Supplementary material

Table S1: List of countries (sea regions) included in the COVID-19 emission adjustment factors per GNFR sector

Sector	Description	Countries included
GNFR_A	Energy industry	30: Austria, Belgium, Bulgaria, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Latvia, Netherlands, Norway, Poland, Portugal, Romania, Russia, Sweden, Switzerland, Slovakia, Slovenia, Turkey, Ukraine
GNFR_B	Manufacturing industry	32: Austria, Bosnia and Herzegovina, Belgium, Bulgaria, Switzerland, Czech Republic, Cyprus, Germany, Denmark, Estonia, Spain, France, Finland, United Kingdom, Greece, Croatia, Hungary, Italy, Lithuania, Latvia, Malta, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Sweden, Slovakia, Slovenia, Turkey
GNFR_C	Other stationary combustion activities	35: Austria, Bosnia and Herzegovina, Belgium, Bulgaria, Czech Republic, Switzerland, Germany, Denmark, Estonia, Spain, France, Finland, United Kingdom, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Latvia, Luxembourg, Malta, Moldova, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Russia, Sweden, Slovakia, Slovenia, Turkey, Ukraine
GNFR_D	Fugitive emissions from fossil fuels	32: Austria, Bosnia and Herzegovina, Belgium, Bulgaria, Switzerland, Czech Republic, Cyprus, Germany, Denmark, Estonia, Spain, France, Finland, United Kingdom, Greece, Croatia, Hungary, Italy, Lithuania, Latvia, Malta, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Sweden, Slovakia, Slovenia, Turkey
GNFR_E	Solvents	23: Austria, Belgium, Bulgaria, Czech Republic, Germany, Denmark, Estonia, Spain, France, Finland, United Kingdom, Greece, Hungary, Italy, Lithuania, Latvia, Netherlands, Norway, Poland, Portugal, Romania, Sweden, Turkey
GNFR_F1 GNFR_F2 GNFR_F3 GNFR_F4	Road Transport	36: Austria, Bosnia and Herzegovina, Belgium, Belarus, Bulgaria, Czech Republic, Switzerland, Germany, Denmark, Estonia, Spain, France, Finland, United Kingdom, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Latvia, Luxembourg, Malta, Moldova, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Russia, Sweden, Slovakia, Slovenia, Turkey, Ukraine
GNFR_G	Shipping	Atlantic Ocean, Baltic Sea, Black Sea, Caspian Sea, English Channel, Greenland Sea, Irish Sea, Kara Sea, Mediterranean Sea, North Sea, Norwegian Sea
GNFR_H	Aviation	39: Albania, Armenia, Austria, Bosnia and Herzegovina, Belgium, Bulgaria, Switzerland, Cyprus, Czech Republic, Denmark, Germany, Estonia, Spain, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Italy, Latvia, Luxembourg, Lithuania, Malta, Morocco, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Sweden, Slovakia, Turkey, Ukraine
GNFR_I	Off-road transport	32: Austria, Bosnia and Herzegovina, Belgium, Bulgaria, Switzerland, Czech Republic, Cyprus, Germany, Denmark, Estonia, Spain, France, Finland, United Kingdom, Greece, Croatia, Hungary, Italy, Lithuania, Latvia, Malta, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Sweden, Slovakia, Slovenia, Turkey

Table S2: Energy consumption by subsectors of the Spanish commercial/institutional sector (IDAE, 2018) and estimated changes in the energy demand due to the COVID-19 restrictions.

	Fossil fuel + biomass consumption (ktep)	**Fossil fuel + biomass consumption (%)**	**Change due to COVID-19 restrictions**	**Change in consumption (%)**
Workplaces	977	26.5%	-80%	-21.2%
Hospitals	428	11.6%	50%	5.8%
Commercial buildings	1509	40.9%	-80%	-32.8%
Restaurants and hotels	160	4.3%	-90%	-3.9%
Schools and universities	287	7.8%	-100%	-7.8%
Other buildings	325	8.8%	-80%	-7.0%
Overall change in fossil fuel + biomass consumption due to COVID-19				**-66.9%**

