Interagency Sustainability Working Group Meeting

GSA Green Building Advisory Committee Decarbonization Advice Letter

Electrification Focus

December 7, 2023

Roger Chang, PE, FASHRAE, Principal, Buro Happold

Scope of Task Group

- The charter of the GSA Green Building Advisory Committee (GBAC) Federal Building Decarbonization Task Group, in its third phase, is to explore opportunities and challenges for electrification of the federal building portfolio, while aligning with national climate goals, action plans, and legislation.

Task Group Approach

- Reviewed current federal policies and executive orders regarding electrification, as a subtopic area set of focus on building decarbonization.
- Reviewed a wide range of resources from national research labs, non-profit organizations, academic research institutions, and the private sector.
- Reviewed GSA's P-100-2021 with 2022 Addendum, *Facilities Standards for the Public Building Service*.
- Hosted guest presentations on electrification work by a range of federal, private sector, and non-profit organizations. These included project case studies, electrification frameworks, and related GSA initiatives.
- Reviewed previous Green Building Advisory Committee (GBAC) task group activities and Advice Letters.

Key Participants

- Donnel Baird, Dom Lempereur, BlocPower
- Roger Chang, Buro Happold
- Brett Bridgeland, RMI
- Ralph DiNola, Erin Beddingfield, NBI
- Gerald Johnson, DOD
- Joyce Lee, IndigoJLD
- Rick Mears, Nael Nmair, FEMP
- Clay Nesler, WRI
- Keiva Rodriques, MD Aviation Administration
- Jane Rohde, JSR Associates
- Tim Unruh, NAESCO
- Conan Wilson, EPA
- GSA: OFHPGB, PBS, OGP
- Public Observers: included representatives of such organizations as AGA, ASHRAE, AWC, BranchPattern, Greenbank, IDeAS Consulting, IUPAT, LBL, NREL, NYSERDA, PNNL and Wright & Company.

Key Presentations

- U.S. Department of Energy: Energy Justice
- City of Denver Building Electrification Program
- Building Electrification at Google
- U.S. Department of Energy Better Climate Challenge Program
- U.S. Department of Energy Building Technologies Office
- GSA Denver Federal Building 48 Case Study
- Institute for Market Transformation - High-Efficiency HVAC
- GSA P-100 Federal Facilities Standards
- Buro Happold Engineering All-Electric Buildings
- GSA Blanket Purchase Agreements
- GSA Green Proving Ground (GPG)
- NYSERDA Empire Building Challenge

Presentation Themes

- **Technology**
  - IMT, DOE Heat Pump
  - Green Proving Ground
- **Policy and Tools**
  - City of Denver, Google
  - P-100-2022, Blanket Purchase Agreements (BPA), ESPC

Presentation Themes

- **Frameworks / Case Studies**
  - GSA Case Study
  - Buro Happold Case Study
  - LBNL/DOE Better Building Program
  - NYSERDA
- **Benefits**
  - DOE Energy Justice

Advice Letter Scope Outline

- Background
- Financing GSA Building Decarbonization
- Decarbonization Task Group History
  - Phase 1: Decarbonization Playbook
  - Phase 2: Portfolio Decarbonization
- Assessing the Portfolio
- Electrification Scope Development
  - Project Phasing, Evolving Technology, Hybrid Solutions, Grid Interactive Efficient Buildings
- Strategic Decarbonization

