



Massachusetts Incentives

Renewable Energy Certificates (RECs) and Solar Renewable Energy Certificates (SRECs I and SRECs II and SRECs II Extension) and the SMART Program, Connected Solutions Battery Storage and Clean Peak Incentives for Residential and Small Commercial Massachusetts and Vermont Solar Electric (PV) Systems

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Preface

Welcome to our sixteenth version of this report, a popular feature on our website since 2010. This time, we'll begin with a discussion on [Meters and Monitors](#) then the [SMART program](#). This is followed by a review of the [Federal & MA Tax Incentives](#) and the potential for new federal incentive policies. The [SRECS & RECS Incentive Summary for 2022](#) begins on page 4 with current SRECs prices on page 8. Finally, we will discuss the [Connected Solutions Program](#) and [The Clean Peak Standard Battery Incentives](#). If you are new to these incentive policies and net metering it is best to read the ["Basic Facts"](#) section on page 4 first.

Meters and Monitors

Metering and monitoring solar PV system production is essential for all but the very smallest PV systems. With the cross over to 5G cellular, some early PV systems are adapting from 3G for monitoring and revenue grade auto reporting. System owners who sell RECs of any sort may be lost. If your PV system has a *revenue grade* meter with a display be sure to take a time stamped photo of the display and meter face showing the total solar kilowatt hours or kWh tally, the meter serial number and brand in the photo. That's your back-up ticket to establish a provable value. Save the photo file with the name of the account and the date. That's an important point for folks who manually monitor a digital solar kWh meter too. When the meter tally reaches 99,999 which commonly occurs in the 8-10th year of operation for a 10 kW system like an odometer on a car, the meter will turn back to 0 – yes, **Zero**. Take a date stamped photo anytime it's in the 99,900's (or 999,900's) to prove a revenue grade turnover will occur shortly. Then as you keep on manually reporting add 100,000 (or 1,000,000) to the new incrementing tally. Remember in MA, solar PV systems under 10 kW can manually report but systems over that size must use a service to auto report. Our customers are all set and BPVS can help those with orphan systems whose monitoring or metering service is not working or has fallen behind in reporting.

SMART Program

The program called **"Solar Massachusetts Renewable Target" (SMART)** began in Nov. 2018. The states' largest utilities: Eversource, National Grid and Unitil now control solar capacity development and incentive payments. The utilities have been aiming for this for years and hit the bullseye with the Baker Administration actions and an acquiescent legislature. Each utility has its' own specific SMART program. They differ on the amount of new solar capacity allowed in a territory and the size of program blocks. The per kilowatt hour (kWh) incentive varies

by utility and is reduced as each block fills. Program costs are recorded by the utilities and charged to all ratepayers. The utilities in concert with the DPU managed to delay the start of the expanded SMART Incentive Program since late 2020. It is now re-starting in early 2022.

There is a backlog of large commercial and utility scale projects on the SMART Program waitlist. The new 2022 SMART Incentive for residential rooftop solar will not exceed \$0.02 per solar kWh for ten years and may be \$0.00 by summer as the expanded blocks get used up. This residential incentive is way too low to justify the transaction costs of participation and thus, for other reasons too, **we advise our customers to not participate.** Since the start of the program in 2018, we have had only one customer participate. Our SMART Consumer Disclosure guidance goes into much more detail and accompanies our quotes. Some Commercial customers may see better SMART Program benefits. Our cost/benefit modeling of all incentives is integral to our proposals and post site assessment quotes.

By the way if you are a **VT GMP customer** contact us for information on their **SMART- like** program.

