



GLOBAL ENVIRONMENT FACILITY
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2017 GHG EMISSIONS FROM TOURISM IN MONTENEGRO

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Acronyms

CH ₄	Methane
CO ₂ e	CO ₂ -equivalents
CO ₂	Carbon dioxide
HFC	Hydrofluorocarbon
GDP	Gross domestic product
GEF	Global Environment Facility
GHG	Greenhouse effect gas
GWP	Global warming potential
IPCC	Intergovernmental Panel on Climate Change
MSW	Municipal solid waste
NIR	National Inventory Report
N ₂ O	Nitrous oxide
TCNTM	Towards a Carbon Neutral Tourism in Montenegro
UNDP	United Nations Development Programme
UNWTO	United Nations World Tourism Organization

1. PRESENTATION

In recent years, Montenegro's tourism sector has experienced a rapid development with an increase in the number of visitors and investments, becoming the main and most dynamic economic sector. As a major contributor to the country's gross domestic product (GDP), is one of the strategic drivers of economic growth. However, in the business-as-usual scenario, tourism sector's greenhouse effect gases (GHGs) emissions will rise by 40% in 2020 above 1990 baseline. As a result of this state of affairs, Montenegro's government has decided to curb the sector's emissions and seek its low carbon development.

In this context, Montenegro's Ministry of Sustainable Development and Tourism and the United Nations Development Programme (UNDP) launched the "Towards Carbon Neutral Tourism in Montenegro" (TCNTM) project, with the immediate target of maintaining tourism sector related GHG emissions at the 2014 level. In order to assess the effectiveness of the measures implemented under the project TCNTM's scope of action, 2014 baseline emissions of GHGs from the tourism sector of Montenegro was calculated.

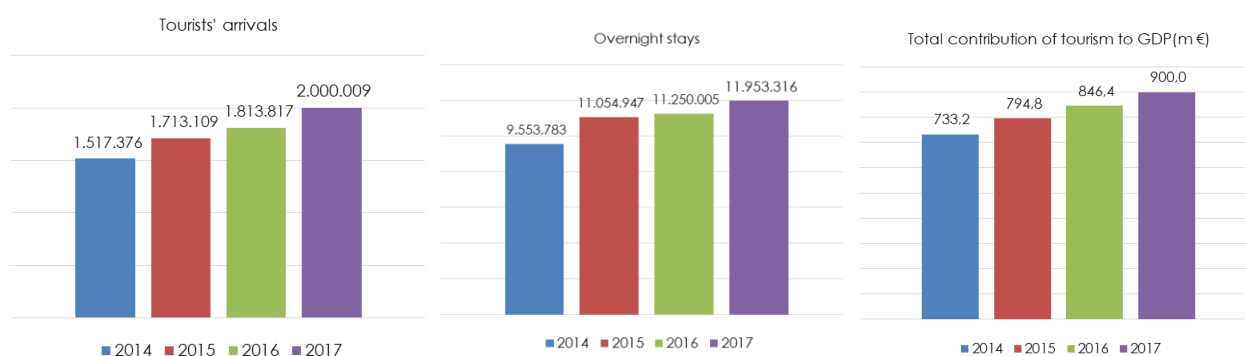
The main goal of this Report is to present the emissions of greenhouse effect gases (GHGs) from tourism in Montenegro during the year 2017.

2. 2017 TOURISM IN MONTENEGRO

Montenegro registered 2.000.009 tourists' arrivals during 2017, representing an increase of 10,3 % in relation of previous year. The total overnight stays of tourists accounted for 11.953.516 nights, 6,2 % more than in 2017 (MONSTAT, 2018).

The total contribution of tourism to the national GDP was estimated in 900 million € (21 % of total GDP), 4,1 % more than in 2016 (World Travel & Tourism Council, 2018).

