

Julie's Bicycle  
SUSTAINING CREATIVITY

INSIDE THE ICE

ICE WATCH  
CARBON FOOTPRINT

OLAFUR ELIASSON & MINIK ROSING

FEBRUARY 2019

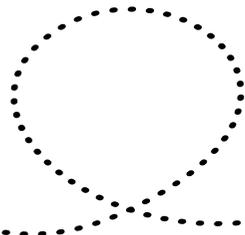
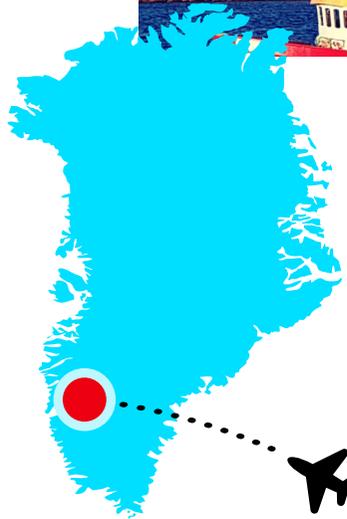


PHOTO Kuupik V. Kleist

## Context

Ice Watch London inspired curiosity, awe, tenderness, sensuousness; passionate and personal responses by art lovers and passers-by alike, gently asking questions and exploring our relationship with the natural world.

This is a critical function of art and culture. The creative and ethical intentions of Ice Watch are hugely strengthened by ensuring that the integrity behind the work – its material impacts on the planet – are equally considered. This is not only relevant to Ice Watch, but to the work of Studio Olafur Eliasson more generally, and the artistic and cultural community at large.



55

t CO<sub>2</sub>e



55 tonnes of carbon  
=  
52 people flying  
return from London to witness  
the icebergs melting



A creative sector that substantially and holistically embodies sustainability so that operations, art and public engagement are aligned, is immeasurably powerful. The carbon footprint doesn't have to be merely a set of data: it should be the muscle which moves the body and soul of the work.

Three years have passed since the momentous United Nations COP21 meeting in Paris which resulted in an unprecedented international agreement to limit global warming to below 2 °C, the Paris Agreement. Ice Watch was first presented by Olafur Eliasson and Minik Rosing at COP21 to accompany the negotiations, reinforce ambition and raise awareness of climate change, using art to unlock our felt experiences which transcend technical, scientific and political narratives.

Ice Watch London, staged in December just past, celebrated the anniversary of the Paris Agreement and coincided with COP24, which took place in Katowice, Poland. Hot on the heels of the Inter-Governmental Panel on Climate Change's 1.5 °C Report published last October which states unequivocally that the window for action is a mere 12 years, Ice Watch was particularly timely: failure to embark on the ambitious journey – the so-called

Just Transition – to a zero carbon economy will be, quite simply, catastrophic.

The creative community is already catalysing a climate movement, evident through seven key cultural responses that are reshaping a creative community fit for the future: art; activism; green organisational leadership; sustainable design and innovation; ethical and ambitious collaborations; a new culture/climate nexus led by a generation of trail-blazers; and ambitious green cultural policy.

Olafur Eliasson, an artist and innovator at the forefront of exploring the links between art, technology, environment, and sustainability and an appointed advocate for the Sustainable Development Goals, is an important leadership voice in this growing movement. Culture can – must – make an exponential difference and works of art combined with acts of care are generous gestures of love for the planet. The inside story of Ice Watch goes far beyond the pavements of Paris, Copenhagen or London. It speaks of the past and to the future, and lovingly tells us the difficult story of the present us in our fragile, stunning world.