November 2022 GBAC Advice Letter

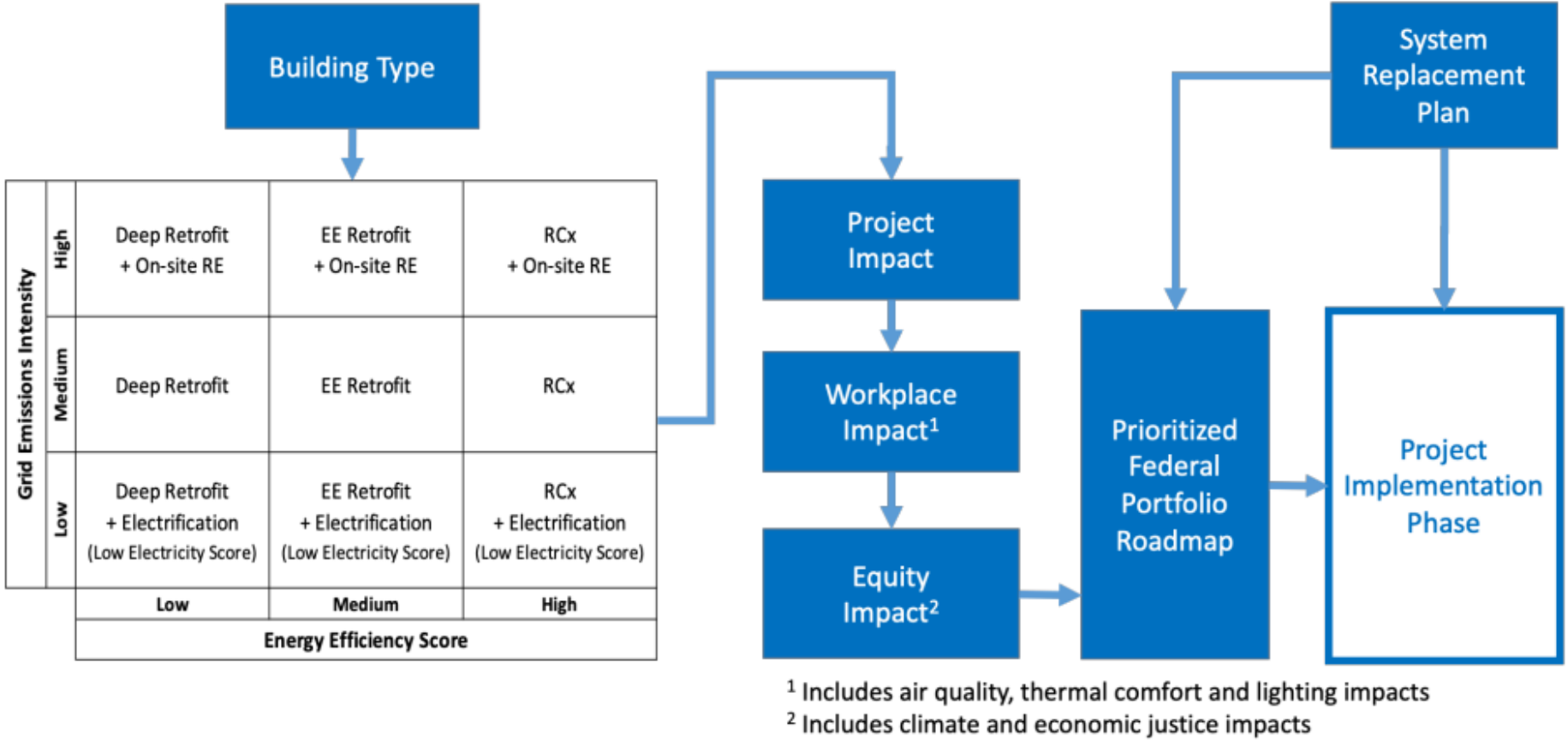