Figure 1: Main tourism figures for 2017

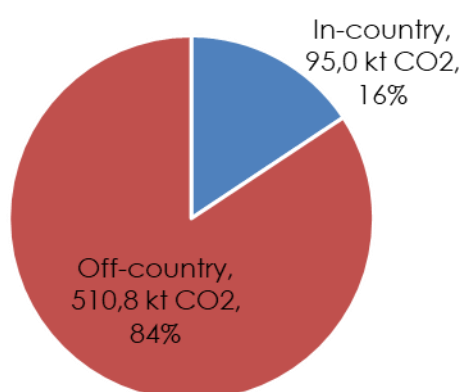


3. GHG EMISSIONS FROM TOURISM

3.1. Global emissions

The total emissions from tourism in Montenegro in year 2017 were **605.857,5 kt CO₂e**. The majority of these emissions (**510.814 kt CO₂e**; 84 % of the total) took place out of the country, in the transportation of foreign tourists from their countries of origin to Montenegro. The rest (**95.043,7 kt CO₂e**; 16 % of the total) was country-based and had its source in the touristic activities, transportation and waste management within Montenegro.

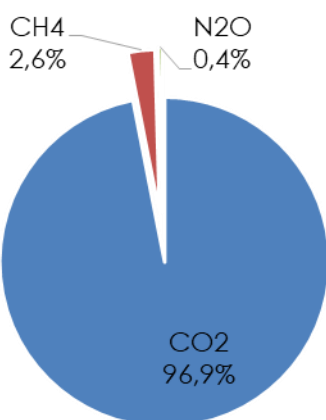
Figure 2: Total emissions by geographical distribution



Total emissions (kt CO₂e, including memo items)

In terms of type of GHG, 2017 emissions were 587.1 kt CO₂, 639,9 t CH₄ (16,0 kt CO₂e) and 9,1 t N₂O (2.72 kt CO₂e). Considering each GHG global warming potential (GWP), CO₂ emissions were 97 % of the total emissions, while CH₄ and N₂O had a 2,6% and 0,4 % share of the total, respectively.

Figure 3: Total emissions by type of GHG



Total emissions by GHG (including memo items)

2017 GHG EMISSIONS FROM TOURISM

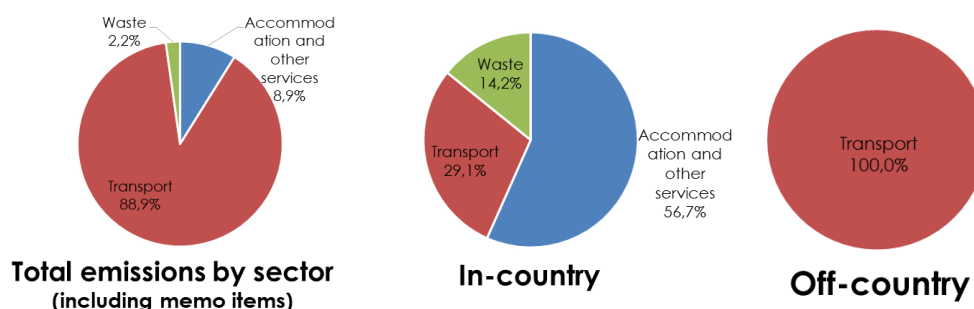
The tourist emissions by sector were as follows:

Table 1. 2016 emissions by sector

Sector	† CO ₂	† CH ₄	† N ₂ O	kt CO ₂ e
Accommodation and other services	51.466,1	75,7	1,7	53,9
Transport	535.670,6	51,3	5,2	538,5
Waste	-	513,0	2,3	13,5
Total	587.136,7	639,9	9,1	605.857,5

Of the total emissions, emissions from transport contributed to 88,9 % of the total, while accommodation and other services to 8,9 % and waste to 2,2 % respectively.

Figure 4: Emissions by sector



In the case of in-country emissions, accommodation and other services contributed to 56,7 %, in-country transport to 29,1 %, and waste to 14,2 % of the total. All off-country emissions were sourced from transport.

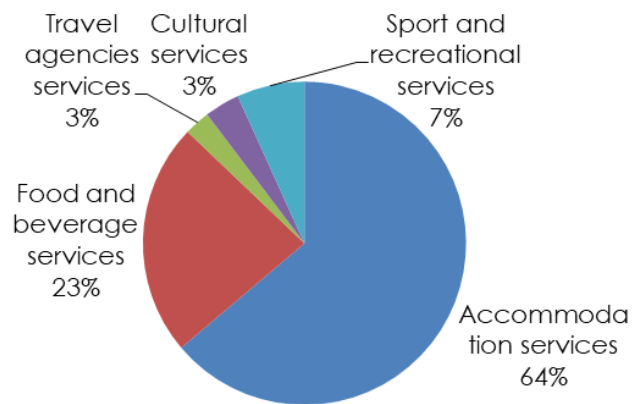
3.2. Accommodation and other services

The emissions from accommodation and other services for tourists in the year 2017 were as shown in following table:

