

# **WINDWARD**

**ENGINEERS & CONSULTANTS**

THE CARBON LEADERSHIP FORUM  
MEP 2040 CHALLENGE  
COMPANY PLAN

## 1 EXECUTIVE SUMMARY

In the fall of 2021, The Carbon Leadership Forum extended an invitation to all mechanical, electrical, and plumbing design firms and system manufacturers, presenting them with a significant challenge. This challenge entails a radical reduction in both embodied and operational carbon within their perspective projects and products. Every corporate entity or signatory that signs the Commitment is obligated to formulate a meticulously crafted, data-driven plan aimed at achieving comprehensive life cycle decarbonization.

Windward has signed the MEP 2040 Commitment and is firmly dedicated to the reduction of operational and embodied carbon emissions within its MEP systems on all projects. As the Windward Team progresses towards a more sustainable future, the company shall monitor its advancements and adapt this strategic plan accordingly.

Windward's company plan encompasses two primary objectives. First, it seeks to address the company's responsibility for investing in sustainable resources. Second, it aims to incorporate advancements within the design industry, propelling it towards a more environmentally responsible future. This document will outline goals accompanied by quantifiable metrics and milestones, which will facilitate the gradual integration of innovative technologies.

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### 3 COMPANY ACCOUNTABILITY

Windward has started the sustainability journey by looking inward to address how the company can reduce its impact on the environment. Our commitment includes reducing the companies:

1. Scope 1 emissions<sup>1</sup> from facility operations
2. Scope 2 emissions<sup>2</sup> from indirect energy sources
3. Scope 3 emissions<sup>3</sup> from company travel

#### 3.1 COMPANY CARBON CALENDAR

To reach these goals, Windward has developed a plan to reduce each emissions scope through a staged approach, targeting zero in all categories by 2040.

	Scope 1	Scope 2	Scope 3
<b>2024</b>	Equipment with EPDs used in designs wherever possible. No new equipment with high-GWP refrigerants. <sup>4</sup> Offer options for eliminating gas burning equipment designed in facilities.	Research investing in certified <sup>5</sup> carbon offset programs to offset 25% of facility electricity.	Investigate feasibility of tracking company flight emissions. All company driven miles and car mileages are tracked. Book flights with highly efficient airlines. <sup>6</sup>
<b>2025</b>	All new and renovated facilities are designed with options for smart-metering and energy management programs.	Research investing in certified renewable energy sources at all office locations	Book non-stop flights only when available. Book economy flights only.
<b>2028</b>		Purchase 10% of facility electricity from certified renewable sources. Offset a portion of facility electricity with carbon offset programs	
<b>2030</b>	Facilities enroll in energy management programs and benchmarking programs such as Energy Star Portfolio Manager or similar	Purchase 35% of facility electricity from certified renewable sources. Offset remaining facility electricity with carbon offset programs.	Enroll in flight emissions offset plans to offset a portion of company travel
<b>2033</b>		Purchase 80% of facility electricity from certified renewable sources. Offset remaining facility electricity with carbon offset programs.	Enroll in flight emissions offset plans to offset 40% of company travel
<b>2034</b>	All high-GWP facility equipment replaced with equivalent low-GWP equipment.	Purchase 90% of facility electricity from certified renewable sources. Offset remaining facility electricity with carbon offset programs.	Enroll in flight emissions offset plans to offset 65% of company travel
<b>2038</b>	All facilities equipped with smart-metering and energy management.	Purchase 100% of facility electricity from certified renewable sources.	Enroll in flight emissions offset plans to offset 90% of company travel
<b>2040</b>	All company facilities and vehicles are Net-Zero Carbon impact.	All company facility energy has a Net-Zero Carbon impact.	Enroll in flight emissions offset plans to offset 100% of company travel.

<sup>1</sup> Scope 1 – direct emissions from company facilities and vehicles – Many scope 1 items are out of the companies ability to control. I.E. rented offices systems design. The company will make changes as they are able.

<sup>2</sup> Scope 2 – Indirect emissions from purchased electricity, heating, and cooling.

<sup>3</sup> Scope 3 – Indirect emissions from company travel, purchased goods, distribution, processing of sold products.

<sup>4</sup> See EPA resource for allowable refrigerants.