Some features of the SMART program and recent accompanying policy are:

On Net Metering in Massachusetts

Net metering means when your site exports electricity to the utility grid you are credited at near the same rate you pay for their electricity. We say” near “because some charges are not credited such as those for energy conservation. When we first started, net metering simply meant the utility would allow us to interconnect and decrement their meter! That they would compensate the consumer was a bonus. That value was set at the least cost supply of electricity price per month- less than \$0.02 per kWh in the last century when electricity cost \$0.12 per kWh. **The net metering credit in 2022 is ~ \$0.22 per kWh.**

- For all new PV Systems over 25 kW (except those serving city or town, state, and federal govt. accounts) and for all PV systems (including those already installed) after their 20th year of operation, net metering credits will be valued at 60% of their near retail value, a 40%’ haircut’!
- For new PV systems under 10 kW on a single- phase service (think- most residences) and under 25 kW on three phase service (small businesses & institutions), near full net metering status is assured. New PV systems in this category which choose not to participate in the SMART program are also assured near full net metering status for twenty years. That means you get credited for your exported solar power almost at the current rate you pay for electricity. The value of your solar generation always keeps up with the cost. See the Basic Facts section below
- For new PV systems over 10 kW on a single-phase service and over 25 kW on three phase service participation in the SMART program is key to net metering or alternative compensation status. Incentives for larger systems are a further enticement.

- On the SMART Incentive

- SMART program *Adders* can increase the incentive per kWh for solar PV systems coupled with batteries for both the residential and larger capacity categories. The incentive is not high enough to justify the investment for homeowners and the rules on how the storage capacity is metered, and how often it has to be discharged are complex, strict and in many residential situations- unworkable.
- Other *Adders* are for agricultural, public entity, landfill and brownfield locations as well as for solar parking lot canopy systems and floating arrays - think solar panels attached to a raft. The value of these *adders* declines and or disappears as each program block fills.
- *Subtractors* can decrease the incentive per kWh for solar PV systems to discourage solar development on prime farmland or clear-cutting a forest to site an array. For some large solar arrays , often community solar arrays , the subtractors are not enough a finance hurdle to prevent development.
- The per kWh incentive and applicable *adders or subtractors* are paid for a period of ten years for the residential <10 kW program participants and twenty years for >25 kW systems. SMART participants assign all production attributes (viz. all renewable and environmental generation characteristics) to the utility *irrevocably* in exchange for the incentive. Each utility separately meters program participants' solar production and charges the solar customer for the metering equipment and services. Each utility pays the incentive directly to the customer by check. In exchange the SMART Program confers the Class 1 Renewable Energy Certificate to the utility to dispense with as it pleases.
- The utilities offer separate SMART programs but share a SMART program administrator, the same company that handles their MassSAVE program, CLEAResult. To help complicate things, separate approvals have to be given by the utility, CLEAResult and the Department of Energy Resources at various steps in the application process and at completion. The Dept. of Public Utilities (DPU) adjudicates on policy interpretations; the DPU ombudsperson and staff handle all complaints.
- The SMART Program is voluntary. This last provision is important. Participation in former programs was also voluntary but they allowed the consumer to either sell or self-retire their renewable or solar renewable generation attributes at will, anytime. Some of our customers would self-retire their attributes right from the start and some sell them as Renewable Energy Certificates (RECs hereon in) or Solar Renewable Energy Certificates (SRECs) depending on the program for just a few years and then self –retire them because they wanted to authentically represent their commitment to the environment. Some customers donated their RECs or SRECs and some using private brokers were offered value added services. With the SMART program there is no choice – you irrevocably assign them to the utility for the duration of the program - 10 years for systems <10 kW and 20 years for systems >25 kW.
- The SMART program has put new wrinkles on tired definitions of attributes and RECs. The major problem with the Program is that incentives were designed to favor large utility sized installations. The complex and redundant application regimen set up by the Baker administration, Dept. of Energy Resources, CLEAResult and each utility has also compromised the program.

Federal and MA Tax Incentives

The major solar incentive is the **Federal Tax Credit** (IRS Form 5695 for residential customers) which will continue through December 2022 - Thank Congressman Richard Neal of the Massachusetts 1st District (among others in Congress) for this extension. The tax credit is **26% of the total system cost**. It will decline next year unless the Build Back Better bill passes the Senate with new tax incentives for Solar. The **Massachusetts Tax Credit** is a maximum of \$1,000.00 for sites which are the legal residence of the taxpayer and may only be taken once. The Federal Tax Credit may be taken multiple times for new solar expense and improvements and there are other tax advantages for commercial sites.

