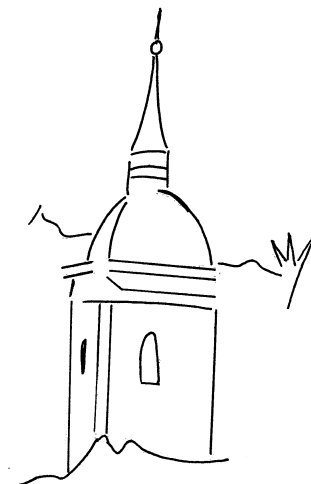


CARBON FOOTPRINT REPORT 2023



(OPERATIONAL CARBON)



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 7th of July 2016 and has operated now for almost seven 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 industry¹.



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.

¹ 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 Zero² 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’ package³. The Science Based Targets⁴ 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 has set a similar target in the Advancing Net Zero Project. In this project two different targets are set⁵:

- Operational carbon: by 2030 all new buildings should operate at net zero carbon emissions whereas by 2050 all (existing and new) buildings should operate at net zero.

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

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

⁴ <https://sciencebasedtargets.org>

⁵ <https://worldgbc.org/advancing-net-zero/whole-life-carbon-vision/>

- Embodied carbon: by 2050 all new buildings must have net zero embodied carbon.

Embodied carbon are emissions during construction, renovation and deconstruction of the building. Combined with operational carbon one gets the Whole Life Carbon of a building.

At Irota EcoLodge we did not want to wait until 2030, let alone 2050. We are proud to be net zero from the very start! To support this net zero claim, Irota EcoLodge published two different reports:

- Operational Carbon Footprint Report (= this report) covering the operational emissions of the whole company. The first report covered 2016 and the current report contains the seventh year of operation covering 2022.
- Whole Life Carbon Footprint Report assessing the carbon emission of one villa over the full life cycle⁶.

Irota EcoLodge can claim to be the first and so far only carbon-neutral accommodation in Hungary⁷, 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.

⁶ https://www.irotaecolodge.com/en/pdf/PDF_LCA_EN.pdf

⁷ 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)⁸.

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 used to be the Budapest City Apartment but since the start of 2023 the apartment is not rented out anymore for the short term. A fourth 'location' are transport fuels for three company cars.



Picture 4: Company car being charged at charging station.

The following ten sources⁹ of carbon emissions were identified at these four locations:

⁸ https://en.wikipedia.org/wiki/Carbon_neutrality, accessed on 23 May 2017.

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.

Transport:

8. A new company car, delivered in august 2019, is an Electrical Vehicle (EV) using electricity.
9. The old company car using diesel.
10. 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:

11. 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.

⁹ These sources cover all direct emissions (Scope 1) and indirect emissions (Scope 2) resulting from energy supplies like electricity, heating and cooling.

12. 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 ¹⁰	0.254	kgCO ₂ /kWh
Propane	3.00	kgCO ₂ /kg
Natural gas	56.1	kgCO ₂ /GJ
Diesel	2.58	kgCO ₂ /litre
Petrol	2.30	kgCO ₂ /litre

Table 1: Carbon Emission Factors

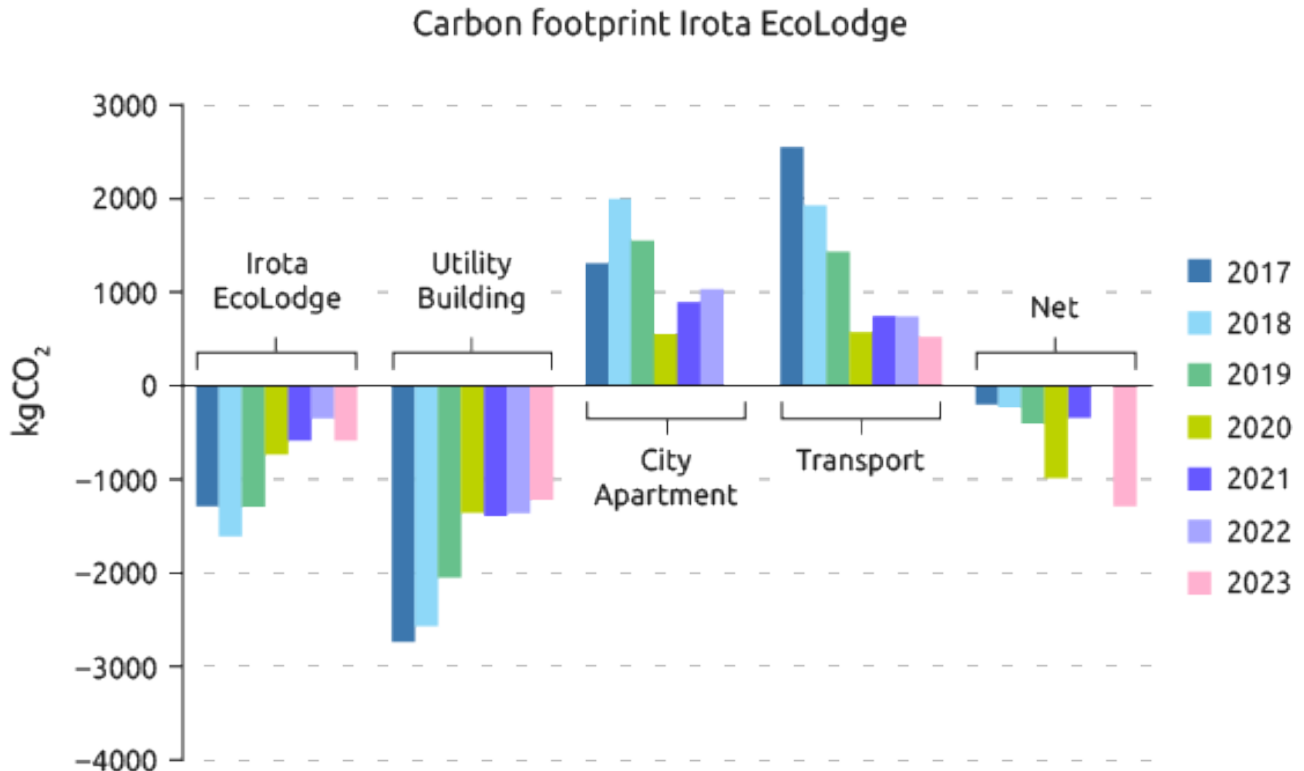
¹⁰ Hungarian CEF logged from api.electricitymap.org (includes import and export) increased with 12.4% Transmission and Distribution losses (<https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?end=2014&start=1960&view=chart>)

