

Solar Advocate Solves Mismatch Challenges by Retrofitting with SolarMagic™

“Installing SolarMagic on my rooftop array will help improve its efficiency by mitigating the impact of shade. This technology can grow PV adoption in the United States by allowing those who thought they were “shaded out” to go solar.”

Rhone Resch, President, CEO, SEIA



Site: Resch Residence, Washington DC

System Size: 7.4 kWp
 Modules: 28 SunPower 205, 8 SunPower 210
 Strings: 4
 Inverter: SunPower SPR-7000m
 Monitoring: FatSpaniel
 Installation date: 2006, additional capacity and SolarMagic 2009

Owners

■ Rhone and Lisa Resch

Findings

■ Existing system performance allowed an energy harvest of only 68.8% (normalized)

Rhone and Lisa Resch, and their two children live in a tree-filled neighborhood in Washington DC. The family enjoys living in a historic 4 bedroom, 2 bathroom house, built in 1912. As part of their commitment to clean and sustainable energy, the family decided to go solar in 2006. Their goal was to reduce their carbon footprint and offset 100% of their electricity use, preserving the beautiful heritage sycamore and oak trees adjacent to the array.

The Reschs’ belief in PV, in concert with their desire to allow the trees to continue to provide the dual benefits of improved air quality and atmosphere in an urban environment, left only one option. Leave the trees untouched and install 6 kWp of modules on their roof.

For three years, four strings of seven 205W SunPower modules had been generating energy on the south-facing roof of the family home. While offsetting some of the residence’s energy consumption, the array had room to grow.

About Rhone Resch Rhone Resch is President and CEO of the Solar Energy Industries Association (SEIA) and a strong advocate for solar energy. He has spent more than 15 years championing clean energy and energy efficiency through involvement in multiple organizations, including the EPA, Business Council for Sustainable Energy, the Global PV Solar Energy Council, and others.

Two challenges existed in expanding the array

- 1) Finding matched modules was difficult—SunPower no longer manufactured SPR-205s. SPR-210s were used (to maintain the visual appeal of the array)
- 2) The trees would cast shade on the additional modules as well as the original modules.

Both shade and module rating differences introduce mismatch to the system.

In PV systems, each string performs only as well as its worst performing module. Poorly performing strings can drag down the energy harvestable from other strings and disproportionately degrade system performance, even if their modules are generating maximum energy. This is the definition of mismatch.

To mitigate mismatch, the Resch's decided to install SolarMagic power optimizers. SolarMagic power optimizers are designed to correct system imbalances and maximize energy harvest despite the causes of mismatch remaining in the array ecosystem. So, trees need not be felled, and replacement or additional modules need not be matched, except for aesthetics.



Figure 1: The Resch residence after additional installed capacity and SolarMagic. Notice that the new modules look identical to the old modules, and the SolarMagic units enabling this array are discreetly located below the modules. This new array has 7.4kWp of capacity.