**ALISON TICKELL**

Director, Julie's Bicycle

# ICE WATCH JOURNEY



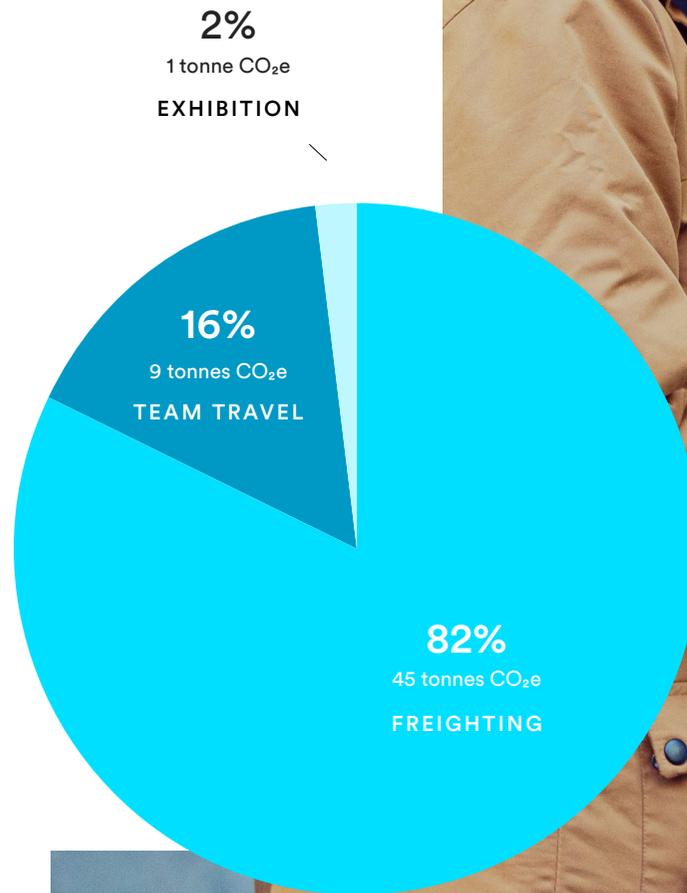
## Executive Summary

Ice Watch, a public art work by Olafur Eliasson and Minik Rosing, was presented outside the iconic Tate Modern and Bloomberg London HQ simultaneously to mark the UN Climate Summit (COP24) in Katowice, Poland and celebrate the third anniversary of the Paris Agreement.

The carbon footprint resulting from the exhibition of Ice Watch London was a total 55 tonnes CO<sub>2</sub>e or 1.8 tonnes CO<sub>2</sub>e per block of ice.

The carbon cost for bringing the thirty blocks of ice is approximately equal to flying two school classes (52 students) from London to Greenland and back to witness the melting of the Greenland ice sheet. This is opposed to the thousands of visitors that experienced Ice Watch and the hundreds of thousands who connected with the issue of climate change through the digital platforms.

The transportation of the ice from Greenland to London accounts for the majority of the emissions: 45 tonnes CO<sub>2</sub>e (82%). The staging of Ice Watch in London resulted in 1 tonne CO<sub>2</sub>e (2%). The remaining 9 tonnes CO<sub>2</sub>e (16%) were generated by the travel undertaken by the team from Studio Olafur Eliasson to London.





## The Exhibit

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Twenty-four blocks were arranged in a circular grove on Bankside outside Tate Modern, where a major exhibition of Eliasson's work will open in July 2019, and six additional blocks were on display in the heart of the City of London outside Bloomberg's European headquarters. As the ice gradually thawed, members of the public encountered the tangible effects of climate change by seeing and feeling the ice melt away.

The blocks of ice were taken out of the waters of the Nuup Kangerlua fjord in Greenland where they were melting into the ocean after having already broken off the ice sheet.

Ice Watch was on exhibit from the 11th December until the ice had all melted, in early January 2019.



## What Was Measured

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The carbon footprint has calculated the emissions resulting from:

- Collection of 122.75 tonnes of ice near Nuuk, Greenland
- Refrigerated sea freighting of nine containers from Nuuk to Immingham, UK
- Trucking of the containers from Immingham to London
- Crane, forklift and cherry-picker equipment used to set-up and breakdown the installation
- Lighting used to display the installation during COP24
- Travel of the Studio team and the carbon footprint researcher to London and Nuuk

Information was gathered about each area from activity type, energy source, quantity of equipment, power demand and distance travelled. The UK Department of Business, Energy and Industrial Strategy 2018 published greenhouse gas emission factors were used to calculate the carbon emissions from all areas, excluding sea freighting and the truck transport between Aalborg, Denmark and Esbjerg, Denmark. The sea freighting and truck transport were calculated from information provided from the Danish Shipping, Royal Arctic.

