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1 FOREWORD

Climate change is and will in the future be one of the most relevant challenges to be tackled globally and also in Italy.

The correlation between global warming and the increase in greenhouse gas concentrations is matter that is now beyond doubt. This view is shared by the world's leading climate experts as well as the vast majority of the scientific community, who believe that human activities are the main cause of the rapid increase in temperatures observed since the mid-20th century.

The most prominent greenhouse gas (GHG) is carbon dioxide (CO_2). This gas is mainly released from the combustion of carbon, which is the fourth most abundant element in the universe in terms of mass, after hydrogen, helium and oxygen. Carbon dioxide is released from the combustion of fossil fuels, such as coal, oil or methane. The carbon dioxide released and present in the atmosphere has a direct impact on the "greenhouse effect" and global warming of the planet.

The global increase in CO_2 levels in the atmosphere is confirmed by hundreds of monitoring sites, including the Centro Aeronautica Militare (Italian Air Force) meteorological station located on Monte Cimone in the Tuscan-Emilian Apennines. Since 1979, this site has been continuously sampling CO_2 concentrations in the air. The Monte Cimone station is the first and only station in Italy to be recognised as a "global" station within the GAW - (*Global Atmosphere Watch*) programme of the WMO (*World Meteorological Organisation*). It is particularly suited to measuring background concentrations of greenhouse gases, both due to its distance from large urban and industrial centres, and to its altitude (above the *atmospheric boundary layer* for most of the year). The following image represents the trend of the time series of background CO_2 concentrations at the Monte Cimone station, updated as of June 2021. The CO_2 trend shown in the figure is equal to +1.86 ppm/year. The following image shows the details of the monthly average over the last 5 years.

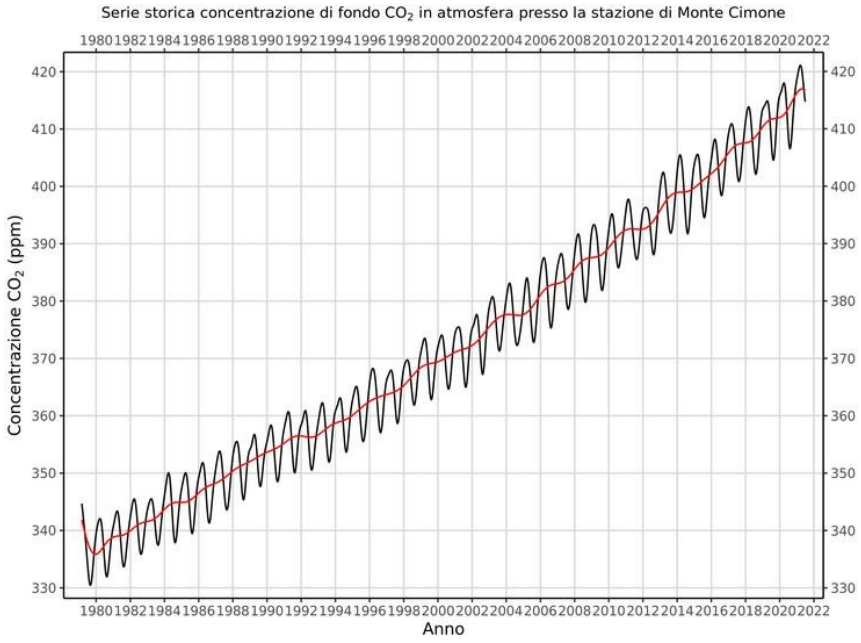

Figure 1: Time series of CO2 concentrations measured at Monte Cimone. The black curve shows the stationary fluctuations, while the red curve does not. The trend is 1.86 ppm/year..

Italy is located in the so-called "Mediterranean hot spot", an area identified as particularly vulnerable to climate change (IPCC, ARC.6; IPCC ARC.5; EEA 2012). In addition, the national territory is notoriously subject to natural risks (instability phenomena, floods, coastal erosion, water shortages). It is already evident how rising temperatures and the intensification of extreme events linked to climate change (droughts, heat waves, wind, intense rainfall, etc.) amplify these risks, the economic, social and environmental impacts of which are destined to increase in the coming decades.

Therefore, the importance of implementing adaptation actions in the territory to cope with the risks caused by climate change is clear. Since this is a highly cross-cutting issue, planning appropriate actions requires:

- a systematised knowledge base of the phenomena;
- an optimal organisational context;
- multi-level and multi-sectoral governance.

