



Powered by  
**Sustainable  
Aviation  
Fuels**

**ATURE**

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**ENVIRONMENTAL  
SUSTAINABILITY  
REPORT**



**BOOM**

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# INTRODUCTION



# LETTER FROM THE FOUNDER AND CEO

BLAKE SCHOLL

We believe life is better lived in person. When we can experience more of the world, we become more closely connected to it. For much of human history, we were only able to go as far as our own feet could take us—living entire lives within a radius of a few miles. But in the last 150 years, we have broken free of the constraint of distance. From steamships to propeller planes to the jet, we've made the world smaller with ever-faster ways of getting around. And each time we improve the speed and convenience of travel, we thrive.

The democratization of air travel has allowed more people to experience the world—creating global citizens, increasing human connection, driving economic growth, propelling the spread of ideas, and reducing conflict. In that spirit, we must continue to innovate toward faster, easier, and more accessible forms of transportation.

With this progress comes challenges to address. The climate impacts of aviation are widely known, and we are often presented with a false dichotomy: enjoy the broad benefits of travel and tourism, or stop traveling to save the planet. But because travel is so vital to the human experience, we have to embrace a future that enables both traveling and being a good steward of the earth. At Boom Supersonic, we believe that by hardwiring sustainability into everything we build, travel can become an even greater good. With Overture, we're developing a sustainable passenger jet that can fly at more than twice the speed of today's airplanes.

For Boom, our environmental sustainability priorities stem from an ambitious but achievable commitment to net zero carbon by 2025 and an approach rooted in driving systematic change. Boom is fundamentally a changemaker. This is as inherent in our product strategy as it is in our approach to sustainability. We intend to go beyond our own commitments to create impact at scale, mobilizing our value chain, collaborating with stakeholders across the global travel ecosystem, and leading advocacy efforts to set new standards for travel.

With that, we are proud to present our first annual environmental sustainability report, a critical milestone to holding ourselves accountable and owning our impacts and commitments. This report is built on two pillars: climate and community.

On climate, we first discuss our efforts to achieve net zero carbon as a company—measuring, reducing, and offsetting Boom's residual emissions. We also lay out our efforts to understand and mitigate Overture's non-carbon dioxide climate effects, on which we're excited to be working with leading climate scientists. And third, we explain what we are doing to advance non-fossil fuel alternatives to conventional jet fuel. Sustainable Aviation Fuel (SAF) is a key enabler of Overture, allowing for net zero carbon supersonic flight.

All airplane manufacturers and operators must carefully consider the community noise effects of aviation, and Boom is proud of our progress in reducing Overture's landing and takeoff noise. Overture will meet the same regulatory noise levels as new subsonic aircraft. We are also passionate about building communities to advance the cause of sustainability. Outside of Boom, we launched the Sustainable Travel Forum and inaugural Net Good Summit in 2021, convening leaders from across the travel industry to collaborate on sustainable practices.

Building any clean-sheet aircraft is complex—building a world-class airliner is even more so. At Boom, we believe the only way to address complex engineering and environmental problems is by involving all stakeholders and partners in deep collaboration. To make these programs sustainable requires investment in every phase of the product life cycle, from design and development through testing, operation, and end-of-life. We're proud to be laying the groundwork for a sustainable company well before we welcome you aboard Overture.

*Blake Scholl*



# OUR SUSTAINABILITY STRATEGY

## → OUR COMMITMENT

Net zero carbon by 2025

## → OUR PRIORITIES

Driving scalable sustainability solutions in commercial aerospace

### ADDRESSING CLIMATE

Build a net zero carbon fleet of commercial supersonic aircraft while addressing non-CO<sub>2</sub> impacts

### ACCELERATING THE SCALE OF SUSTAINABLE AVIATION FUEL (SAF)

Drive access to abundant, affordable SAF while fast-tracking the fuels of the future

### MITIGATING NOISE

Prioritize communities and work to reduce and mitigate noise, including designing Overture to Chapter 14 noise levels using innovative advanced procedures

## → OUR APPROACH

Creating impact at scale: mobilizing our value chain, collaborating with stakeholders across the global travel ecosystem, and leading advocacy to set new standards for travel

### SUPPLIER PARTNERSHIPS

Promoting sustainable business practices across the supply chain

### AIRLINE PARTNER COMMITMENTS

Working with airline partners to secure net zero carbon commitments through use of SAF

### STRATEGIC COLLABORATIONS

Partnering with environmentally-forward organizations to accelerate a net zero carbon future

### POLICY, ADVOCACY, AND LEADERSHIP

Interfacing with global legislators and regulatory bodies to inform standards



# 2021 HIGHLIGHTS

OUR INAUGURAL ENVIRONMENTAL SUSTAINABILITY REPORT FEATURES MAJOR MILESTONES, PARTNERSHIPS, AND PROGRESS TOWARDS OUR COMMITMENTS ACCOMPLISHED IN 2021.

1

## ACHIEVED CARBON NEUTRALITY

Accounting for Boom emissions across scopes 1, 2, and 3 in 2021, we achieved carbon neutrality through greenhouse gas (GHG) emission reduction initiatives and by addressing the remaining 7,550 metric tons of CO<sub>2</sub> through high-quality carbon credits.

2

## ACCOMPLISHED YEAR-OVER-YEAR REDUCTIONS

Since the Boom “base year” inventory of 2019—the first year verifiable data was collected across all three GHG scopes, as defined by the Science Based Targets initiative (SBTi)—Boom’s net GHG emissions have been reduced by 12.2% on average year-over-year (Jan-Dec).

3

## SUPPORTED STRATEGIC PARTNERSHIPS TO ACCELERATE THE SCALE OF SAF

Boom became a member of the Sustainable Aviation Buyers Alliance (SABA) and the ASTM International 100% SAF Task Force, while continuing participation in the Roundtable on Sustainable Biomaterials (RSB) and the Commercial Aviation Alternative Fuels Initiative (CAAFI).

4

## AIRLINE PARTNER COMMITMENTS TO FUTURE OVERTURE FLEET NET ZERO CARBON FLIGHTS

Overture fleets will run on up to 100% SAF, validated in new commercial agreements with United Airlines and Japan Airlines prioritizing sustainability.

5

## OPTIMIZED FOR MACH 1.7

Boom arrived at the final mission requirements for Overture, which will fly over water at Mach 1.7 (1,188 miles per hour at 55,000 feet)—an optimized balance between speed and efficiency.

6

## LEADING THE FUTURE OF SUSTAINABLE TRAVEL

Boom created the Sustainable Travel Forum, the first privately-driven global forum that allies industries to create the future of sustainable travel. In 2021, Boom hosted the Forum’s first annual conference, the Net Good Summit, which convened global industry leaders, sustainability experts, and creative thinkers to advance the Forum’s vision.

7

## REDUCED COMPANY EMISSIONS

At Boom headquarters in Centennial, Colorado, we switched to 100% renewable energy supplied by Colorado wind, and launched a composting program to reduce methane emissions from landfilling food waste.



# ABOUT BOOM SUPERSONIC

## OUR MISSION

To make the world dramatically more accessible

## OUR CORE DESIGN PRINCIPLES

Speed, safety, and sustainability

## OUR FACILITIES

Company Headquarters: Denver, CO  
Overture Superfactory: Greensboro, NC  
XB-1 Flight Test Hangar: Mojave, CA

## OUR AIRCRAFT PROGRAMS

### XB-1

#### PURPOSE

World's only operational non-military supersonic aircraft, proves design and technology for Overture

#### SEATING CAPACITY

**1 PILOT**

#### UPCOMING MILESTONES

**2022**

XB-1 departs Boom HQ for Mojave

**2022**

First flight

### OVERTURE

#### PURPOSE

First commercial airliner designed for 100% net zero carbon operations

#### SEATING CAPACITY

**65-88 PASSENGERS + CREW**

#### UPCOMING MILESTONES

**2022**

Overture Superfactory groundbreaking

**2025**

Rollout

**2026**

First flight

**2029**

Passenger flights



# ABOUT BOOM SUPERSONIC

## BOOM IS REDEFINING COMMERCIAL AIR TRAVEL

Boom's historic commercial airliner, Overture, is designed and committed to industry-leading standards of speed, safety, and sustainability. Overture will be net zero carbon, capable of flying on 100% SAF at twice the speed of today's fastest passenger jets.



## WORLD CLASS AIRLINE PARTNERS

Overture's current order book is \$14 billion (70 aircraft).



## GOVERNMENT PARTNER

Three-year strategic partnership valued at up to \$60 million.



U.S. AIR FORCE

## ADDITIONAL PARTNERS



**Rolls-Royce**  
Engine research and development program



**Collins Aerospace**  
Noise reduction



**American Express**  
Co-marketing & Global Business Travel



**Amazon Web Services**  
AWS high performance computing capabilities

# SAF

Sustainable Aviation Fuels

## COMMITTED TO 100% SAF

Overture will be designed to operate on 100% SAF and accommodate future, more environmentally friendly SAF.

## NET ZERO CARBON BY 2025

Boom is targeting 2025 to achieve net zero carbon.



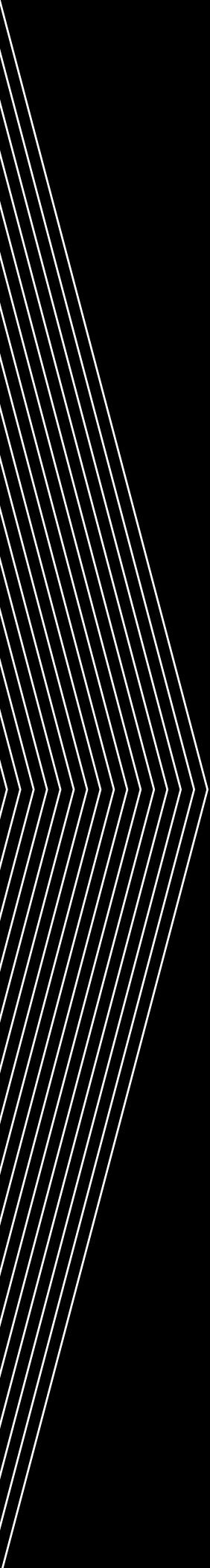
## OVERTURE SUPERFACTORY

Overture final assembly line announced in Greensboro, NC. Groundbreaking is set to occur in 2022, airliner production beginning in 2024, and the facility is expected to create 2,400 jobs by 2032.





# CLIMATE



# ACHIEVING NET ZERO CARBON

## CARBON NEUTRAL IN 2021. NET ZERO CARBON BY 2025.

Current scientific consensus indicates that carbon dioxide (CO<sub>2</sub>) emissions are the leading driver of climate change and one of the biggest threats to our planet (Environmental Protection Agency [EPA], 2022). Addressing this global threat requires urgent, responsible, and collective efforts by government, industry, and individuals. All viable climate strategies must be leveraged, including both rapidly reducing emissions and increasing effective carbon removal solutions.

Our efforts in achieving carbon neutrality in 2021, and our pathway to net zero carbon, are defined by three essential steps: regularly measure, reduce, and offset remaining emissions.

- **Measure:** Account for the emissions of our entire value chain (scope 1-3)
- **Reduce:** Continuously evaluate and deliver on opportunities to drive reductions in carbon
- **Offset:** Invest in a broad portfolio of high-impact, high-quality carbon offset solutions for residual emissions that cannot be mitigated

### OUR NET ZERO TARGETS

Boon strives to be an industry leader in setting carbon reduction targets and acting on those commitments. In 2020, we became the first aircraft manufacturer to sign The Climate Pledge (TCP), a collective committing companies to achieve net zero carbon by 2040, ten years ahead of the Paris Agreement's targets.

Boon plans to go beyond our Climate Pledge commitment by achieving net zero carbon emissions, a major milestone on the path to net zero greenhouse gas emissions (or simply, “net zero”), even sooner—targeting 2025.



# MEASURE

Boom Supersonic’s roadmap to net zero carbon by 2025 and net zero greenhouse gas emissions by 2040 begins with measurement—accurate, detailed emissions tracking—and reporting on our impact.

Transparent reporting is the first step to developing a robust carbon reduction strategy, including enabling Boom to achieve carbon neutrality beginning in 2021. We plan to use this data in 2022 to further refine and execute our emission reduction plan, with ambitious targets for year-over-year improvement and interim milestones towards our net zero commitment.