The carbon footprint calculations do not include because of data availability:

- Studio Olafur Eliasson building
- Launch event





# CARBON FOOTPRINT

## RESULTS

# Carbon Footprint Results

The total calculated carbon emissions will be **55 tonnes CO<sub>2</sub>e** or 54,822 kg CO<sub>2</sub>e

<b>FREIGHTING</b>	Description	Quantity	Emissions Factor	Kilograms Carbon (CO <sub>2</sub> e)
Motor boat	A boat was used to collect 122.75 tonnes of ice from the sea. The boat had a 423 kW engine with an estimated load capacity of 40%.	1 boat was used for 82 hours	0.87 kg CO <sub>2</sub> e per kWh	12,071
Crane	A Liebherr LHM 420 crane was used to move the ice off the boat. Engine power 725 kW.	1 crane for 30 hours	0.25296 kg CO <sub>2</sub> e per kWh (Gross CV) of diesel	5,502
Shipping	<p><b>First leg:</b> The ship transported 122.75 tonnes of ice from Nuuk, Greenland to Aalborg, Denmark</p> <p><b>Second leg:</b> The ship transported 122.75 tonnes of ice from Esbjerg, Denmark to Immingham, UK</p> <p>It is assumed the ship was fit for refrigerated cargo across both legs</p>	<p><b>First leg:</b> 1 container ship travelling 2,260 nautical miles</p> <p><b>Second leg:</b> 1 container ship travelling 459 nautical miles</p>	<p><b>First leg:</b> 73 g CO<sub>2</sub>e per tonne ice per nautical mile</p> <p><b>Second leg:</b> 53 g CO<sub>2</sub>e per tonne ice per nautical mile</p>	23,147
Truck	<p><b>First leg:</b> Trucks were used to transport the ice from Aalborg to Esbjerg. Trucks assumed to be average Euro norm.</p> <p><b>Second leg:</b> Articulated trucks were used to transport the ice from Immingham to Erith</p> <p><b>Third leg:</b> The ice was then transferred to HIAB trucks which transported the ice between Erith and London</p>	<p><b>First leg:</b> 9 wheelers driving 274 km</p> <p><b>Second leg:</b> 9 x 40t trucks driving 322 km</p> <p><b>Third leg:</b> 24 x 12t HIAB trucks driving 32 km</p>	<p><b>First leg:</b> 155 kg CO<sub>2</sub>e per truck</p> <p><b>Second leg:</b> 0.77775 kg CO<sub>2</sub>e per km</p> <p><b>Third leg:</b> 0.75195 kg CO<sub>2</sub>e per km</p>	4,226
<b>TOTAL</b>				<b>44,946</b>

EXHIBITION	Description	Quantity	Emissions Factor	Kilograms Carbon (CO <sub>2</sub> e)
Crane	Two cranes were used to move the ice into position. It is assumed each crane used 18.8 kW and had an efficiency of 3 litres of diesel per hour.	2 cranes for 8 hours each to set-up the installation	2.67614 kg CO <sub>2</sub> e per litre of diesel	268
Cherry-picker	A cherry-picker was used to move the ice into position. It is assumed the forklift had an efficiency of 3 litres of diesel per hour.	1 cherry-picker used for 8 hours to set-up the installation	2.67614 kg CO <sub>2</sub> e per litre of diesel	64
Forklift	A forklift was used to move the ice into position. It is assumed the forklift had an efficiency of 3 litres of diesel per hour.	1 forklife used for 8 hours to set-up the installation	2.67614 kg CO <sub>2</sub> e per litre of diesel	64
Lighting	<b>Period 1</b> (11 days): Lighting was used to present the installation between 11 Dec - 22 Dec. Lighting assumed to be halogen	15,600 W of lights used across Tate and Bloomberg sites for 110 hours	0.3072 kg CO <sub>2</sub> e per kWh of UK mains electricity	541
	<b>Period 2</b> (17 days): Original lighting was replaced with LEDs for the final 17 days between 22nd Dec - 7th January.	1,950 W of lights used across Tate and Bloomberg sites for 170 hours. Assumed LEDs 8 times less energy per light output than halogen.		104
<b>TOTAL</b>				<b>1,041</b>

TEAM TRAVEL	Description	Quantity	Emissions Factor	Kilograms Carbon (CO <sub>2</sub> e)
Short-haul flights	13 people travelled from Berlin to London with 3 individuals making multiple journeys. 1 person travelled from Berlin to Aalborg, Denmark.	19 short-haul flights (1,864 km return)	0.1597 kg CO <sub>2</sub> e per km	5,832
		1 short-haul flight (1,100 km return)		
Long-haul flights	1 person travelled between Berlin to Nuuk, Greenland	1 long-haul flight (7,626 km return)	0.16279 kg CO <sub>2</sub> e per km	1,241
Hotel accommodation	54 nights of accommodation spent by the studio team	54 hotel room rights in total between London and Nuuk, Greenland	32.63 per person night	1,762
<b>TOTAL</b>				<b>8,835</b>



