** | **$ 0.262** | **$ 0.268** | **$ 0.273** | **$ 0.279** | **$ 0.284** |
| **Bond Payments** | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | $ 431,008,725 | | $ - | $ - | $ - | $ - |
| Operations and Maint ($50K/MW/yr) | $ 66,000,000 | $ 75,900,000 | $ 87,285,000 | $ 90,776,400 | $ 94,407,456 | $ 98,183,754 | $ 102,111,104 | $ 106,195,549 | $ 110,443,371 | $ 114,861,105 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Value of Energy Produced by PV | $ (1,077,674,291) | $ (1,099,227,776) | $ (1,121,212,332) | $ (1,143,636,579) | $ (1,166,509,310) | $ (1,189,839,496) | $ (1,213,636,286) | $ (1,237,909,012) | $ (1,262,667,192) | $ (1,287,920,536) |
| **GaSU 11.5% Gross** | $ 123,932,543 | $ 126,411,194 | $ 128,939,418 | $ 131,518,207 | $ 134,148,571 | $ 136,831,542 | $ 139,568,173 | $ 142,359,536 | $ 145,206,727 | $ 148,110,862 |
| **Rate Reduction Funds** | **$ 362,300,222** | **$ 371,475,057** | **$ 379,546,389** | **$ 395,900,447** | **$ 412,511,758** | **$ 860,391,400** | **$ 877,524,209** | **$ 894,921,127** | **$ 912,584,295** | **$ 930,515,769** |

| | Year 31 | Year 32 | Year 33 | Year 34 | Year 35 | Year 36 | Year 37 | Year 38 | Year 39 | Year 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2045** | **2046** | **2047** | **2048** | **2049** | **2050** | **2051** | **2052** | **2053** | **2054** |
| Electric Costs per kWh 2% rise/yr | **$ 0.29** | **$ 0.296** | **$ 0.302** | **$ 0.308** | **$ 0.314** | **$ 0.320** | **$ 0.326** | **$ 0.333** | **$ 0.340** | **$ 0.346** |
| 2% Degradation factor | | | | | | | | | | |
| Operations and Maint ($80K/MW/yr) | $ 126,347,216 | $ 131,401,105 | $ 136,657,149 | $ 142,123,435 | $ 147,808,372 | $ 153,720,707 | $ 159,869,535 | $ 166,264,317 | $ 172,914,889 | $ 179,831,485 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Value of Energy Produced by PV | $ (1,341,047,258) | $ (1,367,868,203) | $ (1,395,225,567) | $ (1,423,130,079) | $ (1,451,592,680) | $ (1,480,624,534) | $ (1,510,237,025) | $ (1,540,441,765) | $ (1,571,250,600) | $ (1,602,675,612) |
| **GaSU 11.5% Gross** | $ 154,220,435 | $ 157,304,843 | $ 160,450,940 | $ 163,659,959 | $ 166,933,158 | $ 170,271,821 | $ 173,677,258 | $ 177,150,803 | $ 180,693,819 | $ 184,307,695 |
| **Rate Reduction Funds** | **$ 966,046,808** | **$ 984,729,455** | **$ 1,003,684,678** | **$ 1,022,913,885** | **$ 1,042,418,350** | **$ 1,062,199,206** | **$ 1,082,257,432** | **$ 1,102,593,846** | **$ 1,123,209,092** | **$ 1,144,103,632** |

## 2 GWs Dual Axis Photovoltaic System

## FIRST YEAR

Georgia Solar Utilities, Inc. (GaSU)
*"Shining a light on Georgia's future"*

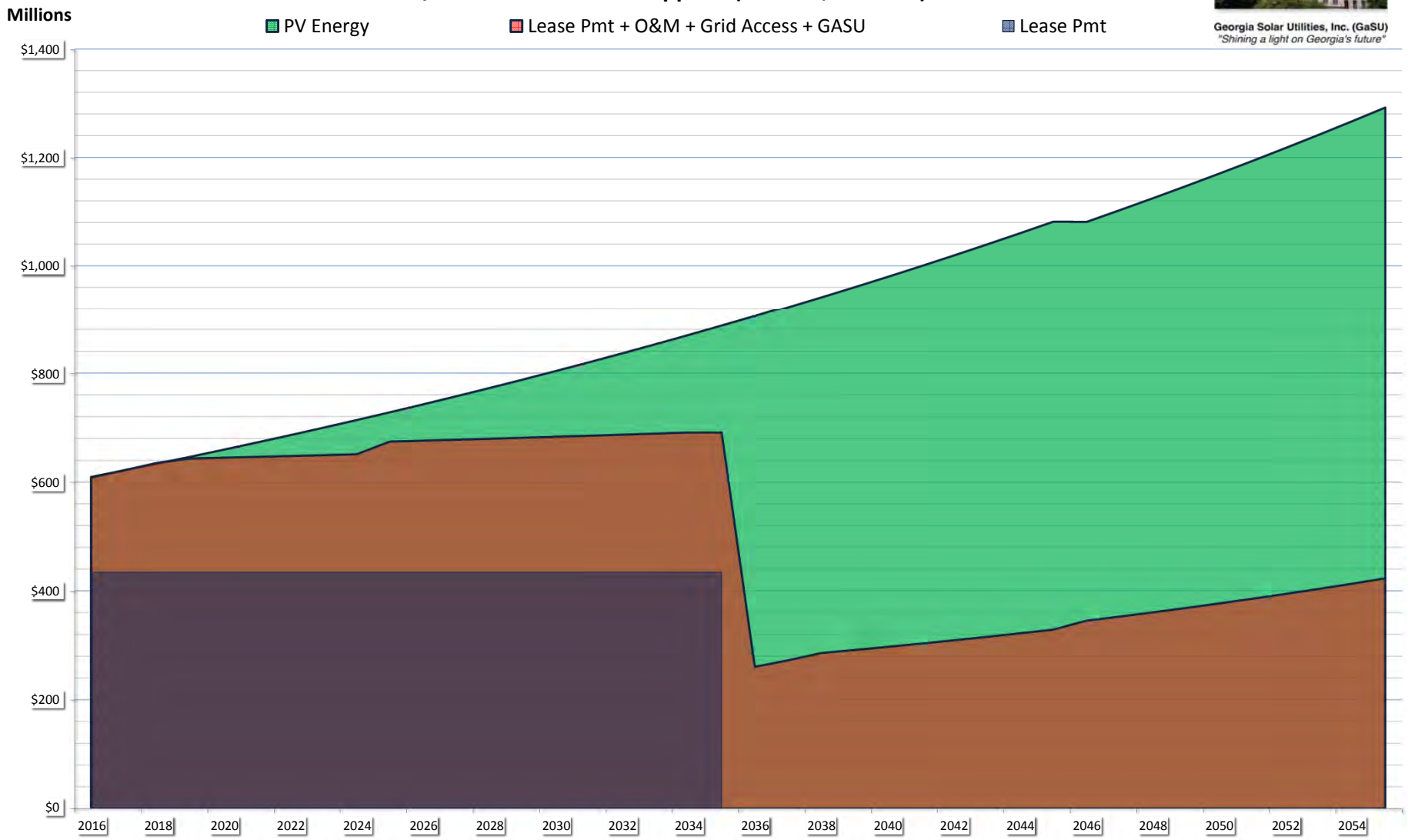
# $.129/kWh 2016
# GA Solar Utilities Inc
### 20 % ITC, 20 Year Bonds

| **Variables** | | **2016** | |
|---|---|---|---|
| Total System Size (watts) | | 2,000,000,000 | watts |
| Insolation Value (annual peak sun hours per day.) | | 6.60 | |
| Capacity Factor | | 27.50% | |
| Electric Sales retail | **$** | **0.129** | kWh |
| Tax Burden (%) | | 30% | |
| REC Compensation Rate (per KW-H) | $ | - | kWh |
| Installation Cost per Watt | **$** | **3.50** | /watt |
| Installation Cost / kWh | $ | 1.186 | |
| | | | |
| **Electrical Power Production & RECs** | | | |
| Annual Power Generated (KW-H) | | 4,721,640,000 | kWh's |
| Value of Solar electricity | $ | 609,091,560 | |
| | | | |
| **Financial Analysis** | | | |
| Total System up front cost (installed) | **$** | **7,000,000,000** | |
| **20**% Federal Business Energy ITC | $ | (1,400,000,000) | |
| **Cost After Rebates, Bond Amounts** | **$** | **5,600,000,000** | |
| | | | |
| Tax Benefit of Depreciation | | | |
| Value of Energy First year | $ | (609,091,560) | |
| Value of SRECs First Year | $ | - | |
| **Actual Net System Cost after FIRST YEAR** | **$** | **4,990,908,440** | |
| | | | |
| **System Cost Returned First Year** | | **29%** | |
| **Tons of CO2 Offset per year (2.3 lbs/kw-h. EPA)** | | **5,429,886** | |