Table 2. Emissions from Accommodation and other services

Emissions summary (t)	CO ₂	CH ₄	N ₂ O	CO ₂ e
Accommodation services	32.234,5	69,3	1,4	34.373
Food and beverage services	12.384,9	4,1	0,2	12.552
Travel agencies services	1.370,2	0,5	0,0	1.389
Cultural services	1.870,5	0,6	0,0	1.896
Sport and recreational services	3.605,9	1,2	0,1	3.655
Total	51.466,1	75,7	1,7	53.864

Figure 5: Source of emissions from accommodation and other services



Emissions from Accommodation and other services

All emissions from accommodation and other services took place in-country and were originated directly by the consumption of fuels or indirectly by the consumption of electricity.

2017 GHG EMISSIONS FROM TOURISM

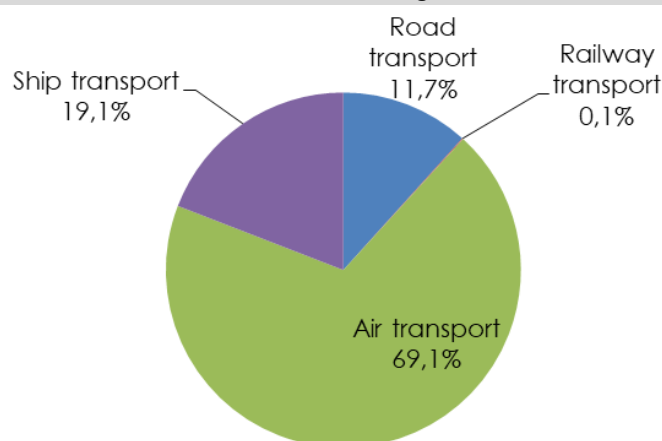
3.3. Transport

Emissions from transport of tourists were as follows:

Table 3. Emissions from Transport

Emissions summary (t)	CO ₂	CH ₄	N ₂ O	CO ₂ e
In-country road transport	19.222,3	2,8	0,2	19.342,8
In-country railway transport	240,8	0,02	0,00	242,4
Air transport (airports)	1.842,4	0,2	0,0	1.855,3
Ship transport	6.188,5	1,1	0,1	6.233,8
Cruises at berth	5.975,1	0,9	0,1	6.012,4
Inland navigation	213,5	0,3	0,0	221,4
Total	27.494,0	4,2	0,3	27.674,3
Memo items				
Off-country road transport	43.356,7	6,3	0,4	43.627,5
Off-country rail transport	84,9	0,1	0,6	251,7
Air transport (international flights)	368.599,2	26,7	3,1	370.198,1
Maritime navigation	96.135,8	14,0	0,8	96.736,6
Total (including memo items)	535.670,6	51,3	5,2	538,5

Figure 6: Source of emissions from transport

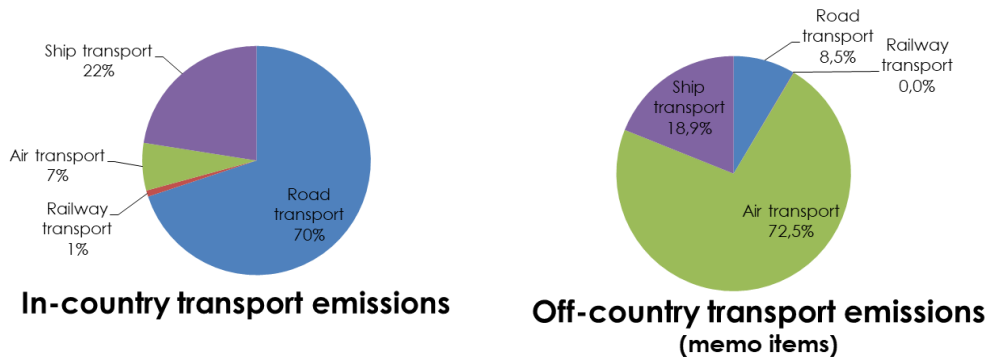


Total emissions from transport (including memo items)

