

***Cecilia Vicuña: Spin Spin Triangulene***  
**Exhibition Carbon Emissions Calculation**

**Solomon R. Guggenheim Museum, New York**

**2022**

Report Produced By Art into Acres

This is the second exhibition carbon calculation, reduction education, and Strategic Climate Fund contribution process undertaken by the Guggenheim.

Please note that this exhibition was primarily organized during the COVID-19 Pandemic. Carbon emissions were reduced because of the pandemic, most notably in travel and shipping. Each exhibition is unique in execution and thus will have a differing carbon impact..

The Guggenheim is committed to developing enhanced carbon emissions tracking methodologies and best practices, to ensure a deeper understanding of the environmental impacts of our work.

## Report Contributors and Metrics Sources

Institution:	Solomon R. Guggenheim Museum, New York (SRGM)
Institution Type:	International Museum
Institution Address:	1071 5th Ave, New York, NY 10128
Artist Name:	Cecilia Vicuña
Exhibition Title:	<i>Cecilia Vicuña: Spin Spin Triangulene</i>
Exhibition Curators:	Pablo León de la Barra, Curator at Large, Latin America, Solomon R. Guggenheim Museum and Foundation Geanine Gutierrez-Guimarães, Associate Curator, Guggenheim Museum Bilbao, Solomon R. Guggenheim Museum and Foundation
Exhibition Type:	Solo Exhibition
Exhibition Size:	10,831 square feet
Exhibition Dates:	May 27–September 5, 2022
Carbon Calculation Dates:	September–December 2022
Exhibition Website:	<a href="#">Link</a>
Calculation Funding Support:	2022 Teiger Foundation Grant to Art into Acres
Strategic Climate Funds:	Wendy Fisher and the Kirsh Foundation
SRGM Project Leads:	Lydia O'Connor, Assistant to the Deputy Director Global Public Affairs and Communications, Sustainability Leadership Team Megan Fontanella, Curator, Modern Art and Provenance
SRGM Sustainability Consultant:	Alexa Steiner, Founder of Rute Collaborative
SRGM Project Team:	Brady Allen, Director, Advancement Operations Maria Paula Armelin, On Call Registrar Rich Avery, Senior Technical Specialist, Fabrication and Facilities Peter Brayshaw, Director, Fabrication Ross Caudill, Fabricator Kelly Cullinan, Associate Director, Exhibition Design Jaime Krone, Senior Director, Exhibition Design and Architectural Strategic Planning Janice I-Chiao Lee, Director, Graphic Design Eliza Stoner, Director, Registrar Trevor Tyrrell, Senior Director of Operations, Museum Facility Marcel Walker, Cabinetmaker Joan Young, Senior Director, Curatorial Affairs
Calculation Report Created by:	Haley Mellin, Artist and Founder, Art into Acres
Editorial and Metrics:	Jodi Roberts, Managing Director, Art + Climate Action
Carbon Calculators Used:	GCC Carbon Calculator STiCh Carbon Calculator
Carbon Advising:	Sarah Sutton, Co-Founder and CEO, Environment & Culture Partners Danny Chivers, Carbon Advisor, GCC Matthew Eckelman, Associate Professor, Northeastern University Ian Lipton, Carbon Accounting Company
Support Contact:	Haley Mellin, <a href="mailto:info@artintoacres.org">info@artintoacres.org</a>

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### **Institution Summary:**

Committed to innovation, the Solomon R. Guggenheim Foundation (SRGF) collects, preserves, and interprets modern and contemporary art, and explores ideas across cultures through dynamic curatorial and educational initiatives and collaborations. With its constellation of architecturally and culturally distinct museums, exhibitions, publications, and digital platforms, the foundation engages both local and global audiences.

An internationally renowned art museum and one of the most significant architectural icons of the 20th century, the Solomon R. Guggenheim Museum (SRGM) in New York is at once a vital cultural center, an educational institution, and the heart of the foundation's international network of museums. Visitors can experience special exhibitions of modern and contemporary art, lectures by artists and critics, performances and film screenings, classes for teens and adults, and daily tours of the galleries led by museum educators. Founded on a collection of early modern art, the SRGM today is an ever-evolving institution devoted to the art of the 20th century and beyond.

