Appendix A: CDP Exam Blueprint

Decarbonization Professional Certification Exam Blueprint

Section I: CDP Exam Weightings by Domain
Section II: CDP Exam Weightings by Subdomain
Section III: CDP Exam Tasks

Section I: CDP Exam Weightings by Domain

Domain	Description	Weighting	Number of Exam Questions
1	Decarbonization Drivers	13%	13
2	Project Planning	14%	14
3	Project Development	13%	13
4	Construction and Renovation	15%	15
5	Passive Efficiency	11%	11
6	Active Efficiency	13%	13
7	Facility Management	12%	12
8	Distributed Energy Resources	9%	9
TOTAL		**100%**	**100**

Section II: CDP Exam Weightings by Subdomain

Domain 1: Decarbonization Drivers

Subdomain	Description	Weighting	Number of Exam Questions
1.1	Climate-Related Decarbonization Drivers	7%	7
1.2	Organization-Related Decarbonization Drivers	6%	6
TOTAL		**13%**	**13**

Domain 2: Project Planning

Subdomain	Description	Weighting	Number of Exam Questions
2.1	Building (Built Environment) Decarbonization Audit	4%	4
2.2	Policy and Regulation Review	3%	3
2.3	Financial Planning	4%	4
2.4	Emissions Reduction Roadmap	3%	3
TOTAL		**14%**	**14**

Domain 3: Project Development

Subdomain	Description	Weighting	Number of Exam Questions
3.1	Integrated Project Delivery	2%	2
3.2	Building Performance Simulation and Analysis	4%	4
3.3	Whole Building Life-Cycle Assessment	6%	6
3.4	Building Information Modeling (BIM)	1%	1
TOTAL		**13%**	**13**

Domain 4: Construction and Renovation

Subdomain	Description	Weighting	Number of Exam Questions
4.1	Building Material Reuse	2%	2
4.2	Low-Carbon Building Materials	4%	4
4.3	Low Global Warming Potential (GWP) Refrigerants	3%	3
4.4	Construction Material Waste Reduction	2%	2
4.5	Building Commissioning	4%	4
TOTAL		**15%**	**15**

Domain 5: Passive Efficiency

Subdomain	Description	Weighting	Number of Exam Questions
5.1	Building Envelope	7%	7
5.2	Natural Ventilation	4%	4
TOTAL		**11%**	**11**

Domain 6: Active Efficiency

Subdomain	Description	Weighting	Number of Exam Questions
6.1	High Performance HVAC&R Equipment	3%	3
6.2	Beneficial Electrification	2%	2
6.3	Building Management and Control Systems	4%	4
6.4	Lighting and Plug-Load Management	2%	2
6.5	Water Conservation	2%	2
TOTAL		**13%**	**13**

Domain 7: Facility Management

Subdomain	Description	Weighting	Number of Exam Questions
7.1	Indoor Environment Quality Management	2%	2
7.2	Refrigerant Management	2%	2
7.3	Integrated Facility Management	3%	3
7.4	Retrocommissioning	3%	3
7.5	Ongoing Commissioning	2%	2
TOTAL		**12%**	**12**

Domain 8: Distributed Energy Resources

Subdomain	Description	Weighting	Number of Exam Questions
8.1	On-Site Renewable Energy	2%	2
8.2	Energy Storage Systems	2%	2
8.3	Electric Vehicle Charging	1%	1
8.4	Demand Flexibility	2%	2
8.5	Off-Site Renewable Energy	2%	2
TOTAL		**9%**	**9**

Section III: CDP Exam Tasks

Domain 1: Decarbonization Drivers

Subdomain 1.1: Climate-Related Decarbonization Drivers

1. Describe the impact of climate change on building energy systems and operation
2. Describe climate change impacts on facility resilience
3. Identify owner's goals for sustainability, resiliency, and carbon neutrality
4. Identify climate change risk mitigation methods

Subdomain 1.2: Organization-Related Decarbonization Drivers

1. Describe owner requirements for facility resilience
2. Identify requirements for building occupant comfort, IEQ, health, and safety
3. Identify the drivers of building asset value
4. Recognize government regulations, requirements, and building decarbonization standards
5. Identify the associated social impacts of reducing carbon

Domain 2: Project Planning

Subdomain 2.1: Building (Built Environment) Decarbonization Audit

1. Conduct technical assessments, including: energy efficiency; electrification; building operations and maintenance; energy types
2. Analyze project opportunities for building decarbonization improvements, including return on investment
3. Use methods and tools to measure embodied and real-world operational carbon and greenhouse gas emissions
4. Define a project's decarbonization measures and specific strategies to be incorporated
5. Develop pathway roadmaps, including interim goals and timeline
6. Validate the building measurement and verification plan and conformance to industry standards (e.g., International Performance Measurement and Verification Protocol (IPMVP))