**2 GW's, $.129/kWh in 2016**

**$5.6 bb, 4.75% bonds, 20 year terms**

**2/3rds of available ITC Applied (20% ITC, not 30%)**

## Financial Totals

| CUMULATIVE in BILLIONS | 30 Years in billions | 40 Years in billions |
|---|---|---|
| Energy Production | $ 24,313 | $ 36,152 |
| 25 Year Bond Payments | $ (8,685) | $ (8,685) |
| Accumulated O & M | $ (1,946) | $ (3,463) |
| Grid access / Trans costs | $ (2,833) | $ (3,777) |
| GA Solar Utilities Inc 11.5% | $ (2,701) | $ (4,062) |
| Rate Reduction Funds | $ 8,148 | $ 16,164 |

**GA Solar Utilities Inc** — **$.129/kWh 2016**

**2 GWs Dual Axis Photovoltaic System** — **1 - 40 Years**

**NO SRECS**

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** | **2025** |
| Electric Costs per KW-H 2% rise/yr | **$ 0.129** | **$ 0.132** | **$ 0.134** | **$ 0.137** | **$ 0.140** | **$ 0.142** | **$ 0.145** | **$ 0.148** | **$ 0.151** | **$ 0.154** |
| **Bond payments $6.3 bb** | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 |
| Operations and Maint - ($20K/yr/MW) | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Depreciation MACRS | | | $ - | $ - | $ - | | $ - | $ - | $ - | $ - |
| Value of Energy Produced by PV | $ (609,091,560) | $ (621,273,391) | $ (633,698,859) | $ (646,372,836) | $ (659,300,293) | $ (672,486,299) | $ (685,936,025) | $ (699,654,745) | $ (713,647,840) | $ (727,920,797) |
| **GaSU escalates to 11.5% Gross** | $ 39,590,951 | $ 52,808,238 | $ 66,538,380 | $ 74,332,876 | $ 75,819,534 | $ 77,335,924 | $ 78,882,643 | $ 80,460,296 | $ 82,069,502 | $ 83,710,892 |
| **Rate Reduction Funds** | **$ 805,531** | **$ (229,925)** | **$ (1,534,599)** | **$ 3,344,882** | **$ 14,785,681** | **$ 26,455,297** | **$ 38,358,304** | **$ 50,499,372** | **$ 62,883,261** | **$ 75,514,827** |
| **Tons of CO2 Offset cumulative** | **5,429,886** | **10,859,772** | **16,289,658** | **21,719,544** | **27,149,430** | **32,579,316** | **38,009,202** | **43,439,088** | **48,868,974** | **54,298,860** |

| | Year 11 | Year 12 | Year 13 | Year 14 | Year 15 | Year 16 | Year 17 | Year 18 | Year 19 | Year 20 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2025** | **2026** | **2027** | **2028** | **2029** | **2030** | **2031** | **2032** | **2033** | **2034** |
| Electric Costs per kWh 2% rise/yr | **$ 0.157** | **$ 0.160** | **$ 0.164** | **$ 0.167** | **$ 0.170** | **$ 0.174** | **$ 0.177** | **$ 0.181** | **$ 0.184** | **$ 0.188** |
| **Bond payments $6.3 bb** | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 |
| Operations and Maint ($30K/yr/MW) | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Depreciation | | | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Value of Energy Produced by PV | $ (742,479,213) | $ (757,328,797) | $ (772,475,373) | $ (787,924,881) | $ (803,683,378) | $ (819,757,046) | $ (836,152,187) | $ (852,875,230) | $ (869,932,735) | $ (887,331,390) |
| **GaSU 11.5% Gross** | $ 85,385,109 | $ 87,092,812 | $ 88,834,668 | $ 90,611,361 | $ 92,423,588 | $ 94,272,060 | $ 96,157,501 | $ 98,080,651 | $ 100,042,265 | $ 102,043,110 |
| **Rate Reduction Funds** | **$ 68,399,026** | **$ 81,540,908** | **$ 94,945,627** | **$ 108,618,441** | **$ 122,564,712** | **$ 136,789,908** | **$ 151,299,607** | **$ 166,099,501** | **$ 181,195,393** | **$ 196,593,202** |

| | Year 21 | Year 22 | Year 23 | Year 24 | Year 25 | Year 26 | Year 27 | Year 28 | Year 29 | Year 30 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2035** | **2036** | **2037** | **2038** | **2039** | **2040** | **2041** | **2042** | **2043** | **2044** |
| Electric Costs per kWh 2% rise/yr | **$ 0.19** | **$ 0.196** | **$ 0.199** | **$ 0.203** | **$ 0.207** | **$ 0.212** | **$ 0.216** | **$ 0.220** | **$ 0.225** | **$ 0.229** |
| **Bond Payments** | | | | | | | $ - | $ - | $ - | $ - |
| Operations and Maint ($50K/MW/yr) | $ 66,000,000 | $ 75,900,000 | $ 87,285,000 | $ 90,776,400 | $ 94,407,456 | $ 98,183,754 | $ 102,111,104 | $ 106,195,549 | $ 110,443,371 | $ 114,861,105 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Value of Energy Produced by PV | $ (868,874,897) | $ (886,252,395) | $ (903,977,443) | $ (922,056,991) | $ (940,498,131) | $ (959,308,094) | $ (978,494,256) | $ (998,064,141) | $ (1,018,025,424) | $ (1,038,385,932) |
| **GaSU 11.5% Gross** | $ 99,920,613 | $ 101,919,025 | $ 103,957,406 | $ 106,036,554 | $ 108,157,285 | $ 110,320,431 | $ 112,526,839 | $ 114,777,376 | $ 117,072,924 | $ 119,414,382 |
| **Rate Reduction Funds** | **$ 608,521,484** | **$ 614,000,569** | **$ 618,302,237** | **$ 630,811,237** | **$ 643,500,590** | **$ 656,371,109** | **$ 669,423,512** | **$ 682,658,416** | **$ 696,076,329** | **$ 709,677,645** |

| | Year 31 | Year 32 | Year 33 | Year 34 | Year 35 | Year 36 | Year 37 | Year 38 | Year 39 | Year 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2045** | **2046** | **2047** | **2048** | **2049** | **2050** | **2051** | **2052** | **2053** | **2054** |
| Electric Costs per kWh 2% rise/yr | **$ 0.23** | **$ 0.238** | **$ 0.243** | **$ 0.248** | **$ 0.253** | **$ 0.258** | **$ 0.263** | **$ 0.268** | **$ 0.274** | **$ 0.279** |
| 2% Degradation factor | | | | | | | | | | |
| Operations and Maint ($80K/MW/yr) | $ 126,347,216 | $ 131,401,105 | $ 136,657,149 | $ 142,123,435 | $ 147,808,372 | $ 153,720,707 | $ 159,869,535 | $ 166,264,317 | $ 172,914,889 | $ 179,831,485 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Value of Energy Produced by PV | $ (1,081,219,352) | $ (1,102,843,739) | $ (1,124,900,614) | $ (1,147,398,626) | $ (1,170,346,599) | $ (1,193,753,531) | $ (1,217,628,601) | $ (1,241,981,173) | $ (1,266,820,797) | $ (1,292,157,213) |
| **GaSU 11.5% Gross** | $ 124,340,225 | $ 126,827,030 | $ 129,363,571 | $ 131,950,842 | $ 134,589,859 | $ 137,281,656 | $ 140,027,289 | $ 142,827,835 | $ 145,684,392 | $ 148,598,079 |
| **Rate Reduction Funds** | **$ 736,099,111** | **$ 750,182,804** | **$ 764,447,094** | **$ 778,891,549** | **$ 793,515,568** | **$ 808,318,368** | **$ 823,298,977** | **$ 838,456,222** | **$ 853,788,716** | **$ 869,294,848** |