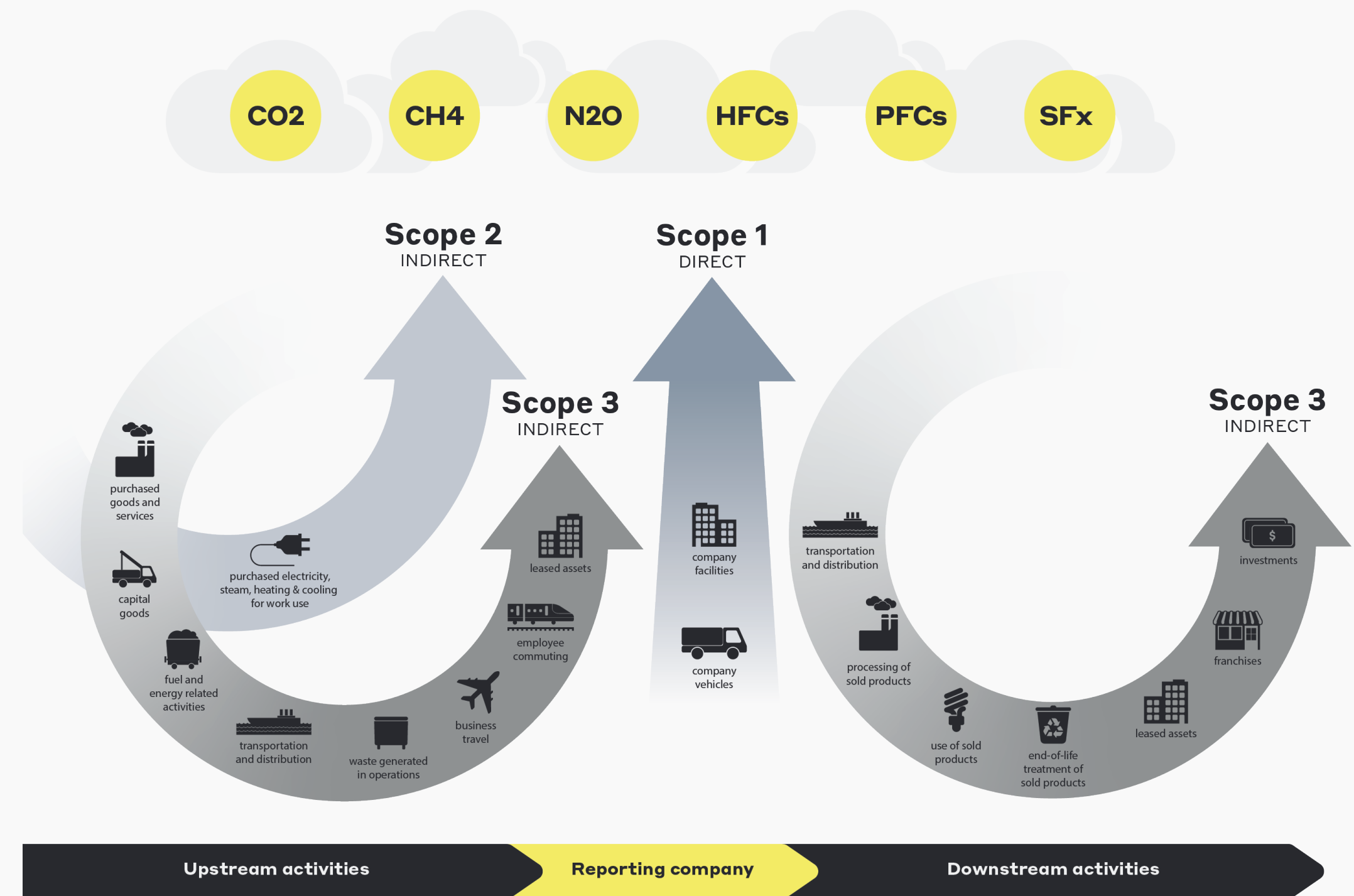
## MEASUREMENT & REPORTING STANDARDS

Boom calculates emissions in accordance with the GHG Protocol, the global standardized framework for measuring and managing greenhouse gas emissions.

The GHG Protocol defines three different scopes of direct and indirect greenhouse gas emissions, with explicit guidance for their measurement and reporting.

While accounting is standardized through the GHG Protocol, there is no standard procedure in place for reporting on emissions. A number of voluntary reporting standards exist, such as the CDP, the Global Reporting Initiative (GRI), and the Sustainability Accounting Standards Board (SASB); however, metrics can differ substantively and these systems lack comparability across data. The GHG Protocol accounting method complies with nearly all reporting frameworks; but at present, no singular existing framework can provide the same degree of reliability as seen in typical financial disclosures (Cannon et al., 2020).

As such, Boom’s 2021 report is focused on our commitments and actions to address critical environmental challenges. As climate-related disclosures and reporting guidance becomes more standardized and potentially regulated, Boom will adopt a standardized reporting framework.



The GHG Protocol defines three different scopes, or categories, of greenhouse gas emissions. The GHG Protocol delineates scopes by direct and indirect emissions sources and provides explicit guidance for their measurement and reporting.



# WATERSHED PARTNERSHIP

In 2021, Boom partnered with Watershed for carbon emissions accounting and climate strategy in order to ensure compliance with the GHG Protocol. We selected Watershed for its deep expertise in tip-to-tail carbon accounting, and its methodology has received third-party verification.

Boom and Watershed used the most recent and relevant emissions guidance available. Environmental Protection Agency (EPA) emission factors were incorporated as well as more specific factors, such as material-specific carbon intensities for supply chain emissions as defined by the trade association International Aerospace Environmental Group (IAEG).

Beginning in 2023, after an additional year of data is collected and analyzed, Boom's emissions reporting will be audited and verified by a third party.



**Ben Murphy**

Head of Sustainability Policy

**A typical week:** Typical doesn't really exist when there are so many facets to achieving [sustainable supersonic flight](#)! I jump from improving our data quality for next year's emissions accounting to advocating for policies that accelerate net-zero carbon fuels to working on [partnerships for plasma-assisted combustion](#) to reduce emissions.

**Our approach:** We're working to remove the barriers to travel—not just the time it takes, but also the environmental impacts. Climate strongly informs our evaluation of customers and suppliers, and having set an internal cost of carbon helps us make data-driven, environmentally-conscious decisions.

**I'm proud of:** Achieving carbon neutrality beginning in 2021 and publishing our first annual sustainability report in the next few weeks.

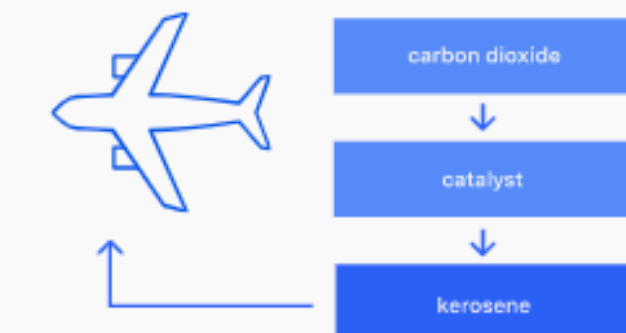
**I'm optimistic because:** Even though aviation is a challenging sector to decarbonize, the rapid acceleration of sustainable aviation fuels over the past few years clearly shows that the future of aviation really will be sustainable. This isn't yesteryear's bio fuel, it's a forward looking technology—pulling CO<sub>2</sub> directly from the air to create net zero carbon fuel.



Working to make travel faster, cleaner, and more beneficial to communities—creating a new model for strategic sustainability in aviation.

They didn't just tack on a climate program; they wove climate thinking into their DNA from day one.

direct air capture  
**Sustainable Aviation Fuel**



“Boom is working not just to be a leader in decarbonizing aviation, but to also **drive systematic change across the entire industry.**”

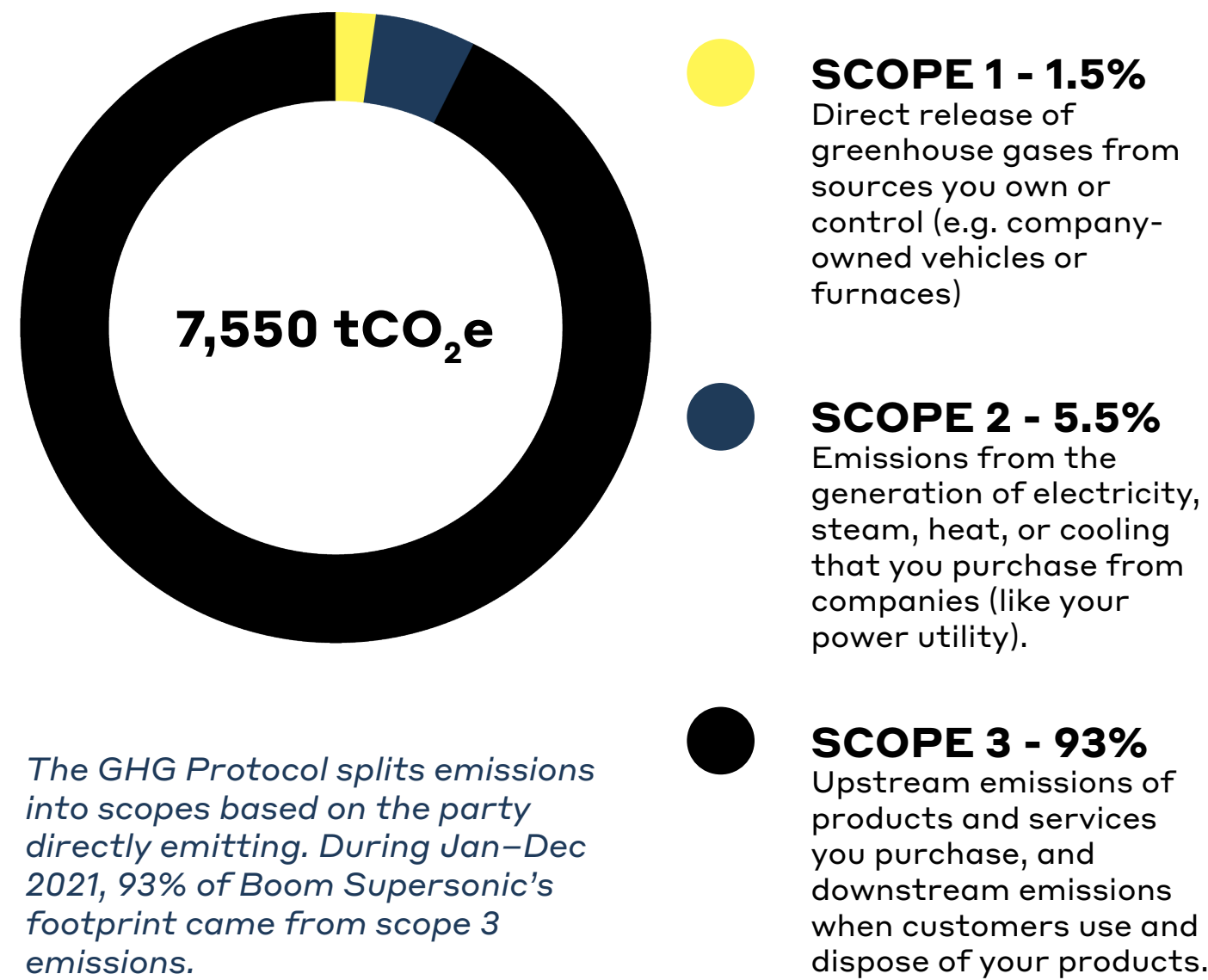
Source: Watershed



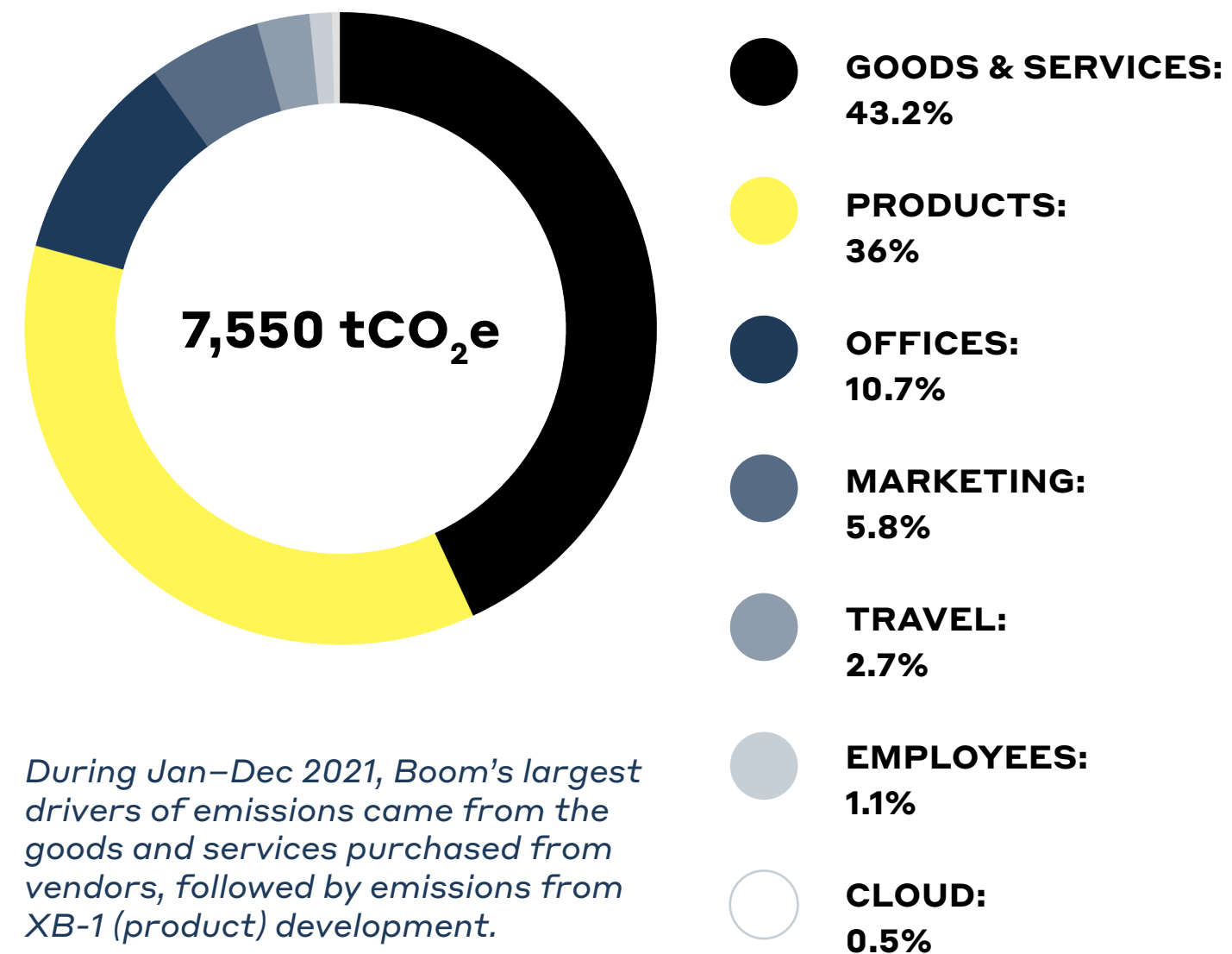
# 2021 EMISSIONS FOOTPRINT

BOOM EMISSIONS DATA PROVIDED BELOW INCLUDES OUR OPERATIONS FROM JANUARY 2021–DECEMBER 2021.