### **Sustainability at the Guggenheim:**

The Guggenheim is committed to a future-focused, comprehensive, and adaptive approach to sustainability, embedded in strategy, operations, and culture across the institution. Guggenheim Leadership and the Board of Trustees, alongside the Sustainability Leadership Team, have identified guiding values as sustainability has become an institutional priority.

The Guggenheim's Sustainability Values:

Resilient. Promoting resilience by reducing our environmental impact, uplifting our people, and preserving the physical and cultural beauty of our institution.

Evidence-based. Setting measurable sustainability targets through an informed and phased approach, while creating consistent internal systems.

Collaborative. Working in partnership within our sector and beyond it, learning from best practice and sharing our own.

Equitable. Meaningfully contributing to the sustainable development of our world, where all living things can thrive in a healthy, equitable environment.

### **Institution Carbon Calculation History:**

The SRGM undertook its first exhibition carbon calculation in February 2020 on the occasion of the Rem Koolhaas exhibition, *Countryside, The Future*. The calculation was initiated by artist Haley Mellin, Founder of art into Acres, and audited by Leslie Durschinger, Founder, Terra Global Capital and Shayna McClelland, Special Projects, Global Wildlife Conservation.

**Exhibition Summary:**

*Cecilia Vicuña: Spin Spin Triangulene* was the first solo exhibition in a New York museum for the pioneering contemporary Chilean artist, poet, activist, and filmmaker Cecilia Vicuña (b. 1948, Santiago). Showcasing Vicuña's artistic production from the late 1960s to today, this exhibition featured the breadth of her multidisciplinary practice, including paintings, works on paper, textiles, films, a site-specific *Quipu* (Knot) installation, a one-time performance of a "living" *Quipu*, and new paintings and works on paper created specifically for this presentation. The title *Spin Spin Triangulene* is a poetic creation based on new scientific discoveries that the artist relates to the Guggenheim's spiral rotunda and the quipu, to stress the connection between science and Indigenous knowledge Vicuña has observed since her early encounter with cybernetics as a young student in Chile. Vicuña explores themes of memory, language, science, and Indigenous spirituality and knowledge across her practice. This exhibition was organized by Pablo León de la Barra, Curator at Large, Latin America, Solomon R. Guggenheim Museum and Foundation, and Geanine Gutierrez-Guimarães, Associate Curator, Guggenheim Museum Bilbao, Solomon R. Guggenheim Museum and Foundation.

To help compensate for the carbon emissions from this exhibition, the SRGM worked in partnership with Art into Acres, supporting their work in forest conservation, thanks to the generosity of Wendy Fisher and the Kirsh Foundation.

Major support for *Cecilia Vicuña: Spin Spin Triangulene* was provided by The Macallan Scotch Whisky; Rachel and Jean-Pierre Lehmann; Catherine Petitgas; and Lehmann Maupin. Additional support is provided by the Coby Foundation, Ltd.; the Kaleta A. Doolin Foundation; the Diane and Bruce Halle Foundation; Liza Mauer and Andrew Sheiner; Jen Rubio and Stewart Butterfield; DIRAC- Division of Cultures, Arts, Heritage and Public Diplomacy of the Ministry of Foreign Affairs of Chile; the Lenore G. Tawney Foundation; Antenna Fundación; Galería Patricia Ready and Fundación Arte+; and Antonio Murzi and Diana Morgan. Additional funding was provided by the Solomon R. Guggenheim Museum's International Director's Council and its Latin American Circle.

**Scope of Study:**

Activities analyzed and operational control: This analysis covers activities directly related to the preparation and execution of the *Cecilia Vicuña: Spin Spin Triangulene* exhibition at the SRGM, including, but not limited to, construction materials, research travel, transportation of materials and artwork, and installation.