## 2 GWs Dual Axis Photovoltaic System

## FIRST YEAR

Georgia Solar Utilities, Inc. (GaSU)
*"Shining a light on Georgia's future"*

# $.16/kWh 2016
# GA Solar Utilities Inc
### 20% ITC 20 Year Bonds

| **Variables** | | **2016** | |
|---|---|---|---|
| Total System Size (watts) | | 2,000,000,000 | watts |
| Insolation Value (annual peak sun hours per day.) | | 6.60 | |
| Capacity Factor | | 27.50% | |
| Electric Sales retail | **$** | **0.160** | kWh |
| Tax Burden (%) | | 30% | |
| REC Compensation Rate (per KW-H) | $ | - | kWh |
| Installation Cost per Watt | **$** | **3.50** | /watt |
| Installation Cost / kWh | $ | 1.186 | |
| | | | |
| **Electrical Power Production & RECs** | | | |
| Annual Power Generated (KW-H) | | 4,721,640,000 | kWh's |
| Value of Solar electricity | $ | 755,462,400 | |
| | | | |
| **Financial Analysis** | | | |
| Total System up front cost (installed) | **$** | **7,000,000,000** | |
| **20**% Federal Business Energy ITC | $ | (1,400,000,000) | |
| **Cost After Rebates, Bond Amounts** | **$** | **5,600,000,000** | |
| | | | |
| Tax Benefit of Depreciation | | | |
| Value of Energy First year | $ | (755,462,400) | |
| Value of SRECs First Year | $ | - | |
| **Actual Net System Cost after FIRST YEAR** | **$** | **4,844,537,600** | |
| | | | |
| **System Cost Returned First Year** | | **31%** | |
| **Tons of CO2 Offset per year (2.3 lbs/kw-h. EPA)** | | **5,429,886** | |

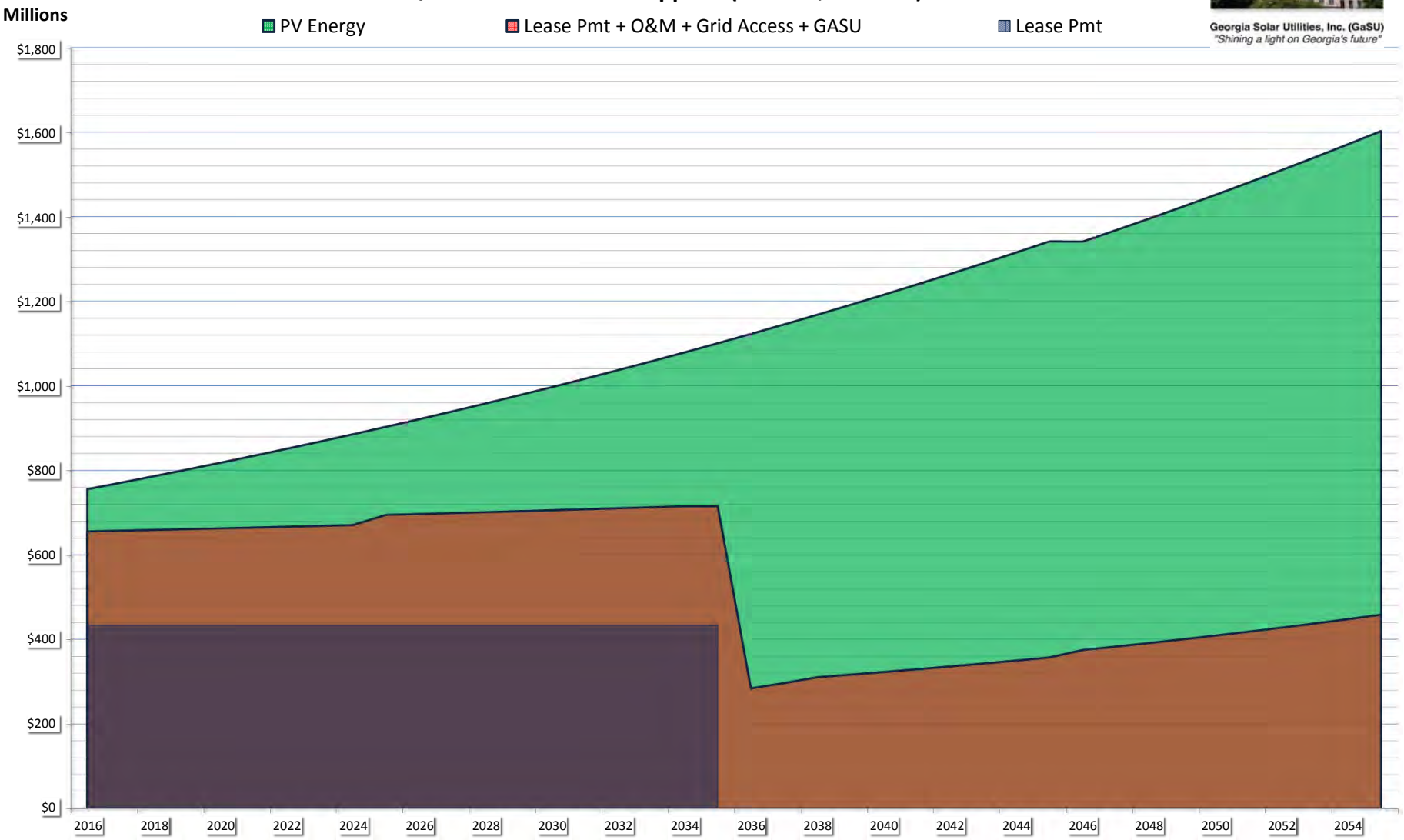
**2 GW's, $.16/kWh in 2016**

**$5.6 bb, 4.75% bonds, 20 year terms**

**2/3rds of available ITC Applied (20% ITC, not 30%)**

Georgia Solar Utilities, Inc. (GaSU)

*"Shining a light on Georgia's future"*



## Financial Totals

| CUMULATIVE in BILLIONS | 30 Year in billions | 40 Year in billions |
|---|---|---|
| Energy Production | $ 30,156 | $ 44,840 |
| 20 Year Bond Payments | $ (8,685) | $ (8,685) |
| Accumulated O & M | $ (1,946) | $ (3,463) |
| Grid access / Trans costs | $ (2,833) | $ (3,777) |
| GA Solar Utilities Inc 11.5% | $ (3,381) | $ (5,070) |
| Rate Reduction Funds | $ 13,311 | $ 23,845 |

