Second Laureate
Applied Research

- **Project title: Design and manufacturing of 5KW PEM fuel cell system with simultaneous using of heat and power for residential purpose**
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Abstract:

Variation of power and application of PEM fuel cells has proven a main roll for this type of fuel cell in many industries. Also the possibility of simultaneous fuel cell power and heat usage increase these tend specially. The designing and manufacturing of 5KW PEM fuel cell system is one of IERC successful projects that has implemented as fuel cell technology localization aim. By this system, 5KW electricity and 7KW heat can be produced and consumed for residential purposes simultaneously. This system produces electricity in higher efficiency, lower noise and pollution. The fuel is purred hydrogen which is a renewable energy source. The 5KW PEM fuel cell system is stand-alone and independent from the grid electricity. The main sections of fuel cell system are as follows:

Two PEMFC Stacks, Fuel Circuit, Oxidant Circuit, Coolant Circuit, Control Circuit and Hydrogen Leakage Alarming Circuit. By the installation and running of the 5KW PEM fuel cell system in Taleghan site of Renewable Energy Organization of Iran in 2009, the first PEMFC system was operated in Iran. Also the warranty of this system has been finished successfully with client satisfaction. All parameters of the system like pressure, temperature and flow rate of air and hydrogen gases are controlled automatically and the performance of the two PEM stacks is stabilized by self-diagnosing.