# Before the Ice Melts

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- **Measurement:** calculate the estimated carbon footprint at the outset of the project to identify if decisions made at the planning stage can avoid carbon and environmental impacts.
- **Freighting:** there are limited opportunities for reducing the freighting carbon footprint of Ice Watch; however, using highly efficient refrigeration and trucking, and reducing the length of time the ice is stored between collection and exhibition would reduce refrigeration energy demand.
- **Personnel travel:** significant carbon savings can be made by using train travel within Europe and selecting hotel accommodation with strong sustainability credentials.
- **Exhibition:** carbon savings can be made through the use of LED technologies to light the installation, ensuring optimisation of lighting technology and design.
- **Procurement:** request information from suppliers on their environmental policy and initiatives – e.g. from the shipping and trucking company. Identify and use suppliers with good environmental credentials as much as possible.
- **Partners:** request information from partners on their environmental policy and initiatives – e.g. asking Tate about their environmental efforts and whether they hold green certifications.

# After the Ice Melts

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## 1. Commitment

### Environmental Strategy

- A holistic and joined-up Environmental Strategy framed through a Policy and Action Plan for Studio Olafur Eliasson would ensure sustainability practices are embedded into all of its projects and day-to-day operations. The policy should map against the Sustainable Development Goals.

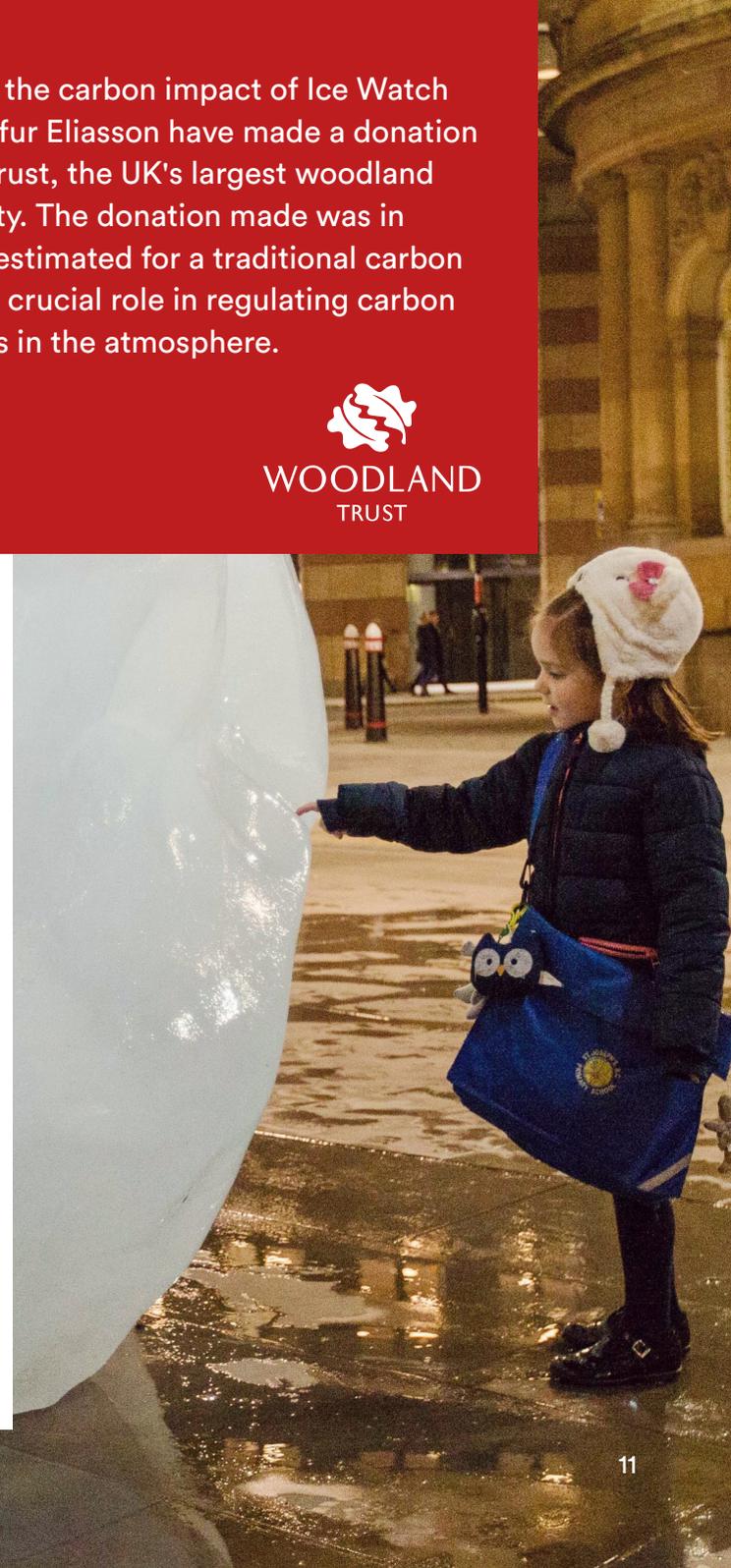
### Communication & Engagement

- Building an environmental strategy that reflects the culture and ethos of Studio Olafur Eliasson should include specific team roles and responsibilities, plus the training, resources and networks needed to support the team to implement the strategy.
- Capture and celebrate the stories of the Studio's sustainability journey to share with other artist studios, galleries, suppliers, partners and audiences. Create opportunities for networking and collaboration with other artist studios: sharing knowledge and ideas will rapidly accelerate good practice, solutions and innovation and inspiration.

To compensate for the carbon impact of Ice Watch London Studio Olafur Eliasson have made a donation to the Woodland Trust, the UK's largest woodland conservation charity. The donation made was in excess of the sum estimated for a traditional carbon offset. Trees play a crucial role in regulating carbon dioxide (CO<sub>2</sub>) levels in the atmosphere.