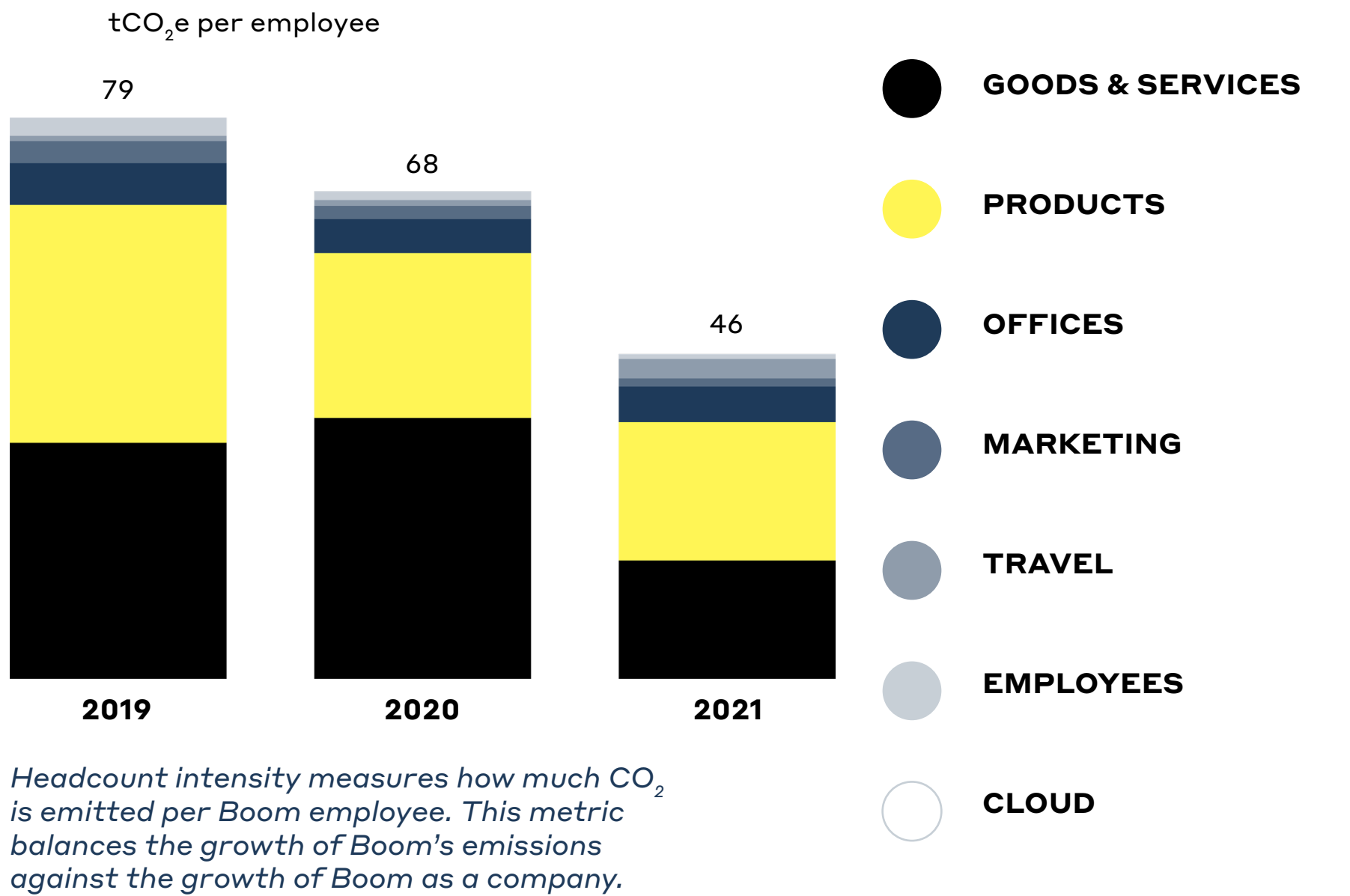
## → 2021 EMISSIONS BY SCOPE



## → 2021 EMISSIONS BY CATEGORY



## → 2019-2021 EMISSIONS BY HEADCOUNT INTENSITY



# FULFILLING SCOPE 3 CARBON NEUTRALITY

IN 2021, BOOM ACHIEVED CARBON NEUTRALITY, ACCOUNTING FOR AND OFFSETTING BOOM GREENHOUSE GAS EMISSIONS ACROSS ALL SCOPE 1, 2, AND 3 EMISSIONS.



## NET ZERO CARBON FLIGHTS

In 2021, Boom signed a commercial agreement with United Airlines, wherein the airline will purchase 15 Overture airliners, once Overture meets United's demanding safety, operating and sustainability requirements, with an option for an additional 35 Overture aircraft. Boom is proud that as part of this agreement, United intends to operate its Overture fleet at net zero carbon from day one, optimized to run on up to 100% SAF.

United's leadership in sustainability serves as an example of what Boom looks for in partners. We plan to work with current and future airline customers to confirm their intention to operate Overture at net zero carbon, following United's lead.

Scope 3 emissions, also referred to as value chain emissions, include "upstream" and "downstream" emissions and often account for the largest contribution of an organization's emissions (EPA, 2022). Because scope 3 emissions occur from sources a company does not own or directly control, there are currently no requirements to measure or report these emissions. However, measuring and accounting for scope 3 emissions are critical to achieving net zero.

Aviation manufacturers are in a unique position with respect to emissions accounting, as the vast majority of emissions fall under scope 3.11, "Use of Sold Products." For an aircraft manufacturer, this category includes the emissions from all fuel burned by all airplanes produced. When the manufacturer's customer is an airline, the manufacturer's scope 3 emissions would include the airline's scope 1 emissions. When Overture enters service, Boom estimates that scope 3.11 will become the largest source of our emissions—over 99%.

For Overture to achieve net zero carbon, operators must use sustainable aviation fuel (SAF) and/or purchase high-quality carbon removal credits. The financial responsibility for the SAF premium or credit purchase can be covered by anyone in the supply chain: the engine OEM, airframer, airline, or a combination thereof.

While challenging and voluntary, Boom has committed to accounting for the entirety of scope 3 and will work with industry partners across our entire value chain to achieve carbon neutrality.



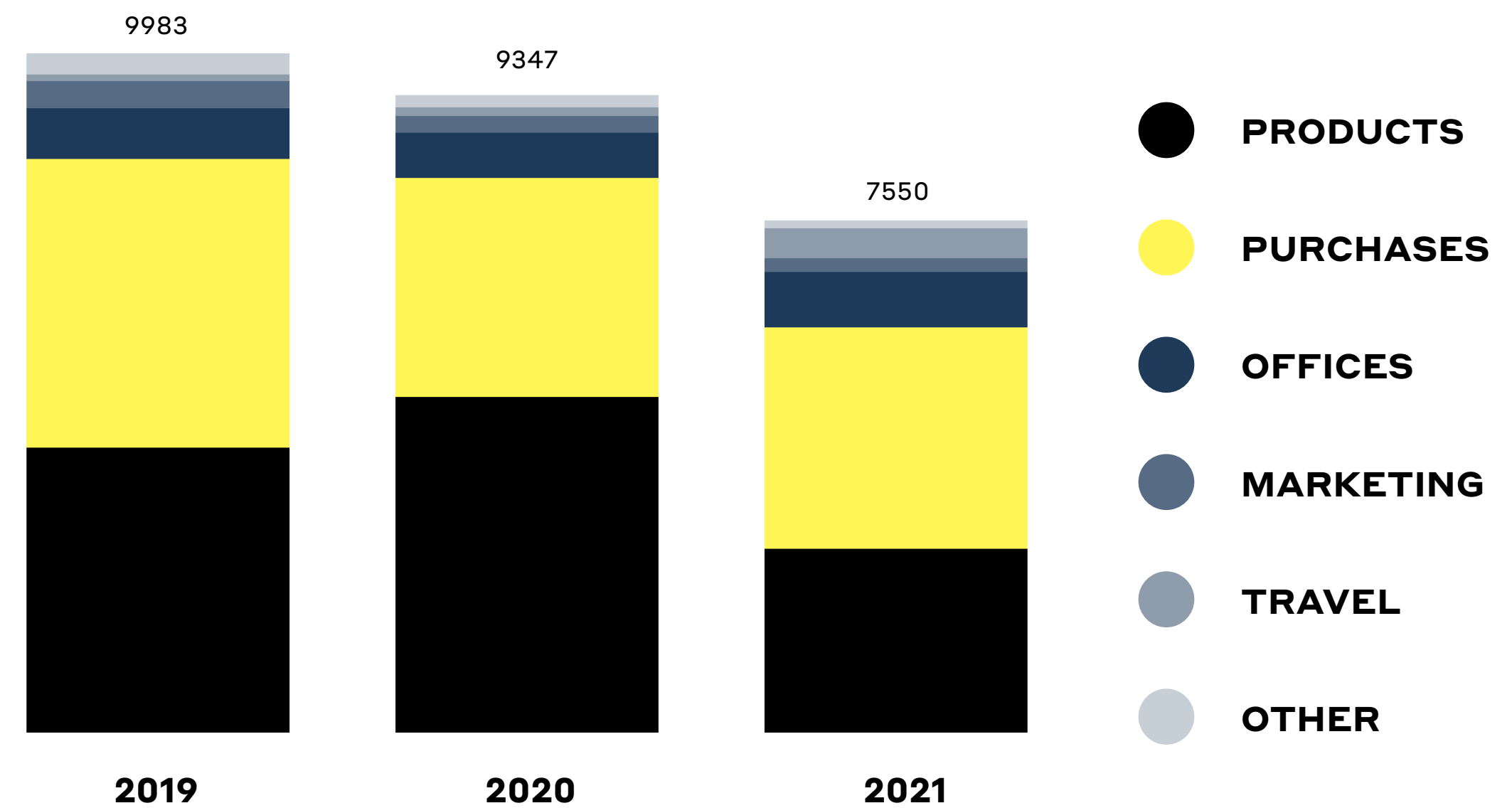
# SETTING TARGETS

While 2021 serves as the first year Boom formally measured and voluntarily reported on its emissions, 2019 will function as Boom’s “base year” for tracking ongoing emissions performance—the first year verifiable data was collected across all three scopes, as defined by the Science Based Targets Initiative (SBTi).

Boom emissions data informs the science-based target we will commit to in 2022. Targets are considered “science-based” if they align with the goals codified in the Paris Agreement—to limit global warming to 1.5°C—and follow emissions mitigation pathways derived from the Intergovernmental Panel on Climate Change (IPCC) Special Report (CDP, 2020). Science-based targets provide companies with a clearly defined, sector- and size-specific path to reduce emissions.

Along with developing targets and a reduction plan in 2022, Boom plans to conduct a preliminary materiality assessment. Materiality assessments engage stakeholders to understand an organization’s most pertinent environmental, social, and governance topics and help inform sustainability reporting, management, and strategy. Our preliminary assessment will help prioritize sustainability issues with the most significant impact and lay the foundation for a more robust official materiality assessment planned for the following years.

## → EMISSIONS BY YEAR tCO<sub>2</sub>e



Boom has set 2019 as its “base” year, or the first year verifiable data was collected across all three scopes, as defined by SBTi. Since 2019, net GHG emissions have been reduced by 12.2% on average year-over-year (Jan-Dec).



# REDUCE

BOOM AIMS TO TAKE A HOLISTIC LIFECYCLE APPROACH TO SUSTAINABILITY AND EMISSIONS REDUCTION, INCLUDING CORPORATE OPERATIONS AND ACROSS ALL PHASES OF THE OVERTURE PROGRAM (DESIGN, BUILD, FLY, RECYCLE).