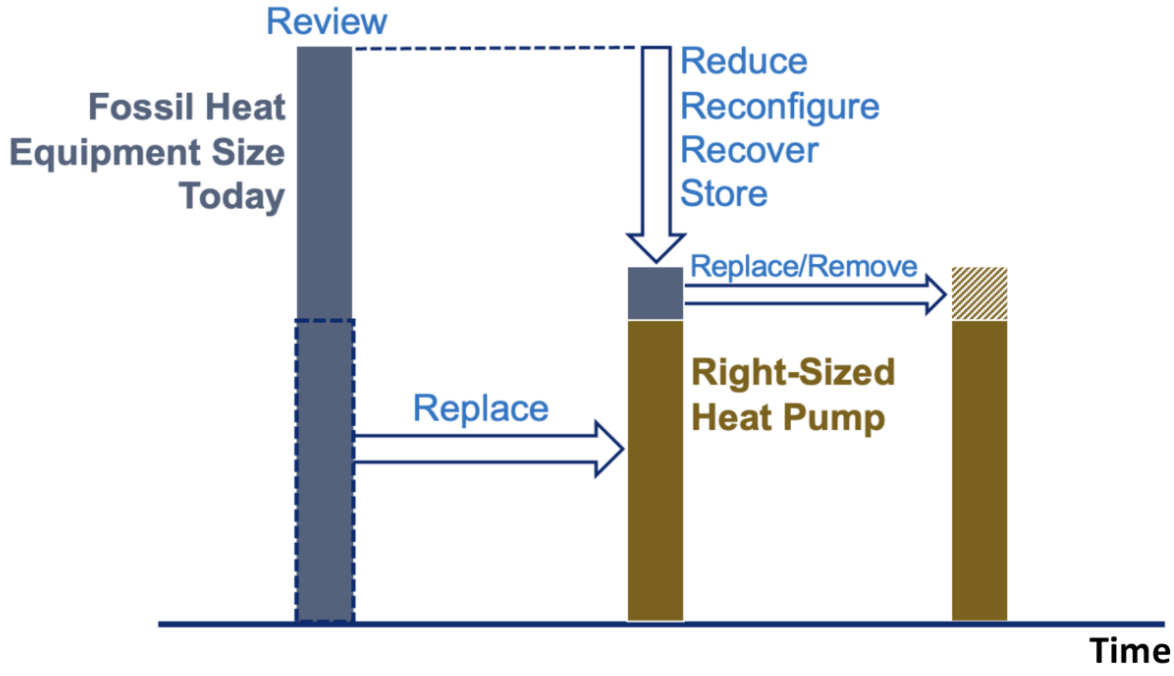