PHOTO Charlie Forgham Bailey



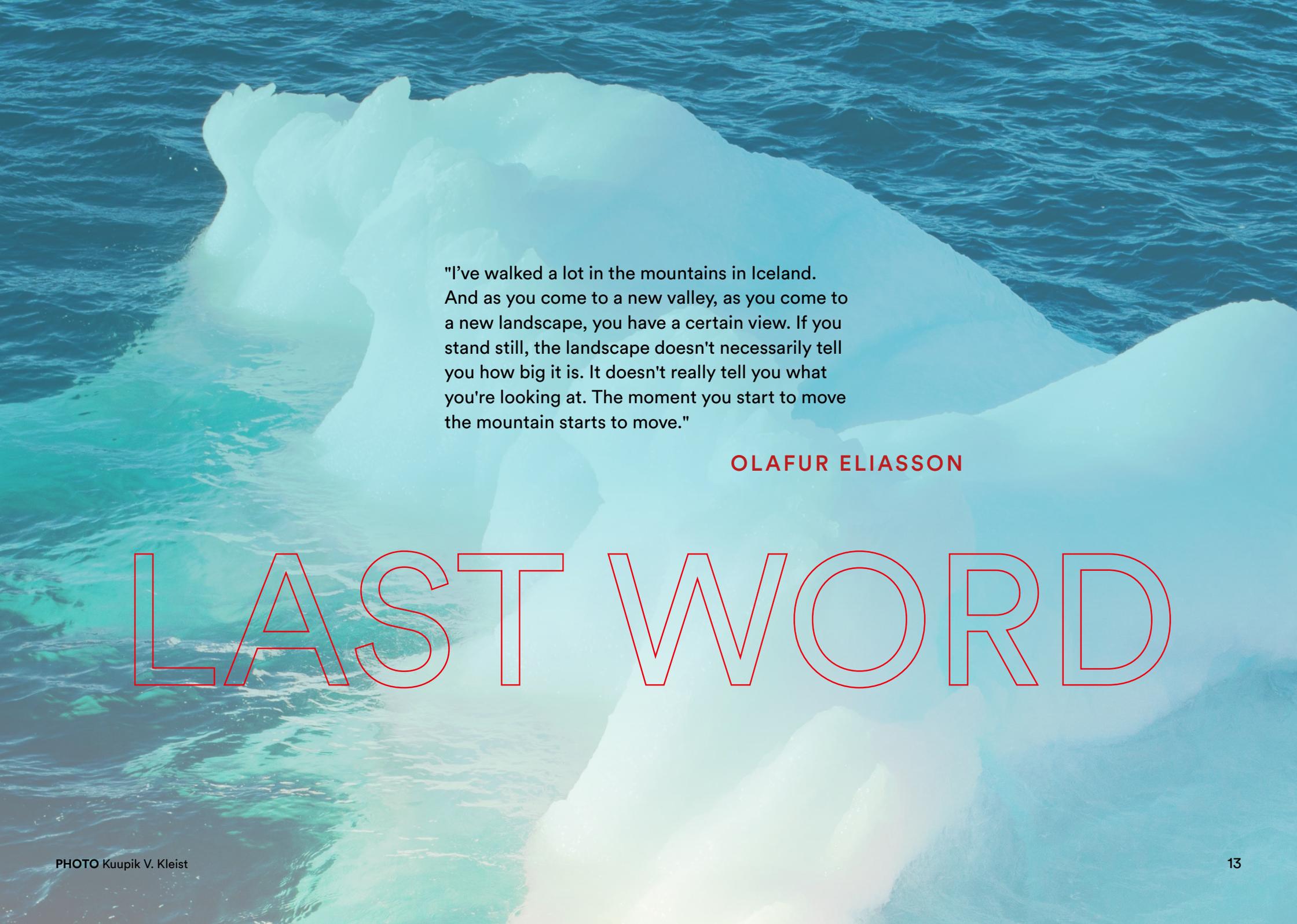


## 2. Understanding

- Measure and joyfully report the Studio's environmental impacts across energy, waste, water, travel, materials and food. Building understanding will create greater literacy internally, and identify where savings can be achieved. Knowledge is powerful, and a literate team will generate confidence, creative ideas and pride in the Studio's integrity, aligning artistic communication with practical progress – ie embodied sustainability. The Creative Green Tools available through Julie's Bicycle are simple free resources specifically for cultural activities, which measure the environmental impacts of the Studio and exhibitions. Where possible, aim to collect accurate consumption figures, e.g. litres of fuel. <https://ig-tools.com/signup>

## 3. Improvement

- With a strategy, policy and action plan underpinning the ethos of Studio Olafur Eliasson, practical environmental actions to reduce energy, waste, water, travel, materials and food impacts will release the curiosity to explore creative and new ways of day-to-day sustainable living and working. These might include: investment in energy efficiency equipment, banning single-use plastics, creating spaces for nature, sourcing of materials with strong environmental credentials, procurement of energy from a renewable energy supplier, audience campaigns.
- Join our pioneering leadership community of Creative Green, 80 arts and cultural companies leading the creative cultural movement by combining practical action with inspirational communication and celebrating our planet.



"I've walked a lot in the mountains in Iceland. And as you come to a new valley, as you come to a new landscape, you have a certain view. If you stand still, the landscape doesn't necessarily tell you how big it is. It doesn't really tell you what you're looking at. The moment you start to move the mountain starts to move."

**OLAFUR ELIASSON**

# LAST WORD

## References

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### **Boat emission conversion factors**

