

Power Purchase Agreements

**Foro de Eficiencia Energética y Energía Renovable:
Herramientas de Análisis Económico para
Aumentar la Competitividad Empresarial
Mayaguez, PR Octubre 2012**

Renewable Energy

Power Purchase Agreement (PPA) in Puerto Rico

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Power Purchase Agreements

- AGENDA

- What is a Power Purchase Agreement
- PPA Obligations
- PPA Tax Credits and Incentives
- PPA Business Terms
- Why a PPA is the Best Solution
- PPA Benefits
- Alternatives
- PPA Termination
- PPA Sample Sheet
- Green Benefits of Solar Energy



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- **What Is A Power Purchase Agreement?**

- A Power purchase agreement is a tool used between a private entity and a customer who purchases electricity through a long term contract.
- The private entity is known as an Independent Power Producer or IPP that acts as the utility producing power for a specific customer.
- The IPP usually owns, operates and maintains a renewable energy system behind the meter service on a specific site, leased or owned.
- The PPA contract specifies a long term relationship, typically 20 years, where the power being produced by the system is bought by the customer.
- The PPA Agreement is also used by companies to receive federal and state tax incentives.

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- **What Does a PPA Defines?**

- The PPA shall include specific commercial terms for:

- The Sale of energy being produced,
- The Project expected starting date,
- Penalties for under performance,
- Payment terms, either flat rate or using escalation rates,
- Termination Clauses and

- Other conditions that might vary according to the needs of buyer, seller, and financing counterparties.

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- **PPA Obligations**

- The Provider has the obligation to finance, build, maintain and deliver energy
- Customer has obligation to take and pay for all power being delivered
- REC or SREC's are negotiable and may be sold separately from energy output
- Long term commitment
- The IPP is responsible for liabilities

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Tax Incentives

- 1603 Grant (Expired)
- ITC (Investment Tax Credit)

Government

PAY ENERGY PRODUCTION

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IPP
Energy Producer

Customer

SELLS ENERGY TO CUSTOMER

Sells SREC's and
Receives Payments

SREC(Solar Renewable
Energy Credit) Buyer or
Utility



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- What is the Investment Tax Credit?
 - The ITC is a 30% tax credit for solar systems
 - Reduces the tax liability for the Owner of the System
 - individuals or businesses that purchase qualifying solar energy technologies.,
 - Valid through 2016, providing certainty for solar developers reducing installation and performance costs
- Renewable Energy Certificates
 - Act 83 of 2010 of Puerto Rico defines a REC as:
 - An asset that can be bought, sold or transfer
 - Establishes is equivalency as one MWh of electricity generated from a green energy source
 - Might be bought from local Utility, or other companies required to comply with a Renewable Portfolio Standard

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- Green Energy Fund
 - A program offered by the PR Energy Affairs Administration offering cash rebates of:
 - Up to 60% the cost of installing small Projects, typically residences and small business(0-100kw)
 - Up to 50% the cost of installing commercial and industrial projects from 100KW to 1MW.
- Large Scale Projects Could Receive
 - Partial exemptions from income taxes, property taxes, and municipal taxes
 - Super depreciation of buildings, structures, machinery, and equipment;
 - Tax-credits related to the use of locally-manufactured products, job creation ,and research and development

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- **Why PPA's?**

- The construction, development, operations and financing problems are transferred to a third party
- Maximizes financial and tax rebates, providing thus a lower production price
- Facilitates renewable energy development providing environmental, educational, financial, and additional benefits to the community

- **How?**

- By Creating a competitive procurement process under RFQ or RFP
- Projects could be open for bids
- Customer may propose key PPA terms and specific guarantees from the IPP

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- PPA Business Terms
 - Energy Pricing in terms of KWh
 - System Project Output - Annual Production
 - System Size Variation
 - PPA Lease Renewal –after 15 or 20 year initial term
 - Buyout Term
 - Performance Bonds
 - Interconnection Costs
 - Customer Cause Temporary Outages
 - Billing and Payment
 - Claiming/promoting green attributes of system