Summary

- Near Retail Net Metering Credit values will continue for residential customers and small commercial customers.
- Market Net Metering Credit (40% lower than near retail) is in effect for most commercial and institutional customers.
- VT and MA PV Systems Purchase is sales tax exempt for many sites.
- It is still prudent for large system plans to go forward and get on the Net Metering Allocation wait list to participate in SMART and/or anticipate a new Program.

RECs - THE SAME OLD STORY

For pre 2010 and all post 2017 owners of small PV systems, you're only eligible to sell production attributes as RECS. There is a soft price for RECs in the market. RECs can be sourced from multiple states and renewable energy sources. The near term projection is that they will stay low as Renewable Portfolio Standards in New England states are increased and more hydro power replaces fossil fuels. Policy consultants and state officials predicted RECs would trade for "hundreds of dollars" each when they first were introduced in the late 1990s. Their initial values were at \$40-50.00 each and have rarely exceeded that. The utilities are paying new **SMART Program residential participants <\$20.00 per REC**. That means less than \$200.00 per year for a Program participant with a 10 kW PV system. The utility itself is its own RECs aggregator and trader. **Pricing at ISO New England has been near \$40.00 per REC but is predicted to decline to \$22.00 by 2025.**

Small system PV owners of RECS not participating in SMART will find few brokers interested in opening a RECs account because of their low volume and low value and high transaction costs. None of the independent aggregators we contacted recently are interested in small system RECS and state policy creates barriers to small system participation. BPVS has been critical of this policy for 25 years and recently wrote again to legislators and administration officials.

Basic Facts

RECs & SRECs use the same metric as electricity, a MWh (megawatt hour). 1,000 kilowatt hours (kWh) equals 1 MWh. Thus every 1,000 kWh produced represents both energy and one Renewable Energy Certificate or Solar Renewable Energy Certificate (SREC) . 1 MWh is slightly less than the average yearly output of a 1 kilowatt (kW) photovoltaic system in our region. Generally, a Massachusetts SREC can only be produced by a PV

system online after Jan 1, 2010, and before 2013 although waivers were given to some projects installed in 2008 and 2009. RECs are far less valuable and result from various 'attribute(s)' defined technologies: wind, low impact hydro, biomass and from any solar PV system installed prior to 2010 and generally no earlier than Jan. 1st, 1998. Variations and factors are applied on an ad hoc basis, usually as a result of Department of Energy Resources policy changes, thus there are SREC II's and SREC II Extension certificates and SREC *factors* which can further define value of this certificate. In 2014, solar hot water systems became eligible for Alternative Energy Certificates. The Department of Energy Resources has set rules and values for them as *solar thermal devices*. You should also note even Natural Gas use at Combined Heat and Power facilities is eligible for Alternative Energy Certificates (AECs).

Traded as if they were real electricity, measured as a MWh, a REC or SREC or SREC II or SREC II Extension Certificate represents the associated renewable energy "generation attribute" separated from the energy. A Generation Attribute is defined in Massachusetts regulation - 225 CMR§14.00 as "a non-price characteristic of the electrical energy output of a Generation Unit including, but not limited to, the Unit's fuel type, emissions, vintage, and Renewable Portfolio Standard eligibility." Often the plural of attribute is used when denoting what comprises the value of a PV system MWh as separated into a tradable certificate. Because officials and others have been unclear in their usage of terms and the definition contradicts itself, we write the word as *attribute(s)*.

Some solar old timers disparagingly call them *Vapor Watts* but we have to recognize that the *bureaucrat*- 'generation attribute' hides societal and especially utility denial of the true state of electricity generation. The cleanliness of solar energy is assigned an arbitrary separate value, but dirty electricity is just electricity. There are no penalizing ugly energy certificates for cancer causing, climate changing, respiratory system compromising, toxic attribute(s) of the conventional fossil fuel and nuclear power mix. The broadening definition of attribute(s) implied in utility language which states they will own the "RECs and/or environmental attributes" from solar facilities is disturbing.

