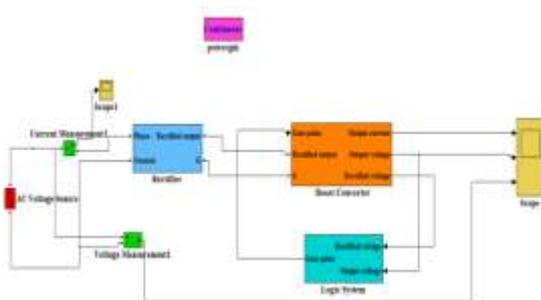


GP1019	Design and Development of Synchronous PFC Boost Converter for Hybrid Power Generation		
Group	1. Rakhee Vijayan		
	2. S. Sachin		
	3. Anusha Vadde		
Department	Electronics and Electrical Engineering (FT-2012)		
Mentor(s)	K.V. NarayanaSwamy, P. Venkatesha Murthy, B. K. Swathi Prasad and V. S. N. SitaramGupta		

Currently hybridization of solar and wind energy resources are in practice to satisfy the variations of the demand for electricity. Higher order harmonics are seen in wind generation system and passive input filters are used to curtail them. Use of passive input filters leads to complexity and self-generated harmonics in the system. Synchronous PFC boost converter is proposed to mitigate the higher order harmonics in wind generation and improves the power factor in electrical distribution where the loads having nonlinear characteristics.

In this current project work, an attempt has been made to develop a low cost Synchronous PFC boost converter that can improve power factor (PF) and low current harmonics. Initially the need and design of converter topologies have been studied. In the existing power factor converter topology, hysteresis control technique has been identified for modification. Identified blocks for modification are voltage error amplifier and diode. PI controller and MOSFET are replaced with a voltage error amplifier and diode respectively to make the input current in phase with the input voltage, hence named as Synchronous PFC boost converter. Detailed design, simulation and hardware implementation has been carried out to achieve desired power factor and low harmonic distortion.

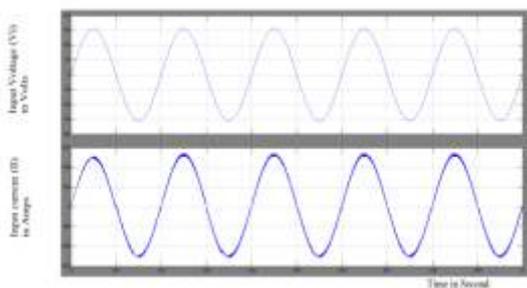
This conceptually built low cost Synchronous PFC boost converter has been tested and demonstrated for its functionality. This converter can be one of the potential solutions for electronic industries capable of achieving the input power factor to 0.999, reduction of input current harmonics to 4.457% and reduction of utility bill for consumers.



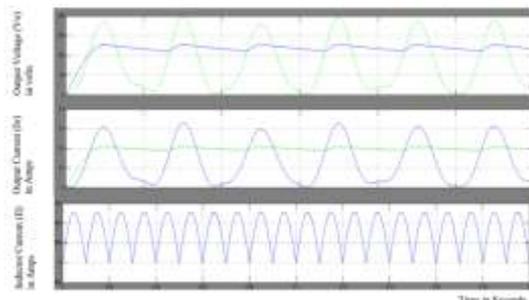
Simulink model of synchronous PFC boost converter

Name of the technique	Hysteresis technique	Synchronous hysteresis technique
Power factor Total	0.993	0.999
Harmonic distortion (in %)	12.83	4.47

Comparison of results



Input voltage and current waveforms



Output voltage and current waveforms