

# CARBON FOOTPRINT REPORT 2020



**IROTA ECOLODGE**

## About Irota EcoLodge

Irota EcoLodge is a small-scale sustainable holiday resort in Northern Hungary, consisting of three holiday homes and a biological swimming pool. The resort opened on the 7<sup>th</sup> of July 2016 and has operated now for almost five years.

It is our vision that luxury and a sustainable way of life go well together and with Irota EcoLodge we set a leading sustainable example in the hospitality industry<sup>1</sup>.



*Picture 1: Terrace of the Upper House*

## Why this report?

A sustainable way of living means organizing human life such a way that the planet can sustain all human activities indefinitely. To achieve sustainability, 17 Sustainable Development Goals (SDG) have been defined<sup>2</sup>. In this report, we focus on two goals: Combat Climate Change and Clean Water and Sanitation.

Scientists agree that the global temperature rise should not rise with more than 2 degrees. This 2-degree scenario is the maximum possible increase in temperature to

<sup>1</sup> For an overview of all our sustainable features, see <http://www.irotaecolodge.com/en/econess.html>

<sup>2</sup> <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>



avoid the most catastrophic effects of climate change. The Paris Climate Agreement, which was based on this scenario, requires a 50-80% global emissions reduction by 2050 from 2010 levels.

The hospitality industry already accounts for around 1% of global emissions and this is set to increase as the hospitality industry continues to grow. The International Tourism Partnership, a platform for hotel industry leaders to work collaboratively to make this one of the world's most responsible industries, has set a carbon reduction goal for its members. The goal is to reduce their absolute carbon emissions by 66% by 2030 and by 90% by 2050, against a 2010 baseline, to fully play their part in mitigating global warming<sup>3</sup>.



*Picture 2: Natural and chemical-free pool*

The World Green Building Council, a network of professionals in the building industry who are committed to the environment, has set a similar target in the Advancing Net Zero Project: by 2030 all new buildings should operate at net zero

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<sup>3</sup> <https://www.tourismpartnership.org/blog/itp-carbon-report-provides-hotel-sectors-goal-mitigate-climate-change/>

carbon emissions and by 2050 all existing and new buildings should operate at net zero<sup>4</sup>.

At Irota EcoLodge we took it a step further: We did not want to wait until 2030, but instead aimed at being net zero carbon *already in 2016*. And not only for our buildings, but for *our company as a whole*! To support this carbon-neutrality claim, Irota EcoLodge will publish a carbon footprint report yearly. The first report covered 2016 and this report contains the fifth calculation covering 2020.

Irota EcoLodge can claim to be the first and so far only carbon-neutral holiday accommodation in Hungary<sup>5</sup>, and probably in the wider region as well.



*Picture 3: 6.56 kWp photovoltaic solar system (right) and solar collectors (left) at Irota EcoLodge Middle House.*

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<sup>4</sup> <http://www.worldgbc.org/news-media/thousands-billions-coordinated-action-towards-100-net-zero-carbon-buildings-2050>

<sup>5</sup> According to the Hungarian Hotel & Restaurant Association.



## Carbon emissions sources

Carbon neutrality, or having a net zero carbon footprint, refers to achieving net zero carbon emissions by balancing a measured amount of carbon released with an equivalent amount sequestered or offset, or buying enough carbon credits to make up the difference<sup>6</sup>.

Irota EcoLodge consists of three physical locations: First, Irota EcoLodge itself with the three holiday homes (Lower, Middle and Upper House) and a swimming pool. The second location is the utility building in Irota where bed linen is washed and stored. On the same plot a cottage is located with a kitchen, living room and bathroom. The third location is the Budapest City Apartment: this apartment is offered in a package deal to guests of Irota EcoLodge, but also rented out separately through platforms like AirBNB. A fourth 'location' are transport fuels for three company cars.



*Picture 4: Washing machine using rain water and extract of washing nuts as detergent.*

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<sup>6</sup> [https://en.wikipedia.org/wiki/Carbon\\_neutrality](https://en.wikipedia.org/wiki/Carbon_neutrality), accessed on 23 May 2017.