The 'C' in REC or SREC stands for Certificate once sold, although Credit is commonly used to mean either the attribute(s) or their transmutation into an official certificate. The market for these digital (not paper) certificates of renewable generation *goodness* are exchanges such as the New England Power Pool Generational Information System (NE-GIS or NEPOOL -GIS) where these certificates are 'minted'. Utilities and electricity suppliers must meet a state regulated Renewable Portfolio Standard (RPS). RPS compliance allows their purchase of RECs or SRECs in lieu of real renewable electricity. While utilities are the primary buyers of RECs and SRECs, there are also voluntary purchasers who wish to lighten their carbon imprint and financiers who buy their potential future value. Often, large scale solar developers use them as collateral.

Aggregators are SREC/REC traders listed by the state and NEEPOOL as eligible brokers to sell these certificates on behalf of PV system owners or certificate owners. Only Massachusetts utilities must purchase Massachusetts SRECs. RECs can be purchased by Massachusetts utilities from out of state and other states purchase them. New finance products based on environmental attributes or renewable generation attributes are creeping into the *vapor watts* business model. If you purchase Class 1 RECs cheaply and retire them, there is a market for these retired certificates too.

Attribute(s) trading is well suited for a Crypto and web.3. secret sharing world.

Don't Confuse RECs & SRECs with Net Metering

The actual energy from a PV system measured on the solar kWh meter at the site reduces your electric bill. This is the primary value of solar PV as electricity or the flow of electrons. Let us summarize the last section - a different financial benefit as RECs or SRECs represents the separate clean attribute(s) of solar *separate from the flow of electrons*. Real electricity flows through wires not spread sheets. Benefits are holistic and greater than their separate parts as deferred emissions certificates and carbon credits.

Once a PV system owner sells the attribute(s) as RECs or SRECs or by participating in SMART, or a Community Solar Subscription, the energy from their PV system is just as “dirty” or unsustainable as the conventional electricity mix. Maybe more so. This may surprise some people because it is not widely known. In 2012 the Federal Trade Commission stepped in to clarify clean energy claims in the marketplace. See page 34 Example 5 in the Federal Trade Commission’s Green Guide for specifics on PV. If you sell the RECs or SRECs you can say you generate and sell clean energy not that you use it. The Vermont Law School in 2015 won a case against Green Mountain Power (VT GMP) , their state’s largest utility, because of claims the utility made to their customers that it was supplying renewable *solar* clean energy in their mix. The lawsuit indicates they were selling the attribute(s) from their customer’s solar PV systems as RECs in the Massachusetts RPS market! Many solar marketers and developers and even utilities will give the impression to consumers they can give up or sell their PV system *attribute(s)* and still pat themselves on the back for using green, clean electricity at their site but that is not true.

How can I sell my SRECs or RECs?

You need to sell your attribute(s) as RECs (SRECs or SRECs II) through an aggregator company similar to a broker for stocks. It is not cost effective for small PV system owners to trade on the NEPOOL–GIS or other markets. SMART and VT GMP participants are required to sell their RECS to their utility. For others there are independent aggregators.

If you are our customer, we will send you a list and our detailed guidance on selecting an aggregator. To enable the sale of RECs in MA your PV system production must report monthly and automatically to the Massachusetts Clean Energy Center Production Tracking System (MassCEC-PTS). With SMART and the Green Mountain Power Program the utility will monitor and report. If you do not wish to sell your RECs in MA we can still equip your system(s) to register and manually report your production to the MassCEC PTS. The MassCEC PTS has educational and archival features that go beyond RECs verification and sale.

We'll present options to manually report or supply equipment to automatically report your PV system *revenue grade* kWh tally. Automatic reporting is required if your PV system is over 10 kW in capacity in MA. or not participating in SMART. With either choice, BPVS installs a revenue –grade, solar kWh meter identical to the best meters utilities use. Manual reporters will receive a username and a password from the PTS administrator. Each month the PTS system sends you email notices to enter your production tally from the solar kWh meter. Automatic reporting equipment uses a datalogger interfaced to the solar kWh meter or the system inverter and the internet service you provide or via cell modem.

