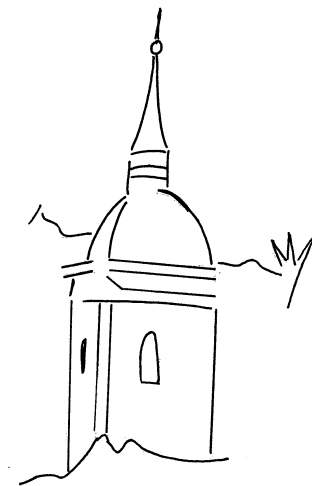


# CARBON FOOTPRINT REPORT 2019



**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 more than 3.5 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 no rise with more than 2 degrees. This 2-degree scenario is the maximum possible increase in temperature to

1 For an overview of all our sustainable features, see

<http://www.irotaecolodge.com/en/econess.html>

2 <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 Net

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

Zero Project: by 2030 all new buildings should operate at net zero carbon emissions and by 2050 all buildings should be 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 climate-neutrality claim, Irota EcoLodge will publish a carbon footprint report for each calendar year. The first report covered 2016 and this report contains the third calculation covering 2019 this being the third full year of operation.

Irota EcoLodge can claim to be the first and so far only climate-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.*

## **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

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

5 According to the Hungarian Hotel & Restaurant Association.

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 fuels for two cars and garden maintenance equipment.



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

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

The following 14 sources 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.

#### Utility building and Cottage:

4. Emissions as a result of electricity being consumed, mainly by the washing machine.
5. 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.
6. 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:

7. 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.
8. The building, in which the apartment is located, has a central heating system fuelled by natural gas. Individual meters are installed in each apartment, so that the total gas consumption for heat generation can be attributed to each individual unit.
9. The building in which the apartment is located, has a central cooling system powered by electricity. Individual meters are installed in each apartment so that the total electricity consumption for cooling can be attributed to each individual unit.
10. Hot water is also centrally generated using natural gas. Individual meters are installed in each apartment, so that the total gas consumption for hot water product can be attributed to each individual unit.

#### Fuels:

11. A new company car, delivered in August 2019, is an Electrical Vehicle (EV) using electricity as fuel.
12. The old company using diesel fuel.
13. A third car using gasoline.

14. Gasoline is used to fuel garden tools to maintain the premises at Irota EcoLodge and around the utility building. Also, chain saws are used to cut firewood.

Above cars and 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 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) have been used that are listed in Table 1.

Electricity <sup>7</sup>	0.477 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
Gasoline	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	6 964 kWh	-0,477	-3 322
2 Consumed electricity	3 745 kWh	0,477	1 786
3 Cooking	24,5 kg	3,00	74
<b>Utility building</b>			
4 Generated electricity	5 361 kWh	-0,477	-2 557
5 Consumed electricity	947 kWh	0,477	452
6 Cooking	10,4 kg	3,00	31
<b>Budapest City Apartment</b>			
7 Electricity consumption of appliances	1 292 kWh	0,477	616
8 Gas consumption for heating	8,4 GJ	56,1	471
9 Electricity consumption for cooling	288 kWh	0,477	137
10 Gas consumption for hot water	5,8 GJ	56,1	326
<b>Fuels</b>			
11 Electricity for electric car	602 kWh	0,477	287
12 Diesel fuel for car	406 l	2,58	1 048
13 Gasoline fuel for car	40 l	2,30	93
14 Gasoline fuel for garden tools	63 l	2,30	144
<b>Total</b>			<b>-413</b>

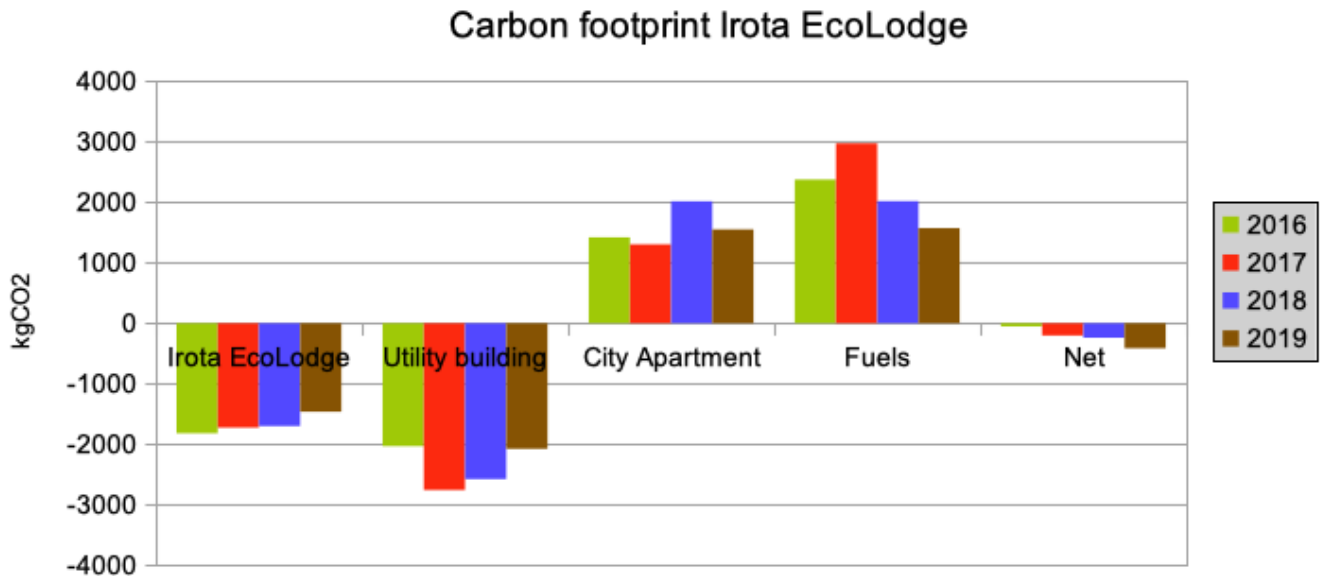
*Table 2: Calculation of carbon emissions*

<sup>7</sup> <https://ars.els-cdn.com/content/image/1-s2.0-S2211467X19300549-mmcl.pdf>, table 7, row consumption increased with 6.3% grid losses from High Voltage network to Low Voltage network.



## Result

The net carbon emissions in the third year of operation amount to -413 kgCO<sub>2</sub>. This proves that Irota EcoLodge remains a climate-neutral resort and even slightly reduced emissions.



Graph 1: Overview of emissions per location.

## 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 185 m<sup>3</sup> of water was consumed in 2019, of which 91 m<sup>3</sup> was drinking (tap) water and 94 m<sup>3</sup> rain water. Hence, by means of collecting rain water, 51% of drinking water was saved in 2019.

## Plans for 2020

In 2019, we were honoured to win the E.On Global Energy Award. For the convenience of our guests, we decided to use the prize money to install charging stations – powered by electricity from our solar panels – for electric cars next to our holiday homes.



*Picture 5: New electric company car charged by solar panels.*

Irota, 25 March 2020

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 48 349260