1

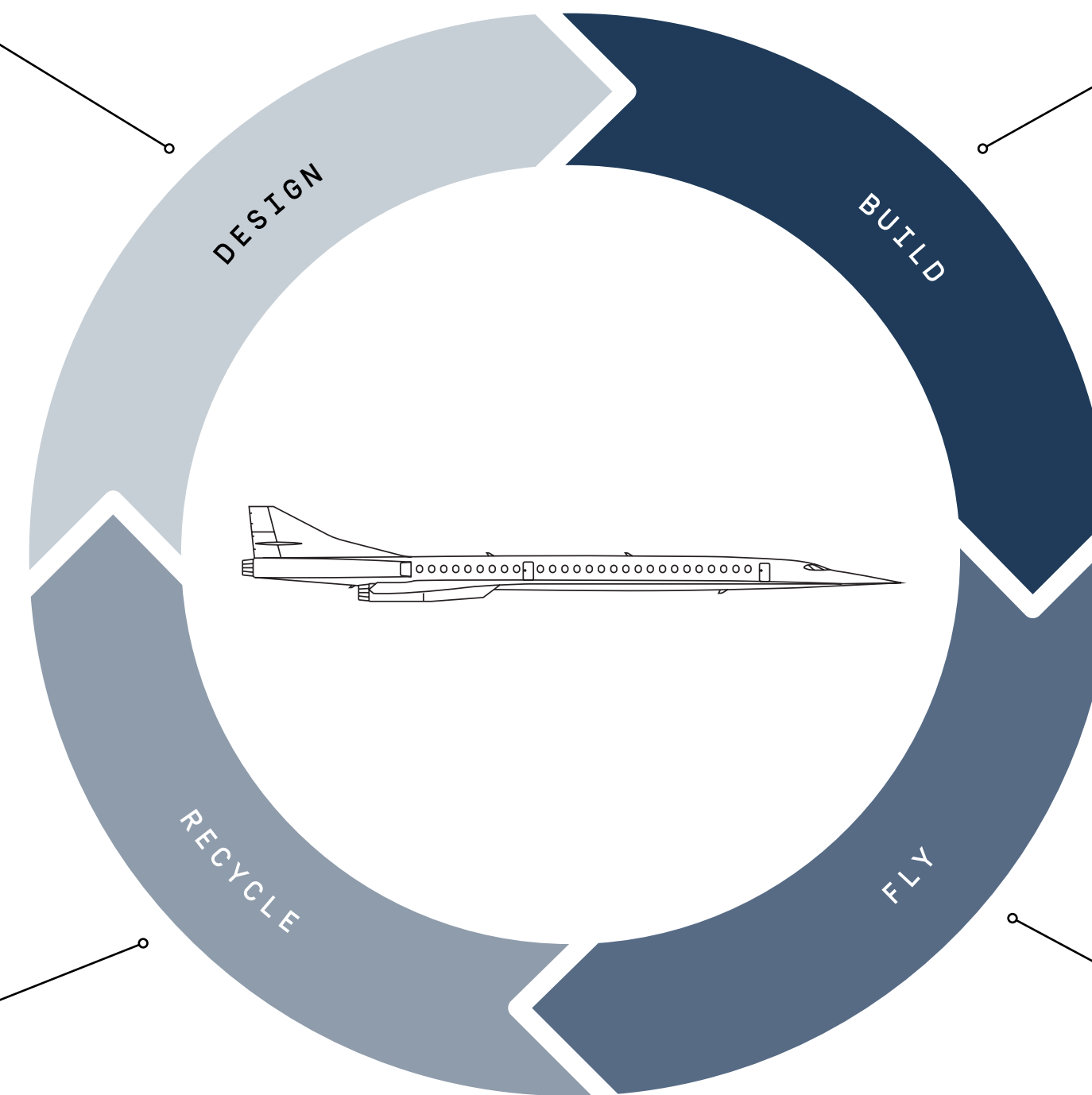
## DESIGN

- Optimizing for maximum efficiency
- Designing for current and future 100% SAF
- Prioritizing noise reduction
- Employing circular economy principles

2

## BUILD

- Building LEED-certified facilities
- Utilizing 100% renewable energy
- Employing resource minimization learnings from XB-1



4

## RECYCLE

- Employing operational recycling
- Recycling Overture components

3

## FLY

- Operating Overture at net zero carbon with SAF
- Innovating to optimize routes
- Sharing expertise to increase SAF adoption





# DESIGN

## OPTIMIZING FOR MAXIMUM EFFICIENCY

- Overture will be powered by medium-bypass turbofan engines, avoiding noisy and fuel-inefficient afterburners.
- Boom is leveraging state-of-the-art computational aerodynamic tools, allowing for rapid iteration and optimization of Overture's airframe for aerodynamic efficiency—down to each millimeter of design.
- Overture will be manufactured using advanced composite materials like carbon fiber, which will reduce weight, drag, and fuel burn.

### REACHING MACH 1.7

In 2021, Boom arrived at the final design speed for Overture, which will fly over water at Mach 1.7 (1,188 miles per hour at 55,000 feet). This was informed by a number of considerations, including significant benefits in noise and environmental performance. To avoid sonic boom community noise, Overture will fly Mach 0.94 over land—considerably faster than subsonic commercial aircraft.

Supersonic aircraft have a fundamental challenge in balancing landing and takeoff (LTO) noise with efficiency. Typical aircraft rely on large diameter, high-bypass ratio engines to reduce LTO noise. However, these large diameter engines result in greatly increased drag during supersonic flight. Boom developed high-fidelity computational optimization processes and innovative noise-reducing technologies to perfect the balance between noise and efficiency.

The move to Mach 1.7 enables a significantly more efficient design, as well as lower cruising altitude. This efficiency improvement comes at only a marginal increase in block time from a Mach 2.2 aircraft—Overture will still cut flight times by up to 50%. Mach 1.7 also reduces the challenges of the noise-to-efficiency tradeoffs faced by supersonic aircraft, ultimately sacrificing very little noise and efficiency performance thanks to innovations in design optimization and noise-reducing technologies.



# DESIGN

## DESIGNING FOR CURRENT AND FUTURE 100% SAF

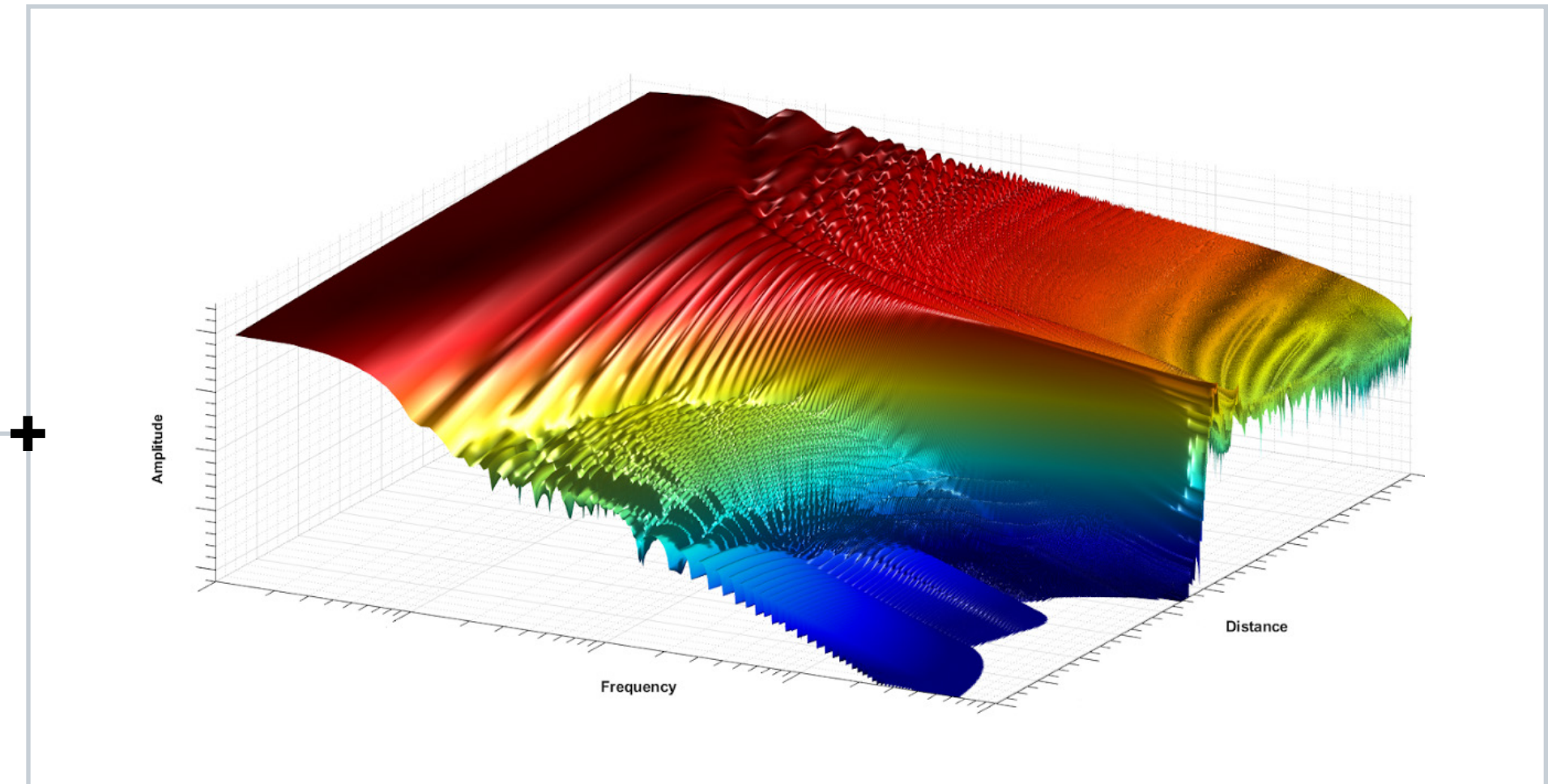
- Overture will be designed to operate on 100% SAF and achieve net zero carbon through advanced biofuels, waste-based fuels, and power-to-liquid fuels, which offer up to 100% lifecycle CO<sub>2</sub> reduction.
- Overture will be able to accommodate future SAF specifications, which feature improved performance characteristics and reduced environmental impacts compared to today's drop-in blended fuels.

## PRIORITIZING NOISE REDUCTION

- Boom is investing in efforts to estimate and address noise, including using first-order models, advanced computational analysis of jet and airframe noise, and acoustics tests on both the vehicle noise and engine jet noise.
- Innovative noise reduction technologies will be integrated into Overture, such as a variable noise reduction system, to minimize noise impacts while maintaining fuel efficiency.
- Overture will meet the same landing and takeoff (LTO) noise levels as existing subsonic standards—equivalent to ICAO Chapter 14 and FAA Stage 5.

## EMPLOYING CIRCULAR ECONOMY PRINCIPLES

- Recycling considerations are incorporated into Overture's design to minimize the amount of waste generated at end-of-life. These strategies include sustainable and regenerative material selection, sourcing, and certification, as well as upcycling.
- Boom is designing in-cabin technology to be modular and easily swappable to ensure future compatibility.



The above plot is a notional acoustic pressure field of a focused sonic boom within the focal zone, from doctoral research conducted by Acoustics Staff Scientist Joe Salamone. The plot is used to predict the amplitude of a sonic boom that undergoes sonic boom focusing. It demonstrates both the amplification and decay of sound as a function of frequency and relative distance from the focusing location. Note that Overture will only fly supersonic over the ocean to avoid sonic boom impact above populated areas.



# BUILD



## BUILDING LEED-CERTIFIED FACILITIES

- Boom is planning to build all new facilities to LEED specifications—including the Overture Superfactory in Greensboro, North Carolina.
- Boom is evaluating other sustainability measures, including adopting waste-minimizing production practices, eliminating all onsite combustion, using electric heat rather than gas furnaces, and utilizing on-site photovoltaic panels.



## UTILIZING 100% RENEWABLE ENERGY

- Only 100% renewable energy will be used across all facilities, including use of onsite clean electricity generation, in-state production through renewable energy utilities, and renewable energy credits if necessary.

### POWERED BY 100% RENEWABLE ENERGY

Boom switched to 100% renewable energy at the company's Colorado headquarters in 2021 through Xcel Energy's Windsource program, supplied entirely from wind farms in Colorado.



## EMPLOYING RESOURCE MINIMIZATION LEARNINGS FROM XB-1

- XB-1's development leveraged advanced prototyping techniques through additive manufacturing with Stratasys and Velo3D, resulting in less manufacturing waste and lighter products.
- Manufacturing tooling—typically disposed of after use—was repurposed for new applications, such as repurposing carbon laminating tools from XB-1's wing skins into vacuum assembly fixtures.

## ENGAGING OUR SUPPLY CHAIN

Boom is committed to integrating sustainability throughout our supply chain. We are working with suppliers from the beginning to identify unique solutions to sustainability and to address scope 3 upstream emissions.