**GA Solar Utilities Inc** — **$.16/kWh 2016**

**2 GWs Dual Axis Photovoltaic System** — **1 - 40 Years**

**NO SRECS**

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** | **2025** |
| Electric Costs per KW-H 2% rise/yr | **$ 0.160** | **$ 0.163** | **$ 0.166** | **$ 0.170** | **$ 0.173** | **$ 0.177** | **$ 0.180** | **$ 0.184** | **$ 0.187** | **$ 0.191** |
| **Bond payments $6.3 bb** | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 |
| Operations and Maint - ($20K/yr/MW) | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 | $ 40,000,000 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Depreciation MACRS | | | $ - | $ - | $ - | | $ - | $ - | $ - | $ - |
| Value of Energy Produced by PV | $ (755,462,400) | $ (770,571,648) | $ (785,983,081) | $ (801,702,743) | $ (817,736,797) | $ (834,091,533) | $ (850,773,364) | $ (867,788,831) | $ (885,144,608) | $ (902,847,500) |
| **GaSU escalates to 11.5% Gross** | $ 86,878,176 | $ 88,615,740 | $ 90,388,054 | $ 92,195,815 | $ 94,039,732 | $ 95,920,526 | $ 97,838,937 | $ 99,795,716 | $ 101,791,630 | $ 103,827,463 |
| **Rate Reduction Funds** | **$ 99,889,146** | **$ 113,260,831** | **$ 126,899,949** | **$ 140,811,849** | **$ 155,001,988** | **$ 169,475,929** | **$ 184,239,349** | **$ 199,298,038** | **$ 214,657,900** | **$ 230,324,960** |
| **Tons of CO2 Offset cumulative** | **5,429,886** | **10,859,772** | **16,289,658** | **21,719,544** | **27,149,430** | **32,579,316** | **38,009,202** | **43,439,088** | **48,868,974** | **54,298,860** |

| | Year 11 | Year 12 | Year 13 | Year 14 | Year 15 | Year 16 | Year 17 | Year 18 | Year 19 | Year 20 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2025** | **2026** | **2027** | **2028** | **2029** | **2030** | **2031** | **2032** | **2033** | **2034** |
| Electric Costs per kWh 2% rise/yr | **$ 0.195** | **$ 0.199** | **$ 0.203** | **$ 0.207** | **$ 0.211** | **$ 0.215** | **$ 0.220** | **$ 0.224** | **$ 0.229** | **$ 0.233** |
| **Bond payments $6.3 bb** | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 | $ 434,262,278 |
| Operations and Maint ($30K/yr/MW) | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 | $ 60,000,000 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Depreciation | | | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Value of Energy Produced by PV | $ (920,904,450) | $ (939,322,539) | $ (958,108,990) | $ (977,271,170) | $ (996,816,593) | $ (1,016,752,925) | $ (1,037,087,983) | $ (1,057,829,743) | $ (1,078,986,338) | $ (1,100,566,065) |
| **GaSU 11.5% Gross** | $ 105,904,012 | $ 108,022,092 | $ 110,182,534 | $ 112,386,185 | $ 114,633,908 | $ 116,926,586 | $ 119,265,118 | $ 121,650,420 | $ 124,083,429 | $ 126,565,097 |
| **Rate Reduction Funds** | **$ 226,305,360** | **$ 242,605,369** | **$ 259,231,378** | **$ 276,189,907** | **$ 293,487,607** | **$ 311,131,261** | **$ 329,127,787** | **$ 347,484,245** | **$ 366,207,831** | **$ 385,305,889** |

| | Year 21 | Year 22 | Year 23 | Year 24 | Year 25 | Year 26 | Year 27 | Year 28 | Year 29 | Year 30 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2035** | **2036** | **2037** | **2038** | **2039** | **2040** | **2041** | **2042** | **2043** | **2044** |
| Electric Costs per kWh 2% rise/yr | **$ 0.24** | **$ 0.243** | **$ 0.247** | **$ 0.252** | **$ 0.257** | **$ 0.262** | **$ 0.268** | **$ 0.273** | **$ 0.279** | **$ 0.284** |
| **Bond Payments** | | | | | | | $ - | $ - | $ - | $ - |
| Operations and Maint ($50K/MW/yr) | $ 66,000,000 | $ 75,900,000 | $ 87,285,000 | $ 90,776,400 | $ 94,407,456 | $ 98,183,754 | $ 102,111,104 | $ 106,195,549 | $ 110,443,371 | $ 114,861,105 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Value of Energy Produced by PV | $ (1,077,674,291) | $ (1,099,227,776) | $ (1,121,212,332) | $ (1,143,636,579) | $ (1,166,509,310) | $ (1,189,839,496) | $ (1,213,636,286) | $ (1,237,909,012) | $ (1,262,667,192) | $ (1,287,920,536) |
| **GaSU 11.5% Gross** | $ 123,932,543 | $ 126,411,194 | $ 128,939,418 | $ 131,518,207 | $ 134,148,571 | $ 136,831,542 | $ 139,568,173 | $ 142,359,536 | $ 145,206,727 | $ 148,110,862 |
| **Rate Reduction Funds** | **$ 793,308,947** | **$ 802,483,782** | **$ 810,555,114** | **$ 826,909,172** | **$ 843,520,483** | **$ 860,391,400** | **$ 877,524,209** | **$ 894,921,127** | **$ 912,584,295** | **$ 930,515,769** |

| | Year 31 | Year 32 | Year 33 | Year 34 | Year 35 | Year 36 | Year 37 | Year 38 | Year 39 | Year 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **2045** | **2046** | **2047** | **2048** | **2049** | **2050** | **2051** | **2052** | **2053** | **2054** |
| Electric Costs per kWh 2% rise/yr | **$ 0.29** | **$ 0.296** | **$ 0.302** | **$ 0.308** | **$ 0.314** | **$ 0.320** | **$ 0.326** | **$ 0.333** | **$ 0.340** | **$ 0.346** |
| 2% Degradation factor | | | | | | | | | | |
| Operations and Maint ($80K/MW/yr) | $ 126,347,216 | $ 131,401,105 | $ 136,657,149 | $ 142,123,435 | $ 147,808,372 | $ 153,720,707 | $ 159,869,535 | $ 166,264,317 | $ 172,914,889 | $ 179,831,485 |
| Grid access / Trans costs $.02/kWh | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 | $ 94,432,800 |
| Value of Energy Produced by PV | $ (1,341,047,258) | $ (1,367,868,203) | $ (1,395,225,567) | $ (1,423,130,079) | $ (1,451,592,680) | $ (1,480,624,534) | $ (1,510,237,025) | $ (1,540,441,765) | $ (1,571,250,600) | $ (1,602,675,612) |
| **GaSU 11.5% Gross** | $ 154,220,435 | $ 157,304,843 | $ 160,450,940 | $ 163,659,959 | $ 166,933,158 | $ 170,271,821 | $ 173,677,258 | $ 177,150,803 | $ 180,693,819 | $ 184,307,695 |
| **Rate Reduction Funds** | **$ 966,046,808** | **$ 984,729,455** | **$ 1,003,684,678** | **$ 1,022,913,885** | **$ 1,042,418,350** | **$ 1,062,199,206** | **$ 1,082,257,432** | **$ 1,102,593,846** | **$ 1,123,209,092** | **$ 1,144,103,632** |