Subdomain 2.2: Policy and Regulation Review

1. Recognize and evaluate current and planned government policies, codes, and regulations that relate to building decarbonization for the project

Subdomain 2.3: Financial Planning

1. Evaluate utility and government financial incentives and rebates to support investment in building decarbonization measures for the project
2. Create and present a life cycle cost analysis for financial advantages of decarbonization that does not focus just on first cost
3. Estimate the cost of different building decarbonization measures
4. Use Measurement & Verification to identify energy conservation measures and validate sustained performance
5. Identify funding sources (considering energy tariffs, incentives, and grants) and assist in application preparation

Subdomain 2.4: Emissions Reduction Roadmap

1. Develop plans for implementing decarbonization measures aligned with regulatory requirements, emissions reduction targets, and owner goals

Domain 3: Project Development

Subdomain 3.1: Integrated Project Delivery

1. Identify the benefits of the Integrated Project Delivery (IPD) method of delivery through the use of building information management
2. Assemble project participants, stakeholders, and communities at the beginning of a project to work together through all phases of design, fabrication, construction, commissioning, and occupancy
3. Facilitate coordination of all stakeholders and feedback integration into design approaches
4. Ensure decarbonization strategies are clear and concise in model used by all stakeholders

Subdomain 3.2: Building Performance Simulation and Analysis

1. Model building energy consumption, costs, and related GHG emissions.
2. Utilize standard-approach calculations for estimating energy savings, considering baseline development and calibration against benchmarks or utility bills
3. Identify energy conservation measures and construct a holistic approach to reduce operational carbon

Subdomain 3.3: Whole Building Life-Cycle Assessment

1. Describe the benefit of conducting a Whole life cycle assessment for the project.
2. Adopt a Whole Building Life Cycle Assessment (WLCA) that complies with a recognized and standardized methodology so that benchmarks and targets can be established in a consistent way (i.e., EN 15978)
3. Evaluate the carbon impact of design decisions and material and systems specifications while considering its entire life cycle (Production, Construction, Use, and End of life)
4. Utilize environmental product declaration (EPD) to enable comparisons between products fulfilling the same function
5. Identify refrigerants used in HVAC/R equipment with low relative global warming potential, such as natural refrigerants, hydrocarbons, hydrofluoroolefins (HFOs)
6. Utilize end of life opportunities to optimize circular economy approaches

Subdomain 3.4: Building Information Modeling (BIM)

1. Leverage Building Information Modeling (BIM) tools to optimize operation and maintenance and reduce embodied and operational carbon emissions.

Domain 4: Construction and Renovation

Subdomain 4.1: Building Material Reuse

1. Retain existing building structures, construction elements and materials for new use (or adaptive reuse)
2. Identify code limits on materials reuse

Subdomain 4.2: Low-Carbon Building Materials

1. Install construction materials with a low carbon footprint in terms of greenhouse gas emissions generated during their manufacturing, transportation, installation, maintenance, and disposal

Subdomain 4.3: Low Global Warming Potential (GWP) Refrigerants

1. Ensure refrigerants used in HVAC/R equipment with low relative global warming potential, such as natural refrigerants, hydrocarbons, hydrofluoroolefins (HFOs), and some hydrofluorocarbons (HFCs)
2. Minimize volume and improve management of refrigerants
3. Review refrigerant management plan

Subdomain 4.4: Construction Material Waste Reduction

1. Divert construction and demolition materials from disposal by using recycled products, practicing source reduction, preserving existing structures, salvaging construction structures, and reusing existing materials

Subdomain 4.5: Building Commissioning

1. Work with the commissioning service provider to inform the commissioning scope and ensure decarbonization design goals are monitored
2. Verify that owner's project requirements (OPR) documentation incorporates decarbonization strategies
3. Participate in a commissioning review of a project design

Domain 5: Passive Efficiency

Subdomain 5.1: Building Envelope

1. Prioritize materials for a building's thermal envelope to reduce carbon emissions by optimizing thermal loads
2. Identify methods and metrics for evaluating thermal envelope performance, including fenestration
3. Analyze the impacts of building location, orientation, shading, and geometry on passive efficiency
4. Evaluate the interaction between climate change and thermal envelope performance over the lifecycle of the facility
5. Reduce building's thermal bridge losses to optimize building envelope performance for lower operational carbon
6. Evaluate infiltration and exfiltration impacts on operational carbon
7. Evaluate surface reflectivity characteristics of exterior thermal envelope components to reduce carbon emissions by optimizing thermal loads

Subdomain 5.2: Natural Ventilation

1. Apply principles and reference standards of natural ventilation, climate psychrometrics, and indoor air quality standards to reduce operational carbon
2. Compare baseline envelope systems against low-carbon alternative systems according to operability, maintainability, reliability, and useful life