When working with an arts organization, art into Acres measures CO2 emissions over which the organization has either direct or indirect operational control. The standard classifications of Scope 1, 2, or 3 are used to refer to activities that generate emissions. These categories refer to the direct or indirect nature of the emissions causality.

Scope 1: Refers to emissions-generating activities over which an organization has direct operational control. These activities occur on the organization's premises and/or with its property. Examples of Scope 1 activities include onsite electricity generation, the burning of fuels to power a boiler or other onsite equipment, and the use of organization-owned vehicles.

Scope 2: Usually refers to the emissions-generating activities of utility companies or other public services, including the generation and delivery of electricity and natural gas. The arts organization contracts with the utility to purchase energy for its facilities and thus has only indirect operational control over these emissions.

Scope 3: Refers to the emissions-generating activities of companies and individuals that provide goods or services to the arts organization. It also refers to work-related activities that take place outside of the organization's premises. Examples of Scope 3 activities include staff travel by plane, train, or car and the shipment of artwork by a third-party shipping company. The arts organization has only indirect operational control over the emissions these activities generate.

For the abovementioned exhibition, the SRGM has provided information on the travel, shipping, energy and materials. This is a Scope 3 focused exhibition audit and is to complement an institutional audit, which involves the museum's full footprint audit of Scope 1 and Scope 2 energy usage conducted in a separate study.

Limits of analysis: As a voluntary carbon audit, the purpose of the report is to calculate the carbon emissions from voluntarily reported activities. This report is a calculation of an exhibition, it is not a representation of emissions stemming from the institution's full range of activities and programs, which would include calculations for additional data sets such as overall utilities information, staff commute information, and the contracting of goods and services across all departments.

#### **Assumptions:**

Provision and entry of data: All data analyzed in this report was furnished by the SRGM. The collection of relevant information from utility bills, shipping statements, travel receipts, and other documentation was conducted by this organization's staff and entered into spreadsheets provided to Haley Mellin of Art into Acres. Insofar as the SRGM has provided the full and accurate information about these activities as they relate to this exhibition, it is reasonable to assume that, to the best of one's knowledge, this report captures the majority of Scope 3 emissions stemming from the Vicuña project.

#### **Accuracy:**

To calculate CO2 emissions generated through energy use, shipping, travel, and publications, Art into Acres has used a calculator developed by the Gallery Climate Coalition (GCC), a London-based nonprofit. The GCC calculator is a free online tool created with the specific needs of arts institutions in mind, focusing on metrics common to museums and galleries active in the international world. The calculator was designed and built by Artlogic founder and CEO Peter Chater with help and guidance from Danny Chivers, an environmental researcher and climate change consultant who works regularly with GCC.

To calculate emissions associated with materials used to ship, store, care for, and install artwork, Art into Acres has used a calculator developed by Sustainability Tools in Cultural Heritage (STiCH). Developed by art conservators and museum professionals, the STiCH calculator compares the carbon footprint of materials and products as well as their toxicity to humans to enable informed choices.

## Methodology:

CO2 equivalents: The activities analyzed in this report produce a range of greenhouse gasses, including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). Emissions from gasses other than CO<sub>2</sub> have been quantified and converted into an equivalent amount of CO<sub>2</sub>. This practice is in keeping with international standards for organizational carbon emissions inventories.

Emissions factors: “Carbon factors” are the amount of emissions created per km, per liter, or per kwh of relevant activity. Most of the conversion factors used in the CGG calculator are taken from the [UK Government’s official annual set of Greenhouse Gas Conversion Factors](#), provided by BEIS (Department of Business, Energy & Industrial Strategy). GCC has also relied on advice from its Environmental Consultants, Danny Chivers and Harris Kuemmerle. Art into Acres also utilizes conversion factors related to particular materials used to make, store, care for, and install art works. These conversion factors have been researched and implemented by the makers of the STiCH calculator as well as independent carbon emissions auditors.