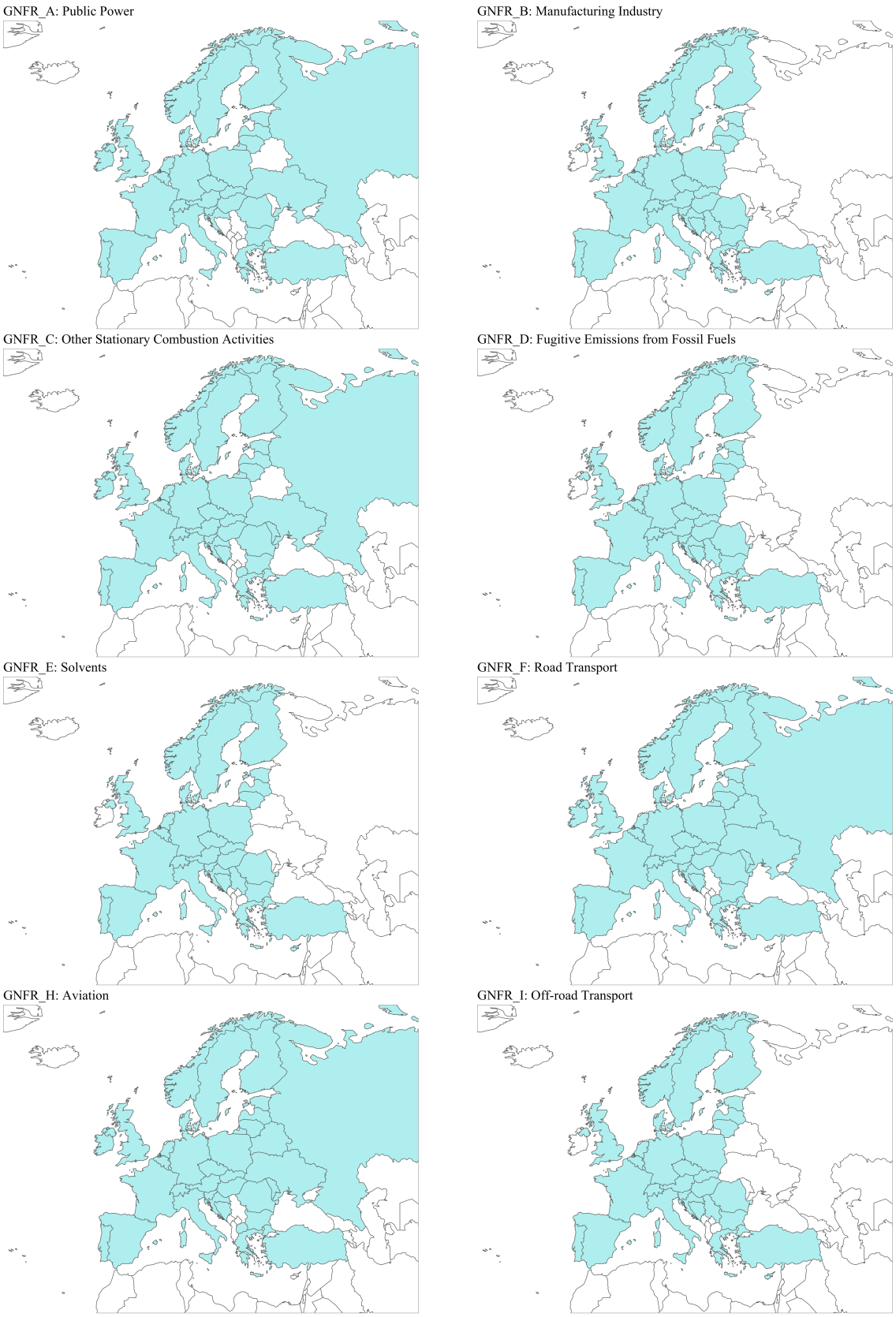

Figure S1: Spatial coverage of the COVID-19 emission adjustment factors constructed for each GNFR sector. Countries included in the database are highlighted in light turquoise

