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***Condominium Solar Hot Water Projects***  
***Thermal-PPA FAQ***  
***Frequently Asked Questions***

***Condominium Associations with common hot water systems have a unique opportunity to reduce their energy costs and use of carbon-based fuels such as natural gas and propane, by installing to a state-of-the art solar hot water system through the proposed Thermal Power Purchase Agreement (Thermal-PPA).***

***How does the Thermal Power Purchase Agreement work?***

Under the Thermal Power Purchase Agreement (Thermal-PPA), there is no immediate installation cost to the condominium association. Instead, the association agrees to purchase the energy produced by the solar hot water system from the installer for six to ten years. At the end of this period, the condominium association will purchase the solar hot water system from the installer for one-quarter to one-half the upfront installed price through a reserve fund established for the purchase. Thereafter, the system will deliver free solar energy to replace some of the increasingly expensive natural gas (or propane) requirement.

***How does the Solar Hot Water System (SHW) reduce use of carbon-based fuels?***

The SHW system feeds solar heated hot water into the existing tanks of the condominium association's common gas-fired hot water system, significantly reducing the amount of natural gas or propane required to heat the water.

***How much of our energy will be provided by the sun?***

The SHW system generates sufficient therms to offset approximately 50-60% of hot water loads.

***What equipment does the system include?***

The SHW system includes flat-plate or evacuated-tube solar collectors mounted on roof-tops, connecting pipes to mechanicals rooms, electronic controls, a heat exchanger to heat cold water entering from the municipal supply, and storage tanks connected to the main hot water system.

***How much will this reduce our carbon footprint?***

Depending on the size of the system, each year approximately 500 to 3,000 therms of natural gas (or propane) use will be eliminated, preventing between 4 and 22 tons of CO<sub>2</sub> from entering the atmosphere. These are rough estimates, as hot water loads will vary from building to building.

### ***How much money will we save in the first six to ten years?***

Initially, energy costs will be unchanged, as the price paid for Thermal-PPA energy is typically set at the prevailing utility rate when the contract is signed. *As carbon-based energy costs rise, however, solar hot water system savings increase, because the Thermal-PPA is a fixed-price contract.* Additionally, solar hot water system installation is always accompanied by whole-plumbing system optimization. Resource Solar ensures that existing supply systems are tuned to most efficiently take advantage of the new solar-thermal energy supply. Although actual savings are highly dependent on future natural gas prices, it would not be surprising to see 10-20% hot water cost savings for the typical condo Association during the initial six to ten-year contract period.

### ***Where are natural gas prices headed?***

Natural gas is increasingly being used for electricity generation as it is a less-polluting fuel when compared to coal. This demand is likely to pressure prices higher over the coming years. Current one-year forward natural gas prices are trading at a 20% premium to the spot market.

### ***How much energy cost will be saved in the long run?***

From the seventh year onward, all energy produced by the SHW system will directly reduce association energy costs, the amount depending on future gas prices.

### ***How much will an Association pay Resource Solar in the first six to ten years before purchase?***

The amount varies greatly, depending on a number of factors, including the complexity of the installation and the number of units in the association. However, like a utility bill, the association **only pays for energy that is delivered**, and all operation, maintenance, and repair costs are the responsibility of Resource Solar.

### ***What makes a Thermal-PPA more attractive than installing the system ourselves?***

Solar hot water is the most rapidly expanding renewable application in single family and rental housing, but condos find it hard to benefit because nonprofit organization and fragmented ownership make it difficult to finance systems and utilize the government subsidies. The Thermal-PPA solves these problems.

### ***Is there a direct purchase alternative to the Thermal-PPA?***

An association could directly purchase the system from Resource Solar but this would require a large upfront assessment. A commercial loan would also be possible, but banks are often reluctant to lend to associations as they do not typically own hard assets (or the assets are subject to extensive association agreements).

### ***Why is a Thermal-PPA economic for an Association?***

The association avoids the pain of an upfront assessment on condo members or the difficulties and expense of borrowing money from lenders who are reluctant to make condo loans. By contributing to a reserve fund, the association enjoys the benefit of interest earned rather than the high cost of money borrowed. By buying at a reduced price at the end of six to ten years, the

association will capture much of the benefit of the governmental solar subsidies. Resource Solar estimates that an association can expect to earn 3-7% on its invested capital for the first 20 years and 10-15% overall (for 30 years of project operation).