## 2 GWs Dual Axis Photovoltaic System

## FIRST YEAR is 2014

## $.134/kWh 2016
## GA Solar Utilities Inc

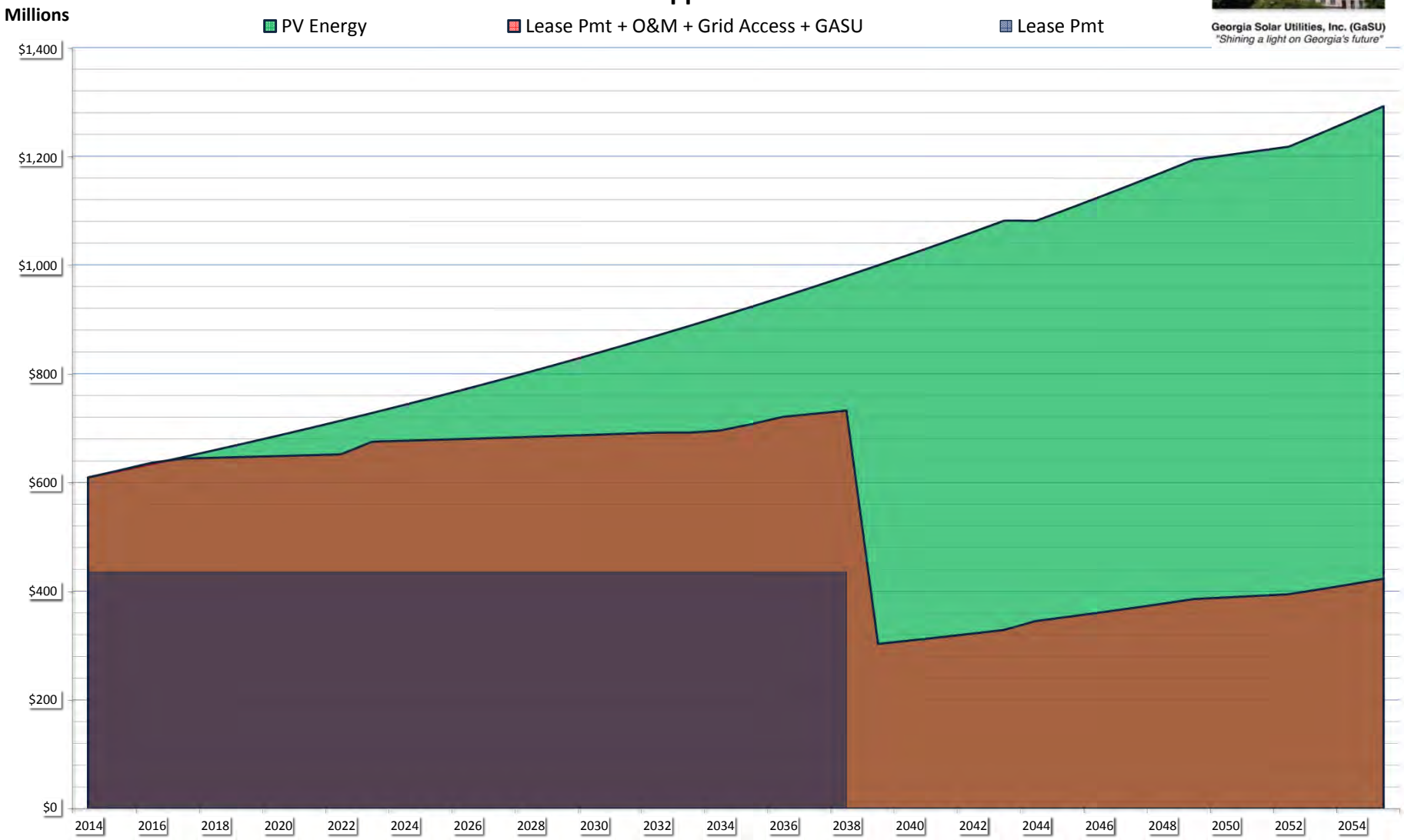
**Georgia Solar Utilities, Inc. (GaSU)**
*"Shining a light on Georgia's future"*

| **Variables** | | **2014** | |
|---|---|---|---|
| Total System Size (watts) | | 2,000,000,000 | watts |
| Insolation Value (annual peak sun hours per day.) | | 6.60 | |
| Capacity Factor | | 27.50% | |
| Electric Sales retail | **$** | **0.120** | kWh |
| Tax Burden (%) | | 30% | |
| REC Compensation Rate (per KW-H) | $ | - | kWh |
| Installation Cost per Watt | **$** | **4.40** | /watt |
| Installation Cost / kWh | $ | 1.305 | |
| | | | |
| **Electrical Power Production & RECs** | | | |
| Annual Power Generated (KW-H) | | 4,721,640,000 | kWh's |
| Value of Solar electricity | $ | 566,596,800 | |
| | | | |
| **Financial Analysis** | | | |
| Total System up front cost (installed) | **$** | **8,800,000,000** | |
| **10**% Federal Business Energy ITC | $ | (2,640,000,000) | |
| **Cost After Rebates, Bond Amounts** | **$** | **6,160,000,000** | |
| | | | |
| Tax Benefit of Depreciation | | | |
| Value of Energy First year | $ | (566,596,800) | |
| Value of SRECs First Year | $ | - | |
| **Actual Net System Cost after FIRST YEAR** | **$** | **5,593,403,200** | |
| | | | |
| **System Cost Returned First Year** | | **36%** | |
| **Tons of CO2 Offset per year (2.3 lbs/kw-h. EPA)** | | **5,429,886** | |

**2 GW's, $.134/kWh in 2016**

**$6.36 bb, 4.75% bonds, 25 year terms**

**30% Cash Grant applied**

## IV. SOLAR MARKET AS IT IS TODAY

In 2011 the US Solar Industry sales grew to more than $57B in installed solar energy systems in a single year. The Global Solar Energy Industry now represents $300 B+ in annual sales and construction (3. Triple Pundit- June 15, 2012). This year the US is on track to install 3.2GW of new Solar Energy facilities a 70% increase over last year (1. SEIA 2012 Report 9/12/2012). Improving solar economics, technology, and demand for clean renewable energy have been driving industry growth for the past eight years.

There are now more than 65GW of installed Solar Energy facilities around the world equivalent to 130 Coal Fired Power Plants (5. Huffington-6/20/12). Germany alone has more than 22GW of Solar Energy equivalent to 22 Nuclear Power Plants (8. Reuters-6/2012). More than 100,000 people in the US now work in the Solar Energy Industry with a growth rate of over 40% per year. Utility Scale Solar Energy is the fastest growing segment of the overall market and now represents 54% of new solar energy development (1. SEIA 2012 Report 9/12/2012).

Solar energy is a critical part of the energy mix of almost every developed country. Distributed Power Generation with clean renewable energy represents the biggest paradigm shift in the Energy Industry in the last 50 years.

However, Georgia has developed less than 1/10 of 1% of the US Solar Market ($50M). The "Opportunity Cost" to Georgia equates to billions to dollars in lost State economic development, thousands of new jobs lost, billions in Federal incentives and cash grants forfeited for lack of significant action to develop GA's renewable energy resources. Of more than $5 billion available in Federal Renewable Energy Grants Georgia received less than $600K. Millions in Enterprise Value for Georgia businesses were lost because Owners have been unable to invest in and own a renewable energy source that could help manage their long term energy

liabilities. Property owners have also been unable to own and invest in renewable energy that would increase the value of their properties. The State of Georgia has lost hundreds of millions in tax revenue that could have been generated by growing the value of businesses and property that make up our tax base (7. ABC- W.Hudson/Reznick 9/2/2010).

Georgia Solar Utilities, Inc., and the GA Solar Industry can deliver billions of dollars of new economic development for Georgia. Competitive, profitable solar power plants will generate jobs, revenues, and rate reductions for GA ratepayers. Our conservative financial model demonstrates that this Master Planned Distributed Power Generation System will pay for itself in 20 - 25 years and over 30 years will generate more than $7 B for GA Ratepayers and $2 B in Grid Access Fees and profits for GPC. The Capital Costs of this project will be funded by Private Capital. No Federal Loan Guarantees will be required or other State incentives. Our model does not include the $$B in additional ratepayer savings coming from the Clean Energy being produced through environmental compliance offsets available from Federal Renewable Energy Credits(RECS) or EPA qualified carbon offsets that will be created.

## V. CONCLUSION

The 'physics to finance' models we used are designed to input various assumptions and values so that the user can 'look forward' in time and predict what will occur physically and financially to a solar investment. The model also 'looks backwards' in time.