The majority of transport emissions were originated by air transport, followed by ship, road and railway transport. If in- and off-country emissions are analysed separately, the contribution of each type of transport was as follows:

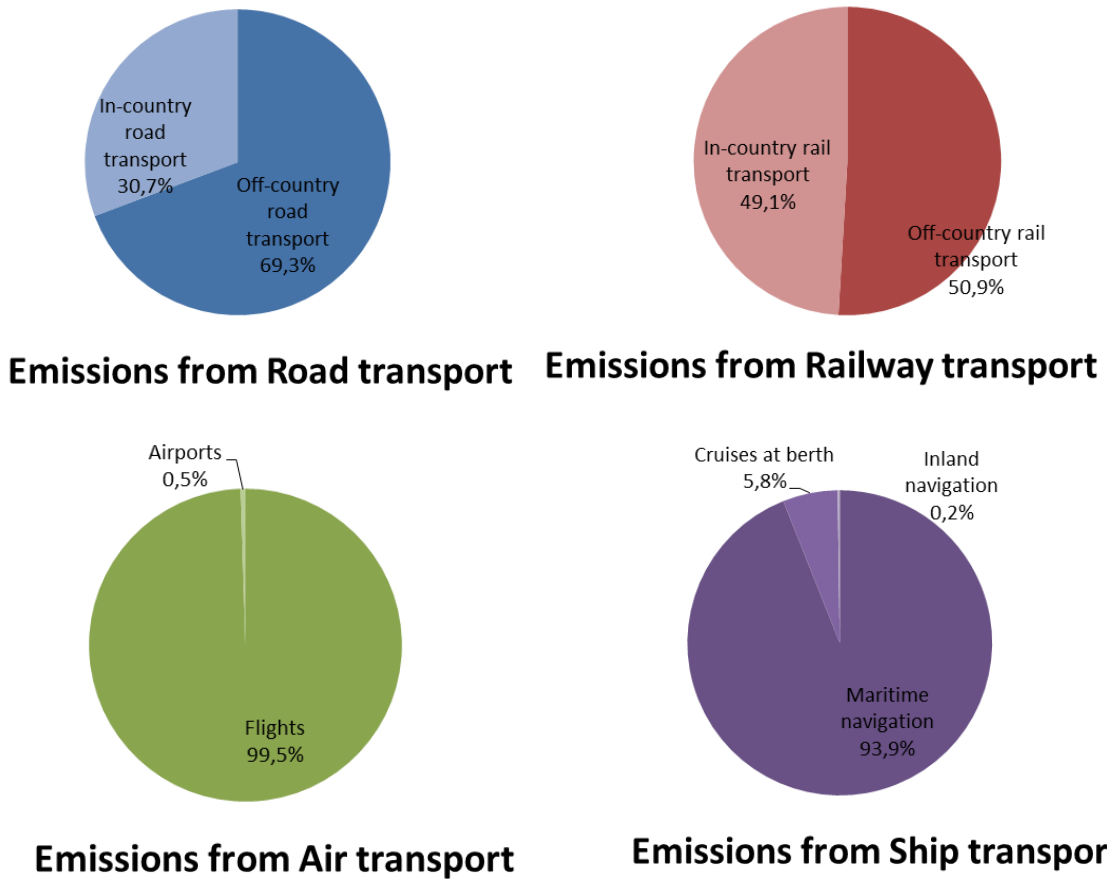
Figure 7: Source of emissions from transport by geographical distribution

2017 GHG EMISSIONS FROM TOURISM



The emissions analysed by type of transport were:

Figure 8: Emissions by transport type



These emissions were originated by the consumption of fuels by vehicles, planes and ships, as well as electricity in the case of trains. Additionally, emissions originated by other activities related to transport are taken into account: fuel and electricity consumed by land activities and airports facilities and fuel consumed by cruises at berth in ports.