Figure 1 – Building Decarbonization Prioritization Methodology

Strategic Decarbonization

- Align Agencies and Policies
- Strategic Electrification Approach
  - Review
  - Reduce
  - Reconfigure
  - Recover
  - Replace (Initial and Final)
- Support Data Tracking and Progress Tracking



NYSERDA

P100-2024

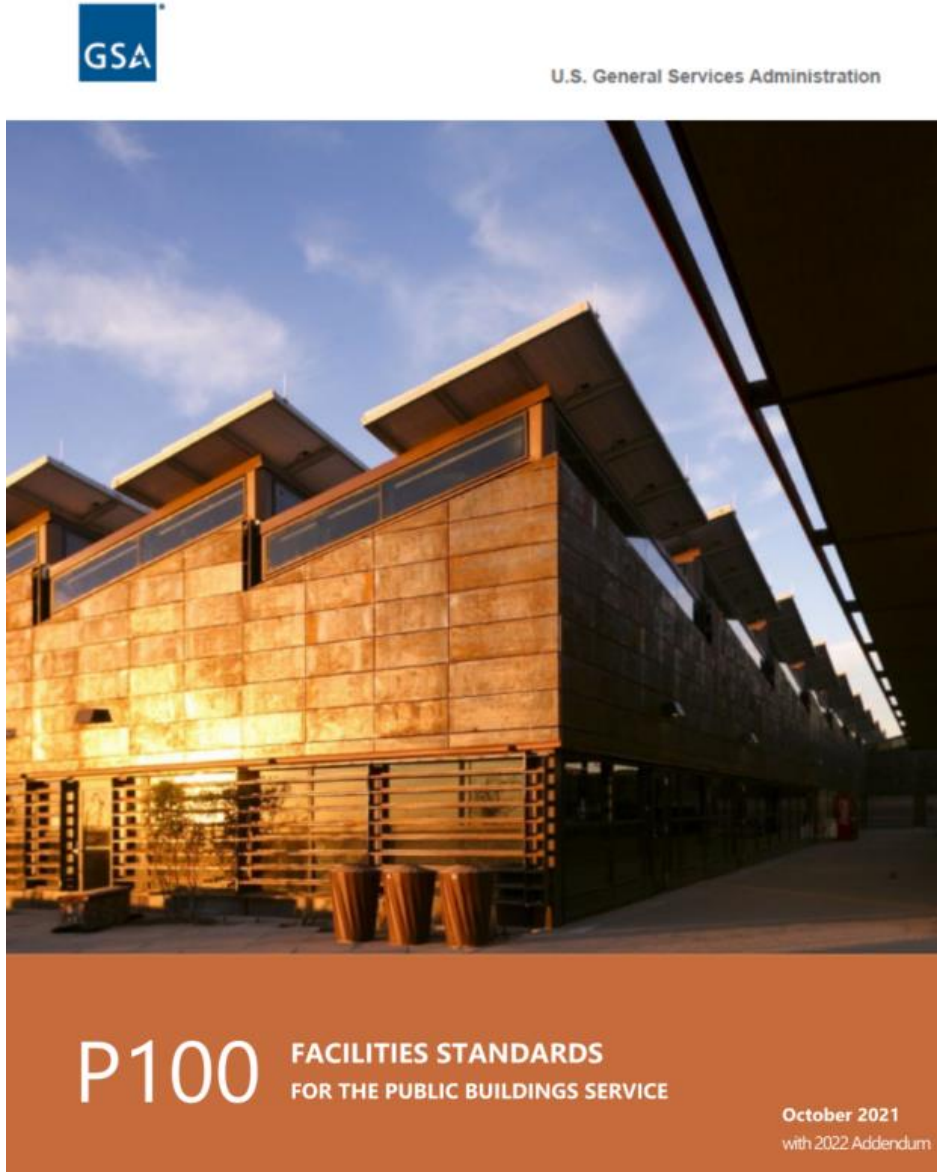
1.9.2.9 DECARBONIZATION

Decarbonization is the process of reducing the amount of GHG emissions from design, construction and building operations. This includes being aware of the embodied carbon of materials and exploring opportunities to sequester carbon. Project teams should evaluate ways to decarbonize their project. Careful consideration must be given to the use of high embodied carbon items like concrete and steel and alternate materials should be considered that have lower embodied carbon such as wood and other biobased materials. See the Carbon Smart Materials Palette.

New construction and major modernization projects must also:

- Target a 20% reduction in the project's whole-building embodied carbon from materials, compared to a conventional standard baseline building of the same project type (e.g. modernization or new construction)
- Calculate and compare carbon footprints for at least the structure and enclosure of a standard baseline building and the proposed design using a GSA-approved embodied carbon estimation tool. Earn at least one Building Life-Cycle Impact Reduction LEED BD+C: New Construction point, using LEED credit Option 2 "Whole-Building Life-Cycle Assessment" (WBLCA) to conduct a cradle-to-grave life-cycle assessment of the project's structure and enclosure and
- Meet ASTM E2921's Standard Practice for Comparing WBLCAs

All GSA projects that use at least 10 cubic yards of a concrete or asphalt mix must use GSA's Low Embodied Carbon Concrete and Environmentally Preferable Asphalt standards listed in Chapter 4, Prescriptive Civil Requirements.