The first steps at a national level were taken in 2015, when the National Strategy for Adaptation to Climate Change (SNAC) was adopted. The strategy analysed the state of scientific knowledge on the impacts of and vulnerability to climate change for the main environmental and socio-economic sectors. It then put forward a set of proposals and action criteria to address the consequences of climate change and reduce its impact.

In 2021, the European Commission presented the new COM (2021) 82 final Adaptation Strategy of 25 February 2021 (Shaping a Climate Resilient Europe - The New EU Strategy for Adapting to Climate Change), which replaces the previous 2013 Strategy. The new Strategy, heralded in the European Green Deal, seeks to achieve the transformation of Europe into a climate change resilient Union by 2050 and is based on four priorities:

smarter, more systemic and integrated, faster adaptation, as well as an intensification of international action.

In order to make adaptation more systemic and integrated, the European Commission, reaffirmed the importance of national adaptation strategies and plans, urging states to make them effective and develop them further. For its part, it commits to support their development and implementation at all levels of governance by articulating the approach around three cross-cutting priorities: integration of adaptation into macro-financial policy, nature-based adaptation solutions and local adaptation actions. The goals outlined in the European Strategy are reinforced by the European Climate Act (Reg. (EU) 2021/1119 of 30 June 2021). By incorporating the Paris Agreement and the UN Agenda 2030 into EU law, this Act requires Member States to adopt and implement national adaptation strategies and plans, taking into account the EU Adaptation Strategy (Art. 5, para. 9 of Reg. (EU) 2021/1119).

The Ministry of Ecological Transition (now the Ministry of the Environment and Energy Security - MASE) has adopted the guidelines contained in the aforementioned international and EU acts. In line with these acts, and with the provisions of the SNAC (National Strategy for Adaptation to Climate Change), it has undertaken significant initiatives on adaptation, in particular the launch of the National Platform on Adaptation and the continuation of the efforts undertaken since 2017 to achieve the adoption of a National Climate Change Adaptation Plan (NCCAP). To begin with, in October 2022, the Ministry of Ecological Transition (now Ministry of the Environment and Energy Security - MASE), in collaboration with the ISPRA (Italian Institute for Environmental Protection and Research), published the National Platform on Adaptation to Climate Change, a portal aimed at informing and raising awareness among citizens and stakeholders on the issue of adaptation and providing data and tools to support the public administration in decision-making processes. The platform will be periodically updated and expanded with data and information from different sources. In line with the guidelines of the European Adaptation Strategy, which seek to achieve smarter adaptation, the National Platform on Adaptation to Climate Change aims to bring together data, information and operational tools and make them readily available to increase knowledge and capacity for planning and implementing adaptation actions throughout the country. Secondly, in transposing the guidelines contained in the aforementioned international and EU acts following the adoption of the SNAC (National Strategy for Adaptation to Climate Change), a special Working Group was set up in 2022 with the aim of speeding up the activities aimed at approving the Adaptation Plan. Its goal was to produce an instrument with which Italy will make its contribution to achieving the global objective of adaptation to climate change defined by the 2015 Paris Agreement, consisting of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change in the context of sustainable development and the goal of limiting global average temperature increase.

The main goal of the NCCAP is to provide a national guiding framework for the implementation of actions to minimise the risks from climate change, to improve the adaptive capacity of socio-economic and natural systems, and to take advantage of any opportunities that may arise from new climatic conditions.

Emilia-Romagna, followed by Tuscany, Campania, Veneto, Lombardy and Liguria, is the Italian region with the highest values of population living in flood risk areas (ISPRA, 2021). Therefore, it is particularly sensitive to extreme events made more frequent by climate change.

2 INTRODUCTION

At present, there are two main approaches to try to contain emissions produced and, at the same time, reduce the risks deriving from climate change:

- the reduction of greenhouse gases;
- the implementation of adaptation strategies, based on reducing the vulnerability of landscape-environmental systems.

The two strategies can also be implemented at different scales: the first concerns the broad scale of national and supranational policies and that of individual behaviour. The second, on the other hand, relates to intermediate scales, at which territorial governance policies are implemented, corresponding, therefore, to the possibilities offered by regional planning and territorial governance tools in general.

There are also many international and national initiatives that have emerged as tools for a conscious and constructive response to the alarm that has been sounded for years regarding climate change and the limitation of energy resources, aspects that are leading to significant changes in business strategies and policies. The tools developed include several international standards (UNI standards) that outline the rules and support companies and organisations focused on sustainable development and growth programmes and committed to reporting, monitoring and reducing greenhouse gas emissions emitted as part of their processes and services or related to the life cycle of their products.