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- Factors to Consider When Selecting an IPP?
 - Experience
 - Ability
 - Financial Stability
 - Legal Background
 - Team Approach
 - Communication



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Integrated Solar Financing

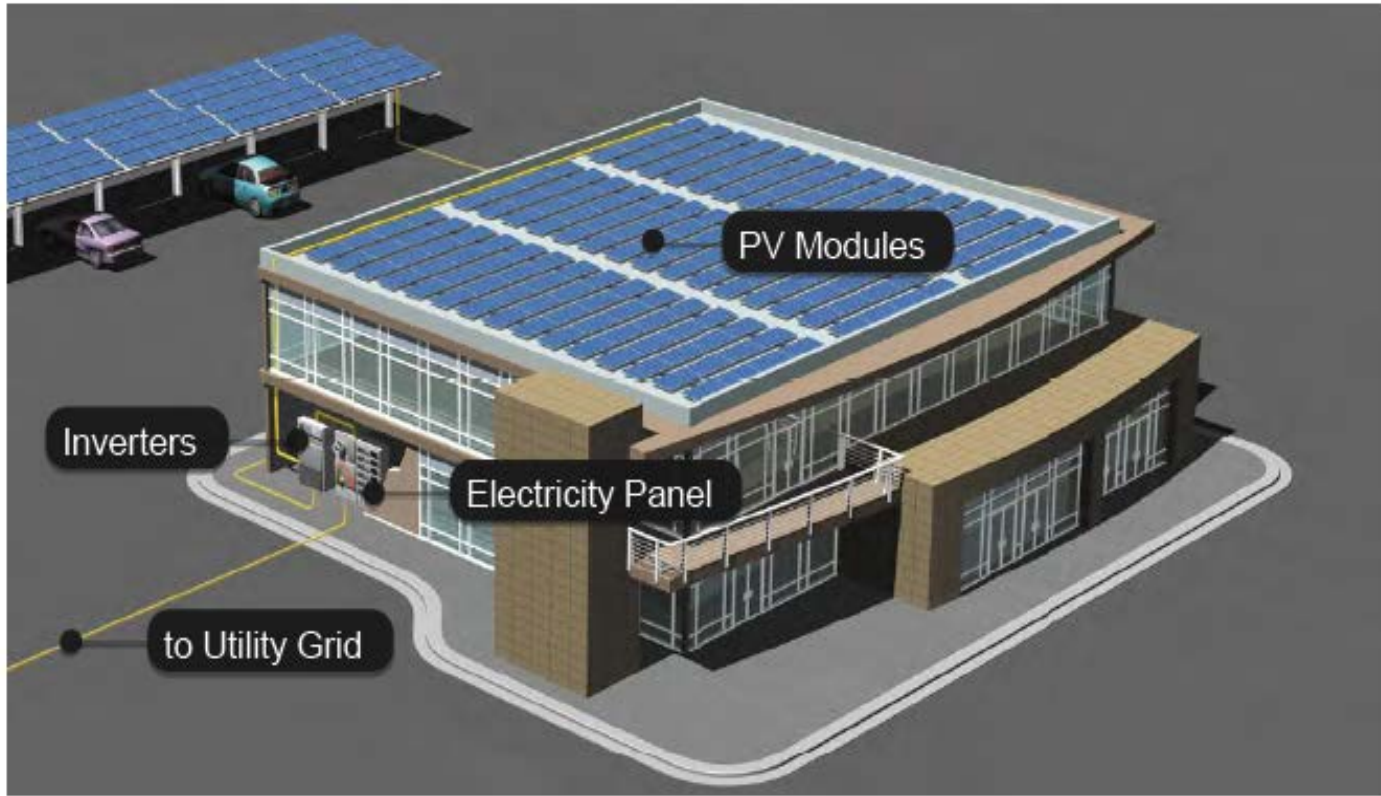
Turnkey Solar Design