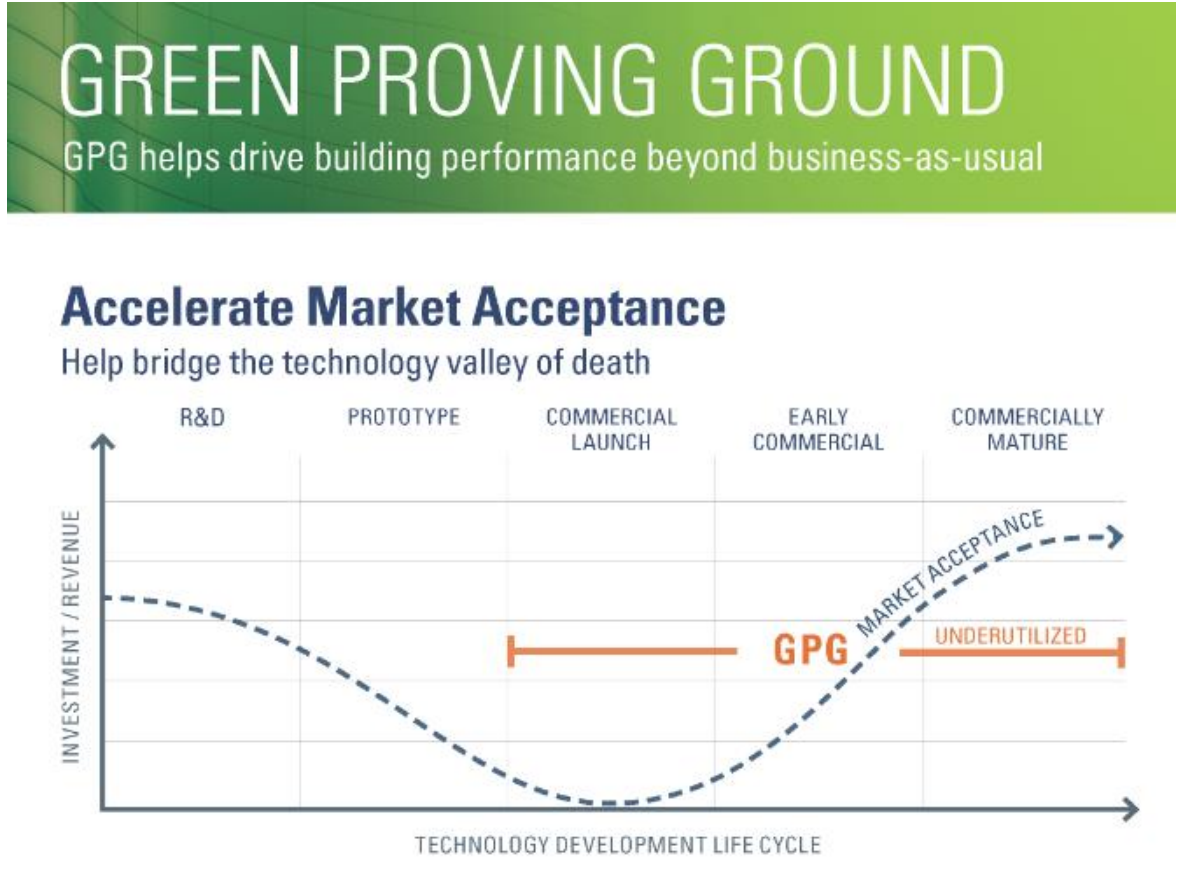


Advice Letter Review

- **Review**
  - Develop a portfolio approach to conducting electrification audits (reference: Appendix C from 2022 advice letter, DOE Better Climate Emissions Reduction Framework).
  - Develop a database of building characteristics.
  - Document current and future projected grid emissions factors, linked with GSA CFE.
  - Develop streamlined guidance for utilization of tax deductions and credits.

Advice Letter Review

- **Reduce**
  - P100: emphasize demand reduction measures
  - Green Proving Ground (GPG): technologies rapidly deployable in existing/historic buildings



Advice Letter Review

- **Reconfigure and Recover**
  - P100: emphasize use of lower temperature systems linked to heat pump systems. Acknowledge evolving technology market.
  - Develop targeted electrification phasing guidance by project type (size, climate, emissions, use).
  - Develop a strategy for replacement of fossil fuel equipment (emergency replacement).
  - Utilize 50,000 square feet as threshold for streamlined pathway.
  - Work with OMB to study the bundling of funding for a group of buildings.
  - GPG: study the impact of small scale battery/thermal storage on emissions reductions.

Advice Letter Review

- **Replace**
  - P100: develop outcome-based metrics based on greenhouse gas emissions intensity.
  - P100: pre-develop factors for teams to use in LCCA for electrified systems (O&M focus).
  - Utilize blanket purchase agreements to address electrification of smaller buildings.
- **Resources**
  - Invest in high quality education, with focus on building operators, design managers, and budget developers.
  - Engage with consortium working on harmonizing decarbonization initiatives.

Advice Letter Review

- **Next Steps for Future GBAC Work**
  - Alignment with Federal net zero emissions definition
  - P100 – detailed input
  - Alignment with industry groups focused on operational decarbonization work – “ECHO” model
  - Alignment with industry health and wellness initiatives

Appendix

- Electrification audits
- Prioritization factors for electrification
- Portfolio budgeting
- High level summaries of presentations
- Resource links

Questions and Discussion

- Ken Sandler, GSA, ken.sandler@gsa.gov
- Roger Chang, Buro Happold, roger.chang@burohappold.com