Location and source		quantity	unit	CEF	kgCO ₂
Irota EcoLodge					
1	Generated electricity	6,863	kWh	-0.254	-1,743
2	Consumed electricity	3,481	kWh	0.254	884
3	Cooking	14.4	kg	3.00	43
4	Petrol for garden tools	101	l	2.30	231
Utility building					
5	Generated electricity	5,297	kWh	-0.254	-1,345
6	Consumed electricity	437	kWh	0.254	111
7	Cooking	0.3	kg	3.00	1
Transport					
8	Electricity for electric car	1,247	kWh	0.254	317
9	Diesel for car	48	l	2.58	123
10	Petrol for car	33	l	2.30	76
Total					-1,302

Table 2: Calculation of carbon emissions

Result

The net carbon emissions in the sixth year of operation amount to -1,302 kgCO₂. This proves that Irota EcoLodge is indeed a carbon-neutral company.



Graph 1: Overview of emissions per location.

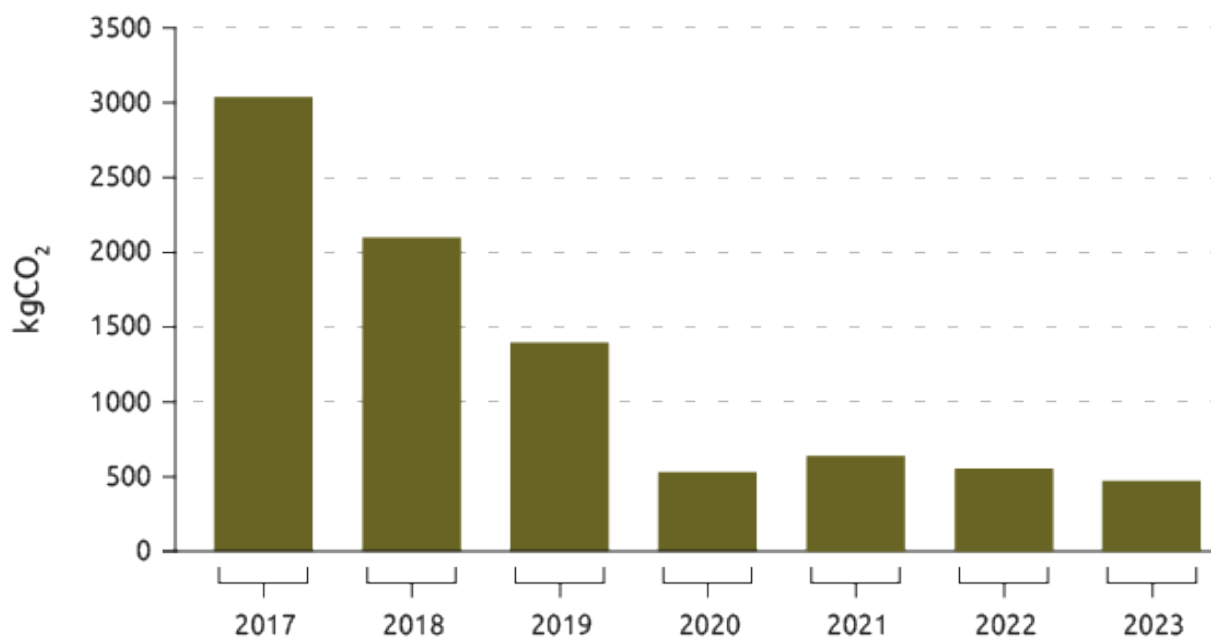
Non-carbon related measure: water savings

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 133 m³ of water was consumed in 2023, of which 62 m³ was drinking (tap) water and 71 m³ rain water. Hence, by means of collecting rain water, 53% of drinking water was saved in 2023.

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, 8 February 2024

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