CH4rLiE: CH4 Livestock Emissions

Bando: PRIN-PNRR 2022

PI: Ilaria Vai (Università di Pavia)

Linea d'intervento: Principale – PI di età inferiore a 40 anni

Durata: 24 mesi

Budget totale: ~300 kE

Strategic emerging topic: SUSTAINABILITY AND PROTECTION OF NATURAL RESOURCES

Cluster: Food, Bioeconomy, Natural Resources, Agriculture and Environment

Sub Cluster:

1.Climate neutrality is built by reducing GHG emissions and enhancing the carbon capture and storage in ecosystems, production systems on land and at sea as well as rural, coastal and urban areas, where the adaptation to climate change is also fostered.

Abstract: The CH4rLiE project aims at developing a prototype for methane emissions capture in a barn environment. Methane has a higher global warming potential with respect to CO2, and nowadays, methane emissions of human origin contribute about 23% to global warming. In this context, emissions from livestock farms play a non-negligible role. Suffice it to say that a single cow is capable of emitting about 110 Kg of methane, equivalent to 2750 Kg of CO2, in a single year. Several projects have tried to mitigate the problem by intervening on animal feed: CH4rLiE, in contrast, proposes to act on the methane already produced and diffused in the air, using a specially developed recovery system. The idea arose from the expertise acquired in the Large Hadron Collider experiments at CERN, where "gas recuperation systems" are being developed to extract CF4 and other components from gaseous detectors exhausted gas mixture. The project will focus on the study of gas adsorption by porous materials and on the development of a prototype system for methane capture, which will be installed in a real barn. This study will be supported by an initial phase of gases diffusion simulations and by a campaign of measurements of gases concentrations in different barn areas…

Organizzazione ed impatto sulla sezione

Il progetto prevede **3 unità**:

1. Università di Pavia (Resp. Ilaria Vai – PI)
2. INFN (Resp. Linda Finco – Vice PI)
3. Università di Torino (Resp. Elio Dinuccio)

Partecipanti INFN PV: Alessandro Braghieri, Paola Salvini

Task INFN PV: Simulazioni diffusione del gas nella stalla; preparazione delle stazioni di monitoraggio del gas e relativo sistema di acquisizione; test in laboratorio del prototipo di cattura del metano; anali dati raccolti in stalla.

Impatto sulla sezione: supporto amministrativo per gestione fondi; supporto di officina e servizio elettronico per la preparazione delle stazioni di monitoraggio del gas e montaggio prototipo di cattura del metano.

Status del progetto: sottomesso in data 29/11/2022, in attesa di valutazione.