These efforts include:

- Requiring Tier 1 suppliers to provide the information needed to robustly calculate and address emissions.
- Including provisions in Boom's supplier requirements and code of conduct requesting suppliers to account for GHG emissions, report on environmental performance, set science-based reduction targets, and collaborate on sustainable product and process development.
- Working with suppliers to identify carbon offsetting responsibility and recommending offsetting strategies and solutions.



# FLY



*Potential routes for Overture are primarily international and transoceanic.*

## OPERATING OVERTURE AT NET ZERO CARBON WITH SAF

- Boom is prioritizing airline partners who intend to operate Overture at net zero carbon.
- Overture flight testing and delivery will use 100% SAF.
- The expected costs of any high-quality, CORSIA-compliant necessary offsets are included in Overture's economic model, ensuring that the aircraft remains economically viable while meeting our sustainability mission.

## INNOVATING TO OPTIMIZE ROUTES

- Overture will be optimized to minimize fuel burn en-route using a proprietary internal flight planning tool. The smart routing tool calculates the most efficient distance- and time-minimizing routes, with consideration of constraints such as subsonic flight over land and “coastal buffer zones” to avoid impacting communities with sonic booms.

## SHARING EXPERTISE TO INCREASE SAF ADOPTION

- Educating key stakeholders is embedded in Boom's strategy to accelerate SAF accessibility and price parity. In multi-industry presentations and prospective partner meetings, we advise on the importance of SAF and provide guidance on how the aviation industry can support the transition to and adoption of SAF.



# RECYCLE

## EMPLOYING OPERATIONAL RECYCLING

- Boom recycles metals, plastics, and other materials in our manufacturing and office facilities.



### DIVERTING WASTE

In 2021, Boom launched a composting program at our Colorado headquarters to reduce methane emissions from landfill food waste.

## RECYCLING OVERTURE COMPONENTS

- Boom is committing to circularity—eliminating waste by reusing, refurbishing, remanufacturing, and recycling products and materials—and is designing Overture to enable reclamation of up to 95% of the aircraft’s materials at end-of-life.



In 2021, Boom joined the Aircraft Fleet Recycling Association (AFRA), ensuring that best practices for recycling and reuse are integrated in Overture’s design from an early stage. AFRA represents companies from across the globe and throughout the supply-chain—from manufacturers to materials recyclers, and researchers working to develop, improve, and promote the sustainable management and circularity of end-of-life aircraft materials and components.



Source: Adobe Stock



# CARBON REMOVAL AND OFFSETTING

## OUR APPROACH TO CARBON REMOVAL AND OFFSETS

At Boom Supersonic, we believe that decarbonization alone will be insufficient to halt and reverse climate change. To keep global warming below 1.5°C, the world needs to remove carbon dioxide already in the atmosphere.

There are two types of carbon removal solutions: nature-based solutions that sequester carbon in plants and soils (e.g., by planting trees or reforesting previously deforested land), and technology-based solutions, which capture carbon from the atmosphere and store it (e.g., using direct air capture and sequestration in cement). Both are necessary for the world to achieve net zero.

Carbon removal projects are unlike traditional carbon offsets, or carbon avoidance, which reduce the release of carbon or prevent deforestation. Boom's carbon offsetting approach involves balancing carbon removal and carbon avoidance within short- and long-term strategies. To achieve carbon neutrality through 2025, we plan to use a blend of CORSIA-accredited, high-quality, carbon avoidance offsets with a focus on social impact and advanced monitoring to ensure permanence, as well as carbon removal credits.

Today, some types of carbon avoidance offsets are fairly criticized, such as when some organizations purchase low-cost, low-quality offsets while continuing to emit carbon. In stark contrast, Boom is committed to high-quality, nature-based offsets. Nature-based carbon avoidance offsets involve the protection, restoration, or management of forests, wetlands, and other ecosystems (Seddon et al., 2021). These offsets are critical to reducing global warming in the short-term because they help protect and restore carbon-sequestering ecosystems, while also improving land management, supporting flood abatement, mitigating air pollution, and slowing declines in biodiversity (Girardin et al., 2021). Simultaneously, these projects can contribute to communities' socio-economic development by enhancing public health, supporting livelihoods, protecting communities and infrastructure from flooding and erosion, and ensuring food security (Fankhauser et al., 2021). With technology-based carbon removal still in nascent industrialization, we are investing in readily available, high-quality, nature-based carbon avoidance offsets in the short term.

After 2025, our roadmap to net zero carbon prioritizes carbon removal solutions. Long-term net zero strategies do not utilize carbon avoidance offsets and leverage only carbon removal credits, such as reforestation and direct air carbon capture and sequestration. Boom is an active proponent of supporting technology-based carbon sequestration and storage initiatives, such as Climeworks, particularly now as their technology continues maturing to help drive down costs in the future. While direct air capture and storage is currently more expensive than carbon removal through reforestation, Boom believes that paying a premium today to purchase direct air capture and storage credits is critical to create demand, help advance industry technology, and make the technology more accessible over time. As such technology matures, affordability will allow for carbon capture and storage credits to become the bulk of Boom's net zero carbon portfolio.

## MEETING ICAO CORSIA CRITERIA

Boom supports the International Civil Aviation Organization (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) mechanism, which allows aircraft operators to offset carbon emissions that cannot be avoided.

CORSIA is ICAO's "carbon-neutral growth" framework, aimed at capping net carbon emissions from international air travel at 2019 levels. An airline that increases emissions beyond the 2019 baseline will be required to utilize SAF or purchase carbon offsets, such as investing in new renewable energy stations, planting forests, or paying for carbon sequestration.

CORSIA offsets must satisfy a series of environmental and social integrity criteria (ICAO, 2019):

- Are additional, or the emissions reduction would not have otherwise happened without the offset
- Are based on a realistic and credible baseline, or a "business as usual" emissions trajectory, demonstrating provable benefit
- Are quantified, monitored, reported, and verified
- Have a clear and transparent chain of custody, with an assigned identification number that can be tracked through an offset's cancellation or retirement via a registry system
- Represent permanent emissions reductions, without risk of reversal
- Assess and mitigate against potential increase in emissions elsewhere (known as material leakage)
- Are only counted once towards a mitigation obligation, avoiding double issuance, double use, and double claiming
- Do no net harm

Boom includes additional principles on top of this commitment:

- Incorporates innovation by advancing technological solutions or pushing technical boundaries (e.g., fuel from CO<sub>2</sub>, novel carbon removal technology, satellite monitoring of reforestation projects, etc.)
- Provides additional social benefits (e.g., job creation, increase in livelihood, promoting inclusivity, etc.)



# CARBON NEUTRALITY BEGINNING IN 2021



*In 2021, Boom supported Pachama's verified reforestation and forest conservation projects in La Fazenda, Brazil, and in the Central Kalimantan Peatlands, Indonesia. Source: Pachama*

In 2021, Boom achieved carbon neutrality by purchasing nature-based carbon avoidance offsets through Pachama and Everland, along with direct air capture and storage carbon removal credits from Climeworks, to cover all scope 1, 2, and 3 emissions.

## NATURE-BASED OFFSETS

**Pachama** is a technology company on a mission to restore nature to solve climate change. Harnessing the latest advancements in satellite imagery, remote sensing, and machine learning, Pachama evaluates the carbon stored in our forests and monitors forest growth over time. Through the Pachama Marketplace, responsible companies can confidently invest in high-quality forest conservation and restoration projects verified by Pachama's rigorous evaluation process.

### 2021 Projects Supported:

- Central Kalimantan Peatlands, Indonesia
- La Fazenda, Brazil

**Everland** represents the world's largest portfolio of high-impact, forest conservation (REDD+) projects in Southeast Asia, Africa, and Latin America, that protect wildlife and enhance the well-being of forest communities while reducing greenhouse gas emissions. The Mai Ndombe Project, developed by Wildlife Works, works in hand with the local forest communities to protect critical wildlife habitats within the Congo Basin, the world's second-largest intact rainforest and some of the most important wetlands on the planet. The project reduces the principal drivers of forest and biodiversity loss while investing in surrounding local communities by building and renovating schools, providing healthcare services, supporting food security and nutrition, and community capacity-building.

### 2021 Projects Supported:

- Mai Ndombe, The Democratic Republic of the Congo



## DIRECT AIR CAPTURE & STORAGE CREDITS

**Climeworks** is a leader in direct air capture (DAC) technology, which captures and removes carbon dioxide directly from the air. Climeworks' direct air capture and storage solution is a permanent, efficient, measurable, and safe carbon dioxide removal solution.



*The Climeworks direct air capture technology runs exclusively on clean energy, and the modular CO<sub>2</sub> collectors can be stacked to build machines of any size. Source: Climeworks*



## THE SOCIAL COST OF CARBON

The social cost of carbon (SCC) is a critical metric for informing climate policy and guiding climate regulations in the U.S. (Resources for the Future [RFF], 2021). SCC is a dollar estimate of all economic damage that would result from emitting one additional ton of carbon dioxide into the atmosphere.

Economists agree that a price on CO<sub>2</sub> emissions set equal to the SCC may be by far the most effective way to mitigate climate change (Metcalf, 2020). However, in decades of global discussions regarding SCC, corollary debates and uncertainties have arisen regarding the emissions covered, calculation models, and the appropriate price of a carbon tax.

Peer-reviewed, empirically-derived research was published in 2021 that combines global data, big data analytics, and detailed climate models to estimate the SCC, rather than assumptions that are scientifically unverifiable (Rode, 2021). In light of this new research, relying upon large-scale data sets for modeling, Boom is a proponent of considering evidence-based policy options that account for SCC.





# ADDRESSING NON-CO<sub>2</sub> EMISSIONS

UNDERSTANDING, QUANTIFYING, INNOVATING, MITIGATING.



Source: Adobe Stock

While carbon emissions represent the largest driver of climate change from aviation, non-CO<sub>2</sub> effects are also contributors. Yet the scientific understanding of non-CO<sub>2</sub> climate effects is still maturing, and research into these contributions continues.

Boon is deploying a two-phased strategy to address non-CO<sub>2</sub> emissions: first, understand and quantify any potential impacts—and second, take a methodical approach to implement mitigations.



# PRIORITIZING CLIMATE SCIENCE

Boom has taken the important first step in understanding Overture's non-CO<sub>2</sub> impacts by prioritizing and investing in climate science.

In 2021, Boom engaged leading climate scientists to better understand the atmospheric effects of Overture emissions in order to inform mitigation strategies. Boom launched a Sponsored Research Agreement with Dr. Donald Wuebbles of the University of Illinois Urbana-Champaign, a respected expert on atmospheric science and widely cited in climate science literature. Dr. Wuebbles has been both a lead author and contributor for Intergovernmental Panel on Climate Change reports and shared a Nobel Peace Prize for this work.

As part of the study with Dr. Wuebbles, Boom is providing aircraft performance data to the University of Illinois laboratory to quantify the specific impacts of Overture. The laboratory will specifically analyze Overture's performance to generate climate assessments. This effort will result in a more robust analysis of supersonic aircraft environmental effects that goes beyond existing studies using notional vehicles. The independent assessment will also help direct research on future SAF properties, providing suggestions on beneficial fuel properties to pursue in a new fuel specification.



## CONTRAILS

Contrails, line-shaped ice clouds which form in the wake of jet aircraft, are a substantial contributor to the climate effects of aviation. There is ongoing scientific debate concerning their exact climate impact, and more research is needed to understand and quantify effects.

At the cruising altitudes typical of supersonic aircraft, contrail formation is greatly reduced compared to typical subsonic cruise altitudes. Research has shown that because stratospheric water vapor concentrations are very low (4–5 ppmv), contrails in the stratosphere would not be expected to grow or persist for very long (Zhang, 2021).

Environmental regulations for aircraft do not currently include contrails; it remains possible that authorities may develop contrail standards in the future. Regardless of the regulatory landscape, Boom believes that the aviation industry should take steps to mitigate contrail formation. In addition to existing operational mitigations (e.g., changing flight paths to avoid contrail-forming regions of the atmosphere) and deploying future zero-aromatics SAF may also reduce contrail formation.



# MITIGATING NON-CO<sub>2</sub> EFFECTS



As understanding of non-CO<sub>2</sub> climate effects continues to improve, Boom is already working to mitigate these impacts by making aircraft modifications, incorporating broad emission-reducing technologies, and investigating new capabilities.

- In 2021, Boom reduced Overture's over water cruise Mach number from Mach 2.2 (1,451 miles per hour) to Mach 1.7 (1,188 miles per hour). By slightly reducing Overture's speed and corresponding cruising altitude, Boom significantly reduced non-CO<sub>2</sub> effects and improved fuel efficiency.
- Overture will be designed to accommodate future SAF without aromatics, which will reduce non-CO<sub>2</sub> emissions and mitigate any remaining contrail effects.
- Boom is evaluating emission-reducing propulsion technologies and engine control schemes to reduce LTO emissions and cruise NOx.
- Boom is also investigating how low-altitude emissions—those produced on the ground and during takeoff, climb-out, approach, and landing—affect local air quality. Boom is working with other manufacturers and broader stakeholders to advance modern LTO emissions standards at ICAO. These updates are expected to be data driven and align with the CAEP Terms of Reference: economically reasonable, technologically feasible, and environmentally beneficial.