and Installation



Solar Consulting & Development Services

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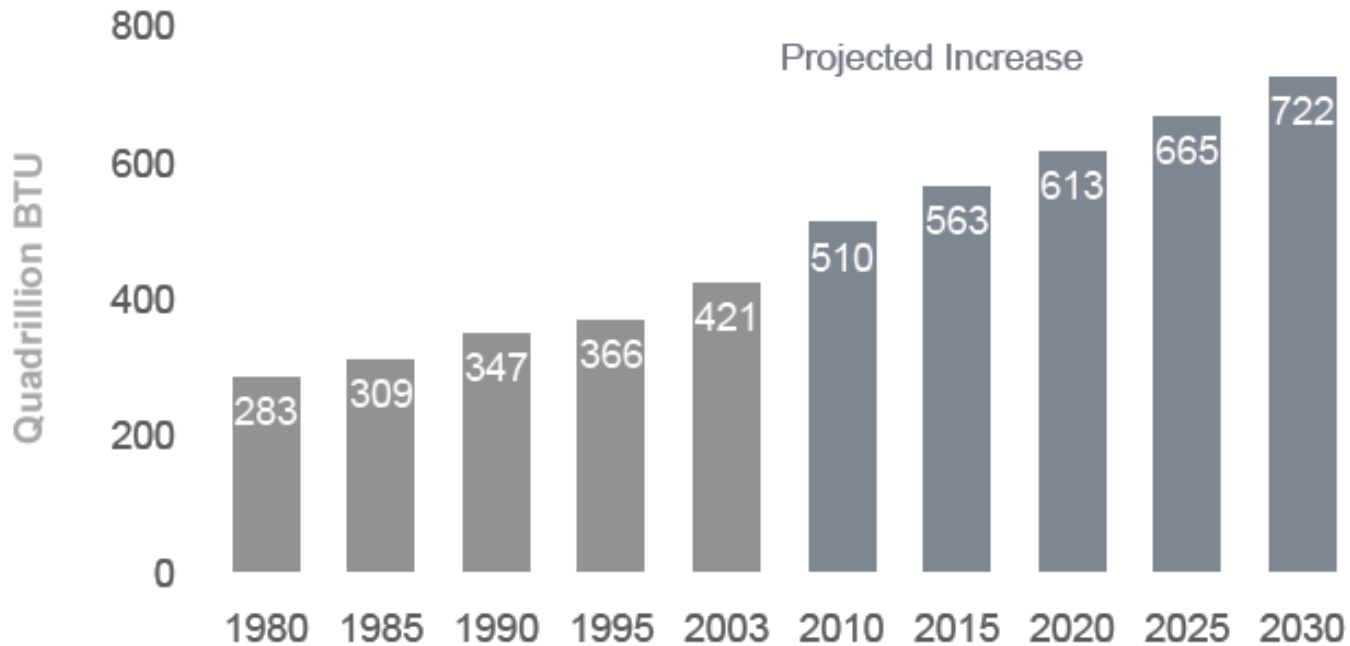
Power Purchase Agreements



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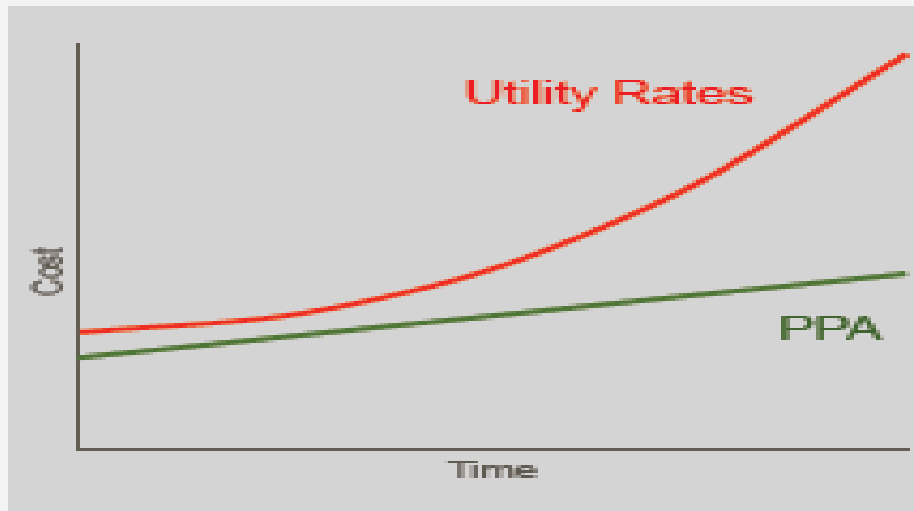
Energy usage around the world has steadily increased since the early 80s



