EXPERIMENTATION ABOUT A MAP ON "MARGINAL TERRITORIES" WITHIN THE EMILIA-ROMAGNA REGION (ITALY).

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FOREWORD

ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development) is leader of the European M2RES Project, whose activities include the drafting of a knowledge base of "marginal terrains" in the Emilia-Romagna Region, deemed to be fit for the setting up of power plants for the generation of energy from renewable sources (Renewable Energy Sources, RES) including wind, solar photovoltaic, biogas and biomass. Geothermal energy is excluded, given the features of this source in the region (low enthalpy). To achieve this goal, a collaboration agreement was signed between ENEA and the Geological, Seismic and Soil Survey of the Emilia-Romagna Region, given its competences in the development of environmental thematic maps

"MARGINAL TERRAINS"

This term indicates areas affected by environmental degradation, where no recovery is possible (or economically sustainable) either for manufacturing or residential purposes. This state of affairs is the result of unfavorable natural features or, more often, of high-impact use change, related to human activities. Conversely, these areas may be of great interest for the installation of renewable electric power generation systems, as set out by the National Guidelines for the identification of areas suitable for this purpose (2010), also taken into account by the measures recently approved by the Emilia-Romagna Regional Authority. ENEA has classified marginal terrains into four categories:
* quarries (and strip mines)
* landfills
* abandoned military bases
* brownfields in general and / or subject to contamination of various kinds.

METHODOLOGY

The cartographic information on the four categories of marginal terrains identified by ENEA is first derived from the Land Use Map (edition 2011), produced by the Regional Service responsible for it. In a second stage, validation of data related to quarries and landfills is carried out by regional and provincial services, dealing with the census and planning of these sectors. Aerial photographs and computerized cadastral maps are used to identify abandoned military sites, i.e. not easily available information. The four categories of areas have also been integrated with data available in the Geological Survey databases, to obtain as much information as possible. They include, for example, areas with unfavorable soil characteristics for agriculture, areas unsuitable for arable land, forestry or grazing (Class VIII Land capability classification). This information is then processed by means of GIS programs to map potentially suitable marginal terrains, which are compared with:
* planning and legislative constraints related to the power generation from renewable sources• urban fabric and land characterized by the presence of water bodies
* lithology of the substrate, presence and characteristics of debris cover on slope (fitness for deep foundations, wind turbine blades)
* land use capability

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These layers act as filters that limit the potential exploitation of marginal terrains for the production of power from renewable sources.

Subsequently, areas will be further characterized according to other parameters, in order to obtain the optimal surfaces for power generation.

The following stage parameters are:
- steepness of the slopes and exposure to solar radiation / prevailing winds
- accessibility
- Information available on the buffer zones of roads, cemeteries, sewage treatment plants, radio antennas.
- lithology of the substrate at a larger scale
- wind
- minimal surfaces
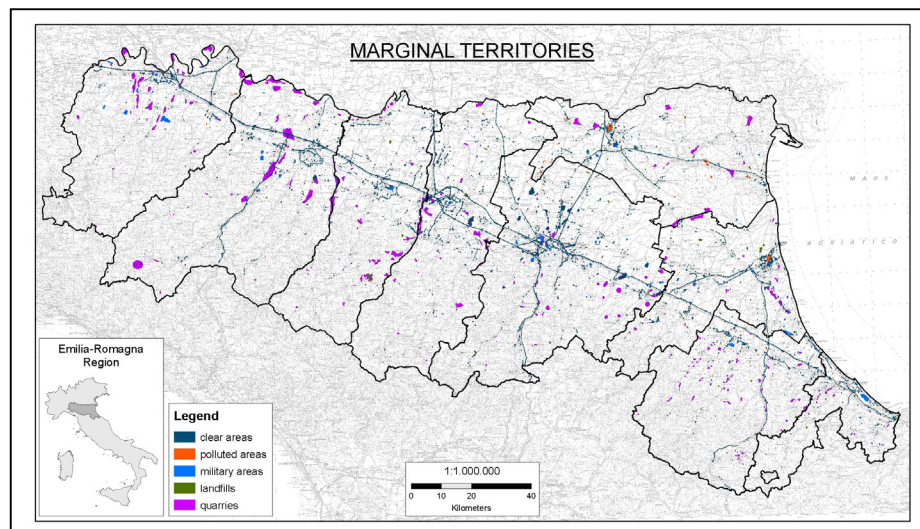- age of facilities (landfills)

Figure 1 – Sketch-map of the "aree marginali" within the Emilia-Romagna Region.

CONCLUSIONS

The project is innovative in that for the first time "marginal terrains" within the region have been identified, at a detailed 1:25.000 scale. The map that has been drafted, as shown in figure 1, is not only the result of an accurate census, but also of the comparison with various types of spatial data, including geological ones, related to the characteristics of foundation soils and soil quality

ACKNOWLEDGEMENTS

REFERENCES

AA.VV (2011) - How to apply common criteria for identifying and quantifying marginal terrains suitable for M2Res implementation