

Country: Italy	Pollutant(s): SO _x , NO _x , PM, BC, PAH, Cd, Zn
Protocol(s): All the protocols	Sector: agricultural residue open burning in agricultural sector
Type of strategy, policy or measure: Diffusion of bio energy	Method used for the current analysis: Demonstrative plant
<p>What is the main objective of the strategy, policy or measure? When has it been implemented/or will be implemented? <i>Please describe briefly what the measure attempts to achieve or what has been the result of its implementation. Please also describe since when it is being employed or for when its implementation is foreseen. Please explain whether implementation is/was immediate or gradual. [150 words max]</i></p> <p>Agricultural residue burning represents an important environmental problem in many countries of the UN-ECE Region, generating significant PM emissions, along with other emissions of POPs, like PAH, and heavy metals, like cadmium or zinc. Also in many Italian regions, particularly in the south, but not only, the practice of agricultural residue open burning is quite widespread, with heavy damages to the environment and the public health. Nevertheless, from agricultural residues, and the woody biomass in general, energy can be produced, other than for heating or cooking. Small plants (until 1 MW electric) can be implemented and powered by agricultural residues collected from crop zones, in close local areas. A demonstrative plant has been implemented in the Italian Puglia region, entered into operation in 2010.</p>	
<p>Background and driving forces: <i>Please explain briefly why this strategy, policy or measure was implemented; mention the driving forces for its introduction e.g. policy development, legislation (EU, national), action plans, voluntary, incentive, or other [150 words max]</i></p> <p>In many Italian areas, air quality standards for particulate matter, as in the provisions of the EU Directives, are not fulfilled, as well as in many rural areas PAH concentrations are critical. While at national level in the year 2019, emissions from agricultural residue open burning are only 1 % of total PM₁₀ emissions, at local level the situation is very different. In Puglia Region, where the demonstrative plant is located, the PM₁₀ emissions from agricultural residue open burning represents 25 % of total emissions, as calculated in the 2010 regional emission inventory. Therefore, the introduction of emission reduction measures in this sector is a policy priority. Moreover, the measure illustrated here is eligible to be replicated in many UN-ECE countries affected by the same problem in similar socio-economic conditions.</p>	
<p>Description of the strategy, policy or measure: <i>Please explain briefly how the strategy, policy or measure works and why it has been chosen compared to other policies/measures. Please also explain how its implementation is being monitored. [200 words max]</i></p> <p>The measure has been applied to the cultivation sector of olive groves, which is an important productive sector in the south of Italy, and, in general, in the whole Mediterranean area. However, the measure is replicable in other cultivation sectors with similar characteristics. In the olive sector, a large amount of pruning is produced and it needs to be disposed. The energy production powered by biomass, in this case, coming from local olive pruning, transforms an environmental problem into an opportunity. The demonstrative plant has been implemented in Calimera (Lecce), in the Puglia region, and it is fed only by olive pruning, collected in about 2400 farms located in 9 municipalities, within a distance up to 10 km from Calimera, with a source basin of about 160000 olive trees. The plant generates electricity and, partially, recovery heat. The plant requires 24 -28 tons/day of biomass for a total of 8000 tons/year, generating 8000 MWh electric/year, with an efficiency of about 24 – 25 %. The plant is equipped with advanced flue gases control systems (multi-cyclone system) to abate pollutant emissions, in particular PM, and with a continuous monitoring system, on the chimney top, to check the flue gas chemical composition.</p>	

Costs, Funding and Revenue allocation:

Please state how much the implementation of the measure costs including its monitoring and how it is funded (national budget, industry, taxes, etc.) If the measure is creating revenue, please also explain how this revenue is being allocated and collected. [200 words max]

The disposal of the huge quantity of pruning, coming from olive cultivations, has always been an economic and environmental problem. The realization of the plant requested four years of analyses, needed to develop all the technological aspects and identify the best biomass supply basin. An economic analysis was carried out to verify the economic feasibility of the project, since no public financial resources were planned. An initial financial investment of about 8 million Euro, collected by an ad hoc created Consortium, was established. The electricity generated is delivered to the Electrical Utility and a power line directly supply the city of Calimera, a community of about 6800 inhabitants, while the heat is used in agriculture.

Effect and impacts on air pollution abatement:

Please explain briefly the effect of the policy, strategy or measure and how it has impacted the abatement of air pollution. If impacts are known, please quantify, if possible. Please highlight also other effects of the implementation of the measure e.g. with regard to compliance, the acceptance of the measure or its transposition (e.g. from a voluntary to a regulatory or another type of measure). [150 words max]

Environmental benefits come from the management of the biomass collection/supply chain. An ad hoc company has been created for the harvesting and transport of the pruning to the co-generation plant. The establishment of a trust agreement with the local farmers allowed the development of a network of about 1200 collecting farms. In return of the pruning harvested, farmers gain land cleaning, without open residue burning. Applying this measure, a reduction in the open burning, higher than 70 %, is estimated, with related consequent reduction in the air pollutant emissions. Dust emissions from the co-generation plant are lower than of 1 mg/Nm³, much more lower than the Emission Limit Value requested for the licensing of the plant.

References/Further information: *Please provide most relevant sources for information such as references for web links, books, other resources.*

N.Colonna, "Biomass to Energy options to avoid open burning emissions: an Italian successful case study", Ottawa, 24/10/2019,

<http://tftei.citepa.org/images/files/2019-10-22-23-24/7.%202019%20Colonna%20ENEA%20ITALY%20Bio-energy%20reducedWORKSHOP-.pdf>

V.Pignatelli, M.Monni, "Produrre energia dalle biomasse vincendo la sfida della sostenibilità: l'impianto Fiusis di Calimera (Energy generation from biomass, winning the sustainability challenge: the Fiusis plant of Calimera)", Pianeta Terra, pag. 33, January 2019 (in italian)

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Additional comments: *Please include any additional information you may wish to provide here.*