Energy saving is an open point in most European countries where energy policies are oriented to reduce the use of fossil fuels, greenhouses emissions and energy independence, and to increase the use of renewable energies. In the last several years, new technologies have been developed and some of them received subsidies to increase installation and reduce cost. This article presents a new sustainable trigeneration system (power, heat and cool) based on a solid oxide fuel cell (SOFC) system integrated with an absorption chiller for special applications such as hotels, resorts, hospitals, etc. with a focus on plant design and performance. The proposal system is based on the idea of gasifying the municipal waste, producing syngas serving as fuel for the trigeneration system. Such advanced system when improved is thus self-sustainable without dependency on net grid, district heating and district cooling. Other advantage of such waste to energy system is waste management, less disposal to sanitary landfills, saving large municipal fields for other human activity and considerable less environmental impact. Although plant electrical efficiency of such system is not significant but fuel utilization factor along with free fuel, significant less pollutant emissions and self-sustainability are importance points of the proposed system. It is shown that the energy efficiency of such small tri-generation system is more than 83% with net power of 170 kW and district energy of about 250 kW.