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Strategic use of the underground for an energy mix plan, synergies among CO_2 and CH4 Geological Storage and Geothermal Energy: Italian Energy review and Latium case study

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Since the world-wide energy demand has been growing so much in the last years, it is necessary to develop a strategic mix-energy plan to supply low GHG (GreenHouseGas) emissions energy and solve the problem of CO_2 emission increasing. A recent study published by European Commission shows that, if existing trends continue, by 2050 CO_2 emissions will be unsustainably high: 900-1000 parts per million by volume. The European Commission in 2007 underline the necessity to elaborate, at European level, a Strategic Energy Technology Plan focused on non-carbon or reduced-carbon sources of energy, as renewable energies, CO_2 capture and storage technologies, smart energy networks and energy efficiency and savings. Future scenarios for 2030 elaborated by the International Energy Agency (IEA) shows as a mix energy plan could reduce the global CO_2 emissions from 27Gt to 23 Gt (about 15%).
A strategic use of the underground in terms of:
- development of CCS (Carbon dioxide Capture and Storage) associated to fossil fuel combustion;
- increase of CH4 geological storage sites;
- use of renewable energies as geothermic for power generation;
could open a new energy scenario, according to the climate models published by IPCC.
Nowadays CCS market is mainly developed in USA and Canada, but still not much accounted in Europe. In Italy there aren't active CCS projects, even if potential areas have been already identified.
Many CH4 storage sites are located in Northern America, while other are present in Europe and Italy, but the number of sites is limited despite the huge underground potentiality.
In Italy the power generation from geothermal energy comes exclusively from Tuscany (Larderello-Travale and Mt. Amiata geothermal fields) despite the huge potentiality of other regions as Latium, Campania and Sicily (Central and South Italy).
The energy deficit and the relevant CO_2 emissions represent a common status for many Italian regions, especially for the Latium Region. This suggests that a new energy plan to improve the efficiency and the environmental sustainability is necessary.
The evaluations of potential areas suitable for CO_2 and/or CH4 geological storage and geothermal energy in the Latium region, have been done through a revisiting of public data such as well composite logs and maps. For the selection has been taken in account too, exclusion criteria sites as well as presence of geological risks and natural protected areas. Then the storage capacity and geothermal potentiality have been estimated for the selected areas. Finally, considering the hypothesized energy mix plan, an evaluation of the potential CO_2 emissions decrease has been done. Preliminary results are
encouraging to extent this evaluation also in other regions to improve a National Energy Plan.