We ran it back in time to discover when the technology and financial operability of the solar opportunity GaSU describes began to occur. What we found was that 2 ½ years ago the opportunity was emerging. The solar technology was clearly there, but it was more expensive to build. However, 2 ½ years ago the Federal 1603 ITC we use today that has to be discounted

significantly was a 30% Cash Grant from the US Treasury. A 30% Cash Grant offsets the additional material costs sufficiently to allow the business plan we now present to function back then about as well as it does today. The model of this same system coming on line in 2014 instead of 2016 is attached as (**2 GW's, $.134/kWh in 2016, $6.36 bb, 4.75% bonds, 25 year terms, 30% Cash Grant applied)** the last model.

GPC was publicly told of the impact they were having on solar development by Wes Hudson in the Atlanta Business Chronicle on 9/2/2010 (#7 - ABC - Wes Hudson, Reznick Solar Opportunity Cost Article). The attached model confirms Mr. Hudson's estimate of damages as conservative. The Wall Street Journal article of 6/8/2012 (#11 - WSJ – "Tom Fanning, The Natural Gas Skeptic"), 21 months later show there had been no change in course.

Three years of the Federal 1603 Grant/ITC has been lost to Georgia. We are up against an end to it in 2016. Were it not for similar funds, Vogtle may not have happened. Rapid action will leave the time to complete GaSU's Business plan and find Georgia able to make a new and significant harvest of the sun by 2016.

Georgia Power has defaulted on their right to lead solar development in Georgia. The PSC can correct the course of this state. The three words on PSC Seal are wisdom, justice and moderation. The PSC has shown great wisdom in the past. It is time for justice for the ratepayers and the moderation of not wasting a finite natural resource of coal when this state has an abundant free and infinite energy source to supplement coal and expand our coal reserves much further into the future.

GaSU hereby respectfully requests that the Commission agree that, pending proof of GaSU's financial viability and technical competence, the right to undertake utility scale solar development in Georgia will be granted to GaSU. Further GaSU will be authorized to begin to help organize building a distributed solar power generation system.

GaSU further requests that the PSC agree the Putnam 80 MW project and similar other projects up to 500 MW's be started as a beginning point for the distributed generation system.

Respectfully submitted this 20th day of September, 2012.

GEORGIA SOLAR UTILITIES, INC.

3330 Cumberland Blvd SE
Suite 500
Atlanta, GA 30339
(478) 474-5024
info@gasolarutilities.com

By:_____
Robert E. Green
President

Reference List: items 7 – 12 are attached


1) http://www.seia.org/news/report-us-solar-market-spikes-q2-2012-more-doubling-q2-2011-market-size
2) http://cleantechnica.com/2012/06/14/solar-in-the-us-policy-promise-9-more-solar-charts-images/?utm_source=twitterfeed&utm_medium=twitter&utm_campaign=Feed%3A+IM-cleantechnica+%28CleanTechnica%29&goback=%2Egde_1630787_member_124781068
3) http://www.triplepundit.com/2012/06/worldwide-investment-renewable-energy-hit-257-billion-2011/
4) http://www.businessweek.com/news/2011-11-16/clean-energy-investment-may-double-to-395-billion-2020.html
5) http://www.huffingtonpost.com/billy-parish/on-the-longest-day-of-the_b_1612786.html
6) http://www.seia.org/research-resources/major-solar-projects-list \
7) ABC - Wes Hudson, Reznick Solar Opportunity Cost Article, 9-2-2010
8) Reuters- "Germany Sets New Solar Power Record 22GW", 6-2012
9) WSJ – "Tom Fanning, The Natural Gas Skeptic", 6-8-2012
10) **Towards the Full Cost of Coal:** Caroline Burkhard Golin, Georgia Institute of Technology

ATLANTA BUSINESS CHRONICLE
REAL TALK Atlanta's Experts in Real Estate

Wes Hudson

# GEORGIA LOSING OUT ON RENEWABLE ENERGY

Thursday, September 2, 2010, 11:11am EDT | Modified: Thursday, September 2, 2010, 11:20am

In an economy with record unemployment, Georgia has turned down billions of dollars in federal grants intended to stimulate investment in renewable energy in the past 12 months. Georgia continues to lag behind other states (and the world) when it comes to renewable energy.

It was recently reported in the Atlanta Journal-Constitution (http://www.ajc.com/business/georgia-power-to-double-595617.html ) that "Georgia Power is doubling the amount of solar energy it will buy from independent producers." Unfortunately, doubling a ludicrously low number is more an exercise in green-washing than any real progress. Especially given glaring facts such as the fact that there is literally 10 times more solar energy installed in DeSoto County Florida (25 Megawatts) than the entire state of Georgia).

While Reznick Group and numerous other companies and professional organizations like the Georgia Solar Energy Association continue to applaud this change in stance by the nation's most obstinate power company, such changes in heart are unfortunately essentially cosmetic. The new stance by the power company is truly only modestly helpful news for real estate, and then only on the very small scale as compared to other southern states. The latest change in corporate policy by the public utility is unfortunately very, very limited (by design) and does not, indeed cannot, apply to the required larger commercial and utility scale solar projects that big-box companies are preferring to do in other states like North Carolina, Florida, Tennessee and other southern states. So Georgia is still at the back of the line in relative comparison.

Yet Georgia's economy cannot afford to lose out on large commercial and utility scale solar and biomass projects, which continue to select other southeastern states for their base of operations. Why? It's because Georgia

state law does not support the renewable energy electrical sales industry and instead supports fossil and nuclear fuels. Georgia only dabbles in biomass and landfill gas to serve the purposes of corporate marketing. Hyrdo power is maxed out.

So, as long as Georgia state law continues to make the sale of renewable energy illegal between non-utilities, and as long as we allow the Georgia Territorial Electrical Services Act to be interpreted as making the sale of renewable electricity illegal in Georgia, then we and Georgia are losers.

To date, and largely because such sales of electricity are alleged to be illegal, of the over five billion dollars in federal renewable energy grants made by the U.S. Treasury, only a paltry $600,000+ has found its way to Georgia.

It is therefore absolutely clear that Georgia's laws on renewable energy are directly harming both the statewide economy and capital investment in Georgia.

This is specifically because such laws directly prevent large scale real estate from purchasing commercial scale solar energy from solar energy companies, the operating costs of real estate in Georgia are in many cases being inflated and subjected to ever increasing electrical rates. The use of solar power is a near ideal way for real estate owners to fix their price of electricity for decades at a time. Yet in Georgia, this is not happening largely because of the protection given public utilities by the state: a protection that 90 percent of the other U.S. States refuse to grant. All when solar power is declining in price more rapidly than ever before and when federal tax credits and grant will cover at least 40 percent of your solar capital costs.

Clearly, this must change in the next legislative session. But the power lobby is strong. They have so far mis-educated Georgia's elected officials to believe that we don't have enough sun in Georgia to run a solar power. But the truth is that renewable energy works. Georgia Power now says so publicly. Finally. And the Georgia Public Services Commission Chairman also says so publicly. So it's time for us to re-educate our elected officials with the truth.

While Georgia Power's recent news moved the needle in the right direction, we are still forced to look forward to the day when Georgia's energy policy allows this state to do commercial and utility-scale solar projects equal in size to the ones currently being done in neighboring states and in other regions of the United States.

So, as you talk with the candidates for Governor, and your other elected officials during this election time, make sure you tell each of them that you expect them to clarify the language in the Georgia Territorial Electrical Services an make it clear that the state of Georgia encourages the sale of

renewable electricity, by private contract, between a buyer and a seller, neither of which is required to be a public utility, municipal utility or EMC. Making that one small change will open up a flood of capital investment for the state, improve opportunities for the real estate sector, improve cash flows and operating savings, and take Georgia into the 21st century, rather than the 20th, which is where we are stuck now. While you are at it, ask your elected officials to also boost the system size restrictions in the Georgia Cogeneration and Distributed Generation Act of 2001. If we tweak those two state laws, our world, and our state economy, will show signs of immediate improvement, in the form of increased capital investment, lower utility costs, reduced water usage and less air and water pollution.