The following 14 sources<sup>7</sup> of carbon emissions were identified at these four locations:

Irota EcoLodge:

1. Emissions as a result of electricity being consumed in the houses.
2. Offset emissions as a result of electricity being generated by the solar panels on the roof of the Middle House. As solar panels generate emission-free electricity, feeding this electricity into the holiday homes or into the grid results in less emission by power plants connected to the electricity grid.
3. Each house has a cooking stove using propane/butane gas supplied in gas cylinders. These on-site emissions occur by burning of this gas in the stove.
4. Petrol is used to fuel garden tools to maintain the premises at Irota EcoLodge. Also, chain saws are used to cut firewood.

Utility building and Cottage:

5. Emissions as a result of electricity being consumed, mainly by the washing machine.
6. Offset emissions as a result of electricity being generated by the solar panels on the roof of the utility building. As solar panels generate emission-free electricity, feeding this electricity to the utility building and into the grid result in less emission by power plants connected to the electricity grid.
7. The cottage has a cooking stove using propane/butane gas supplied in gas cylinders. These on-site emissions occur by burning of this gas in the stove.

Budapest City Apartment:

8. Emissions as a result of electricity being consumed. These emissions occur not on-site, but off-site at power plants feeding into the electricity grid.
9. The building, in which the apartment is located, has a central heating system fuelled by natural gas. Individual heat meters are installed in each apartment, so that the total gas consumption for heat generation can be attributed to each individual unit.
10. The building in which the apartment is located, has a central cooling system powered by electricity. Individual cool meters are installed in each apartment so that the total electricity consumption for cooling can be attributed to each individual unit.
11. Hot water is also centrally generated using natural gas. Individual water meters are installed in each apartment, so that the total gas consumption for hot water product can be attributed to each individual unit.

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<sup>7</sup> These sources cover all direct emissions (Scope 1) and indirect emissions (Scope 2) resulting from energy supplies like electricity, heating and cooling.

Transport:

12. A new company car, delivered in august 2019, is an Electrical Vehicle (EV) using electricity
13. The old company car using diesel.
14. A third car using petrol.

The above mentioned electrical and diesel car and the garden tools are used both for business and private use. Therefore it is not possible to determine precisely which part of the emissions should be assigned for business use. As an estimated guess, 50% of the emissions have been assigned to business purpose. The third car using petrol is exclusively used for business purpose.

The following emission sources have not been taken into account:

15. Heating of the houses occurs with firewood. The firewood is sourced locally from the surrounding forests. As these forests are replanted, the occurring carbon dioxide emission will be absorbed when new tree grow (short-cycle carbon emissions). In accordance with carbon accounting practise, these emission can be set at zero.
16. Another source of carbon emission is the usage of charcoal or firewood in the outdoor kitchens. Similarly, these are short-cycle carbon emissions and can be set zero.



*Picture 4: Waster water treatment and rainwater storage.*



## Calculations

To calculate carbon emissions, the Carbon Emission Factors (CEF) that have been used are listed in Table 1.

Electricity <sup>8</sup>	0.285 kgCO <sub>2</sub> /kWh
Propane	3.00 kgCO <sub>2</sub> /kg
Natural gas	56.1 kgCO <sub>2</sub> /GJ
Diesel	2.58 kgCO <sub>2</sub> /litre
Petrol	2.30 kgCO <sub>2</sub> /litre

*Table 1: Carbon Emission Factors*

Location and source	quantity unit	CEF	kgCO <sub>2</sub>
<b>Irota EcoLodge</b>			
1 Generated electricity	7 012 kWh	-0.285	-1 998
2 Consumed electricity	3 392 kWh	0.285	967
3 Cooking	28,1 kg	3.00	84
4 Petrol for garden tools	94 l	2.30	215
<b>Utility building</b>			
5 Generated electricity	5 355 kWh	-0.285	-1 526
6 Consumed electricity	576 kWh	0.285	164
7 Cooking	0,0 kg	3.00	0
<b>Budapest City Apartment</b>			
8 Electricity consumption of appliances	307 kWh	0.285	88
9 Gas consumption for heating	6,9 GJ	56.1	387
10 Electricity consumption for cooling	36 kWh	0.285	10
11 Gas consumption for hot water	1,0 GJ	56.1	58
<b>Transport</b>			
12 Electricity for electric car	1 197 kWh	0.285	341
13 Diesel for car	62 l	2.58	159
14 Petrol for car	28 l	2.30	64
<b>Total</b>			<b>-987</b>