Once you choose an aggregator, you will give them permission for coded access to your production tally. Whether you manually report your tally each month to the PTS or it is automatically reported, you too have access to the PTS production tally page on their website and that of your monitoring service. Massachusetts should improve the PTS to make data available to all, including academics and to quantify production in a user-friendly way to show emissions deferral. The SMART Program does not use the PTS. SMART and *SMART-like* utilities collect the data directly from the extra solar meter they own and read.

Your aggregator will submit to NEPOOL –GIS and through the Dept. of Energy Resources in MA, a Statement of Qualification (SQA) or your PV system. BPVS will list and verify all of the technical details the SQA requires. Sometimes our customers switch aggregators. Our technical documentation help is still a free service.

It is a conflict of interest for us to recommend any aggregator/broker, advise you on their offers or be both an aggregator and design /installation firm. Please read on to understand our policy.

BPVS POLICY on RECSs/SRECs/ SRECs II/Clean Peak (CPC) Certificates & Advice

BPVS installation, service or repair contracts never include a clause or clauses with conditionals or duplicitous language that takes ownership of SRECs, SRECs II or RECs, AECs or CPCs (Clean Peak Certificates) from you. Nor does it take miscellaneous implied equivalents such as ‘Carbon Credits’, ‘Emissions Credits’, ‘Pollution Offsets’, ‘Clean Energy Attributes’, ‘attributes’, ‘credits’, ‘Environmental Financial Incentives’, Clean Peak Credits, separated benefits, or ‘Green Tags’ or Certificates. All of these are code or brands for ‘generation attribute’ or ‘renewable generation attribute’ or ‘environmental attribute’ and/or the Class 1 REC.

It is common practice for PV firms including solar developers, lead generators, and consultants to represent aggregator/broker firms and receive commissions from them. Neither the PV firm nor the aggregator/broker is required to disclose such relationships. Some PV firms are also aggregators. When shopping for a PV system, if the PV installation firm, coordinating service firm, solar coach or leasing salesperson did not or does not disclose your eligibility for RECs or SRECs or SRECs II or Extension certificates or the SMART Program incentive and /or suggests that they will “take care” of that for you, be careful.

Metering & RECs

BPVS supplies calibrated solar kWh meters identical to the best meters utilities use; revenue grade, our meters are digital, easy to read. They have tamper indicating, unbroken seals, and 0 kWh registered at start. We register the solar kWh meter serial number in our files and add a tamper indicating seal to the meter base hasp. The Automatic meter and reporting equipment we supply is from a third-party provider unassociated with us or any aggregator/broker. Should DOER, or the Department of Public Utilities (DPU) ever challenge the meter readings from your site we’re happy to verify that the equipment installed is **revenue grade and the wiring is properly routed and connected for revenue grade integrity.**

You do not have to sell the SRECs/RECs from your PV system. Not selling them means you have retained the clean energy benefits with the electricity. Currently that also means you are not participating in the SMART Program. The [BPVS website includes a table to calculate](#) deferred emissions from your personal or “on site” solar energy use. The official DOER manner of retiring RECs and SRECs will actually cost you money so all our customers self-retire their attribute(s) before they are ‘minted’ by an aggregator.

Some customers sell or sold their RECs or SRECs for only a few years to make their expense for PV more reasonable. Others never sell them. Some businesses and institutions do not sell them so they can authentically tell their patrons that the electricity on site- used to grow or make a product or perform a service, is green. **At BPVS we're here to help you in an objective, non-judgmental manner no matter what you choose.** Some customers sell every REC or SREC.

Aggregator/Brokers typically charge a fee ranging from 2% to 10% of the sale price they get for your SRECs or RECs. For small PV systems, the aggregator bundles their certificates with those of others to trade in large blocks. Consult your tax advisor; generally, proceeds to you from SRECs/RECs sales are considered taxable income even though the aggregator does not send you an IRS form 1099. A low commission percentage does not mean you'll get the best per SREC/REC price from that aggregator. Sometimes brokers with high fees have provided the best overall return to PV owners. Our technical documentation help to you and the aggregator you choose is still a free service under our warranty.

