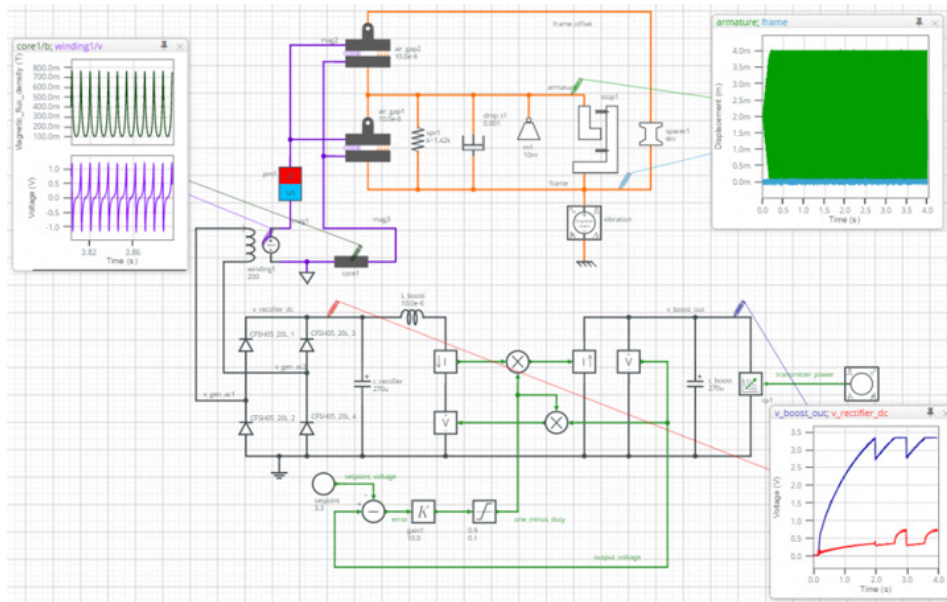# Using SystemVision® Cloud for Energy Harvesting Application

This energy harvesting example, developed using SystemVision Cloud, shows an electrodynamic EH system that could be used to extract energy from the vibration of an industrial motor.

## Energy Harvesting for Industrial IoT and Automotive Applications

Many new IIoT and automotive applications use wireless sensing technology as their data source. These systems need electrical power to operate the sensor and signal conditioning circuits, as well as for data processing and transmission. A common problem for these systems is the limited lifetime of batteries and the cost to replace them. Energy Harvesting (EH) can extend that lifetime or even eliminate the need for batteries. With EH, a sensor system includes a mechanism to extract waste energy from the local environment and convert it to useful electrical power.

SystemVision Cloud is a free online circuit simulator that provides easy-to-use schematic capture, a rich variety of electronic circuit and mechatronic system building-block models, and state-of-art simulation technology. It is well suited for the design of circuits and mechanisms used in energy harvesting applications. The energy harvesting example designs shown on this sheet are also available on SystemVision Cloud. There, the user can open any of these designs and interact with a "live" version, or save a copy and make desired changes, then re-simulate and see the effect of those changes. These examples can provide useful starting points for creating custom designs.

