Memorandum

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To: Executive Branch Agencies Owning Buildings and Land

From:

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Re: Guidance to Agencies to Comply with Executive Order 17-20, Section 3(B) Directives

Background

In 2017, Governor Brown signed Executive Order (EO) 17-20, *Accelerating Efficiency in Oregon's Built Environment to Reduce Greenhouse Gas Emissions and Address Climate Change.*

Section 3(B) of this EO directed DAS and ODOE to work with state agencies to, *"ensure that new state-owned buildings permitted after January 1, 2022 and used primarily for office and other commercial workspace are designed to be able to operate as carbon-neutral buildings defined with full fuel-cycle considerations that are inclusive of, but not limited to, off-site renewable energy and other provisions of ASHRAE standard 189.1.*"

In addition, DAS and ODOE were directed to, *"analyze feasible options with the Department of Environmental Quality (DEQ) that would lower the embodied carbon of building materials in new construction of state buildings".*

This memorandum provides agencies with guidance on complying with these directives. It includes both definitions and steps agencies should take to engage with DAS, ODOE and DEQ when designing new buildings for office or other commercial workspace. Attachment A provides a simple checklist agencies can apply to building projects.

Defining carbon neutral buildings

Carbon neutral buildings address both operational and embodied carbon:

- Operational carbon includes the greenhouse gas (GHG) emissions associated with the operational use of the building. This includes all carbon from energy required to heat and power the building, including but not limited to lighting, plug loads, heating and cooling and cooking[1].

[1] Source: https://living-future.org/zero-carbon-certification/

- Embodied carbon includes the GHG emissions associated with the raw material extraction, manufacturing and processing, transportation and installation of building materials[2].

Both operational and embodied carbon emissions are significant portions of Oregon's Consumptions-Based Emissions Inventory, making up 20 percent and 8 percent, respectively[3].

Applying carbon neutrality to state agency buildings

Carbon neutral buildings are highly energy efficient buildings that are designed and constructed to be able to offset annual energy usage with renewable energy. Steps for applying carbon neutrality to state buildings include the following:

- First, all cost-effective energy efficiency measures to significantly reduce energy consumption should be installed.
- Second, the project should include sufficient renewable energy to meet or exceed the building's energy consumption. On-site renewable energy generation is preferred.
- Procurement of off-site renewable energy generation may be considered when on-site generation capabilities are inadequate or infeasible.
- Other mechanisms for getting to carbon neutrality, such as renewable energy credits, are discouraged and should only be considered as a "last resort" where no onsite or offsite opportunities are feasible.

Applicable building codes for carbon neutrality

EO 17-20 references ASHRAE 189.1, which was a green building construction code until it was merged into the International Green Construction Code (IgCC). The EO did not specify an applicable version and date of ASHRAE 189.1.

Codes for energy efficiency

Given the advancement in Oregon's baseline energy code since 2017 and the evolution of ASHRAE 189.1, the current *2021 Oregon Energy Efficiency Specialty Code,* which references the *ASHRAE 90.1-2019 Energy Standard for Buildings,* will result in state buildings that are more energy efficient than *ASHRAE 189.1-2014*. This is the recommended baseline standard for new state buildings.

Codes for renewable energy

After prioritizing energy efficiency, agencies should consider elements of the International Energy Conservation Code (IECC) and the IgCC that target zero energy and carbon neutral buildings. Particularly, "Appendix CC: Zero Energy Commercial Building Provisions" to the 2021

[2] Source: https://living-future.org/zero-carbon-certification/

[3] Operational and embodied GHG emissions for buildings were combined using the following sources: https://www.oregon.gov/deq/FilterDocs/OregonGHGreport.pdf ; https://www.oregon.gov/deq/ghgp/Pages/GHG-Inventory.aspx

International Energy Efficiency Code provides framework for consideration and integration into project design. This appendix overlays the baseline energy code and provides a requirement for onsite or offsite renewable energy to balance building energy consumption and provides a framework and calculation methodology for doing so.