<sup>5</sup> Carbon offset method should be thoroughly researched before enrollment.

<sup>6</sup> As of Aug 2023 – Delta Airlines, American Airlines, and United Airlines are leaders in reducing carbon impact.

## 3.2 SCOPE 1 INITIATIVES

To meet scope one goals, where able, Windward will install equipment with environmental product declarations certifying their impact as well as reduce on-site refrigerants, and on-site fuel.

Windward notes the limitations to this goal include that many facilities are rented and thus the energy sources and equipment are not in the company's control. To combat this, Windward will work with its rented facilities to meet these goals whenever possible.

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### 3.2.1 ENVIRONMENTAL PRODUCT DECLARATIONS

Products accompanied by environmental product declarations (EPDs) have been rigorously researched to inform the purchaser of the product's environmental impacts. EPDs are a transparent, objective report that communicates what a product is made of and how it impacts the environment across its entire life cycle.

Starting in 2024, any Windward facility renovations or new construction will require all equipment to be accompanied by an EPD, where possible, allowing facility environmental impact to be entirely understood.

Over the following years all new equipment installed will be switched over to equipment with an attached EPD, with the goal of by 2038 having all facility equipment's environmental impact fully understood.

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### 3.2.2 ELIMINATION OF HIGH GLOBAL WARMING POTENTIAL REFRIGERANTS

Refrigerants have an exponential impact on global warming. To reduce Windwards footprint in this area, no new equipment which uses high-GWP refrigerants<sup>4</sup> will be installed in any Windward facility. Switching to low-GWP refrigerant equipment will continue until only low-GWP equipment is in use with a deadline of 2038.

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### 3.2.3 ELIMINATION OF FUEL BURNING SOURCES

In 2024, any Windward facility modifications or new construction will have design options presented for electrified systems. By 2032 all fuel burning equipment will be eliminated from facilities where possible.

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### 3.2.4 SMART METERING AND ENERGY MANAGEMENT

As artificial intelligence and sensory technologies develop, energy consumption can be significantly reduced through smart management.

Beginning in 2025, all facility designs will include options for smart-metering capable controls. In 2030, Windward will begin enrolling in energy management plans in smart-metering ready facilities to significantly reduce their energy consumption. By 2038 all facilities will be controlled by smart-metering programs where possible to reduce carbon emissions through strategic control and pattern recognition.

### 3.3 SCOPE 2 INITIATIVES

Reducing indirect emissions from purchased electricity used in Windward facilities is also a priority. Energy generated offsite at power plants is only approximately 35% efficient when accounting for generation, transmission, and distribution efficiencies. To reduce this hefty environmental impact Windward will begin transitioning to renewable energy sources and investing in carbon offset programs.

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#### 3.3.1 CARBON OFFSET PROGRAMS

When it is not possible to eliminate all causes of emissions, carbon offsets can be a solution. While the company transitions to renewable energy sources, we can offset our remaining environmental impacts by buying into such programs. Our investments will go to environmental protection efforts meant to reduce greenhouse gas emissions to make up for emissions incurred by our facilities and energy use. Investments will be adjusted as we transition to renewable sources.

Some carbon offset programs have been proven to do little to no good for the environment. Before investing in a program, Windward will perform thorough research to ensure their money is going to the right cause.

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#### 3.3.2 RENEWABLE ENERGY SOURCES

As government support increases and new technologies emerge, renewable sources are becoming available on the energy market. Beginning in 2025, Windward will research purchasing electricity from a certified renewable source. Where possible, this amount will increase steadily with a goal of reaching 100% renewable electricity purchase by 2038.

Windward will attempt to prioritize purchasing energy directly from renewable energy generators except for in locations without access to direct connections.

### 3.4 SCOPE 3 INITIATIVES

Scope three is about being conscious of the impact of company travel. It is not feasible to eliminate company travel, but through intelligent choices Windward can reduce their environmental impact from travelling significantly.

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#### 3.4.1 FLIGHT IMPACT REDUCTION

There are three choices that can be made when scheduling and booking flights that are widely agreed to reduce impact. Starting in 2024, Windward will follow these simple but impactful steps to reduce travel emissions.

1. *Select airlines with higher engine efficiency.* As of August 2023, Delta Airlines, American Airlines, and United Airlines are leaders in reducing carbon impact through engine design. Exact carbon emissions saved by this choice vary by flight, airplane size and model, but overall, this has a positive effect.
2. *Book non-stop flights.* Non-stop flights reduce distance travelled and time in low-engine efficiency conditions (take-off, landing, idling). Non-Stop flights will be booked whenever available.
3. *Book economy flights.* Economy flights take up less space on the plane, meaning they account for fewer emissions. This is a minor change but sets a good example for others.

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#### 3.4.2 FLIGHT CARBON OFFSET PLANS

The above recommended airlines have carbon offset programs. Beginning in 2030, Windward will attempt to purchase carbon offsets for company flights.

### 3.4.3 PUBLIC TRANSPORT INCENTIVES

To encourage the use of public transportation and clean methods of commuting, incentives will be offered to employees which will cover their commuting and other company related travel expenses if they choose to use public transportation. Incentives will include full monthly or annual reimbursements for bus or rail passes. Windward will also encourage traveling by train when available for short-distance company travel to reduce flight miles.

### 3.5 TRACKING PROGRESS

Each of the discussed company carbon footprint reduction methods will be tracked annually and reported to the Carbon Leadership Forum. Below briefly details how the company will track each metric.

<i>Initiative</i>	<i>Tracking Method</i>
<p>2.2.1 Designing with EPD's</p> <p>2.2.2 Eliminate High GWP Refrigerants</p> <p>2.2.3 Eliminate Burning Fuel Sources</p> <p>2.2.4 Smart Energy Management</p>	<p>A company-created program will be used to document related equipment installed in all new construction and renovations of company facilities. The program has built in progress metrics and will report if Windward is meeting, exceeding, or falling behind its goals.</p>
<p>2.3 Facility Energy Consumption</p>	<p>All company facilities' electricity and fuel consumption will be recorded in a company-wide document. The annual consumption will be compared with goals to determine progress. As Windward begins purchasing renewable energy from the grid and enrolling in carbon offset programs, this document will inform the quantity of renewable energy and offset credits required to meet annual goals.</p>
<p>2.4 Company Travel</p> <p>2.4.1 Flight Impact Reduction</p> <p>2.4.2 Flight Carbon Offset Plans</p>	<p>Flight and driven miles will be reported in a company-wide document. Data will be sourced from employees' travel reports and include miles driven/flown and calculate related emissions. As the company begins carbon offset programs, those will be counted against the emissions to reflect improvements.</p>
<p>2.4.3 Public Transportation Incentives</p>	<p>Enrollment in company transportation incentives will require filling out a survey to gather how many driven miles are being avoided and what type of public transportation is being used. This data will be gathered and tracked in a company database and each enrollment will count towards carbon footprint reductions.</p>

*A final report template will be created to populate and use to report back annually, summarizing the company's progress*

## 4 DESIGNING FOR ZERO

Windward has committed to applying environmentally friendly ideas to all their projects. Through a phased process, the company will work towards designing net zero on all projects by 2040. Via the MEP 2040 Challenge issued by the Carbon Leadership Forum and signed by Windward Engineering and Consultants, four key areas of improvement have been identified:

1. Reduce operational and embodied carbon across MEP systems on all projects, targeting zero by 2040.
2. Request low-global warming potential (GWP) refrigerants when designing systems to reduce or eliminate greenhouse gas (GHG) emission from refrigerants.
3. Request Environmental Product Declarations (EPDs) in project specifications for MEP system components.
4. Participate in a quarterly MEP 2040 Forum and a Carbon Leadership Forum Community discussion group to share lessons learned and contribute to a growing body of knowledge.

Windward has developed a timeline of milestones in each category. Highlights of Windwards plan includes:

- Design all new construction projects to be net-zero in operation by 2035.
- Reduce MEP related embodied carbon in all new construction, major retrofits<sup>7</sup>, and infrastructure projects by 50% by 2030.

In addition to required MEP 2040 areas of improvement, Windward will also set targets for water conservation, air health and indoor air quality.

### 4.1 NEXT STOP: NET-ZERO

Similar to the company accountability plan, the project carbon emissions reduction plan will be a phased process, targeting 2040 to be 100% Net-Zero Projects. Below is a table describing Windwards yearly goals in each area of improvement.