# ACCELERATING THE SCALE OF SAF

## INCREASING ACCESSIBILITY AND PRICE PARITY FOR SAF TODAY. ADVANCING SAF FOR THE FUTURE.

Sustainable aviation fuel (SAF) is critical to achieving net zero carbon in the aviation industry.

As a sustainable substitute for conventional jet fuel, SAF currently available in 2021 can reduce carbon emissions by up to 80%, while future SAF technologies could provide up to 100% lifecycle carbon reductions and enable truly net zero carbon operation.

Boom's sustainability strategy centers on scaling SAF production and use: accelerating the advancement, commercialization, accessibility, and price parity of SAF.

### INTRODUCING SUSTAINABLE AVIATION FUELS (SAF)

SAF is a mix of hydrocarbons that is chemically similar to conventional jet fuel but is not derived from fossil fuels. SAF instead relies on carbon atoms from organic and waste materials, known as feedstocks. These include waste oils, algae, forest residues, municipal solid waste, and industrial gasses, as well as atmospheric CO<sub>2</sub>.

While fossil fuel and SAF produce the same amount of CO<sub>2</sub> emissions when burned, the carbon atoms in SAF were already circulating in the carbon cycle—for example, biofuel SAF is produced from plants that removed CO<sub>2</sub> from the atmosphere during growth. In this way, SAF forms a closed carbon loop. A net reduction in CO<sub>2</sub> emissions is achieved relative to fossil jet fuel when carbon reductions are calculated over the fuel's entire lifecycle—including emissions from extracting the feedstock and refining the fuel through to combustion of SAF in a jet engine. ICAO's CORSIA framework mandates sustainability requirements for SAF. These requirements include a minimum 50% lifecycle CO<sub>2</sub> emission reduction, limited fresh-water requirements, does not contribute to food scarcity, and also accounts for indirect land use considerations (preventing deforestation).

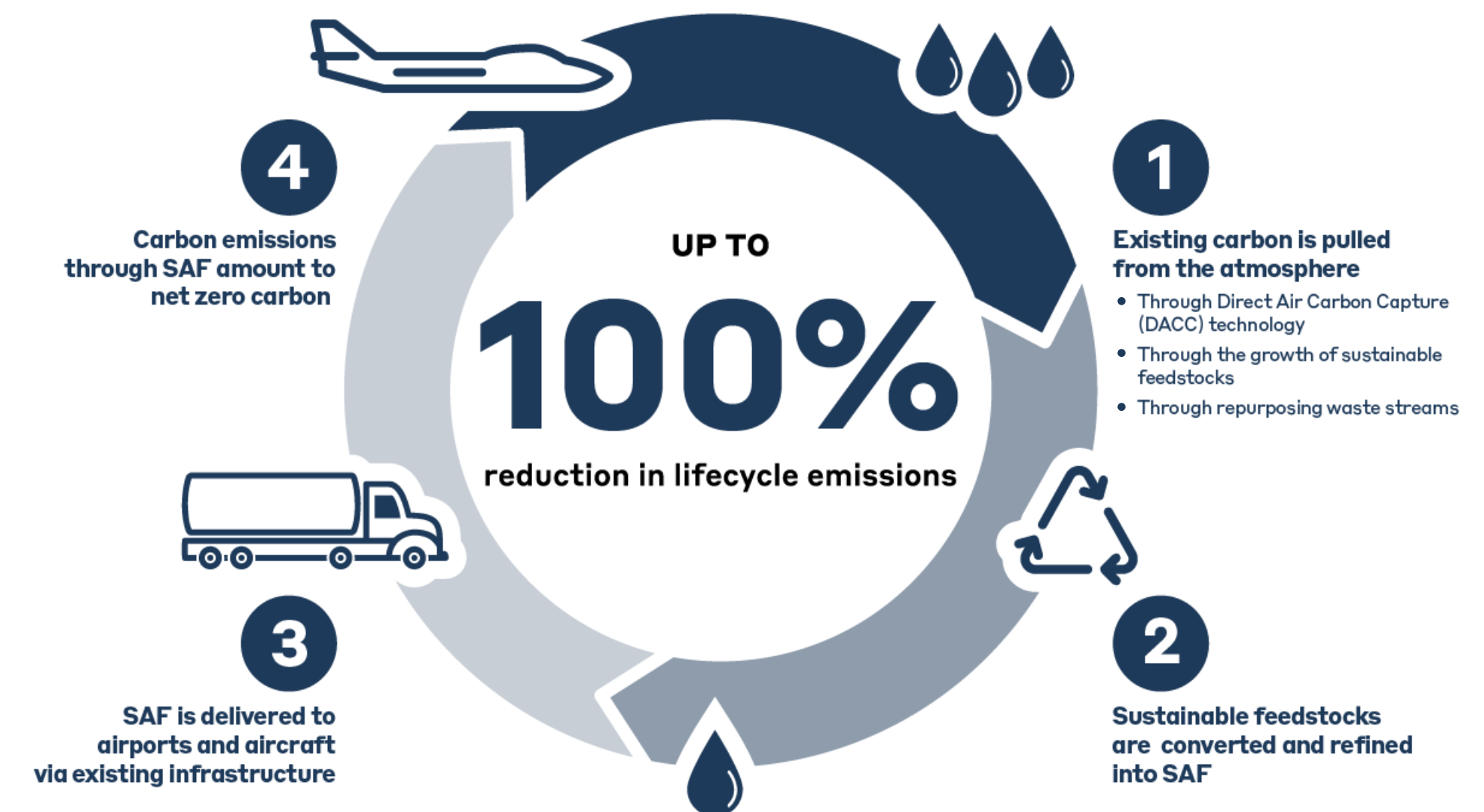
Direct air carbon capture, sometimes referred to as Power to Liquid (PtL) or Power to Jet, is Boom's preferred SAF pathway. PtL has the potential to be the most sustainable solution for aviation—as well as the most promising for long-term scalability and affordability.

While PtL achieves nearly 100% lifecycle carbon reduction and is nearly infinitely scalable, it is currently also the lowest maturity technology. Fortunately, a number of companies and academic institutions are working on this type of technology—including one of Boom's partners, Prometheus.

In addition to the sustainability benefits, production of SAF has increased economic benefits. It advances energy independence, decoupling the price of jet fuel from the price of crude oil. This provides stability to airlines and passengers. Additionally, SAF creates a market for waste materials such as municipal solid waste and agricultural residues, and will create jobs throughout the process—from feedstock production through refining and delivery.

### SAF LIFECYCLE REDUCTION

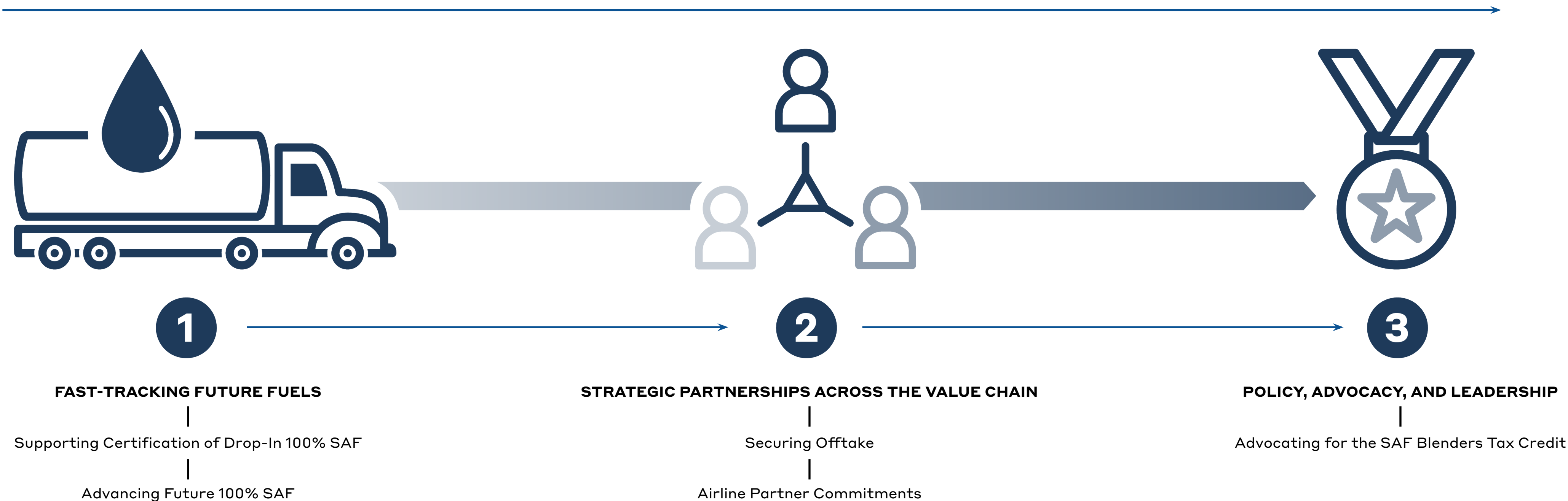
SAF has the potential to reduce lifecycle emissions by up to 100% compared to conventional jet fuel.



# BOOM SAF STRATEGY

SAF IS CRITICAL TO BOOM'S MISSION OF BUILDING A SUSTAINABLE SUPERSONIC AIRLINER.

While Boom is designing Overture to accommodate 100% SAF, our focus goes beyond a sustainable product strategy and our own net zero commitments. We are working to make sustainable aviation fuels the industry standard while accelerating the scale of SAF through efforts to fast-track future fuels, build strategic partnerships across the value chain, and lead efforts in advocacy.



# FAST-TRACKING FUTURE FUELS

SAF can be categorized into three generations of technology:

- SAF 1.0 - Currently-available SAF is approved in blends of up to 50% with conventional jet fuel. This blending enables the fuel to be “drop-in,” capable of use in any existing aircraft and airport infrastructure without any modifications or issues. This SAF is able to achieve up to an 80% lifecycle carbon reduction, but faces economic and scaling challenges.
- SAF 2.0 - Often called “drop-in 100% SAF,” these proven SAF technologies are presently being industrialized, including PtL and advanced biomaterial-based SAF. These are expected to be introduced by 2030, and will be compatible with existing engines (hence the term “drop-in”), scalable and economical, and can achieve 100% lifecycle carbon reduction. SAF 2.0 provides an immediate and clear path to reducing aviation carbon emissions.
- SAF 3.0 - Emerging SAF technology, called “Jet X,” maximizes environmental benefits. This includes 100% lifecycle carbon reduction, reduced contrail formation, and greater energy density. Like SAF 2.0, it will be scalable and economical. SAF 3.0 comes with challenges; in particular, the requirement that engines and aircraft be designed to accommodate this future fuel.

Boom is taking a two-part approach to ensure the availability of SAF in the near term and prepare for the future: (1) joining industry efforts to rapidly scale drop-in 100% SAF (SAF 2.0), and (2) supporting development of future pathways and fuel specifications that will provide greater benefits in the long term (SAF 3.0).

## SUPPORTING CERTIFICATION OF DROP-IN 100% SAF

To achieve use of drop-in 100% SAF, robust research and testing is required to inform and approve a new standard with ASTM International, the standards body that assures the testing and safety of any new fuel. This evaluation is currently underway, and ASTM is expected to approve drop-in 100% SAF in the near future. Extensive testing thus far has proven it is safe to use and results in meaningful CO<sub>2</sub> reductions, with no apparent risks remaining for drop-in 100% SAF.

Because Overture is being developed within the same timeframe as drop-in 100% SAF certification, Boom is poised to contribute to fuel approval efforts and the aircraft may provide a valuable opportunity for testing during fuel approval. Boom will carry out robust development and testing specific to Overture to ensure compatibility.



## PARTNERING TO FACILITATE APPROVAL

Boom intends to serve as a bridge between SAF producers and suppliers to promote meaningful adoption of alternative fuels, and participates in associations geared toward facilitating SAF advancement. These groups include the Commercial Aviation Alternative Fuels Initiative (CAAIFI) and Roundtable on Sustainable Biomaterials (RSB).

In 2021, Boom joined the new ASTM International 100% SAF Task Force, which will oversee development and qualification efforts for increasing permitted blend ratios. Because Overture is not yet capable of directly testing fuel performance, current efforts are focused on deepening engagements as Overture matures. Accommodating 100% SAF is a top-level Overture requirement being flowed down to suppliers.



# FAST-TRACKING FUTURE FUELS



## ADVANCING FUTURE SAF

As a completely new aircraft design, Overture is being designed to accommodate Jet X (or SAF 3.0), capturing the fuel's full potential to achieve 100% lifecycle carbon reductions and reduce non-CO<sub>2</sub> effects.

Efforts towards Jet X include working with our engine partner to define a future fuel specification, conducting research with national laboratories, forging partnerships with SAF producers best suited to produce Jet X, and advocacy to garner broader support for the fuel.