Inspired by shared calculation rules, this document presents the protocol to illustrate the methodology for calculating CO_{2eq} emissions related to the racing phases for driving events organised and managed by Canossa Events S.r.l. It demonstrates the organisation's commitment to tracking and subsequently offsetting its own impacts.

The protocol describes the boundaries of the system and, for each event for which a calculation of climate-altering emissions will need to be developed, illustrates the type of data to be collected and how it will be collected, and finally, identifies the emission factors and the relevant databases used for the calculations.

3 SYSTEM BOUNDARIES

The calculation of emission contributions produced by events **relates exclusively to direct emissions related to the motoring event in the strict sense**, i.e. the **racing phase**. This phase, to summarise, consists of laps/courses of a known length, previously calculated at the event organisation stage, which are raced by a certain number and type of cars, which may be classic, sports or other staff and support cars.

4 INPUT DATA

Given the boundaries of the system as defined above, which represent the limits of the calculation of emissions produced, the following information is collected for each event subject to reporting during the phases preceding the race.

The data, organized into points, is collected in "standardised forms" as shown in the example below.

Data collection sheet:

Event:		
1	**Dates:**	
2.1	**Route in total km** For competing cars	
2.2	**Route in total km** For staff cars	
3.1	**No. of historic cars in the race**	
3.2	**No. of other cars in the race**	
3.3	**No. of accompanying cars (staff, crew, etc.)**	
4.1	**Type of cars in the race** *(historic, sports, etc.)*	
4.2	**Type of other accompanying cars** *(fuel type and EURO standard)*	

In the post-race phases, the above data is subsequently verified, highlighting any variations compared to the previously indicated values.

5 EMISSION FACTORS

Once data has been obtained on

- Number and type of cars involved in the event
- Length of the route (in km)

the CO_2 emissions related to the traffic component must be calculated. This will be done using the emission parameters provided by the ISPRA SINANET database. The database of average emission factors related to road transport proposed by ISPRA (Italian Institute for Environmental Protection and Research) is based on the estimates made in order to draw up the national inventory of atmospheric emissions reported in 2022. This is produced annually by ISPRA as a tool for verifying the commitments undertaken at international level on the protection of the atmospheric environment, such as the Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, the Geneva Convention on Transboundary Air Pollution (UNECE- CLRTAP), and the European Directives on the limitation of emissions.

The methodology developed and applied to the estimation of air pollutant emissions is based on the EMEP/EEA *air pollutant emission inventory guidebook 201*9 and is consistent with the IPCC Guidelines for greenhouse gases 2006 .

The calculation of emission parameters uses the COPERT version 5.5.1model, software whose development is coordinated by the European Environment Agency, as part of the activities of the *European Topic Centre for Air Pollution and Climate Change Mitigation*.

The estimates were calculated on the basis of national input data on vehicle fleets and circulation (fleet size, average mileage and fuel consumption, speed per vehicle category with reference to urban, extra-urban and motorway driving cycles, other specific national parameters).

The methodology proposed here identifies the following parameters as the most representative emission factors for the specific cases and types of vehicles under consideration:

Type of vehicle in the event	**Emission factor - ISPRA_SINANET 2020**	
	Type (from database)	*CO_2 emission parameter (g/km)*
Historic cars	*Passenger Car, Petrol, Large-SUV, PRE-ECE*	322.113711
Sports cars	*Passenger Car, Petrol, Large-SUV, Euro 5*	342.619096
Staff/support cars (D)	*Passenger Car, Diesel, Medium, Euro 6*	150.060719
Staff/support car (B)	*Passenger Car, Petrol, Medium, Euro 6*	193.335179

6 CALCULATION, REPORTING AND PRESENTATION OF RESULTS

In relation to the input data collected in the pre-race phase, multiplying the number of vehicles involved (values in 3.1, 3.2 and 3.3), broken down by class/type (values in 4.1 and 4.2) and by kilometres travelled (values in 2.1 and 2.2) will result in an overall balance of the quantities (expressed in kg or t) of CO_2 emitted in the racing phases under consideration for the event in question.

This balance will be provided to the organiser Canossa Events S.r.l., who will be able to publicise the calculation of the CO_2 emitted during the racing phases for the specific event, developed using the methodology described in this protocol.

In the post-race phase, it will be the responsibility of the organiser Canossa Events S.r.l. to verify, ex-post, the validity of the input data used by comparing them with the actual data. If there are any variations, the CO_2balance will be updated.

For communication purposes, the CO_2 balance calculated with this methodology can be presented in the following form: