ROAD MAP TO REDUCING BUILDING LIFE CYCLE IMPACTS
A TIMELINE OF KEY MILESTONES + ACTIONS

BY THE CARBON LEADERSHIP FORUM

 PRIMARY AUTHORS: Brad Benke, Dave Walsh, and Meghan Lewis
EDITORS + CONTRIBUTORS: Dirk Kasner, Walter P Moore Structural Engineers
Professor Kate Simonen, University of Washington

Additional thanks to the Seattle LCA Roundtable for providing early input.

Reducing embodied carbon and other life cycle impacts in construction requires collaboration between designers, builders, and manufacturers across the building sector. This timeline suggests milestones for ensuring teams can take action before the last responsible moment. Every project is different, but this is a complex process requiring early interaction and engagement for success.

In the interest of minimizing embodied carbon, the first questions that owners and designers should ask themselves before embarking on a project are:

• Is a building required?
• Can you re-use an existing building?
• Can you build a smaller building?

For additional introduction and definitions, please see the online version of this timeline on the Carbon Leadership Forum website (http://www.carbonleadershipforum.org)

WASHINGTON

Determining operational, embodied, and whole-building impacts requires a holistic approach to decision making.

Carrying out this work is different, but this is a complex process requiring early action before ‘the last responsible moment.’

ROAD MAP TO REDUCING BUILDING LIFE CYCLE IMPACTS
A TIMELINE OF KEY MILESTONES + ACTIONS

BY THE CARBON LEADERSHIP FORUM

 PRIMARY AUTHORS: Brad Benke, Dave Walsh, and Meghan Lewis
EDITORS + CONTRIBUTORS: Dirk Kasner, Walter P Moore Structural Engineers
Professor Kate Simonen, University of Washington

Additional thanks to the Seattle LCA Roundtable for providing early input.

Reducing embodied carbon and other life cycle impacts in construction requires collaboration between designers, builders, and manufacturers across the building sector. This timeline suggests milestones for ensuring teams can take action before ‘the last responsible moment.’ Every project is different, but this is a complex process requiring early interaction and engagement for success.

In the interest of minimizing embodied carbon, the first questions that owners and designers should ask themselves before embarking on a project are:

• Is a building required?
• Can you re-use an existing building?
• Can you build a smaller building?

For additional introduction and definitions, please see the online version of this timeline on the Carbon Leadership Forum website (http://www.carbonleadershipforum.org)

WASHINGTON

Determining operational, embodied, and whole-building impacts requires a holistic approach to decision making.

Carrying out this work is different, but this is a complex process requiring early action before ‘the last responsible moment.’

ROAD MAP TO REDUCING BUILDING LIFE CYCLE IMPACTS
A TIMELINE OF KEY MILESTONES + ACTIONS

BY THE CARBON LEADERSHIP FORUM

 PRIMARY AUTHORS: Brad Benke, Dave Walsh, and Meghan Lewis
EDITORS + CONTRIBUTORS: Dirk Kasner, Walter P Moore Structural Engineers
Professor Kate Simonen, University of Washington

Additional thanks to the Seattle LCA Roundtable for providing early input.

Reducing embodied carbon and other life cycle impacts in construction requires collaboration between designers, builders, and manufacturers across the building sector. This timeline suggests milestones for ensuring teams can take action before ‘the last responsible moment.’ Every project is different, but this is a complex process requiring early interaction and engagement for success.

In the interest of minimizing embodied carbon, the first questions that owners and designers should ask themselves before embarking on a project are:

• Is a building required?
• Can you re-use an existing building?
• Can you build a smaller building?

For additional introduction and definitions, please see the online version of this timeline on the Carbon Leadership Forum website (http://www.carbonleadershipforum.org)

WASHINGTON

Determining operational, embodied, and whole-building impacts requires a holistic approach to decision making.

Carrying out this work is different, but this is a complex process requiring early action before ‘the last responsible moment.’
**REVIEW SPECS FOR IMPACT REDUCTION**
- Identify 3+ materials to specify that meet reduction goals based on research
- Incorporate new product if applicable

**SPECS/DESIGN CALC**
- Confirm reduction strategies are specified
- Research best in class GWP and identify 3+ materials to specify

**SUBMITTALS**
- Confirm optimizations maintained through buy-out

**FINAL ASSESSMENT**
- Update LCA model per submittals
- Calculate project GHG emissions
- Calculate % below or above LCI targets
- Reflect on differences between design and as-built LCA and identify future strategies

**SHARE**
- Document results in firm database
- Share your results + lessons learned!

**OPTIMIZE: NEW PRODUCT VERIFICATION**
- Assemble LCA Of New Product (By Manufacturer)
- EPD Certification
- Publish New EPD For Product

**EARLY CD**
- Design-Build: Work with Builder to select products with lowest (verified) impact
- D-B-B: Discuss Spec Feasibility: How To Incorporate, Select Product type with lower industry average as well as product specific choices
- LCA: CONFIRM REDUCTION STRATEGIES
  - Confidence can achieve reduction goals
  - LCA calcs on design complete

**50% CD**
- SPECS/DESIGN CALC
  - Confirm reduction strategies are specified
  - Research best in class GWP and identify 3+ materials to specify

**100% CD**
- SPECS/DESIGN CALC
  - Confirm reduction strategies are specified
  - Research best in class GWP and identify 3+ materials to specify

**BIDDING**
- SPECS/DESIGN CALC
  - Confirm reduction strategies are specified
  - Research best in class GWP and identify 3+ materials to specify
  - Design team + builder collaborate to ensure % reductions included in bid requirements

**CONSTRUCTION**
- SPECS/DESIGN CALC
  - Confirm reduction strategies are specified
  - Research best in class GWP and identify 3+ materials to specify
  - Design team + builder collaborate to ensure % reductions included in bid requirements

**BUILT**
- SPECS/DESIGN CALC
  - Confirm reduction strategies are specified
  - Research best in class GWP and identify 3+ materials to specify
  - Design team + builder collaborate to ensure % reductions included in bid requirements
  - SUBMITTALS
    - Collaborate to set final concrete mixes if using
    - Update LCA to reflect final design
  - Update LCA Model, track changes in CDs + Submit calculations if applying for rating system credits
  - Design team + builder collaborate to ensure % reductions included in bid requirements

- SUBMITTALS
  - Confirm optimizations maintained through buy-out
  - Finalize concrete mixes if using
  - Update LCA to reflect final design

- BUY-OUT + SUBMITTALS
  - Track optimizations through submittal process
  - Work with builder to ensure % reductions maintained throughout buy-out

- FINAL ASSESSMENT
  - Update LCA model per submittals
  - Calculate project GHG emissions
  - Calculate % below or above LCI targets
  - Reflect on differences between design and as-built LCA and identify future strategies

- SHARE
  - Document results in firm database
  - Share your results + lessons learned!