SMART LIVING: SIGNATURE RESEARCH AT S&T

S&T’s research strengths in Smart Living include cyber security, sustainable energy research, big data analytics, architectural design, behavioral and environmental psychology, and transportation and infrastructure to lead research and development efforts toward a more secure and sustainable society.

ECO VILLAGE

Nano & Micro grids

The Solar Village homes are connected via the Microgrid, allowing further research opportunities. The solar generation on each house comprises a type of silicon panel, either monocrystalline or multicrystalline, with a total power generation capable of 21 kW. Each of these 4 arrays uses a Fronius grid-connected inverter, sized for each array, before connecting to the rest of the microgrid. A 5 kW natural gas fuel cell was installed to apply aspects of combined heat and power to the microgrid.

The electricity is directed to the microgrid power system, the heat output is directed to the hydronic systems within two of the homes. The heat is used primarily as a supplement to potable water and space heating load.

In its first generation, this hardware primarily allows the microgrid to direct energy to the necessary loads and direct excess energy to storage, or to the municipal grid. In the next iteration, the time of use, demand response, load shifting, and other scenarios will be integrated to affect microgrid power operations. The technology within this project and the integration of the systems involved have made this a state of the art facility on the Missouri S&T campus.
**ALL KINDS OF SMART**

Missouri S&T Microgrid Industrial Consortium brings together top experts from across Missouri to explore future energy needs. Current consortium members are:

- Ameren
- Doe Run
- Missouri Public Utility Alliance
- UK Lead Agency Consortium

To learn more on how to become a consortium member and benefits of being a member, contact Dr. Mehdi Ferdowsi (Consortium Director) at ferdowsi@mst.edu or visit our website at cree.mst.edu

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**CENTER FOR RESEARCH IN ENERGY AND ENVIRONMENT (CREE)**

CREE manages the Solar Villages laboratory (operations, Research, and Outreach) and collaborates closely with faculty researchers and industry partners to promote research, demonstration, technical training, and development in Renewable energy, smart living, and resilient community development.

For more information on current research, development projects, and industry partnerships, Missouri, Microgrid/nanogrid Data access, Solar Villages laboratory tours...

**VISIT:**

cree.mst.edu or contact directly Stephane Menand 573-341-6088

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**COLLABORATIVE SPACE**

The Solar Villages Laboratory at Missouri S&T provide a place for innovation. Bringing together student Design Teams, our world class researchers, and industry partners to design and build the world of tomorrow.

From planning sustainable communities, to designing the next generation of resilient infrastructure, the CREE Solar Villages Laboratories provide a collaborative learning experience that is unique on a university campus.

**Above:** Excess energy from one house powers the other houses in the grid.