2017 GHG EMISSIONS FROM TOURISM

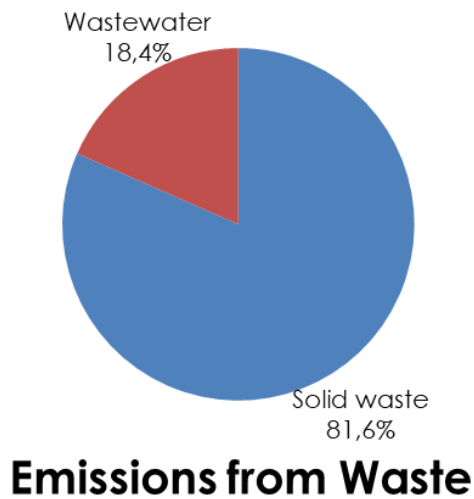
3.4. Waste

The emissions from the management of waste generated by tourists in the year 2017 were as shown in following table:

Table 4. Emissions from Waste

Emissions summary (t)	CO ₂	CH ₄	N ₂ O	CO ₂ e
Solid waste	-	440,7	-	11.017,3
Wastewater	-	72,3	2,3	2.487,8
Total	-	513,0	2,3	13.505,1

Figure 9: Source of emissions from waste



All emissions from waste took place in-country and were originated by the decomposition of the waste (solid or liquid) generated by tourists.

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3.5. Main indicators

In the following table, the most relevant indicators of 2017 emissions from tourism in Montenegro are shown:

Table 5. Main indicators of tourism GHG emissions

Indicator	Unit	Value
Total average emission per tourist arrival (including memo items)	kg CO ₂ e/tourist arrival	302,9
Total average emission per tourist arrival (excluding memo items)	kg CO ₂ e/tourist arrival	47,5
Total average emission per overnight stay (including memo items)	kg CO ₂ e/overnight stay	50,7
Total average emission per overnight stay (excluding memo items)	kg CO ₂ e/overnight stay	8,0
Average emission per overnight stay (excluding in- and off-country transport)	kg CO ₂ e/overnight stay	5,6
Accommodation and other services emissions per overnight stay	kg CO ₂ e/overnight stay	4,5
Accommodation emissions per overnight stay (excluding other services)	kg CO ₂ e/overnight stay	2,9
Accommodation and other services emissions per tourist arrival	kg CO ₂ e/tourist arrival	26,9
Off-country transport emissions per foreign tourist arrival	kg CO ₂ e/foreign tourist arrival	272,1
In-country transport emissions per tourist	kg CO ₂ e/tourist arrival	13,8
Waste emissions per tourist arrival	kg CO ₂ e/tourist arrival	6,8

4. EVOLUTION OF EMISSIONS

The following table shows the GHG emissions from tourism since the year 2014, which has been established as Baseline year¹.

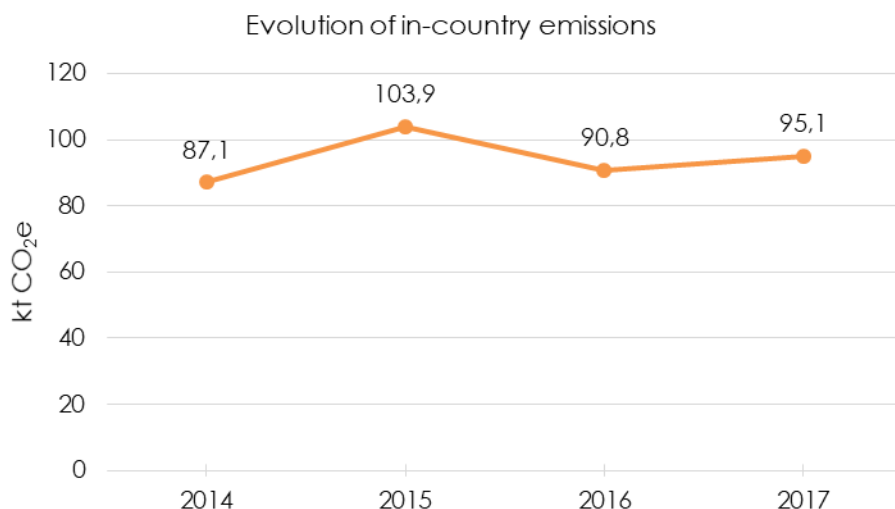
Table 6. Comparison of emissions since 2014