Conversion factors key to this report include:

Mobile fossil-fuel combustion (gasoline/petrol, average biofuel blend): 1 liter = 2.19352 kgCO<sub>2</sub>e

Mobile fossil-fuel combustion (jet fuel/aviation spirit): 1 liter = 2.33048 kgCO<sub>2</sub>e

GCC Calculator Metrics: [Link](#)

## Results:

Introduction: The purpose of this carbon emissions report is to quantify the Scope 3 carbon footprint of *Cecilia Vicuña: Spin Spin Triangulene* at SRGM in 2022, and to use this understanding to reduce future exhibition emissions at the planning stage. All data was provided by the museum as extracted from its operational database and records. The results of this report will be used by the SRGM in its voluntary efforts to reduce the organization’s environmental impact. Note: Visitor travel, events and utilities are not included in this partial-museum exhibition.

**Shipping:**

Road and air freight was used to transport all artwork for *Cecilia Vicuña: Spin Spin Triangulene*. The below calculation takes into account only the distance between a shipment’s place of origin and the SRGM (as well as the return shipment when applicable).

**SHIPPING**

**Air Freight**

Flight routes are defined in the same way as Passenger Flights, above. Enter the combined weight of all goods and packaging in kilograms. Based on previous carbon audits, an assumption has been made of an average of 25 miles of road journey by truck at either end of each journey.

	Route	Return	Weight inc. packaging (kg)	Total distance (m)	Carbon (tCO2e)	
1	LHR × JFK ×	Return ▾	315.34	6,889	3.96	×
2	MIA × JFK ×	Return ▾	419.1	2,184	3.51	×
3	GVA × JFK ×	Return ▾	55.9	7,709	0.79	×
4	AEP × JFK ×	Return ▾	59	10,577	1.14	×
5		▾				

Total distance (air freight): 27,358 (m)  
Carbon footprint (air freight): 9.40 (tCO2e)

**Road Freight (Truck/HGV)**

Please enter routes manually in the form 'London to Rome' or 'New York to Los Angeles' and use [Google Maps](#) to look up road distances.

	Route / Event	Return	Weight inc. packaging (kg)	Distance (m)	Total Distance (m)	Carbon (tCO2e)	
1	Blauvelt to Guggenheim NYC	Return ▾	408	24.33	47	0.02	×
2	Long Island City to Guggenheir	Return ▾	5.4	12	24	0.00	×
3	Tribeca to Guggenheim NYC	Return ▾	1.8	8	15	0.00	×
4	Boston to Guggenheim NYC	Return ▾	317.5	211	421	0.04	×
5	Sag Harbor to Guggenheim NYC	Return ▾	45.4	166	332	0.00	×
6	Brooklyn to Guggenheim NYC	One-way ▾	2.7	11.9	11	0.00	×
7	Florida to Guggenheim NYC	One-way ▾	4.5	1283	1,283	0.00	×
8	New Paltz to Guggenheim NYC	One-way ▾	.45	86.2	86	0.00	×
9	New Paltz to Guggenheim NYC	One-way ▾	.45	86.2	86	0.00	×
10	New Paltz to Guggenheim NYC	One-way ▾	.45	86.2	86	0.00	×
11	New Paltz to Guggenheim NYC	One-way ▾	.45	86.2	86	0.00	×
12	New Paltz to Guggenheim NYC	One-way ▾	.45	86.2	86	0.00	×



13	New Paltz to Guggenheim NYC	One-way ▾	.45	86.2	86	0.00	×
14	New Paltz to Guggenheim NYC	One-way ▾	.45	86.2	86	0.00	×
15		▾					

Total distance (road transport): 2,732 (m)  
 Carbon footprint (road transport): 0.06 (tCO2e)

**Total CO2 emissions from Shipping: 9.46 tons CO2 equivalent**

**Travel:**

While preparing for this show, the SRGM staff and affiliates traveled by plane and car, primarily. The below calculation factors in transportation method and distance between point of origin and destination (and return if applicable).

**TRAVEL (FLIGHTS)**

Click in the first column and start typing (e.g. 'London Heathrow' or 'LHR') to add an origin and destination airport. Add at least two airports to define a route and add stopovers if required. Total passenger distance and carbon values are automatically calculated. Click and type in the last row to create new rows.