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PPA vs. Rising Utility Rates



Lock in utility expenses now to protect against rising utility rates

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- PPA Benefits

- No Upfront associated costs
- Reduced Utility Bills
- Additional Cash Flow Positive from day one to year 20
- Predictable Energy Cost
- Avoid increase in energy costs due to hurricane, fires and natural disasters
- Lock In lower production rate
- Increased savings
- Reduced carbon emissions from the solar system



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- **PPA Benefits (cont..)**

- **No operation or maintenance expenses**
- Customers only purchase the energy produced, so all operation and maintenance is on the IPP
- Switching to clean renewable solar energy is one of the best marketing and PR tools available
- **Freeing of capital for critical investments**
- Saving money on operating costs
- **No production risks**
- On average, 100kW of DC solar electricity installed in North America will reduce approximately 175,000 lbs of CO₂ annually.

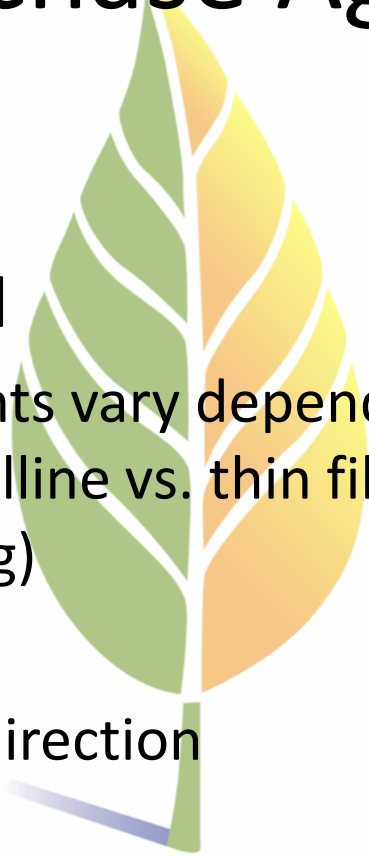
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- PPA Alternatives

- Ground Mounted

- Land requirements vary depending on PV type and efficiency (crystalline vs. thin film) and system type (fixed vs. tracking)
 - Soil conditions
 - Land slope and direction



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- PPA Alternatives

- Roof Top

- Roof information Type
 - Age and roof replacement plans (new roofs are ideal)
 - Maximum load the roof can safely support (taking into account rain/snow and likely accumulation locations)
 - Has a roof structural analysis been completed?
 - Roof orientation
 - Roof warranty
 - Avoid shading (applies to all solar project types)
 - Locate roof obstructions such as HVAC equipment, vents, etc.
 - Potential roof leaks: may want to limit or prohibit roof penetrations
 - Fire protection: GSA and certain states such as California have setback requirements and other guidelines



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- PPA Alternatives

- Carport Systems

- What is the available space (taking into account trees, grassy areas, etc.)?
 - Height requirements
 - Lighting
 - Storm water drainage requirements
 - Snow melt from the carport may refreeze. Consider using water resistant pavement and/or improve drainage by adding gutters



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- PPA Alternatives

- Off-Site

- Wheeling System
 - Built using an off site facility
 - Allows to expand and protect existing building facilities
 - Leased property
 - Charges wheeling tariff cost associated with distribution usage