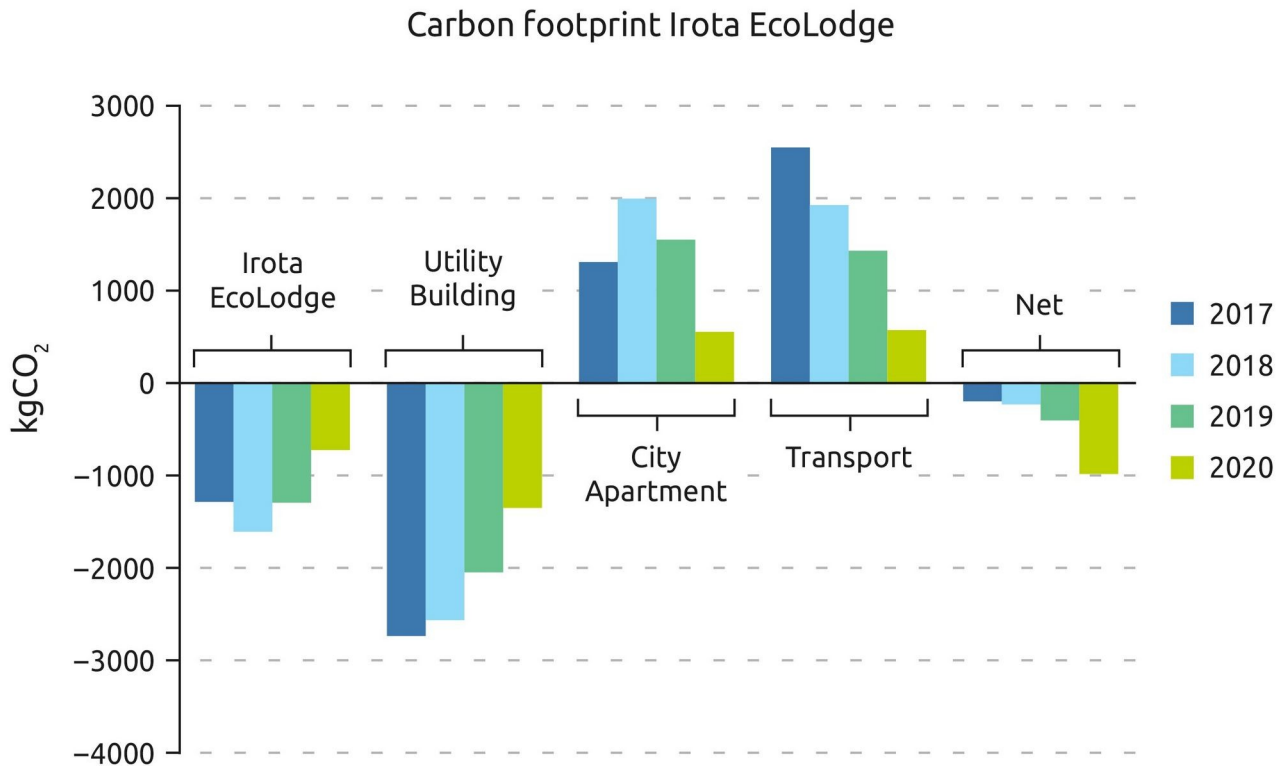
*Table 2: Calculation of carbon emissions*

<sup>8</sup> Hungarian CEF logged from [api.electricitymap.org](https://api.electricitymap.org) (includes import) increased with 12.4% Transmission and Distribution losses (<https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?end=2014&start=1960&view=chart> )