### ***Why is a Thermal-PPA economic for Resource Solar?***

Resource Solar has an operating subsidiary that owns and manages such systems for condominiums. It pools the capital of investors and utilizes the public tax incentives unavailable to a nonprofit association.

### ***Will SHW help our property values?***

Solar panels may be visible depending on a number of factors, including roof pitch and orientation, existence of parapet walls, etc. Resource Solar **always** relies on professional engineers (PE's) to ensure safe, secure, and leak-proof roof-top installations. In most instances, Resource Solar works with the roof contractor of record to be sure all warranties are maintained. The solar system will become an attractive sales feature for the ecologically and economy-minded. Numerous studies have shown that solar installations increase sales value (while also reducing the average time-on-the-market for listed properties). Finally, depending on existing construction and the latest Focus on Energy requirements, solar hot water can make association-managed buildings eligible for an "energy efficient" certification.

### ***How will the Association pay the purchase price at the end of 6 years under the Thermal-PPA?***

Alternative approaches include: 1) a special assessment via the monthly condo fee, 2) using a portion of the maintenance reserve that has already accumulated, or 3) earmarking a portion of future reserve accumulations. For example, a six-year special assessment could work as follows: if the upfront cost of the system is \$100,000, the buyout rate is 35%, and the number of units equals 50, the addition to the condo fee would be \$9.72 per month per unit (72 monthly payments).

### ***Can the Association choose to implement a smaller system?***

**Yes!** Although we size our systems to provide the *greatest* rate of return over a 30-year life, smaller systems can make sense for associations that wish to limit the size of the special assessment. A 30% reduction in system size (and associated cost) can still provide an attractive rate of return for a condominium association and its owners.

### ***What are the Durability Features of a Solar Hot Water System?***

The SHW system can operate for 30 years or more with regular maintenance and periodic replacement of inexpensive components. The collectors themselves – either flat-plate panel or evacuated tube – are certified by the Solar Rating & Certification Corporation (SRCC, see [solar-rating.org](http://solar-rating.org)) an agency created by the U.S. Department of Energy. These standards must be met to obtain Federal solar tax credits and to obtain the Focus on Energy Cash-Back Reward.

### *How do equipment warranties work in a Thermal-PPA?*

In this arrangement, Resource Solar is responsible for the operation, maintenance, and provision of energy through the first six to ten years. In addition, Resource Solar will provide its own **total parts and labor** warranty through the first two years of operation **after** purchase by the association, effectively providing fully warranted service for the entire SHW system through the first eight years of operation. In addition, separate manufacturer warranties will apply.

### *What are the anticipated maintenance costs and procedures?*

SHW systems have few moving parts and generally require little maintenance, but they do require annual checks and adjustments. Accordingly, a service contract with Resource Solar, or another quality solar thermal contractor is highly recommended. (Of course, Resource Solar is **directly** responsible during the six to ten-year Thermal-PPA contract life.) Resource Solar **includes** maintenance cost assumptions in all its financial proformas, including costs associated with annual inspections; annual solar fluid quality analysis; and periodic replacements of solar fluid, circulating pumps, expansion tanks, and anode rods.

### *Will there be monitoring of the thermal energy output?*

**Yes!** In fact, Resource Solar **must** monitor the therms delivered, using meters that produce verifiable data to generate monthly bills. Condominium owners will be able to **view the production of their own condominium association-based renewable power** as it occurs by visiting the Resource Solar website.

### *What else should I know?*

Various utilities offer “green power” programs that attract many customers paying \$5, \$10, sometimes \$20 extra per month. It feels like the “right thing to do”. **But**, there is very little tangible connection to this renewable energy, as the energy generation (usually wind turbines), are in a farmer’s field far from the customer’s home. Also, if the home is sold, the customer doesn’t benefit from this renewable power(!) For condominium owners participating in Resource Solar’s Thermal-PPA, the story is very different. The renewable equipment is **on location**: it augments the value of the units and thus, is money in the pocket upon a sale; and, of course, there is peace of mind knowing the system reduces green house gas emissions while supporting the new energy economy.