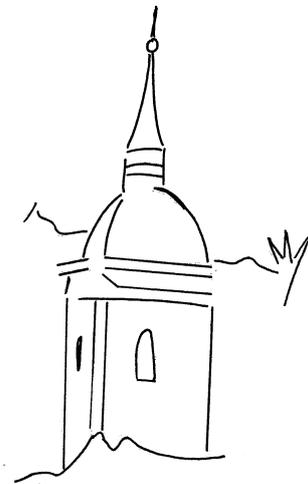


# CARBON FOOTPRINT REPORT 2021



**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 six 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?

At the UN conference in Paris in 2015, an agreement was reached to keep the rise in global temperature well below 2 °C above pre-industrial levels, and preferably limit the increase to 1.5 °C. This goal requires a drastic reduction of greenhouse gas emissions by 55% by 2030 and to net zero emissions by 2050.

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

Several initiatives have been developed since Paris to reach this goal. Race to Zero<sup>2</sup> is the UN-backed global campaign rallying non-state actors – including companies, cities, regions, financial and educational institutions – to halve global emissions by 2030 and deliver a net zero carbon world by 2050. The EU has set a binding target of achieving climate neutrality by 2050 through the so-called ‘Fit for 55’ package<sup>3</sup>. The Science Based Targets<sup>4</sup> initiative helps companies to set emission reduction targets to limit the global temperature rise above pre-industrial levels to 1.5 °C.



*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 carbon emissions and by 2050 all existing and new buildings should operate at net zero<sup>5</sup>.

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<sup>2</sup> <https://unfccc.int/climate-action/race-to-zero-campaign>

<sup>3</sup> <https://www.consilium.europa.eu/en/policies/green-deal/eu-plan-for-a-green-transition>

<sup>4</sup> <https://sciencebasedtargets.org>

<sup>5</sup> <https://www.worldgbc.org/advancing-net-zero>

At Irota EcoLodge we did not want to wait until 2030, let alone 2050. We are proud to be a net zero company from the very start! To support this net zero carbon claim, Irota EcoLodge publishes a carbon footprint report each year. The first report covered 2016 and the current report contains the sixth year of operation covering 2021.

Irota EcoLodge can claim to be the first and so far only carbon-neutral accommodation in Hungary<sup>6</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>6</sup> As confirmed by 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>7</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: Company car being charged at charging station.*

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<sup>7</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>8</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>8</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 5: 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>9</sup> | 0.280 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*

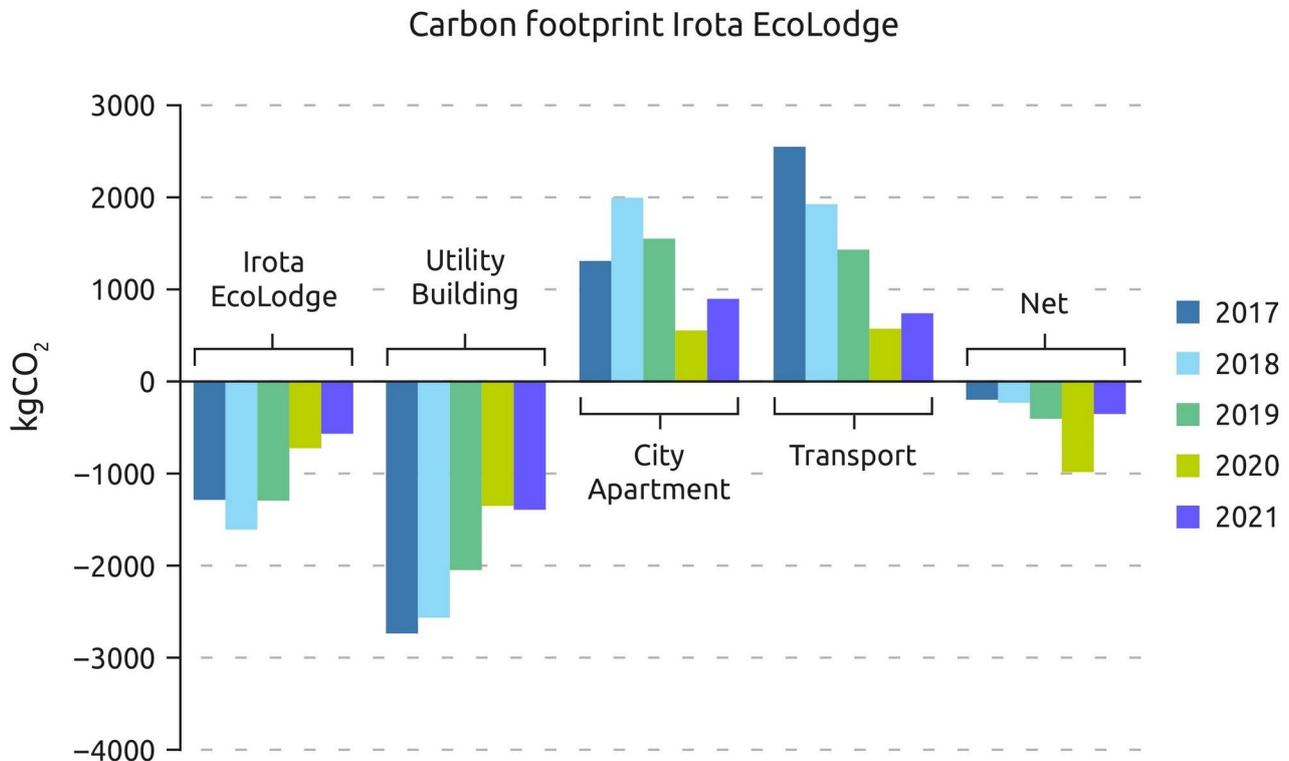
| <b>Location and source</b>              | <b>quantity unit</b> | <b>CEF</b> | <b>kgCO<sub>2</sub></b> |
|---|----------------------|------------|-------------------------|
| <b>Irota EcoLodge</b>                   |                      |            |                         |
| 1 Generated electricity                 | 7 159 kWh            | -0.280     | -2 005                  |
| 2 Consumed electricity                  | 3 974 kWh            | 0.280      | 1 113                   |
| 3 Cooking                               | 19,8 kg              | 3.00       | 59                      |
| 4 Petrol for garden tools               | 107 l                | 2.30       | 245                     |
| <b>Utility building</b>                 |                      |            |                         |
| 5 Generated electricity                 | 5 523 kWh            | -0.280     | -1 547                  |
| 6 Consumed electricity                  | 545 kWh              | 0.280      | 153                     |
| 7 Cooking                               | 0,0 kg               | 3.00       | 0                       |
| <b>Budapest City Apartment</b>          |                      |            |                         |
| 8 Electricity consumption of appliances | 1 107 kWh            | 0.280      | 285                     |
| 9 Gas consumption for heating           | 6,6 GJ               | 56.1       | 371                     |
| 10 Electricity consumption for cooling  | 43 kWh               | 0.280      | 12                      |
| 11 Gas consumption for hot water        | 3,9 GJ               | 56.1       | 218                     |
| <b>Transport</b>                        |                      |            |                         |
| 12 Electricity for electric car         | 1 435 kWh            | 0.280      | 402                     |
| 13 Diesel for car                       | 78 l                 | 2.58       | 201                     |
| 14 Petrol for car                       | 55 l                 | 2.30       | 125                     |
| <b>Total</b>                            |                      |            | <b>-367</b>             |

