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Arizona Corporation Commission
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Commissioners:

AriSEIA submits the following Paper to the docket and requests that any questions regarding the Paper be directed to Mr. Jim Combs, AriSEIA Board Member, at his email address of jcsolar@aol.com or by phone to Mr. Combs at (480) 835-9549:

Rationale for Solar Water Heating Incentives – An ARISEIA Position Paper

"Although the residential photovoltaic ("PV") marketplace is currently extremely competitive and customers are buying a significant number of systems without a substantial incentive, this competiveness does not extend to other renewable technologies, such as wind, solar water heating, and solar daylighting to name a few. " "Staff believes that incentives should not be eliminated for all renewable technologies and all market segments when one market segment, and only one market segment (the residential PV market), is approaching cost competitiveness"

The above comments are from the 2012 ACC Staff report in response to the Arizona Public Service Company's proposed 2013 Renewable Energy Standard and Tariff (REST) Implementation plan. We in the Solar Water Heating (SWH) "market segment" feel that it points out a differentiation between renewables that deserves individual consideration.

In addition to a huge total amount of REST incentive money, at an initially extremely high cost per kWh, a few different factors have driven residential PV sales. These factors are indirectly related to REST/APS incentives but are not available to the other renewable technologies. We want to point this out not to disparage residential PV - which we feel is important to a change of paradigm in the energy market - but instead to support the rationale for a separate consideration for SWH.

With respect to REST funding the total **amount of funds allocated through 2012 for residential PV has been $152.5M as opposed to $12.5 million for SWH**. Between 2007 and into 2010 residential **PV received approximately four times the amount of incentive per kWh as did SWH**. In fact it wasn't until 2012 that the Up-Front Incentive for residential PV and SHW became equal. Again this is not being pointed out to detract from one market segment but instead to understand why one market segment has been successful and another has languished. We in the SWH market segment feel that these differences in funding help account for differences in market success and want to avoid the simple conclusion that one technology succeeded compared to another under equal circumstances. **Residential PV was given the equivalent advantage of a big head start on a downhill track (12 times the amount of incentive money at 4 times the cost per kWh) as compared to SWH.** It would seem that a difference in market success was guaranteed.

Aside from the above specific REST incentive allocation some other factors have played onto the lack of need for future REST incentives in the case of residential PV. These should be considered before making a sweeping generalization on the need for all renewable incentives.

Perhaps the most fortuitous factor that has helped the lessening of need for residential PV incentives has been the dramatic cost reductions for the panels. None of the other renewables have had that happen (possibly because they were not given the same type of huge incentives to begin with). International trade wars and solar panel manufacturers fight for survival have also driven the costs down to below the cost of production. Current trends indicate an increase in panel costs which have some in the residential PV industry advocating a continuation of utility incentives.

But what really accounts for the lack of need for residential PV incentives is the advent of the "leasing model". Residential PV system installations doubled in one year when leasing was introduced and now has tripled (See graph 3). Under this financial arrangement a homeowner or small business does not directly buy the system but instead leases it. This allows the lessor to value the system much higher than one could sell a system for (as much as 2-3 times the values) in order to receive double to triple the amount of Investment Tax Credit (ITC) as well as a much higher depreciation tax advantage. The lessor also typically gets a large prepayment on the lease. By leveraging all these incentives the lessor does not need a utility incentive. Essentially the federal government has taken up the slack for the need of the utility incentive with the doubling of the ITC and depreciation. Because of the much lower cost of SWH systems there are no lessors that want to make the same type of financial arrangement. There is not as much tax avoidance appetite to make it worthwhile. The point here is not to lament the advantage that the residential PV industry has in this regard but to point out that it is an incentive from another source (the federal government) that has alleviated the need for the PV incentive from the REST. That same incentive source is not available to SWH. There is one other source of incentive that residential PV has that is not available to SHW and that is net metering. We in the SWH market segment want to make clear at this point that we fully support net metering in that it advances a good, clean source of energy for a utility, at a good price, helping to avoid the building of new power generators. But we do want to make sure that it is acknowledged that net metering is essentially an incentive to a buyer of PV. It allows the PV customer to produce more electric during the 6 hour solar day than they can use during that time and sell the extra back to the utility. The electricity that is sold back helps pay off the PV investment much quicker than just the energy usage that is avoided by the PV system. The average amount sold back to the utility is over $400 per year which extends to $2000 in five years, $4000 in ten… It is universally accepted that without net metering residential PV cannot exist. Conversely, since SWH stores its energy it does not require the incentive of net metering.
The fact that SWH stores its energy to be used over a 24 hour period is just one of the unique advantages it has and added value it brings to the electric utility. Because of that storage it helps alleviate peak load electric use much more than any of the other renewables do.