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<sup>7</sup> Major retrofits will be considered any retrofit with a project scope area of 1,000 square feet or more.



	Operational Carbon	Embodied Carbon	Low-GWP Refrigerants	Environmental Product Declarations <sup>8</sup>
<b>2024</b>	<p>Begin conducting lifecycle operational energy/carbon emission analyses including source energy consumption on all major projects.</p> <p>Report lifecycle analyses to owner as part of deliverables</p>		<p>Design using low-GWP equipment as they become available and when supported by client.</p> <p>Incorporate Low-GWP requirements in BOD</p>	<p>Obtain EPDs for all packaged RTU, PTAC, PTHP, VRF, Condensing units designed for permit.</p> <p>CIBSE TM65<sup>9</sup> for water cooled chillers, cooling towers, A/C chillers, heat pumps, AHUs</p>
<b>2025</b>	<p>10%<sup>10</sup> of projects designed with options to be Net-Zero or Net-Zero Ready<sup>11</sup>.</p> <p>Develop project energy baseline by continuously populating database with new construction project lifecycle energy analyses</p>		<p>Phase-out HFC refrigerants as prescribed by the EPA for all projects.</p> <p>Document new refrigerant requirements in master specifications</p>	<p>EPDs for water cooled chillers, cooling towers, A/C Chillers, Heat Pumps, AHUs</p> <p>CIBSE TM65 pumps, fans, batteries, switchgear, transformers, generators</p>
<b>2026</b>	<p>15% of projects designed with options to be Net-Zero or Net-Zero Ready</p>			<p>EPDs for all pumps, fans, batteries, switchgear, transformers, generators</p>
<b>2028</b>	<p>25% % of projects designed with options to be Net-Zero or Net-Zero Ready</p>	<p>Reduce in-scope embodied carbon by 10% in all new-build projects.</p> <p>Incorporate in BOD</p>		
<b>2030</b>	<p>40% of projects designed with options to be Net-Zero or Net-Zero Ready</p> <p>Reduce life-cycle carbon emissions of projects by 30%</p>	<p>Reduce by 25% in new construction, major retrofits<sup>7</sup>, and infrastructure</p>		
<b>2033</b>	<p>60% of projects designed with options to be Net-Zero or Net-Zero Ready</p>			
<b>2035</b>	<p>80% of all projects designed with options to be Net-Zero or Net-Zero Ready</p> <p>100% of new construction projects designed to Net-Zero</p> <p>Reduce life-cycle carbon emissions of projects by 65% compared to baseline</p>	<p>Reduce by 50% in all new construction major retrofits, and infrastructure projects</p>		
<b>2038</b>	<p>100% of projects designed with options to be Net-Zero or Net-Zero Ready</p>			
<b>2040</b>	<p>100% of projects to be Net-Zero</p>			

<sup>8</sup> The listed EPD goals are prescribed by the Carbon Leadership Forum directly.

<sup>9</sup> CIBSE TM65 is an internationally applicable methodology for the calculation of embodied carbon.

<sup>10</sup> Percentage metrics applies to in-scope work only (Typical for all metrics).

<sup>11</sup> Net-Zero-Ready: designed and built to meet a certain level of energy efficiency so that if a renewable energy system were installed or connected to, the building would become net-zero (Blue Green Alliance Foundation).

## 4.2 OPERATIONAL CARBON

The path towards achieving net-zero operational carbon entails an initial step of creating comprehensive project metric documentation. After quantifying the operational carbon values for projects, the team can then advance towards more stringent and frequent net-zero initiatives, ultimately culminating in achieving one hundred percent net-zero project status by the year 2040.

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### 4.2.1 DOCUMENTATION

In 2024, Windward will begin conducting energy modeling including site and source energy consumption analysis on all major projects. Gradually, a company database of project efficiencies and energy consumption will be developed to track project progression towards the company goals.

To encourage client understanding and involvement in this process, Windward will begin making energy modeling outputs standard on project submittals. By gathering and sharing information, the client, the architects, and the engineers will gain understanding of their design's effects on energy consumption and carbon emissions.