There is really no reason not to. Unless of course, you prefer to live in the past and let the world slip by.

*Wes Hudson is co-managing principal of Reznick Group's Atlanta office.*

**Categories:** Green, Energy & the Environment

**People:** Wes Hudson

**Germany sets new solar power record,** BERLIN (Reuters) - German solar power plants produced a world record 22 gigawatts of electricity per hour - equal to 20 nuclear power stations at full capacity - through the midday hours on Friday and Saturday, the head of a renewable energy think tank said.

Erik Kirschbaum Reuters May 26, 2012 - 2:02 pm

The German government decided to abandon nuclear power after the Fukushima nuclear disaster last year, closing eight plants immediately and shutting down the remaining nine by 2022.

They will be replaced by renewable energy sources such as wind, solar and bio-mass.

Norbert Allnoch, director of the Institute of the Renewable Energy Industry (IWR) in Muenster, **said the 22 gigawatts of solar power per hour fed into the national grid on Saturday met nearly 50 percent of the nation's midday electricity needs**.

"Never before anywhere has a country produced as much photovoltaic electricity," Allnoch told Reuters. "Germany came close to the 20 gigawatt (GW) mark a few times in recent weeks. But this was the first time we made it over."

The record-breaking amount of solar power shows one of the world's leading industrial nations was able to meet a third of its electricity needs on a work day, Friday, and nearly half on Saturday when factories and offices were closed.

Government-mandated support for renewables has helped Germany became a world leader in renewable energy and the country gets about 20 percent of its overall annual electricity from those sources.

Germany has nearly as much installed solar power generation capacity as the rest of the world combined and gets about four percent of its overall annual electricity needs from the sun alone. It aims to cut its greenhouse gas emissions by 40 percent from 1990 levels by 2020.

THE WALL STREET JOURNAL.
WSJ.com

THE WEEKEND INTERVIEW

June 8, 2012, 6:40 p.m. ET

# Tom Fanning: The Natural Gas Skeptic

Nobody can sit here and tell me that it's going to be safe forever, safe in terms of economics and reliability,' says the Southern Company CEO.

Tom Fanning By JOSEPH RAGO

New York

'I'm here to talk about what we're calling an 'all of the above' energy strategy," President Obama said the other day. Funny, Mitt Romney also calls it that. Everyone in Washington calls it that, and everyone claims to be in favor of it too: natural gas, solar, coal, biofuels, hydro, nuclear, oil, wind, the works. But almost nobody supports "all of the above," not really.

In theory, liberals want to phase out fossil fuels in the name of climate change. In theory, conservatives oppose subsidies for renewables, unless they like ethanol, but then they also support subsidies for nuclear and often oil and gas. And in practice, both political parties tend to dump ideology and support whatever status quo energy sources predominate in their home districts.

Tom Fanning's home district, so to speak, is Georgia and Alabama and parts of Mississippi and Florida—the region powered by Southern Company. The giant utility's CEO and chairman is among the few who take what he calls an "all the arrows in the quiver" approach—perhaps to differentiate himself from the Washingtonians—though he notes slyly that "We actually believe in the dogma."

Even as natural gas booms and coal-fired power falls dramatically, Southern is building new coal plants, in Kemper County, Miss. Outside Waynesboro, Ga., work is under way on the islands and cooling tower of what by 2016 will become the first new U.S. nuclear unit since the Jimmy Carter era. In Nacogdoches, Texas, Southern is building one of the country's largest commercial renewable-power stations, which will convert trash from lumber making and other forms of waste biomass into electricity.

For Mr. Fanning, this is common sense. He likens it to diversifying an investment portfolio: "You don't pick one stock." He may be right that "all of the above" is a sensible approach, but it isn't common—either in politics or in the electric industry. Mr. Fanning has emerged as one of the most trenchant (in fact, one of the only) critics of the transformative switch to gas from coal. Mr. Fanning explains, "It just doubles down your risk into one segment that looks promising today but nobody can sit here and tell me that it's going to be safe forever, safe in terms of economics and reliability."

In that sense, Southern's "genetic conservatism"—Mr. Fanning's term—may also be Exhibit A for the growing left-right coalition that wants to "make business boring again" in the too-big-to-fail era. They favor a return to something like the postwar business model that prevailed until the

deregulation wave of the 1980s—safer but less competitive, more stable but also less entrepreneurial.

Boring is the wrong word for someone as effusive and iconoclastic as Mr. Fanning, but he does belong to a corporate culture that rejects barbarians-at-the-gate capitalism. He likes to invoke "Beta," the financial measure of the volatility of an asset in relation to the overall market. "Last year," he says proudly, "among the S&P 500, we had the second-lowest Beta. The only company that beat us was . . . Hormel. They make Spam! Southern may not be exciting, but we're dependable and we work like crazy to be dependable."

To those who favor a business world with less risk and fewer vampire squids, Mr. Fanning is your guy.

***

Mr. Fanning sat down with the Journal editorial board recently amid "an historic shift" in the electric industry. King Coal is in twilight. For decades it was the engine of the U.S. power system, delivering nearly 60% of net generation by the 1980s. Southern illustrates the new reality; the share of its generation mix from coal has plunged to 35% in 2012 from 70% only five years ago. Meanwhile, gas has climbed to 47% from 16%.

One major reason, both at Southern and industry-wide, is the Environmental Protection Agency, which has been regulating against carbon like crazy. The EPA has effectively banned new coal and other rules are grinding down the existing fleet.

Enlarge Image

Close

Mr. Fanning views the EPA's campaign as a special kind of recklessness. "It's terribly unwise in my view to create a regulatory regime that bans one of the nation's most plentiful resources. We own 28% of the world's coal reserves—we have a blessing of wealth. It should be brought to bear here in America. If not, due to regulatory policy, it will be burned for the benefit of the citizens of China or India or elsewhere." He's right: Exports have nearly doubled since 2007.

On the other hand, markets are demolishing coal more effectively than government. Since 1990, power companies have selected coal for merely 6% of new generation. Gas was the fuel for 77%, even as coal has been far more competitive than it is today.

Now gas enjoys a huge price advantage, driven by the hydraulic-fracturing techno-revolution and the vast shale reserves of the greater Midwest. When gas is trading at $6 per million British thermal units, it is 50% cheaper than coal over the life of a power plant. Today, gas is trading near $2.

Mr. Fanning isn't so sure. "When you think about the kind of time horizon that a business like ours is in, where you put capital-intensive assets in the ground with a 30- or 40-year economic life, you need to think long term," he says. So here's the skeptic's case.

"Nationwide, I think we're going to be consuming over 50% more gas going forward than we currently do," Mr. Fanning notes, "or at least there's a good potential for that." Demand for gas is growing not merely for baseload electricity but in manufacturing, chemicals, transportation, and other industries. Consumption is also lagging below trend given the weak economy.

Even with many more wells and increased production, Mr. Fanning thinks gas prices will return to their historic oscillations and eventually spike. "Gas has traditionally been way more volatile certainly than coal and nuclear," he says. "So you're buying a more volatile product. You're creating a higher-Beta energy policy."

As coal recedes, Mr. Fanning warns that customers may be forced to rely on sources that are less productive and more expensive because there's nothing to pick up the slack. "If conventional coal is not going to get done, and there's only a few people who can do nuclear—this ain't a job for beginners—you're left with gas and, heaven forbid, renewables?" He cautions: "Now I'm as excited about renewables as anybody. But they're a niche play."

Other risks to ultracheap gas are political. Fracking could slow if government decides to "move beyond gas" with bad regulations, and a carbon tax or cap and trade could return. Natural-gas exports will also grow as the U.S. builds more terminals and producers see business opportunities in Europe and Asia. "You're going to see a harmonization of world-wide gas prices," much like the global commodity markets for oil. "Right now essentially the U.S. has a dividend coming to the economy in terms of cheap energy," says Mr. Fanning, who doesn't think it can last.