[http://uk-air.defra.gov.uk/assets/documents/reports/cat07/1106231031\\_IP\\_Task\\_25\\_Inland\\_Waterways\\_Issue\\_1.pdf](http://uk-air.defra.gov.uk/assets/documents/reports/cat07/1106231031_IP_Task_25_Inland_Waterways_Issue_1.pdf)

### **DEFRA 2018 published emission conversion factors**

<https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018>

### **Julie's Bicycle's IG Tools for hotel accommodation emissions factor**

[www.ig-tools.com](http://www.ig-tools.com)

### **Shipping emissions conversion factors**

Provided by special consultant from Danish Shipping via Royal Arctic  
<http://www.shipowners.dk>

## Acknowledgements

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We would like to thank Studio Olafur Eliasson for supplying the necessary information for calculating the carbon footprint, in particular Geoffrey Garrison who was helpful and responsive throughout; Erica Bolton, Bolton and Quinn; Bloomberg Philanthropies; and Royal Arctic for providing additional information about the sea freighting.

## About Julie's Bicycle

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Julie's Bicycle is a London based global charity bridging the gap between environmental sustainability and the creative industries. Founded in 2007, its vision is a progressive, efficient and sustainable creative community. It works with over 1,000 arts organisations across the UK and internationally to measure, manage and reduce environmental impacts. Since 2012, the charity has helped the arts sector save 23,600 tonnes of CO<sub>2</sub>e emissions, equivalent to £16.5 million.

This report was first published in January 2019 with calculated carbon emissions of 40 tonnes CO<sub>2</sub>e. Additional data was subsequently provided on the freighting impact of Ice Watch London. This publication was amended in February 2019 with a revised figure for calculated carbon emissions of 55 tonnes CO<sub>2</sub>e.

For more information go to:

[juliesbicycle.com](http://juliesbicycle.com)



#ICEWATCHLONDON

# ICE WATCH

The carbon footprint for Ice Watch was  
prepared by Julie's Bicycle

Julie's Bicycle  
SUSTAINING CREATIVITY