This report includes values for SRECs and RECs based on public information at the time of writing in February 2022. BPVS provides this price information, projections and analysis in a conservative light as a service to our customers assessing risk. History, causes us to refrain from charming optimism for this complex market.

SREC Market Prices

SRECs I from the third quarter of 2021 will sell or are selling for bid prices of **\$300.00 -335.00** each on the open market. **The SREC 1 tranche has closed for many and will close for most because their 10 year or 40 quarter term is ending in 2022-2023.** Depending on your contract with your aggregator you may receive a bit better or a bit worse for either SRECs I or for SRECs II.

SRECs II from the third quarter - solar production of 2021 will sell or are selling on the open market for **around \$275.00 each.** We expect an average price of \$270.00 per SREC II for their term life for those PV system owners whose systems were installed prior to the offer's end on January 8th, 2017. The last SREC II of this 2013-2017 PV system vintage should be created and sold in 2027.

RECs – New England

Pricing at ISO New England has been near \$40.00 per REC but is predicted to decline to \$22.00 over the next three years.

Please consider those values. The SRECS 1 and II were limited offers but still there should be a greater demand and better price for RECs considering all the corporations claiming they're greening their energy supply.

Connected Solutions

Connected Solutions is a new program offered through the MassSAVE program with both National Grid and Eversource Utilities. The program offers incentives for appliances and thermostats but also battery based, stand-by and utility controlled energy storage or ESS. The program has provisions to incorporate Solar PV, even preexisting PV systems, through partnership with several ESS equipment designs. The appeal is twofold:

1. Lithium Ion battery based stand by capacity housed in sleek cabinets, ready for a utility outage with the ability of solar PV to re-charge the battery bank during a prolonged outage.
2. An incentive is paid to the account owner when the utility commands the battery to discharge during evening peak demand events in summer and perhaps the winter too to help offset fossil fuel Peaker plant use. In concept it's a great way to shift the intermittent power of daylight generation to a dispatchable generation resource when power is most expensive in the evening.

There are a specific number of events each year when the Utility sends a signal to your batteries to discharge to the grid. A payment of up to \$1,500.00 annually and up to \$7,500.00 over the five- year term of the program contract is suggested. No amount is guaranteed; it is dependent on the number of events you participate in. The utility can change the terms of the contract at will. Recently, National Grid changed to no longer have winter events but did increase their payment for battery discharge during a summer event. Both utilities do not encourage participants to think there may be another five-year term after the first term expires.

Some advantageous features of the Program are:

- One can use the 0% interest HEAT loan subsidy through MassSAVE to pay for just the battery bank ESS product equipment. You can't use the loan to pay for the solar component or the costs of installing a transfer back-up load panel and switchgear at your home.
- If a winter storm is coming the utility assures you it will not discharge the battery bank so you can be sure it's ready in case the lights do go out.
- You can participate in the Connected Solutions battery program and receive the Energy Storage adder from the SMART program simultaneously and may be eligible for the new Clean Peak incentive.

We advise our customers who truly need battery back -up capacity to not participate because:

- The eligible ESS equipment products do not have a long track record. Our proven projects and designs now have 40 years plus of performance at our customer's homes.
- The Battery bank capacity is lower than what we specify in our designs. The Power Conditioning Equipment lacks the surge capacity and other simple, inexpensive features that measurably improve performance, durability and flexibility during prolonged outages.
- The control and command and communications between utility, or it's suurogate Program sponsor and the equipment manufacturing/monitoring provider, the equipment and then the customer needs to be improved.

- The Battery cycling regimen of the utility may not benefit the life cycle durability of the Lithium-Ion pack. Some of these Battery Packs can be damaged permanently if left uncharged too long.
- Given the cost of the ESS systems even with all program incentives in place and perfect operation with the maximum incentives earned, it would take 10-12 years to realize a simple payback. Of course, power during an outage is almost immeasurably valuable but get a system that will last.
- The Connected Solutions application and program agreements burden the consumer. You can quit at any time but you give up everything else and have to keep the equipment. We can't advise people to sign onto the Program application and the Program Sponsor agreement binders.
- Please see our Solar and Storage guide at: <https://bpvs.com/solar-storage/>

Clean Peak

Last year we mentioned these **Clean Peak Certificates (CPC)** were coming and that they may be a better compensation incentive for Solar and Storage than SMART or the MassSAVE Connected Solutions programs. That has not worked out yet. In fact, the state and the utilities have taken pains to assure folks they can combine the incentives from all three Energy Storage System Programs: SMART Connected Solutions and Clean Peak programs. The Clean Peak Incentive even in concert with the others is insufficient to really incentivize the addition of these proscribed equipment manufacturer's products for a ten-year return at the residential scale.