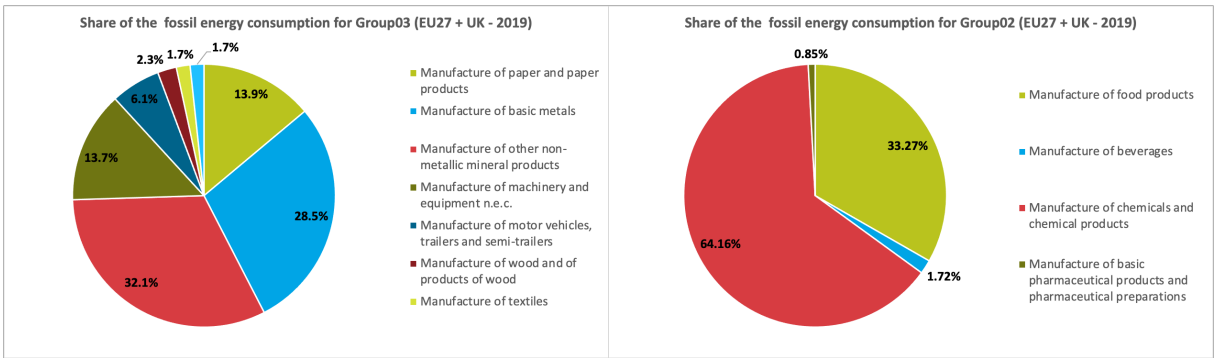

Figure S2: Relative fossil energy consumption in the GNFR_B3 - Manufacture of other products (left) and GNFR_B2 - Manufacture of pharmaceutical, chemistry, food and beverages products – (right) manufacturing industry subcategories per industrial branch in the EU27 + UK during 2019 (Eurostat, 2021).

Figure S3: Weekly (UK) and monthly (Denmark, Spain, Norway) changes in traffic activity (orange line) and petrol sales (blue line) due to COVID-19 restrictions during 2020. Correlation between the two parameters is represented with the Pearson correlation coefficient (PCC).

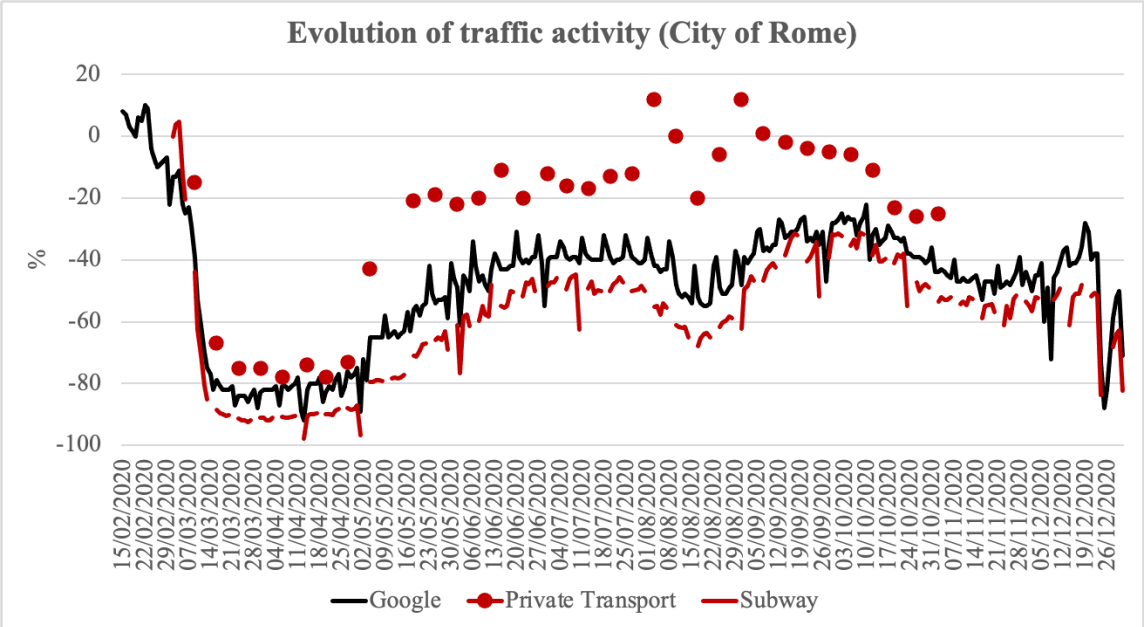

Figure S4: Comparison of Google LCC (2021) traffic movement trends with the evolution of the private transport and access to subway reported by Roma Mobilita (2021) for the city of Rome and the period 21 February to 31 December 2020.

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