Alternative fuel production, either from biomass feedstocks or power-to-liquid CO<sub>2</sub>, allows for the optimization of fuel characteristics that cannot be easily achieved with petroleum-based fuels. The ability to customize these properties within a new fuel specification could enable significant improvements in aircraft performance, most notably reduced fuel burn and increased range, as well as a reduction in environmental impacts. These properties include reduced aromatics (contributing to a reduction in contrail climate impact), increased thermal stability, increased energy density, and increased specific energy, as well as changes to viscosity, lubricity, and other characteristics to achieve additional functional performance and operability effects.

In particular, improvements in specific energy and energy density can result in a lower total aircraft weight and reduced fuel burn. Higher thermal stability may allow for greater efficiency and decreased engine maintenance (Holladay et al., 2020). While it is possible to customize petroleum-based fuels to achieve these improvements, the end product is expensive and does not necessarily address climate impacts. The advancement of synthetic and sustainable aviation fuels is expected to provide a more economical pathway to producing advanced fuels. These characteristics are expected to have meaningful emissions reductions as well as reduced non-CO<sub>2</sub> impacts.

There are challenges associated with introducing a new fuel which would be incompatible with existing infrastructure, from the fuel delivery system to aircraft and engine systems. Unlike drop-in SAF, Jet X or future SAFs may require dedicated infrastructure. In addition, safeguards will be needed to ensure the fuel is not used by legacy aircraft requiring Jet A/A-1. As safety is a top priority, the risks and implications from fueling errors are critical—however, these risks are solvable.

Jet X and future SAFs will need to go through the robust ASTM approval processes to ensure safety and engine compatibility. With fuel approval from ASTM and airworthiness certification from the FAA, Overture's utilization of future SAF could rapidly accelerate the market's transition to a higher performance, more sustainable, new fuel specification, functioning as a case study for other original equipment manufacturers (OEM).

While rapid scale-up of drop-in SAF options are needed now, Boom believes in also prioritizing the development, testing and approval of next generation fuel specifications, which can achieve even greater carbon reduction and further reduced environmental impacts.



# FAST-TRACKING FUTURE FUELS

## UNDERSTANDING SAF ECONOMICS AND PROJECTED COST

A future in which SAF is widely available and economically viable can be achieved through commercialization and government incentives. Boom, along with the broader aviation industry, is taking meaningful action to advance both public and private sector drivers, with the goal of rapidly maturing and scaling SAF.

SAF is currently only available in limited supply, accounting for less than 0.1% of global aviation fuel usage in 2019. While production costs continue to drop, current SAF costs up to 2–3x as much as conventional jet fuel, presenting a barrier to large-scale uptake (Wang, 2021). Achieving adequate supply and price parity with jet fuel requires continued progress across social, economic, and technical domains. SAF producers need demand signals in order to scale, accomplished through public and private sector initiatives.

Commercial demand can come in a number of forms, most notably including offtake agreements, which are contractual agreements to purchase SAF directly from a producer. In 2021 alone, 3.3 billion gallons of SAF offtake agreements were signed globally (ICAO, 2022). In addition to offtake agreements, book-and-claim systems provide an additional means to democratize SAF supply, like that provided by the Sustainable Aviation Buyers Alliance. These systems and registries enable flying passengers, both corporate and individual consumers, to pay for an equivalent amount of SAF to be used wherever available, regardless of itinerary. In the near-term, this is an important mechanism to further stimulate demand.

Policy instruments are also integral to reducing project risk and ensuring the economic viability of SAF. These include feedstock subsidies, which incentivize producers to use waste products such as municipal solid waste as an input; capital grants or loans, which provide capital for producers to build large production facilities; and output-based incentives, which can provide tax credits or other discounts to SAF producers and buyers to further stimulate commercial demand (Wang, 2021). A National Renewable Energy Lab analysis shows that SAF supply will dramatically increase with policy incentives and pre-commercial investment (Newes, 2021).

Beyond current-generation policy measures, mechanisms that correctly price the climate effects of fossil fuels should be pursued. These avenues include carbon pricing and the removal of fossil fuel subsidies, both of which would enhance the competitiveness of SAF.

A common misconception is that feedstock limitations constrain the global supply of SAF—this is not the case, and there is ample feedstock for the needs of the aviation industry. In the early development of SAF, the only

production technique was use of waste cooking oils. While this specific feedstock is limited, the Department of Energy has shown that the vast “menu” of feedstock sources currently available ensures there is more than enough feedstock to meet the projected fuel demand of the U.S. aviation industry (Bioenergy Technologies Office, n.d.). An estimated 1 billion tons of feedstock material can be collected sustainably each year in the United States, enough to produce 50–60 billion gallons of low-carbon biofuels. Other analysis further suggests that feedstocks are sufficient to meet global demand—SAF could power all of aviation in 2030 relying only on existing feedstocks and technologies (World Economic Forum, 2020).

Increasing SAF supply and improving economics is possible, and Boom is working hard to make this a reality in the near future.

## SABA

SUSTAINABLE AVIATION BUYERS ALLIANCE

In 2021, Boom joined the Sustainable Aviation Buyers Alliance (SABA), a buyer-led collaboration spearheaded by RMI and the Environmental Defense Fund to accelerate the path to net zero aviation by driving investment in and adoption of SAF.

As a member, Boom supports SABA in creating vital infrastructure to enable the growth of sustainable aviation fuel, including a new type of environmental attribute and registry that allows companies, airlines, and eventually the flying public to purchase credits for SAF. Boom will also utilize SABA's market-enabling infrastructure to employ SAF to reduce scope 3.6: “Corporate Travel Emissions.” Currently, SAF is only used at a small subset of airports, and only if a local buyer is willing to pay a premium. SABA's efforts aim to increase SAF supply and decrease SAF costs.





# STRATEGIC PARTNERSHIPS ACROSS THE VALUE CHAIN

## SECURING OFFTAKE

Boom is currently engaging with SAF producers to secure adequate supply for Overture operations. SAF will power Overture's engine test, certification, and production test, as well as power Overture delivery flights.

Boom's approach for securing SAF supply balances carbon reduction with end-of-decade projections for economics and scalability, prioritizing these factors over near-term availability.

- **2030 economics:** As the various SAF technologies mature, there will certainly be production cost differences. Boom is focused on the most promising long-term technologies at the potential expense of near-term availability.
- **2030 scalability:** Similar to economics, no single bio-based feedstock is widely regarded as being capable of providing all of global aviation supply. Certain feedstocks have greater scalability, but these feedstocks may not be the most available or have the greatest carbon reduction potential.
- **Carbon reduction:** All SAF production pathways seek to maximize carbon reductions, but some achieve greater reductions than others. We hope to see technologies improve such that all pathways can approach net zero carbon, but are prioritizing those with highest carbon reduction potential.

## PARTNERING WITH PROMETHEUS FOR ZERO NET CARBON SAF

In June 2019, Boom announced our first SAF partnership and offtake agreement with Prometheus Fuels, a leader in replacing fossil fuels with zero net carbon electrofuels made using renewable electricity and CO<sub>2</sub> from the air.

Prometheus is a Y Combinator-backed company that has developed a novel process to inexpensively synthesize fuel from atmospheric CO<sub>2</sub>. Prometheus's PtL process is unique in the industry, offering price parity with fossil fuels and an ability to meet future aviation needs at scale.



# AIRLINE PARTNER COMMITMENTS



Boom is partnering with airlines to enable net zero carbon Overture flights and SAF use, and is proud to have airline partners that prioritize sustainability.

In 2021, Boom signed a commercial agreement with United Airlines for an order of 15 Overture aircraft with options for another 35, optimized to run on up to 100% SAF. This same year, United became the first airline in the world to operate a passenger-carrying flight powered by 100% drop-in SAF in 2021.

In 2017, Japan Airlines became a strategic partner with Boom, which also includes options to purchase up to 20 Overture aircraft through a pre-order arrangement. As the first airline to conduct a demonstration flight powered by SAF in Asia, Japan Airlines has a long history of sustainability, targeting a commitment of net zero carbon by 2050.

Japan Airlines and United have both made investments in Fulcrum BioEnergy, a company pioneering the production of SAF from municipal waste.

## PARTNER WITH BOOM

Partnering with Boom offers unique opportunities to advance sustainable aviation—integrating low carbon materials into the design, implementing the latest green manufacturing techniques at the Overture Superfactory, and providing fuel for the first commercial supersonic SAF flight.

Boom is open to collaborations, co-marketing opportunities, and joint advocacy on sustainability policies. For information on partnering with Boom, email [suppliers@boomsupersonic.com](mailto:suppliers@boomsupersonic.com).



# POLICY, ADVOCACY, AND LEADERSHIP

While interest in SAF is rapidly accelerating as societal pressure increases, policy instruments are integral to accelerate production and adoption, move towards economic parity, and meet demand at competitive prices.

SAF can reach price parity with Jet A through incentives, pricing carbon, steadily lower clean energy prices, technological progress, and other market forces. Once price parity is proven, supply will rapidly accelerate. Boom promotes legislation and regulatory policies to help increase production and facilitate adoption of SAF and help expedite the decarbonization of aviation.



## GROWING GOVERNMENT BACKING

In September 2021, the Biden administration took major steps to coordinate leadership and innovation across the federal government, aircraft manufacturers, airlines, fuel producers, airports, and non-governmental organizations to advance the use of cleaner and more sustainable fuels in American aviation.

Executive actions across federal departments will result in the production and use of billions of gallons of sustainable fuel that will enable aviation emissions to drop 20% by 2030 when compared to business as usual (The White House, 2021). This includes the SAF Grand Challenge, which aims to achieve three billion gallons of SAF production by 2030.



# POLICY, ADVOCACY, AND LEADERSHIP

## ADVOCATING FOR THE SAF BLENDERS TAX CREDIT

To accelerate the competitiveness of nascent SAF technology, Boom supports incentives for SAF use. Tax credits would help new SAF technologies achieve price parity with fossil fuels. These incentives would help SAF become commonplace in aviation, as alternative fuels are in ground transportation today.

Since 2020, Boom has been an active member of the informal industry coalition comprising nearly fifty other companies and trade groups advancing a performance-based tax credit for sustainable aviation fuel blenders. The SAF blenders tax credit coalition advocates for a \$2.00/gallon tax credit. This measure would increase production, reduce SAF costs, and stimulate research into innovations that would further scale SAF to meet demand.

To support the credit, Boom efforts include outreach to the White House and Capitol Hill as well as coordination through the Aerospace Industries Association (AIA), a US trade group. The momentum behind SAF incentives is strong, with the Sustainable Skies Act introduced in the House, the Clean Energy for America Act in the Senate, and the President's budget including a SAF tax credit. The SAF blenders tax credit will incentivize producers to focus more resources, including R&D funds, raw feedstocks, and refinery capacity, towards SAF, increasing production rates and reducing costs to the airlines and aircraft operators.

In addition to Boom's current advocacy with the SAF coalition, Boom will continue to work alongside the coalition, AIA, and other organizations on SAF tax incentives and other environmentally beneficial policies, such as R&D funding, grants, loans for capital costs, and cost-share programs. Boom is advocating for increased funding to be included in forthcoming legislation, to be used for SAF and aviation emission-reducing research and development. This increased funding will help mature fundamental research, unlocking new pathways and helping to reduce costs of existing pathways.



# COMMUNITY



# MITIGATING NOISE



## INNOVATION IN NOISE REDUCTION, PREDICTION, AND VALIDATION

In civil aviation, sustainability goes beyond climate and emissions. Community noise is a consideration for every aircraft that takes flight, supersonic or subsonic.

Noise is a key priority for Overture design. We are targeting current subsonic noise certification levels through the use of noise-reducing innovations and advanced flight procedures. Critical to these efforts is a new technology called a variable noise reduction system (VNRS). Overture's automated VNRS will reduce engine and aircraft noise during takeoff and landing, reducing community impacts. We are also working with our partners to develop innovative engine noise reduction technologies.

Boom has invested extensive engineering resources into noise analysis, including low-order models, computational aero-acoustic analysis, and wind tunnel tests of jet and airframe noise. This work affords us high confidence in Overture's noise levels, enabling us to optimize for efficiency while remaining confident we will meet the same certification noise levels applicable to current subsonic aircraft.



# MITIGATING NOISE

## DESIGNED FOR CHAPTER 14 LEVELS

Overture is designed to balance noise and emissions, and Boom is targeting landing and takeoff (LTO) noise levels equivalent to the most recent subsonic standards.

Overture will meet ICAO Chapter 14 noise levels using advanced procedures—the same standard as subsonic vehicles. The current Overture design includes margin to Chapter 14 noise levels to accommodate uncertainty in both acoustic source and measurement.

Beyond LTO noise, Overture will be operated so as to not create a sonic boom over land, to avoid disturbing communities on the ground. Overture will operate at supersonic speeds only over water, taking into account appropriate standoff distances from coastal areas.

Additionally, Boom has developed proprietary software to determine optimal flight routings that minimizes trip time while avoiding overland sonic booms. When in service, Overture additionally will use real-time atmospheric data to determine where the aircraft must slow to subsonic speeds near coasts to avoid sonic boom impacts to land. This pilot guidance and sonic boom warning system is patent pending as of 2021.