Carbon neutral vs. carbon neutral ready buildings

While EO 17-20 directs projects to be carbon neutral "ready" – essentially meaning efficiency is maximized and the building can easily accommodate renewables at some point in the future – agencies are strongly encouraged to pursue carbon neutrality at the outset.

- Completing a carbon neutral "ready" building and then installing renewables later may be less cost effective, and the project may not be eligible for the same incentives from Energy Trust or other utilities as would a whole carbon neutral building project.
- ODOE's State Energy Efficiency Design (SEED) and Green Energy Technology (GET) programs also require designing energy efficiency and renewable energy into the initial project, which creates additional incentive for agencies to achieve carbon neutral goals in the initial project.

Applicability to state buildings

EO 17-20 directs agencies to apply carbon neutral standards to new state-owned buildings primarily to be used as office space, as well as other commercial workspace. Agencies should also consider the following:

- Other commercial workspaces may include warehouses, health care facilities and educational facilities.
- Building types to which this directive does not apply include data centers, residential construction, industrial processes, maintenance shops and laboratories.
- If the floor area of a proposed multi-use project contains more than 50% office space (for example, building with both storage and office space), then the standards should be applied.

DAS, ODOE, and DEQ recommend early consultation to discuss applicability to EO 17-20 to any new state agency construction as there will be some cases where further discussion is needed to determine if a specific project aligns or not with the intent of EO 17-20.

While EO 17-20's carbon neutral standards to not specifically apply to renovations, agencies are strongly encouraged to consider a carbon neutral goal for such projects to maximize energy efficiency and opportunities for renewables, and to lead by example.

How to engage with ODOE

ODOE's SEED and 1.5% for GET programs will be the primary pathways for agencies to discuss and determine methods to comply with EO 17-20 requirements regarding carbon neutral building operations.

- SEED requires new state buildings to be constructed to perform at least 20% better than the current energy code and includes detailed engineering analysis and energy modeling to demonstrate this performance.
- The GET program requires projects with a total contract price of $5 million or greater to set aside 1.5% of the contract price for green energy technologies, including renewable energy.

The requirements of these existing state agency programs, in combination with the frameworks available in such standards as the IECC, can provide agencies with a pathway to meet EO 17-20 requirements.

As all state agencies work to implement this newly effective directive, ODOE will work collaboratively with state agencies to develop the most efficient and effective path to meet the carbon neutral requirements, and ODOE welcomes input in how to best implement this process.

Agencies planning to construct new buildings should engage with ODOE as early as possible in their new building design process and should incorporate EO 17-20 requirements into project planning and design procurements, to ensure that energy efficiency and renewable measures are incorporated into the design. More information about SEED and program contacts can be found here:
https://www.oregon.gov/energy/energy-oregon/Pages/SEED-Program-Guidelines.aspx

Defining embodied carbon in buildings

Embodied carbon is the carbon dioxide (carbon) and other GHG emissions associated with materials and construction processes throughout the whole lifecycle of a building or infrastructure project.

Embodied carbon includes any carbon created during:

- The manufacturing of building materials (material extraction, transport to manufacturer, manufacturing).
- The transport of those materials to the job site.
- Construction practices used and the emissions or benefits associated with end-of-life material disposal or recovery.

For most building materials, emissions from material extraction, transport to manufacturer and manufacturing comprise most of the carbon impacts. These emissions are typically referred to as “cradle-to-gate” emissions.

Designing for embodied carbon

There are an increasing number of options to design lower carbon buildings and source lower carbon materials in building projects. Constructing smaller buildings, reusing buildings and using fewer materials are some simple design solutions to integrate early in projects.

Once a design is chosen, there are numerous strategies to optimize material choices through sourcing lower carbon:

- Concrete
- Steel
- Asphalt
- Drywall
- Furniture and flooring
- Many other materials

Lower carbon products are available in the market that have comparable cost and performance to conventional materials.

While there are currently no carbon limits for construction materials specified on newly constructed state buildings, there are numerous privately constructed projects in Oregon that have required material carbon disclosure and/or limits for projects. The City of Portland set carbon limits on their concrete purchases, which can be used as a point of reference for projects in the Portland Metro area.