Here are some other unique reasons for maintaining a Solar Water Heating incentive:

- Water heating is a very significant part of a homeowners' energy cost, 15-30% of the electric bill and 70-80% of the gas bill. A properly sized SWH system saves 80-90% of those bills
- Every ratepayer has a water heater that will need replacing at some point. A well funded incentive gives every ratepayer an opportunity to leverage the money

they would have spent on a traditional water heater towards a renewable energy asset (SWH) at a net cost they can afford. And the incentive money is money they have paid into through the REST.

- Because the cost of a SWH with incentives is relatively low for a solar product, it is within the reach of ownership for most ratepayers. Ownership lets them, the ratepayers (not an out of state entity), capitalize fully on the savings benefit. And those saving are typically spent in Arizona which benefits the state economy.
- Most SWH companies have financing options such as one year same as cash loans that allow the homeowner to capture all the incentives before having to pay off the balance of the system. With a well considered incentive, that balance could be designed to be just a little more than the cost of a traditional water heater which would insure a huge adoption rate for SWH by the average ratepayer.
- With a relatively low budget compared to residential PV (see graph 1) a very high number of ratepayers would benefit.
- Heating water with a resistance heating element is an archaic and inefficient design. A properly sized SWH allows the homeowner to completely turn off their heating element for 8 months of the year supplying 100% of the water heating capacity which cuts across every peak load model, guaranteeing peak load savings during those months. (It also allows for a significant benefit during winter months when it still provides 50% of the water heating capacity.)

The REST program was established based on recommendations from the Uniform Credit Purchase Program group which had representatives from the ACC staff, APS (with other affected electric utilities), and the various renewable energy technologies. It was a well thought out program that has had much success. However, much has changed since then and many of the original goals have been forgotten. It is often mentioned that some of the goals of the REST was to create environmental benefits and employment benefits. But they were just side benefits. It has also been mentioned that the REST was designed to drive down the cost of renewables and increase their adoption by ratepayers. Again, many hoped for that but it was not the reason the Arizona Corporation Commission created the REST.

The Arizona Corporation Commission established the REST to insure that other forms of energy production, specifically renewable energy, would not be quashed by the monopolies' complete control of energy sourcing. It established the Tariff to fund

these other forms of energy production to level the playing field from the complete control and advantage of the Utilities leaving ratepayers with no alternatives. There was no end game planned for an elimination of incentives and in fact APS stated that they did not anticipate a lowering of the SWH incentive below the .50/kWh savings during their request to lower the incentive from the original .75. However, it was anticipated that in the leveling of the playing field the cost of some of the renewables would go down and so would the necessity of the amount of some of the incentives. That has happened in the case of residential PV for the reasons mentioned above which were not substantially caused by the REST except possibly by the huge amount of money spent on it. Solar Water Heating still suffers from that unlevel playing field and ironically the field is unlevel when compared to residential PV without the advantages of huge REST funding, leasing and net metering. One can only imagine the number of ratepayers that would have been helped if the funding for SWH was $152M over the course of the REST (the amount spent on PV) vs. the $12M that actually was spent.

It is hoped that the Arizona Corporation Commission considers all of the above in the upcoming Implementation Plans and can work with the Solar Water Heating industry to reset the REST to keep a very valuable form of solar from being quashed. It really is a solar product that most ratepayers can take advantage of at an extremely low cost compared to PV. The ratepayers deserve that option.