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### 4.2.2 PROGRESSION

To meet the goals outlined in the table above, Windward will implement a series of strategies in their designs to reduce operational carbon emissions.

- Building automation system compatible controls for lighting and mechanical systems:
  - Scheduling
  - Occupancy Sensors
  - Performance monitoring
  - Design controls for Demand Response<sup>12</sup>
- High Performance Systems and Electrification
  - Encourage full-building electrification for net-zero-readiness.
  - Provide options for high efficiency systems such as heat pumps and heat recovery.
  - Incorporate renewable energy sources such as geothermal, photovoltaic, and wind energy.

## 4.3 EMBODIED CARBON

Aside from the significant impact of refrigerants on the embodied carbon of MEP systems, there are initiatives the Windward team will take to reduce the embodied carbon of their designs. These small changes in design practice combined could add up to significant changes. As new opportunities in these areas are developed, Windward will continuously incorporate them into their projects.

A universal practice that will be observed across the MEP scopes is Right-Sizing of all equipment and elements. By continuously seeking opportunities to avoid oversizing, the cascade effect through systems will significantly reduce equipment size and environmental impact from material use, operational carbon emissions, and waste.

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<sup>12</sup> Demand response: Regional programs to balance demand on the grid by shifting peak usage, typically through monetary incentives.

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#### 4.3.1 MECHANICAL

In the mechanical scope of projects, the following steps will be taken<sup>13</sup>:

- Specify electric heating elements where possible.
- Reduce duct runs by using plenums or other methods.
- Increase component reuse on projects when possible.
- Specify duct and pipe insulation to be low-embodied carbon insulation where possible.
- Pursue higher efficiency machines to reduce equipment count.

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#### 4.3.2 PLUMBING

Within the plumbing scope of projects, the following steps can be taken:

- Specify electric heating elements and/or heat pump water heaters.
- Incorporate low flow fixtures to reduce pump sizes and water usage.
- Specify pipe insulation to be low-embodied carbon insulation.
- Investigate heat recovery from sanitary waste streams.
- Investigate grey water and rainwater harvesting to reduce overall water usage.

#### 4.4 LOW-GWP REFRIGERANTS AS PART OF BASIS OF DESIGN

The Environmental Protection Agency (EPA) under the AIM Act has regulated the use of refrigerants in HVAC equipment. These regulations are designed to phase-down HFC refrigerants (such as R410A and R134A), which will reduce ozone-depleting substances (ODS) from being released during equipment servicing, operation, and disposal.

Starting on January 1<sup>st</sup>, 2025, certain subsectors<sup>14</sup> of HVAC equipment such as chillers, air conditioners, and rooftop units must be installed with refrigerants meeting the proposed GWP limit of 700. This will include the use of newly permitted A2L refrigerants<sup>15</sup>. In the following years, more subsectors will be restricted. By 2036, the EPA phase-down is projected to reduce HFC refrigerant production by 85% from the baseline.

As of early 2024, equipment will be available on the market to be included in Windwards design documents. To meet MEP 2040 challenges and comply with the final EPA ruling, Windward's engineering team will begin specifying the new low-GWP refrigerant equipment as it becomes available. Windward will remain diligent in keeping track of new technologies in the field and continuously specify new items on their projects.

To ensure Windward is keeping up with industry advancements, the team will keep documentation of equipment that meets new standards and host internal meetings to keep the team informed on updated technologies.

#### 4.5 ENVIRONMENTAL PRODUCT DECLARATION REQUESTS

Environmental Product Declarations (EPDs) are transparent, third-party summaries of a Life-Cycle Assessment conducted to identify the "cradle-to-grave" environmental impact of a piece of equipment or material. This includes raw material collection, processing, product shipping, operation and then to how it will be disposed of at the end of its life.

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<sup>13</sup> The embodied carbon reduction practices in these sections are not exhaustive and will be added to over time.

<sup>14</sup> See the [EPA Technology Transition Program Fact Sheet](#) for a comprehensive list of subsector phase-down dates

<sup>15</sup> A2L refrigerants are classified as non-toxic, flammable, and low burning velocity substances. They require different fire safety considerations than previously used refrigerants, however, they save up to 75% in GWP.