*Table 2: Calculation of carbon emissions*

<sup>9</sup> Hungarian CEF logged from [api.electricitymap.org](http://api.electricitymap.org) (includes import and export) 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 -367 kgCO<sub>2</sub>. This proves that Irota EcoLodge remains a carbon-neutral company.



Graph 1: Overview of emissions per location.

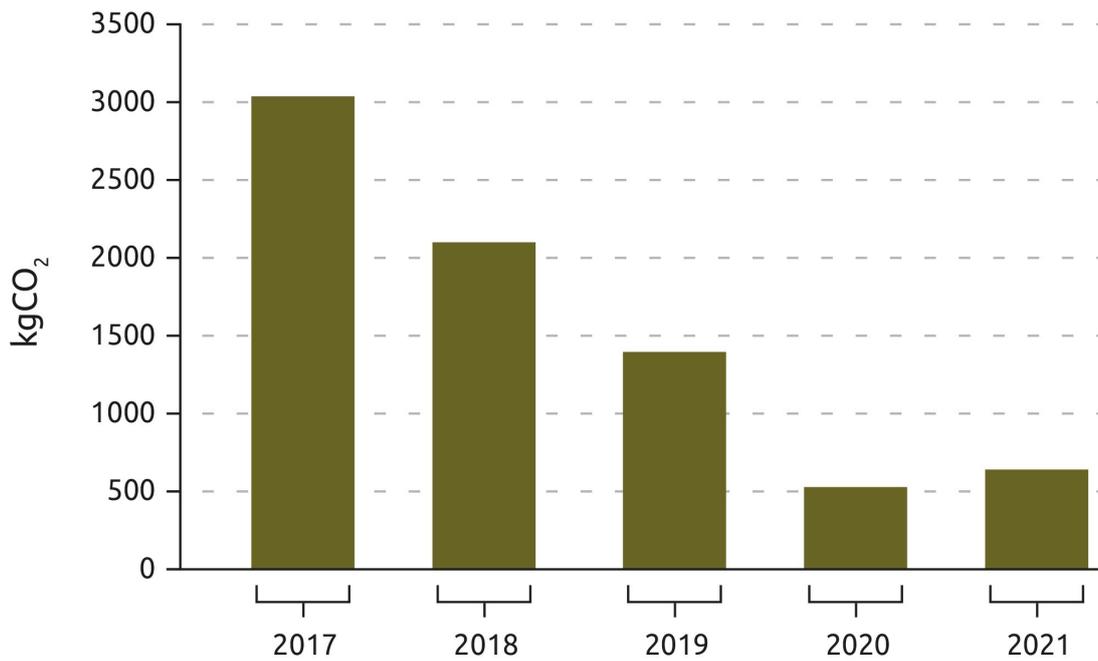
## Non-carbon related measure: water savings

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 190 m<sup>3</sup> of water was consumed in 2021, of which 98 m<sup>3</sup> was drinking (tap) water and 92 m<sup>3</sup> rain water. Hence, by means of collecting rain water, 48% of drinking water was saved in 2021.

## Future plans

In the future we want to bring fossil fuel emissions to zero so there is not need to offset emissions. This will mean switching garden equipment to electric equipment, supplying the cooking stoves with biogas and phasing out the two fossil fuelled company cars.

## Direct emissions Irota EcoLodge



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

Irota, 14 February 2022

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