## PRIORITIZING DAYTIME OPERATIONS

The day-night average sound level (DNL) noise metric is used to describe the effects of environmental noise in a simple, uniform, and appropriate reflection of cumulative exposure to sound over a twenty four-hour period (Federal Aviation Administration [FAA], 2022). To account for a higher sensitivity to noise at night, nighttime flight noise receives a tenfold multiple weight—measured as if ten daytime events had occurred—and thus receives a “penalty” of 10 dBA, the measurement for noise level as perceived by the human ear.

Supersonic aircraft allow airlines to schedule more flights during the day, corresponding to fewer nighttime takeoffs and landings. This inherent characteristic of Overture reduces community noise.

## ENGAGING AIRPORT COMMUNITIES

Boom is committed to making supersonic flight something that communities welcome. Ahead of Overture’s entry into service, Boom plans to undertake outreach to airports and surrounding communities in collaboration with airports and other stakeholders, in order to understand and address community concerns. Boom continues to work with ICCAIA and ICAO Committee on Aviation Environmental Protection (CAEP) to allow use of innovative noise-reducing certification and flight procedures.

## INTERNATIONAL NOISE STANDARD SETTING (CAEP)

Boom is actively working with regulators to advance global environmental standards for supersonic commercial aircraft.

The ICAO CAEP formulates new policies and standards related to the environmental effects of aviation. The US Federal Aviation Administration works with its international counterparts at CAEP to develop global standards for supersonic aircraft.

In early 2022, ICAO CAEP agreed to work toward technologically feasible, economically viable, and environmentally beneficial supersonic landing and takeoff noise and emission standards by CAEP/13 in 2025. Formalizing global environmental standards for supersonic commercial aircraft in the upcoming CAEP cycle will both ensure Overture is environmentally responsible and enable a certification process consistent with that for subsonic aircraft, ensuring timely certification of Overture. Because airplanes are inherently international products—often taking off and landing in different countries—global standards are critical for regulatory certainty and unlock innovations that improve connectivity across the world.



# BUILDING A MORE SUSTAINABLE TRAVEL FUTURE

Boom was founded on the belief that travel can be a force for good—a planet where we can go to more places more often is a better place to live. Travel allows us to experience the world, increases human connection, and fosters mutual understanding. Travel is also essential to sustainable development, facilitating cross-cultural understanding, reducing inequities, supporting job growth, and more.

## SUSTAINABLE TRAVEL FORUM

The aviation, travel, and mobility sectors of today have faced an inflection point—and an opportunity. The need to limit climate change is clear, urgent, and more important now than ever. Consequently, the global travel industry must go beyond isolated commitments and pledges to sustainability and respond in an ambitious, transformative, and collective call-to-action.

In response, Boom founded the Sustainable Travel Forum in mid-2021. The Forum is an independent group with the mission of building the sustainable future of global travel through education, advocacy, and innovation.

The Forum began with sixteen founding members, including industry experts, leaders and stakeholders in aviation, transport, travel, mobility, and sustainability.

By harnessing the collective strengths of key leaders across travel and mobility sectors, Boom believes that the future of sustainable travel can arrive sooner and create greater impact. The Forum's first year priority will be to better involve consumers on what it means to travel sustainably, with a focus on academic engagement and SAF education.

## SUSTAINABLE TRAVEL FORUM FOUNDING MEMBERS

- **Tori Emerson Barnes**  
U.S. Travel Association, Executive Vice President, Public Affairs and Policy
- **Tim Brown**  
IDEO, Executive Chair; kyu Collective, Vice Chair; Boom Supersonic, Advisor
- **Brian K. Elson**  
Rolls-Royce, Vice President, Government Relations
- **Brandt Hastings**  
Volta Charging, Co-Founder and President
- **Andrew Hogg**  
Tourism Australia, Executive General Manager, Eastern Markets and Aviation
- **Philippe Karam**  
Amazon Air, Director, Global Fleet & Aviation Sourcing
- **Nora Lovell Marchant**  
American Express Global Business Travel, Vice President, Global Sustainability
- **Dr. Lourdes Maurice**  
Former Executive Director FAA Office of Environment and Energy; Boom Supersonic, Advisor
- **Rob McGinnis**  
Prometheus Fuels, CEO
- **Jerry Mpufane**  
South African Tourism North America, President
- **Ben Murphy**  
Boom Supersonic, Head of Sustainability
- **Takahiro Nakashima**  
Japan Airlines, Advisor, ESG Promotion Department
- **Lauren Riley**  
United Airlines, Managing Director, Global Environmental Affairs and Sustainability
- **Brian Ripsin**  
Shell Aviation, Sustainability Manager Americas
- **Madge Thomas**  
American Express, President of the American Express Foundation and Head of Corporate Social Responsibility
- **Sheelagh Wylie**  
VisitBritain, Chief Marketing Officer





# BUILDING A MORE SUSTAINABLE TRAVEL FUTURE

## THE NET GOOD SUMMIT

Held on the heels of COP26, Boom convened the inaugural Net Good Summit in November 2021, bringing industry leaders, influential thinkers, and sustainability experts together in Lake Tahoe under a unifying mission: to define and build the future of sustainable travel.

Over the course of two days and across eighteen sessions, twenty-five speakers explored the challenges, tools, science, standards, and innovations on the path to advance socially and environmentally responsible travel and tourism. The Summit focused on five core themes: decarbonizing transportation, responsible tourism, enabling technologies and innovations, sustainability governance, and calls to action.

A diverse sampling of organizations from across the global travel spectrum were represented—including academia, aircraft equipment manufacturers, airlines, arts organizations, climate consultancies, consumer brands, electric vehicle solutions, financial services, fuel suppliers, government agencies, renewable energy technologies, travel and sustainability nonprofits, travel management firms, and tourism boards.

The Summit's scale—just over fifty leaders and experts were in attendance—allowed for meaningful interactions, fostering deeper relationship building. Discussions on the day's topics extended beyond the ballroom into breakfasts, networking breaks, and evening activities.



# EMPLOYEE & COMMUNITY ENGAGEMENT



At Boom, we are passionate about building communities and workplaces to advance sustainability. Within our organizational efforts, we are building programs that allow all of us to clean up our neighborhoods, making a positive impact directly in the communities around us. As Boom expands, we are prioritizing developing workplaces that enhance the region they are in, bringing more than jobs and economic impact.

## SUPPORTING ECONOMIC GROWTH

Boom is proud that Overture will be designed and assembled in the United States, leveraging the formidable talent, entrepreneurial spirit, and tradition of innovation in our workforce.

As Boom's growth accelerates, our facilities will continue to create well-paying engineering and manufacturing jobs, as well as academic engagement opportunities with nearby institutions.



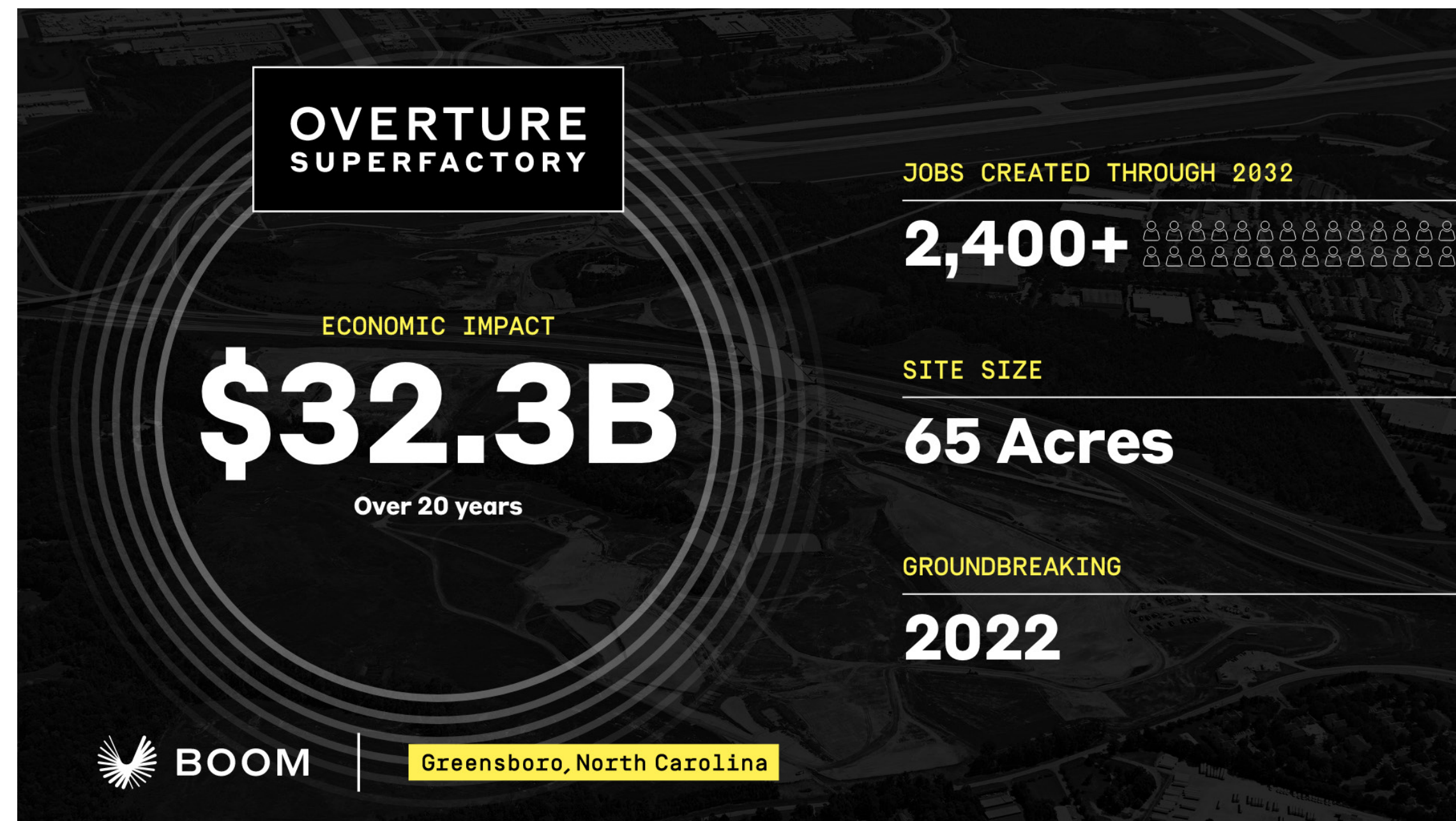
# EMPLOYEE & COMMUNITY ENGAGEMENT

## INVESTING IN NORTH CAROLINA

In early 2022, Boom announced the Piedmont Triad International Airport in Greensboro, North Carolina, would be the site of its full-scale manufacturing facility, the Overture Superfactory.

Boom will invest \$500 million in North Carolina to develop the Overture Superfactory. Boom's presence in North Carolina is projected to increase economic growth by more than \$32.3 billion over 20 years.

By 2032, Boom will create more than 2,400 advanced manufacturing jobs and educational training and career pathways for 200 students from publicly funded North Carolina schools.



# EMPLOYEE & COMMUNITY ENGAGEMENT

## EMPLOYEE ENGAGEMENT

Boom employees participate in volunteer activities yearly. In 2021, Boom staff joined Colorado State Parks in local park beautification and environmental cleanup projects.



# LOOKING TO THE FUTURE



# LOOKING TO THE FUTURE

In developing our first annual sustainability report, we had the opportunity to reflect on our growth, progress, and achievements—as well as our opportunities to improve.

When we achieved carbon neutrality in 2021, we knew that the road to net zero by 2040 would be challenging. Satisfying this ambitious commitment will require dedication, but it is also an opportunity—to innovate, build partnerships, and ultimately help others meet this goal, too. We are confident that we will meet the challenge.

We recognize the investment and dedication required for excellence across all ESG goals. We are working to foster a more inclusive, empowering, and equitable experience for our employees while closing gender and diversity gaps in representation. While our reporting is voluntary as a private company, we're working to achieve a level of compliance on par with those required by disclosure standards.

Above all, we are committed to doing business with integrity. We will remain a company that prioritizes transparency, accountability, and social responsibility on our journey to comprehensively report our efforts and performance. Just as our sustainability strategy is rooted in systems change, this mindset also applies to how we approach reporting: with the aim of setting a higher standard for radical transparency, accountability, and ethics.



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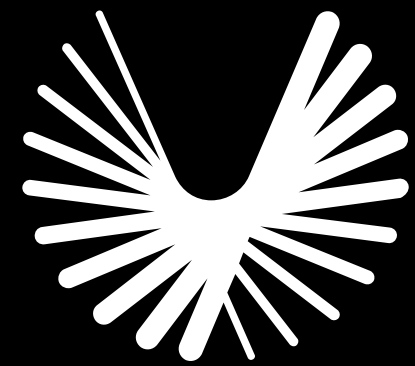
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# BOOM

## DISCLAIMER

This report contains certain metrics and other information relating to Boom's sustainability commitments, objectives, goals, plans, expectations and data. This information is based on a combination of company- and industry-specific datasets and represents company and third-party best estimates, calculations, and assumptions. Such measurements reflect current industry practices, and other applicable frameworks, but has not been audited or reviewed by a third party. This report contains forward-looking information, which involve risks and uncertainties that may result in actual results to differ materially from those expressed or implied.

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