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- PPA Termination
 - Offers an extension of current PPA after the initial term has expired
 - The IRS has established guideline for purchasing facilities at Fair Market Value after the 20th year.
 - The actual buyout price must be determined through an IRS approved methodology for determining "fair market value" at the time a system buyout is contemplated.
 - After the initial PPA term has been completed the agreement shall be terminated with no further responsibility.
 - *When the contract has been terminated either voluntarily or through your breach of the PPA, you could be subject to early termination fees IPP's loss of contracted future revenues.*

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| | |
|--------------------|---------------|
| Total System Size: | 6,681.6 kW DC |
| | 5,000.0 kW AC |

| | |
|------------------------------|----------|
| Approx. Total System Acreage | 20 ACRES |
|------------------------------|----------|

| | |
|------------|---------------------------|
| PV Panels: | (27840) Yingli YL240P-29b |
| Inverters: | (10) SMA - SC500U (480V) |
| Racking: | GROUND MOUNT-FIXED |

| | |
|--|-----------|
| Estimated Production (MWh, Year 1): | 10,703.9 |
| Estimated Production (MWh, PPA Term): | 204,208.4 |
| % of Current Annual Energy Usage (MWh) | 100% |

PPA TERMS

| | |
|-------------------|---------------|
| Starting Rate: | \$.20 per kWh |
| Escalation Rate: | 0% per year |
| Agreement Length: | 20 years |

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System Assumptions

| | |
|----------------------------------|----------------|
| System Size (DC) | 6,681.60 kW |
| System Size (AC) | 5,000.00 kW |
| Year 1 Production | 10,703,923 kWh |
| Annual System Degradation Factor | 0.50% |

PPA Terms

| | |
|--|---------|
| PPA Starting Rate | \$0.200 |
| PPA Annual Escalation Rate | 0.00% |
| PPA Agreement Term | 20 |
| Estimated System Buyout - % of Original System Cost* | 20% |

Utility Rate Scenarios

| | |
|---|-------|
| SCENARIO 1 Annual Utility Escalation Rate | 0.0% |
| SCENARIO 2 Annual Utility Escalation Rate | 5.0% |
| SCENARIO 3 Annual Utility Escalation Rate | -1.5% |

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| Year | Actual Usage (Kwh) | PREPA RATE | Solar System Prod | PPA RATE | CASH FLOW SAVINGS | Cumulative Savings |
|------|--------------------|------------|-------------------|----------|-------------------|--------------------|
| 1 | 24,231,567 | \$0.251 | 10,703,923 | \$0.20 | \$545,900 | \$545,900 |
| 2 | 24,534,461 | \$0.251 | 10,650,404 | \$0.20 | \$543,171 | \$1,089,071 |
| 3 | 24,841,142 | \$0.251 | 10,597,152 | \$0.20 | \$540,455 | \$1,629,525 |
| 4 | 25,151,656 | \$0.251 | 10,544,166 | \$0.20 | \$537,752 | \$2,167,278 |
| 5 | 25,466,052 | \$0.251 | 10,491,445 | \$0.20 | \$535,064 | \$2,702,342 |
| 6 | 25,784,378 | \$0.251 | 10,438,988 | \$0.20 | \$532,388 | \$3,234,730 |
| 7 | 26,101,682 | \$0.251 | 10,386,793 | \$0.20 | \$529,726 | \$3,764,456 |
| 8 | 26,433,016 | \$0.251 | 10,334,859 | \$0.20 | \$527,078 | \$4,291,534 |
| 9 | 26,763,429 | \$0.251 | 10,283,185 | \$0.20 | \$524,442 | \$4,815,977 |
| 10 | 27,097,971 | \$0.251 | 10,231,769 | \$0.20 | \$521,820 | \$5,337,797 |