Originally, EPDs were sought after for structural materials such as wood, steel, concrete, and glass. However, EPDs for MEP equipment are becoming required by LEED and other sustainability certifications. While a product having an EPD is not a guarantee that it is the most environmentally friendly, EPDs are useful for calling attention to environmental impacts and a useful disclosure tool as the industry becomes more concerned with carbon footprint.

Windward will follow the timeline set by the Carbon Leadership Forum to require EPDs on all projects for selected equipment. The team will maintain documentation of sources of such equipment for easier selection on future projects. EPDs will be reported to the owner to encourage understanding of the carbon impact of their facility.

#### 4.6 STANDARDS, SPECIFICATIONS AND TYPICAL SELECTIONS

To ensure carbon reduction initiatives are carried out in the construction of projects, Windward will include the efforts discussed above as requirements in the project specifications beginning in 2024. This will especially include EPD accompanied products, refrigerant selection, and insulation types.

#### 4.7 TRAINING NEEDS

The Windward team has begun to identify areas of improvement where training will benefit the carbon reduction efforts. Bi-weekly presentations will be held to begin addressing these training needs. Training will include<sup>16</sup>:

- Energy Modeling
- Right-sizing
- Refrigerant GWP and Refrigerant Selection
- Environmental Product Declarations
- CIBSE TM65

#### 4.8 TRACKING AND REPORTING

Each of the discussed company carbon footprint reduction methods will be tracked annually and reported to the Carbon Leadership Forum. Below briefly details how the company will track each metric.

<i>Initiative</i>	<i>Tracking Method</i>
<i>Operational Carbon</i>	Complying with the company plan, projects will, in phases, begin being required to be modelled in energy modeling software. Results will be documented in a company created document to categorize projects by parameters to develop a database of operational carbon emissions and track reductions.
<i>Embodied Carbon</i>	Using EPD data and other sources, a company database will track projects embodied carbon reduction. The database will separate project efforts by parameter including project type, scope type (M/E/P) and new construction vs retrofit.
<i>Low-GWP Refrigerants</i>	As new equipment is manufactured with complying refrigerants, a company list of such equipment will be created to assist in future designs

<sup>16</sup> This is not an exhaustive list and will be developed over time.

*Environmental Protection Declarations*

All project equipment selected with an EPD will be documented and added to a shared folder for future reference. A template will be developed to be presented with project drawings, summarizing the embodied carbon of the selected equipment.

*A final report template will be created to populate and use to report back annually, summarizing the company's progress*

## 5 WINDWARD SPECIAL CONSIDERATIONS

Windward has a unique background as a majority Native American owned business. This influence has inspired the company to think bigger about their sustainability goals. Beyond energy and carbon, a set of goals pertaining to water conservation and air quality will be developed to be added to Windwards sustainability plan by 2025.

## 6 CONCLUDING REMARKS

In conclusion, Windward's commitment to the MEP 2040 Challenge issued by The Carbon Leadership Forum reflects its dedication to driving meaningful change within the mechanical, electrical, and plumbing design industry. By signing the MEP 2040 Commitment, Windward has undertaken a significant responsibility to reduce both embodied and operational carbon emissions, aiming for Net-Zero status by the year 2040.

The comprehensive company plan outlines a phased and strategic approach, addressing Scope 1, Scope 2, and Scope 3 initiatives, as well as specific measures to reduce operational and embodied carbon. The emphasis on sustainability is evident in the incorporation of Environmental Product Declarations (EPDs), the elimination of high Global Warming Potential refrigerants, the transition to renewable energy sources, and the integration of smart metering and energy management.

The "Designing for Zero" section demonstrates Windward's holistic approach, not only reducing operational and embodied carbon in MEP systems. The timeline of milestones, including achieving Net-Zero status for all projects by 2040, showcases Windward's commitment to continuous improvement.

The commitment to tracking progress is a testament to Windward's transparency and accountability. With clearly defined tracking methods for each initiative, Windward ensures that its actions are measurable, enabling the company to report progress annually to The Carbon Leadership Forum.

As Windward embarks on this sustainability journey, it not only contributes to the larger industry discourse but also sets a commendable example for others to follow. The proactive and strategic initiatives outlined in the company plan position Windward as a leader in environmental responsibility, fostering a more sustainable future for the MEP design industry.