	Route	Return	Class	People/Qty	Total passenger distance (m)	Carbon (tCO2e)	
1	GIG × JFK ×	Return ▾	Economy ▾	1	9,608	2.13	×
2	GIG × MIA × JFK × GIG ×	One-way ▾	Economy ▾	1	10,071	2.24	×
3	GIG × BOG × JFK × GIG ×	One-way ▾	Economy ▾	1	10,110	2.25	×
4	GIG × JFK ×	Return ▾	Economy ▾	1	9,608	2.13	×
5		▾	▾				

Total distance (flights): 39,396 (m)  
 Carbon footprint (flights): 8.75 (tCO2e)

**Car travel (other)**

	Amount	Carbon (tCO2e)
Distance travelled on business (in miles, from mileage claims):	170	0.05
Fuel purchased for company cars (gallons):		

Carbon footprint (other cars): 0.05 (tCO2e)

**Total CO2 emissions from Travel: 8.80 tons CO2 equivalent**

**Materials:**

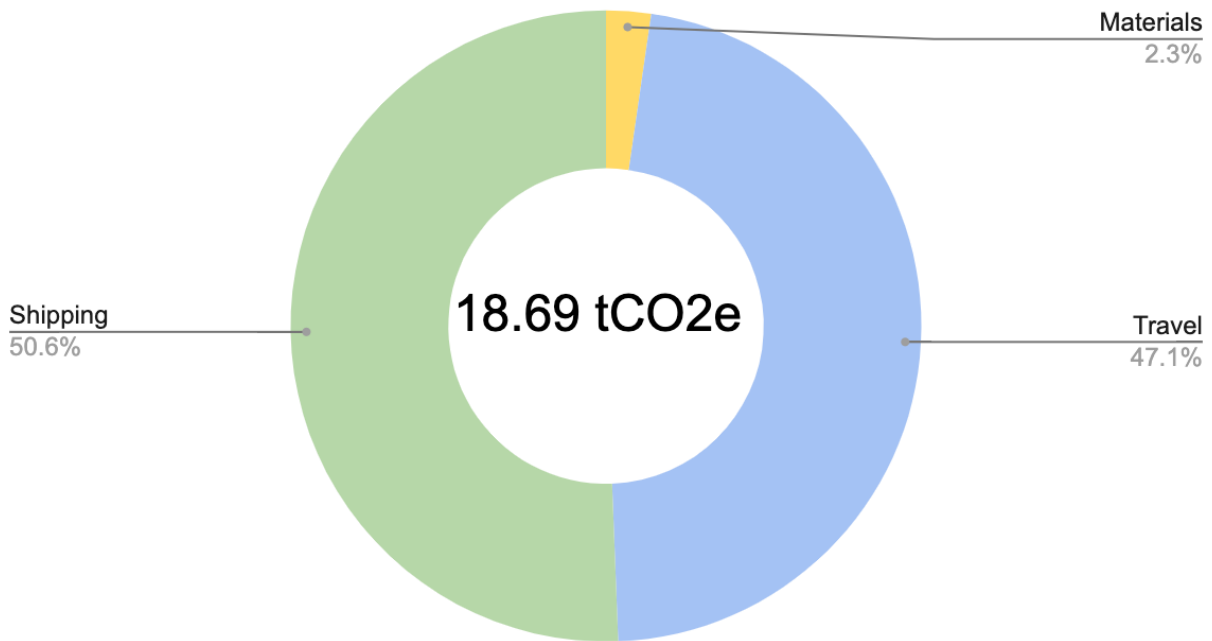
The below quantifies reported Exhibition Construction Materials, in addition to the calculation for paint (based on the Carbon Accounting Company’s calculator): 37.6 kgCO2e and the calculation for joint compound (based on conversion factor provided by Matthew Eckelman): 10.525 kgCO2e.