Carbon disclosures, limits or targets can be set at the building or material scale.

How to engage with DEQ

Agencies are directed to contact and collaborate with the DEQ Materials Management Program to address embodied carbon emissions.

- Agencies should contact the DEQ team as early as possible so they can provide review of documents and serve as a technical advisor.
- DEQ can help integrate embodied carbon goals into the project RFP so the chosen design, engineering and construction teams have the capacity and ability to take ownership of embodied carbon reduction goals.
- In some cases, the DEQ team will also have direct capacity to consult on material selection and analysis with the project team.

Integrating embodied carbon goals into design and construction contracts helps build capacity in the hired firms who can then take that experience to their next project, increasing Oregon's chances of meeting carbon reduction goals.

Agencies are also directed to work with their project teams to document outcomes of the analysis and materials selection process in a publishable case study, including the modeling of carbon reductions achieved from an established design baseline. DAS and DEQ can provide review of draft

case studies. Documenting and sharing project results helps build capacity in the industry statewide to reduce embodied carbon.

The DEQ Materials Management program's EO 17-20 web site can be found at: https://www.oregon.gov/deq/mm/production/Pages/EO-17-20.aspx. Additionally, agencies can contact the DEQ team directly by email at built.environment@deq.oregon .gov.

Future steps

DAS, with support from ODOE and DEQ, is currently evaluating options to develop sustainable design guidelines for state buildings. These guidelines would be inclusive of, but broader in application than the directives of EO 17-20 and may also address topics such as specific thresholds for embodied carbon in building materials.

State agency stakeholders will be engaged in the process of developing these guidelines. Until such guidelines are developed and adopted, state agencies are directed to continue to use this memorandum as guidance for complying with EO 17-20 3(B) and to contact DAS, ODOE and DEQ with any questions.

Attachment A: Project Checklist for Executive Order 17-20 Directive 3(B): Carbon Neutral Operations for New State Buildings

This checklist provides state agency project managers and staff with a general list of tasks to help with meeting the requirements of Executive Order 17-20 Directive 3(B). It is not intended to be a comprehensive list, and agency staff are encouraged to use this list to guide their process in addition to collaboration with DAS, DEQ and ODOE staff to understand and fulfill the Executive Order requirements.

- ☐ Consult early with DAS, ODOE and DEQ to discuss applicability of EO 17-20 to any new state agency construction.

Carbon neutrality in building energy use

- ☐ Pursue the feasibility of carbon neutrality at the outset, rather than "carbon neutral ready" design.
- ☐ Design and install cost-effective energy efficiency measures to significantly reduce energy consumption.
- ☐ Include sufficient renewable energy to meet or exceed the building's energy consumption. On-site renewable energy generation is preferred.
- ☐ Apply the *2021 Oregon Energy Efficiency Specialty Code* for energy efficient design, which references the *ASHRAE 90.1-2019 Energy Standard for Buildings (or the applicable Oregon energy code in effect at the time).*
- ☐ Use existing State Energy Efficient Design (SEED) and 1.5% Green Energy Technology (GET) programs to support high energy performance and installation of onsite renewable energy
- ☐ For renewable energy, consider elements of the International Energy Conservation Code (IECC) and the IgCC. Reference Appendix CC: Zero Energy Commercial Building Provisions" to the 2021 International Energy Efficiency Code for calculating net-zero energy and carbon-neutral building performance.
- ☐ Consider a carbon neutral goal for major renovations to maximize energy efficiency and opportunities for renewables, and to lead by example.

Carbon neutrality in building materials

- ☐ Contact the DEQ team as early as possible so they can provide review of documents and potentially serve as a technical advisor.
- ☐ Integrate embodied carbon goals into the project RFP.
- ☐ Consider a smaller building, reusing buildings or materials and using fewer materials in design and construction.
- ☐ Consider lower carbon materials such as:
    - Concrete
    - Steel
    - Asphalt
    - Drywall
    - Furniture and flooring
    - Other materials
- ☐ Work with project teams to document outcomes of the analysis and materials selection process in a publishable case study.