This CPC program is open and BPVS will stay alert for any changes that may improve it. There are increased transaction costs. Monitoring has to be reported in 15-minute intervals. Trading is done on the New England Power Pool Generational Information System (NE-GIS or NEPOOL -GIS). The first registered systems are listed as of this writing, and all are systems over 250 kW with larger battery capacity. Small systems will certainly need an aggregator to handle their CPCs. Again, not enough of an incentive to merit discussion of returns for residential customers.

Afterword

The nearly fifty-year-old transition to clean energy must accelerate. It is shameful how much time has been wasted. It is unconscionable to luxuriate in electricity usage here while 2 billion world citizens have no consistent electricity for fundamental needs like lighting and water pumping.

In Massachusetts, we cannot allow the utilities to put solar development on pause so they can promote greater reliance on greenish certificate programs and natural gas in the region. Preserving their scale of revenue and profit through higher service costs and arbitrary fees is too much of a burden as society with private capital accelerates the transition to solar generation. All sectors must make sacrifices to assure authentic sustainable practice including publicly sanctioned monopoly enterprises.

Without question, solar opportunists have discredited the solar effort and some critics have good cause to complain that solar incentives have been too generous for some developers including those who push solar leases and Power Purchase Agreements (PPAs) in the residential sector and PPAs in the municipal and community solar sectors. Massachusetts has done a poor job on consumer protection in this arena and in establishing solar as a licensed trade.

We get incentives wrong by pretending to feed to RPS mandates with RECs etc. for just the Investor Owned Utilities (IOUs). We need to establish a state - wide renewable standard subscribed to, by all accounts, *for the people ,by the people*. The standard should be managed outside of but in parallel with the Grid Independent System operator as part of the duties of a transparent independent quasi-governmental service agency.

Call it the **Massachusetts Green Utility Authority** or whatever suits the legislature but all electricity distributors and suppliers including Municipal Electric departments must subscribe to it. Within it enfold the MassSAVE mission and services and all the funds the utilities now collect for energy efficiency and conservation and renewables. That will remove redundancies in existing programs including SMART. Its formation will necessarily require DPU reform. It should absorb or merge with the MassCEC and the Production Tracking System (PTS) will be an important element of its service. That's a tall order for the legislature as big if not bigger than the Electricity Restructuring Act of 1997 but it must be done.

Given state climate action goals, this **Massachusetts Green Utility Authority** will set the solar capacity and production, incentives to be reasonable and consistent and financed by penalties on dirty power production. If they conduct a true Value of Solar study it will proceed from the physics of electron flow and Grid support benefits, locational capacity value and reliability of solar PV as a generation resource, then add all the environmental benefits. Because solar is today's energy its value will change in relation to all electricity pricing variables, sometimes to its detriment as well as its benefit. It has proved this on a daily and monthly basis for years. This is why a Green Utility or Regional Green Power agency must be the transparently objective data authority for reporting and setting the bonus value for solar and wind and energy storage systems on a real time basis. Time of use rates would incentivize quality ESS systems. Assuring professional installations and solar commerce integrity in the marketplace is another area of efficiency and leads to durable infrastructure. The attribute(s) form of metrics and Certificate trading must be rejected because they are false abstractions and thus inefficient. Even as financial instruments they're clumsy. The de- centralization of the grid and formation of microgrids should be considered as policy tools toward healing the environment and energy equity. Again given the urgency of state climate action goals we can't leave policy to the whims of utility executives and politicians.

Please Contact us at info@bpvs.com, we welcome your comments and questions.