CATEGORY	SUB-CATEGORY	ITEM	QUANTITY	GHG/UNIT	TOTAL GHG	SAFETY DATA SHEET
Tapes/Fasteners	Fastener: Physical	Nails/screws stainless steel	4.535 kg	4.132	18.739	N/A
Wood/Composites	Wood: Softwood	Western red cedar	.0225 cubic-meter	45.736	1.029	N/A
Wood/Composites	Plywood	Birch plywood	.5873 cubic-meter	471.999	277.205	Safety Data Sheet
Wood/Composites	Wood: Hardwood	Poplar	.019 cubic-meter	57.818	1.099	N/A
Board/Sheet/Film	Board: Plastic Rigid/Semi-Rigid	Plexiglas acrylic sheet	8 kg	8.288	66.304	N/A
Tapes/Fasteners	Fastener: Physical	Velcro	2 kg	9.208	18.416	N/A
<b>TOTAL CARBON FOOTPRINT (kg CO<sub>2</sub> eq)</b>					<b>382.792</b>	

**Total CO2 emissions from Exhibition Construction Materials: 0.43 metric tons CO2 equivalent**

**Total Calculated Emissions:**

The below pie chart visualizes the relative emissions created from road shipping, flights, and other forms of travel, and reported materials.



**CO2 emissions for the Cecilia Vicuña: Spin Spin Triangulene: 18.69 metric tons CO2 equivalent**

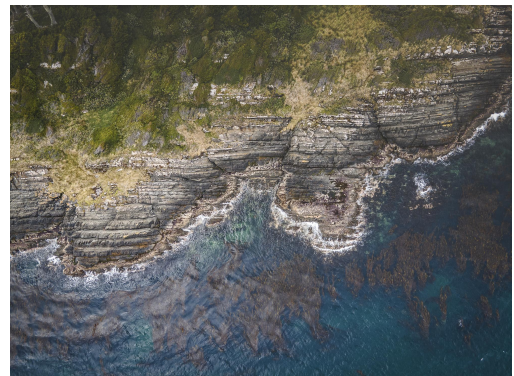
**Strategic Climate Fund Contribution:**

Art into Acres is an artist-founded non-profit initiative that supports permanent large-scale land conservation on behalf of artists, institutions, exhibitions and collectors. The conservation emphasizes carbon protection and high biodiversity landscapes, with a focus on helping communities, indigenous peoples, and nations conserve 30% of the planet in its natural state by 2030.



*Cecilia Vicuña: Spin Spin Triangulene* was the first solo exhibition in a New York museum for the pioneering contemporary Chilean artist, poet, activist, and filmmaker Cecilia Vicuña. Born in Santiago, the artist chose to support a local permanent land conservation project in her country for the Strategic Climate Funds contribution on behalf of this exhibition.

SRGM’s Green Team members Lydia O’Connor and Megan Fontanella, with Art into Acres founder Haley Mellin, engaged the process of reviewing the conservation project proposed, discussing this project with the artist, and completing the carbon report, alongside the museum’s sustainability consultant, Alexa Steiner, founder of Rute Collaborative. Jodi Roberts, of Art + Climate Action, oversaw calculation metrics for this report, in particular for complex areas like materials.



For the exhibition’s SCF, the SRGM made a contribution to Art into Acres to support the creation of Cape Froward National Park in Chile, matched by Tompkins Conservation. This proposed protected area is focused on conserving 127,505 hectares, or 315,072 acres, of land at the southern tip of South America. Support for this Strategic Climate Fund donation has been generously provided by Wendy Fisher and the Kirsh Foundation.



Photo credit from top to bottom: Eduardo-Hernandez (1&2), Marcela Quiroz (3)

**Next Steps:**

The SRGM is committed to developing enhanced carbon emissions tracking methodologies and resulting best practices, to ensure a deeper understanding of the environmental impacts of our work. The Green Team is hard at work on the next steps, understanding the takeaways from this carbon study, determining how best to enhance the tracking process, and determining best practices for reporting and sharing. This work is iterative, and there is much more to learn. The SRGM will continue to work to embed carbon tracking into every day processes and reduce impacts. This case study highlights the ongoing institutional commitment to climate action.

The SRGM team is immensely grateful for the leadership and dedication of artist Haley Mellin, at Art into Acres, in the production of this report.