

Environment and Energy Unit Region of Lombardy , Italy	Technical-economic feasibility study of a microgrid in the Municipality of Corleto Perticara	2013
<p>The feasibility study has been carried out in the framework of the FACTOR20 project, co-financed by the European Program LIFE +, aimed to assess the expected development of smart grid in European countries. The study takes into consideration a microgrid to be implemented in the small rural Municipality of Corleto Perticara located in the Basilicata Region.</p> <p>This Region imports about 52% of the consumed electricity and due to insufficient meshing of the grid together with insufficient reliability of the power lines had at the time an unavailability rate of the electric service greater than the national average one. In addition, in the area including the Municipality of Corleto Perticara, the presence of long distribution lines (resulting in high losses in the network) and users with discontinuous and particularly disturbing withdrawal profiles (steelworks) cause voltage fluctuation phenomena (flicker). It should be added that in some distribution lines the level of virtual saturation is reached mainly because of the high number of renewable sources connections.</p> <p>Smart grids capable of managing bidirectional flows of electricity are seen as the solution capable to overcome existing problems and to make the best use of distributed renewable sources.</p> <p>In this context the microgrids, interconnecting local loads and resources of local generation and operating as a single controllable entity with respect to the public grid, take on particular interest in reducing the congestions of the local electricity network. Through an Energy Management System controlling generation units, passive loads and energy exchanges with the public grid, the microgrid integrates the behaviours and actions of all connected users: producers, prosumers and consumers.</p> <p>The feasibility study takes into account a microgrid including 1569 consumers (public, domestic, commercial and industrial) and 15 prosumers having an electricity consumption of 3,472 GWh in 2012 year. The existing 1.132 kW_p PV systems (including 134 kW_p installed on prosumers buildings) and two wind generators with a total power of 1800 kW provide an annual generation of 3,8 GWh.</p> <p>Assessed on the basis of daily consumption profiles a total of 935 MWh/year locally generated and exceeding the simultaneous electricity demand of the microgrid is fed into the public grid while 413 MWh/year are withdrawn from the grid when the local generation is insufficient. Being the 998 kW_p PV system and the 1800 kW wind farms, both owned by producers, connected to the MV network, the 6 MV/LV (15/0,4 kV) stations supplying all the consumers and the three local generation sites are connected, through underground cables, to the Common Coupling Point of the microgrid placed at the electrical station AT/MT(130/15kv). From economic point of view the microgrid, after taking charge of:</p> <ul style="list-style-type: none"> ● the depreciation corresponding to the required investment of Euro 800.000, ● the incentives to be granted to existing producers in compliance with the current regulation (“IV and V Conto Energia”), ● the payment to the local distributor of the charges currently borne by all the involved consumers, <p>allows to reduce by an average of 22% the cost of the electricity service for the users.</p> <p>The benefits related to the microgrid are not limited to the reduction of supply costs but include:</p> <ul style="list-style-type: none"> ● the national electricity system is relieved of the payment of Euro 120,000 as incentives currently paid to the existing producers, ● the sharp reduction in electricity transport, with the corresponding reduced losses and less congestion in so avoiding or differing any adaptation of the local electrical infrastructures, ● a concrete possibility of active demand management given the possibility of differentiating supply rates on the basis of different supply profiles within the limited number of users of the microgrid. 		