Domain 6: Active Efficiency

Subdomain 6.1: High Performance HVAC&R Equipment

1. Refine the owner's project requirements (OPR)
2. Identify, analyze, and compare base and alternative systems:
    i. Selection
    ii. Optimization
    iii. Operability
    iv. Maintainability
    v. Reliability
3. Prepare the basis of design (BOD) based on the OPR
4. Review and comment on the design of heating, ventilating, air-conditioning, and refrigeration (HVAC&R) systems
5. Ensure applicable codes, standards, and guidelines are incorporated in the design and construction documents
6. Evaluate applicable incentive opportunities

Subdomain 6.2: Beneficial Electrification

1. Evaluate and recommend electrification strategies for buildings
2. Recommend an advanced metering strategy for electricity consumption of the building
3. Determine available electrical system capacity to accommodate electrification
4. Evaluate the replacement of fossil-fuel systems with electric alternatives that reduce greenhouse gas emissions
5. Explain how buildings interact with the electric grid

Subdomain 6.3: Building Management and Control Systems

1. Review and comment on the design of the building management system (BMS) and control sequences
2. Ensure that controls are compatible with the equipment and systems

Subdomain 6.4: Lighting and Plug-Load Management

1. Develop strategies to reduce energy consumption and select devices for automatic switching and dimming of general indoor and outdoor lighting and the control of plug loads
2. Utilize energy modeling to assess the efficiency of various indoor and outdoor lighting options

Subdomain 6.5: Water Conservation

1. Recommend strategies to reduce potable water use.
2. Recommend low water usage equipment and systems
3. Recommend energy efficient systems and strategies

Domain 7: Facility Management

Subdomain 7.1: Indoor Environment Quality Management

1. Identify indoor environment quality (IEQ) requirements
2. Recommend building systems to provide a comfortable, safe, and healthy environment
3. Recommend systems and strategies to monitor and control IEQ within and around buildings

Subdomain 7.2: Refrigerant Management

1. Recommend refrigerant management plan(s) for high global warming potential refrigerants in buildings to minimize leakages and ensure their recovery, recycling, and destruction at the end of life
2. Recommend strategies to transition to and manage low global warming potential refrigerants

Subdomain 7.3: Integrated Facility Management

1. Recommend technologies, systems, and processes to optimize the operations and maintenance of buildings while enhancing sustainability, productivity, and tenant experiences
2. Recommend Facility Condition Assessments (FCAs) are performed systematically and the Whole Life Cycle (WLC) assessment be updated as applicable
3. Utilize energy analytics and data management to track, benchmark and verify the performance, identify energy savings, and reduce operational carbon
4. Recommend integration of various building systems under a centralized control platform to highlight carbon-intensive operations and address as applicable
5. Recommend facility staff training and education on decarbonization

Subdomain 7.4: Building Retrocommissioning

1. Explain the role of retrocommissioning in the decarbonization of building assets
2. Recommend decarbonization strategies for retrocommissioning of buildings
3. Verify that current facility requirements (CFR) documentation incorporates decarbonization strategies

Subdomain 7.5: Building Ongoing Commissioning

1. Explain the role of ongoing commissioning in the decarbonization of building assets
2. Recommend decarbonization strategies for ongoing commissioning of buildings
3. Verify that current facility requirements (CFR) documentation incorporates decarbonization strategies

Domain 8: Distributed Energy Resources

Subdomain 8.1: On-Site Renewable Energy

1. Recommend opportunities for generating renewable energy on-site (solar, wind, hydro, biofuels)
2. Integrate and coordinate adding renewable energy sources into the grid and other existing energy infrastructure, interconnection
3. Navigate the challenges and solutions for managing variable renewable energy supply, energy storage
4. Understand current electric grid emission factors and future trends.
5. Identify current emission factors for other energy sources

Subdomain 8.2: Energy Storage Systems

1. Evaluate energy storage system technologies and their related benefits and limitations
2. Recommend the use of technologies (thermal and electric storage) for later use powering electrical

Subdomain 8.3: Electric Vehicle Charging

1. Review site energy control objectives, vehicle energy needs and site infrastructure constraints for EV charging plan

Subdomain 8.4: Demand Flexibility

1. Evaluate the capability for demand-side building loads to manage short-term electricity consumption patterns on based on time-of-use energy pricing or utility requests
2. Identify opportunities and measures to shed and shift a building's electricity demand.
3. Evaluate incentive programs from electricity utility companies (e.g., rebates for every KW of demand reduced) and ensure these have been communicated to staff and/or tenants

Subdomain 8.5: Off-Site Renewable Energy

1. Inform stakeholders of laws, policies, and regulations surrounding carbon reduction and REC purchasing
2. Evaluate and recommend the procurement of low/no carbon electricity from off-site renewable energy projects, renewable energy certificates (RECs), power purchase agreements (PPAs) or green power utility contracts
3. Identify current and forecasted electric grid emission factors