"Believe me," he continues. "I think gas will be the dominant resource going forward. But I am not willing to subject my customers to the risk of betting it all on gas."

***

For most of the 20th century, the consensus was that utilities like Southern were natural monopolies. The physics of electricity are simple and begat industrial organization: Because power can't be stored except in small quantities, supply and demand must be in balance at every instant. The thinking was that only one central authority could effectively manage the grid and coordinate the large-scale deployment of capital.

The same reasoning used to apply to the rest of the economy: Markets could only function if they were structured as cartels and competition suppressed. Thus the oligopolies in railroads, radio and television licenses, phone lines, air travel. Thus the separation of investment and commercial banking under the 1933 Glass-Steagall Act.

Deregulation—the insight that competition could generate new efficiencies—did not come to the electricity markets until the 1980s and '90s. Though it now sells some power in the wholesale markets, Southern defeated bids (including from the likes of Enron) to restructure markets in Georgia and Alabama, and Mr. Fanning says that "by any yardstick my customers are better off" as a result.

As he sees it, the kind of "managed competition" that prevails elsewhere gives energy companies the incentive to increase prices at the margin. They can thereby increase their profitability as revenue rises but fixed costs don't. The people who favor competition, he says, "are making a self-serving economic argument. They don't face market pressure to do what's best for consumers."

The vertically integrated, regulated utility, Mr. Fanning adds, "should be the dominant solution" because it ensures corporate cultures "are set up in terms of their ability to succeed in both the long and short run." He calls such companies "birds of prey," with Southern as "a classic bird of prey. We don't chase fads. And yet, we are able to produce yearly results year after year after year."

"Moving prey" are companies that prioritize the next quarter's bottom line at the expense of long-range viability. "And of course road kill," he jokes, "are companies that can't do either."

Mr. Fanning thinks U.S. business has a "moving prey" problem. "The Beta of the United States economy is higher than it has ever has been," he says. Not enough people understand "how growing systematic risk hurts the ability of the United States to generate economic growth that is regular, predictable and sustainable."

The problem, in a word, Mr. Fanning continues, is "chasing that last increment of return without regard for risk. We all know from our schooling that value is a function of risk and return. Risk is as important as return. And I think so often given the herd mentality we see in the markets, people forget that."

Mr. Fanning has a business philosophy that used to be considered old-fashioned, until recently. It could avoid destruction a la 2008. But it would most definitely thwart creative destruction as well.

*Mr. Rago is a member of the Journal's editorial board*

# Towards the Full Cost of Coal: A review of the recent literature assessing the negative health care externalities associated with coal-fired electricity production

Caroline Burkhard Golin
PhD Candidate, School of Public Policy
Georgia Institute of Technology
DM Smith Building
685 Cherry Street
Atlanta, GA 30332-0345
Cburkhard3@gatech.edu

**Executive Summary**

A critical issue in the development of cleaner and renewable energy sources is an adequate assessment and reliable estimates of the negative impacts generated from traditional energy sources (Ahmad, 1989; N. Z. Muller, and Robert Mendelsohn, 2007; Pope, 2002) In 2011, significant scientific and economic research focused on the external costs of coal-fired power generation; particularly the health care costs associated with exposure to hazardous airborne particulates, ozone (O3), and carbon dioxide (CO2) emissions. The following year, the Obama administration established the first national standards on carbon emissions from power plants. As a result, states heavily reliant on coal-power for electricity will undoubtedly need to evaluate the cost of relying on traditional energy sources versus investing in cleaner or renewable sources. This report systematically reviews the latest research on the full cost of coal, focusing specifically on the negative, external healthcare costs associated with coal-fired power generation, and applies these results to Georgia. In the first section, the he report reviews the findings of four major studies conducted in 2011 by the Environmental Protection Agency (U. S. EPA, 2011), the National Institute of Environmental Health Sciences (Gohlke et al., 2011), the Center for Health and Global and Environment (Epstein et al., 2011), and economists Nicholas Z. Muller, Robert Mendelsohn, and William Nordhaus (N. Z. Muller, Mendelsohn, & Nordhaus, 2011).These reports were chosen as they are all widely cited within the field of environmental science and economics, are the most recent reports to focus specifically on the external costs generated by coal-fired power generation, and present clear methodologies that can be applied in a state-specific scenario. In the second section, I use the methodologies of the EPA and the Center for Health and Global Environment to calculate the health care costs associated with coal-fired power production in Georgia. The Center for Health an Global Environment methodology was chosen because it monetized external healthcare cost in US dollars on a per kWh basing, lending itself more flexibility when determining a per power plant, per county, and per capita impact.

A review of the recent literature on the negative externalities associated with coal-fired power generation reveals that the true cost of coal retains a much higher price tag then the one related on the average consumer's energy bill. Economists Nicholas Z. Muller, Robert Mendelsohn, and William Nordhaus (MMN) determined that coal-fired power generation is the largest industrial contributor of external costs and the electricity produced by coal-fired power plants has a higher gross external damage per kWh than any other electricity source. These external damages range from 0.8 to 5.6 times the value added of generation, where sulphur dioxide (SO2) emissions were responsible for 87% of the gross external damages associated with coal-fired power emissions, and that 94% of the damages were because of increased mortality. Additionally, MMN concluded that when the impact from CO2 is accounted for, the gross external damage for coal power increases by nearly 25%. MMN estimated that CO2 emissions are responsible for approximately one-fourth of total air pollution damages from coal-power generation and add an additional $15 billion in external damages per year. As a result, the total gross external damage for coal-fired power generation ranges from $57 to $90 billion per year, depending on the value attributed to the "social cost of carbon" (SCC) and the region's reliance on coal-fired electricity generation. The National Institute of Environmental Health Sciences concluded that coal consumption is significantly and positively correlated with detrimental health impacts resulting from exposure to particulate matter

of 10 parts per millimeter (PM10) and that increased coal consumption is associated with increased infant mortality and decreased life expectancy. The Center for Health and Global Environment at Harvard Medical School (CHGE) determined that the best and the low estimates for health damages due to air quality detriment impacts to be $187.5 billion, and $65 billion, respectively. On a plant-by-plant basis, after being normalized to electricity produced by each plant, per kWh, the additional healthcare cost of coal is on average 9.3 ¢/kWh with a low estimate of 3.2 ¢/kWh and a high of 16 ¢/kWh; the range representing the estimated external cost for the highest impacting plant to the lowest. The CHGE study also determined that the best estimate for the true cost of coal-fired electricity generation, including the economically quantifiable health costs generated from coal-power production, to be between 17.8¢/kWh and 26.89¢/kWh. The high rate included the destruction caused by land-use, mercury deposition, water, waste and atmospheric pollution, where the average was restricted just to the health impact caused by fine particulate matter. The EPA concluded that the health impacts due to particulate exposure generated in coal-fired combustion is costing Americans between $110 and $270 billion annually in adverse health care costs. Over 90% of these costs are a result of premature mortalities.

Additionally, the EPA estimates that Georgian's pay between 3.3 and 7 billion dollars in aggregate health costs annually as a result of unhealthy levels of exposure to PM2.5 and O3. Given that the current population of Georgia is approximately 9.8 million, the EPA estimates translate into every Georgian incurring between $330 and $800 per year in additional health care costs due to coal-fired power generation. Finally, when the methodology of the CHGE is applied to Georgia, the report estimates the average cost of coal-fired electricity to be 18.17 cents per kWh, when factoring in health impacts due to particulate exposure, and 26.67 cents per kWh, when factoring in the total monetized health impacts. These numbers are two to three times the current average retail cost of electricity generation in Georgia of 8.8 cents per kWh(EIA, 2010). The retail cost of electricity generation, is used in comparison, because a full-levelized cost of electricity generation (including health, environmental, resource-use impacts, etc.) has yet to be computed for the state of Georgia.