Emissions (t CO ₂ e)	Baseline (2014)	2015	2016	2017	Variation (2017 vs 2016)
Accommodation and other services	50.872,9	62.363,3	49.848,2	53.864,2	8%
Transport	24.514,2	27.926,3	27.305,9	27.674,3	1%
Road transport	17.188,2	18.629,9	18.343,3	19.342,8	5%
In-country road transport	17.188,2	18.629,9	18.343,3	19.342,8	5%
Railway transport	503,7	573,7	241,1	242,4	1%
In-country rail transport	503,7	573,7	241,1	242,4	1%
Air transport	1.973,6	2.407,2	1.781,8	1.855,3	4%
Airports	1.973,6	2.407,2	1.781,8	1.855,3	4%
Ship transport	4.848,7	6.315,5	6.939,7	6.233,8	-10%
Cruises at berth	4.372,9	5.874,5	6.711,5	6.012,4	-10%
Inland navigation	475,8	441,0	228,2	221,4	-3%
Waste	11.692,5	13.602,4	13.675,9	13.505,1	-1%
Solid waste	9.704,0	11.301,5	11.334,4	11.017,3	-3%
Wastewater	1.988,4	2.300,9	2.341,5	2.487,8	6%
Total	87.079,6	103.892,0	90.830,0	95.043,7	5%
Memo items					
Off-country road transport	28.676,2	34.238,7	32.812,0	43.627,5	33%
Off-country rail transport	199,3	259,2	192,9	251,7	30%
Flights	313.080,1	311.063,2	331.171,7	370.198,1	12%
Maritime navigation	55.717,0	79.383,5	95.096,1	96.736,6	2%
Total (including memo items)	484.752,2	528.836,6	550.102,8	605.857,5	10%

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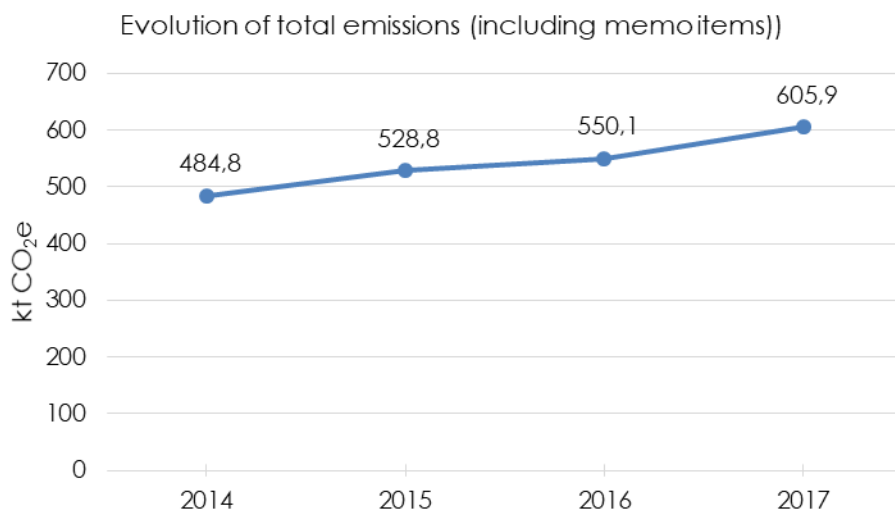
The following figure shows the evolution of in-country emissions.

Figure 10: Evolution of in-country emissions



Next figures presents the evolution of total emissions, including memo items (i.e. off-country emissions).

Figure 11: Evolution of total emissions (including memo items)



Total GHG emissions from tourism sector in Montenegro in 2017 are 605.8 kt CO₂e. vast majority of these emissions (510.814 ktCO₂e; 84%) originated from transport for the tourists coming to Montenegro. Total of 95 ktCO₂e or 16% are GHG emissions originated in country from different tourism activities: accommodation, in country transport and waste management. Variations 2016 – 2017 are +5% for in country emissions and 10% for off country emissions.

The rationale behind emissions increase is permanent tourism growth – increase of main parameters, i.e. tourism arrivals, overnight stays and share of tourism in total GDP. Emissions from accommodation sector exceeded 50%, confirming high mitigation potential. One-

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third of total in country emissions are from transport. Based on the established trends from 2014, TCNT Project defined public calls for investment co-financing for hotels and non-motorized transport in order to sustain Montenegrin tourism sector carbon footprint.