## Result

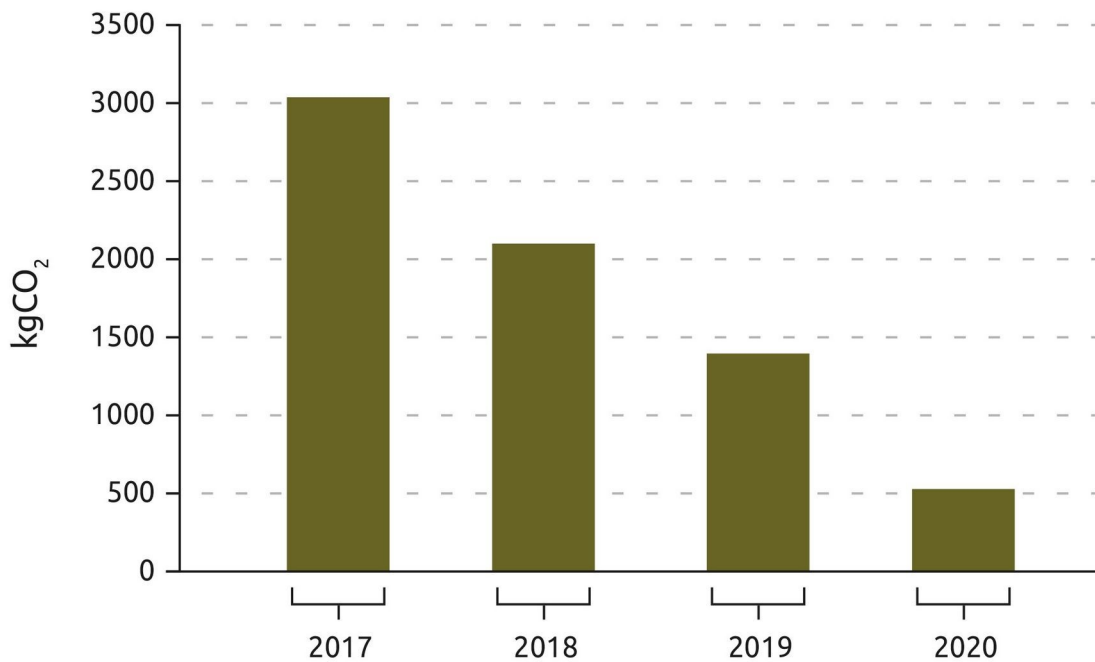
The net carbon emissions in the fifth year of operation amount to -987 kgCO<sub>2</sub>. This proves that Irota EcoLodge remains a carbon-neutral resort. Even more some, net carbon emission went significantly into the negative so Irota EcoLodge is offsetting more emissions than it emits!



*Graph 1: Overview of emissions per location.*

This significant decrease has two causes: The COVID-19 crisis did not reduce occupancy at Irota EcoLodge, but did significantly slash occupancy at our Budapest City Apartment. This is a temporary effect. The second cause is the switch to electric driving in summer 2019 leading to a significant reduction in fossil fuels consumed for the first full year of operation in 2020. This can also be seen in the following graph showing direct emissions of all fossil fuels.

### Direct emissions Irota EcoLodge



*Graph 2: Direct emissions caused by fossil fuels.*

### **Non-carbon related measure: water savings**

Irota EcoLodge has been designed to maximally reduce the environmental footprint. One of the measures taken is collection and usage of rain water for washing the bed linen, flush the toilets and replenish the swimming pool. A total of 194 m<sup>3</sup> of water was consumed in 2020, of which 115 m<sup>3</sup> was drinking (tap) water and 79 m<sup>3</sup> rain water. Hence, by means of collecting rain water, 41% of drinking water was saved in 2020.

### **Future plans**

In 2020 we installed three charging stations<sup>9</sup> – powered by electricity from our solar panels – for electric cars at each of the three holiday homes. This will help to reduce travel related emission of our guests.

In the future we want to bring fossil fuel emissions to zero. This will mean switching garden equipment to electric equipment, supplying the cooking stoves with biogas and phasing out the two fossil fuelled company cars.

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<sup>9</sup><https://www.plugshare.com/location/215468>



*Picture 5: Company car being charged at charging station.*

Irota, 24 March 2021

For further information please contact:

Lennard de Klerk

E-mail: [lennard@irotaecolodge.com](mailto:lennard@irotaecolodge.com)

Web: [irotaecolodge.com](http://irotaecolodge.com)

Facebook: [fb.com/irotaecolodge](https://fb.com/irotaecolodge)

Tel.: +36 30 3662983