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20 YEAR PPA CASH FLOW: PREPA RATE 5% ANNUAL INCREASE (SCENARIO 2)

| Year | System Production | PPA Rate | PPA Bills | Avoided Utility Rate | Avoided Utility Bill | Annual Cash Flow |
|------|-------------------|----------|---------------|----------------------|----------------------|------------------|
| 1 | 10,703,923 | \$0.2000 | (\$2,140,785) | \$0.2510 | \$2,686,685 | \$545,900 |
| 2 | 10,650,404 | \$0.2000 | (\$2,130,081) | \$0.2636 | \$2,806,914 | \$676,833 |
| 3 | 10,597,152 | \$0.2000 | (\$2,119,430) | \$0.2767 | \$2,932,523 | \$813,093 |
| 4 | 10,544,166 | \$0.2000 | (\$2,108,833) | \$0.2906 | \$3,063,754 | \$954,921 |
| 5 | 10,491,445 | \$0.2000 | (\$2,098,289) | \$0.3051 | \$3,200,857 | \$1,102,568 |
| 6 | 10,438,988 | \$0.2000 | (\$2,087,798) | \$0.3203 | \$3,344,095 | \$1,256,297 |
| 7 | 10,386,793 | \$0.2000 | (\$2,077,359) | \$0.3364 | \$3,493,743 | \$1,416,385 |
| 8 | 10,334,859 | \$0.2000 | (\$2,066,972) | \$0.3532 | \$3,650,088 | \$1,583,116 |
| 9 | 10,283,185 | \$0.2000 | (\$2,056,637) | \$0.3708 | \$3,813,430 | \$1,756,793 |
| 10 | 10,231,769 | \$0.2000 | (\$2,046,354) | \$0.3894 | \$3,984,081 | \$1,937,727 |

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20 YEAR PPA CASH FLOW: 1.5% ANNUAL PREPA RATE REDUCTION (SCENARIO 3)

| Year | System Production | PPA Rate | PPA Bills | Avoided Utility Rate | Avoided Utility Bill | Annual Cash Flow |
|------|-------------------|----------|---------------|----------------------|----------------------|------------------|
| 1 | 10,703,923 | \$0.2000 | (\$2,140,785) | \$0.2510 | \$2,686,685 | \$545,900 |
| 2 | 10,650,404 | \$0.2000 | (\$2,130,081) | \$0.2472 | \$2,633,153 | \$503,072 |
| 3 | 10,597,152 | \$0.2000 | (\$2,119,430) | \$0.2435 | \$2,580,687 | \$461,257 |
| 4 | 10,544,166 | \$0.2000 | (\$2,108,833) | \$0.2399 | \$2,529,267 | \$420,434 |
| 5 | 10,491,445 | \$0.2000 | (\$2,098,289) | \$0.2363 | \$2,478,871 | \$380,582 |
| 6 | 10,438,988 | \$0.2000 | (\$2,087,798) | \$0.2327 | \$2,429,480 | \$341,682 |
| 7 | 10,386,793 | \$0.2000 | (\$2,077,359) | \$0.2292 | \$2,381,072 | \$303,714 |
| 8 | 10,334,859 | \$0.2000 | (\$2,066,972) | \$0.2258 | \$2,333,629 | \$266,658 |
| 9 | 10,283,185 | \$0.2000 | (\$2,056,637) | \$0.2224 | \$2,287,132 | \$230,495 |
| 10 | 10,231,769 | \$0.2000 | (\$2,046,354) | \$0.2191 | \$2,241,561 | \$195,207 |

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- **Impact on Global Warming Emissions**
 - Your solar system will reduce Carbon Dioxide emissions by 409,475,707 lbs.
 - This is equivalent to the effect of removing 1,657 passenger vehicles from the road. This is equivalent to the effect of planting 3,685 acres of trees
- **Impact of Fossil Fuel Consumption**
 - Americans emit about 15,000 pounds of Carbon per person annually making us the world's largest per capita contributor to global warming.
 - 82% of these emissions are the result of burning fossil fuels for either automobiles or generating electricity



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- **Impact on Polluting Emissions**

- Nitrogen Oxides are a major contributor to smog and air induced respiratory problems.
- Your system will reduce Nitrogen Oxide emissions by 394,531 lbs.
- Sulfur Oxides are the primary components of acid rain.
- Your system will reduce Sulfur Oxide emissions by 854,818 lbs.



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