To learn more about EH design capability in SystemVision Cloud, go to www.systemvision.com/blog/energy-harvesting
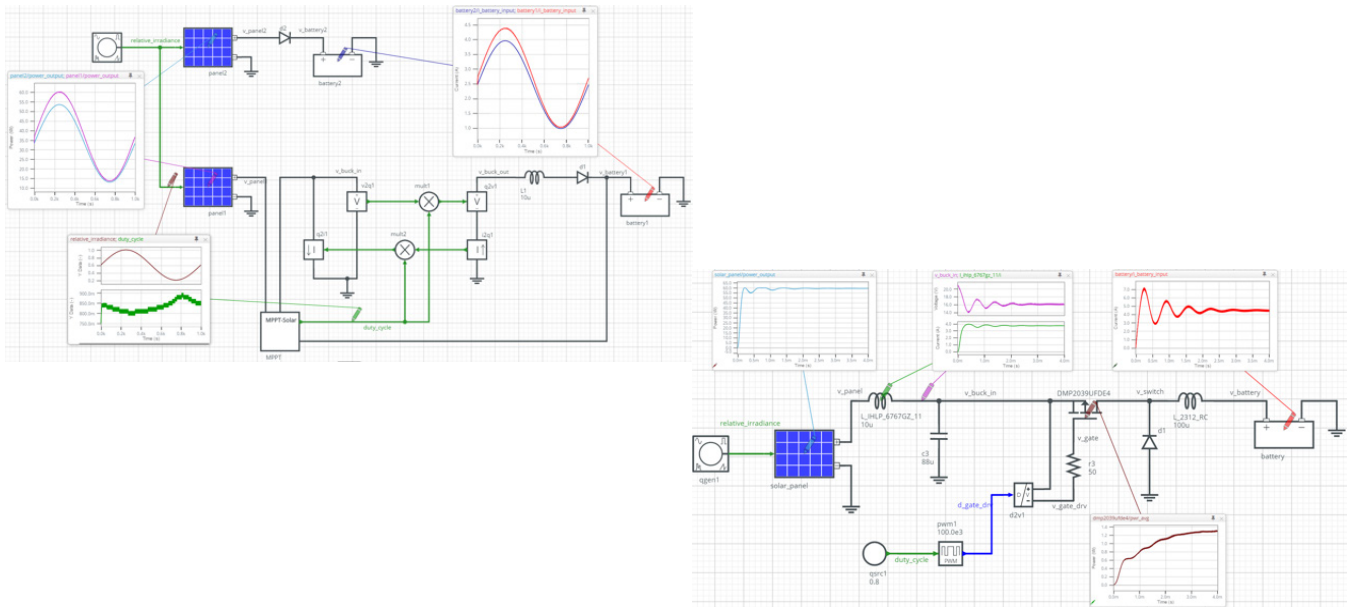
Thermal Energy Example

The example shown at the top of the reverse side is an electro-thermal EH system. It includes a Peltier/Seebeck TEG and a sampled-data algorithm for maximum power point tracking (MPPT). This example could be for an industrial process or automotive engine sensing application, anywhere there is a waste heat source at relatively high temperature, with a much lower temperature ambient heat sink nearby.

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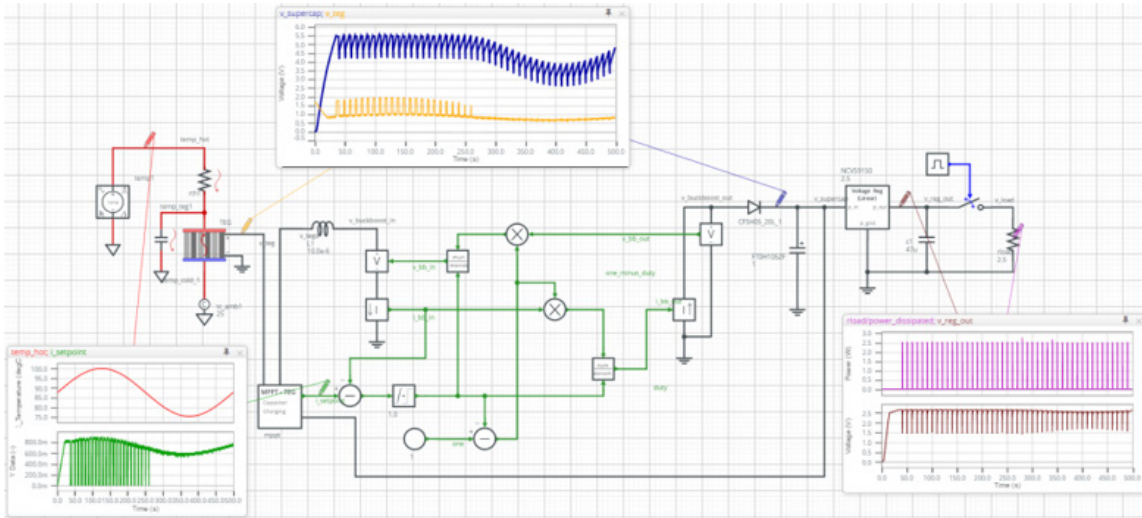
Solar Energy Example

This example is for a somewhat higher power solar charging system for a 12 V automotive battery. The version of the design shown on the left-side can be used for system-level tradeoff analysis, comparing direct solar battery charging vs. using an MPPT algorithm and an ideal buck converter model. The right-side view shows a buck power stage circuit implementation, including all of the component power losses for efficiency assessment.