



**CLIMATE
CHALLENGE
NETWORK**

Mayors' Megawatt Challenge

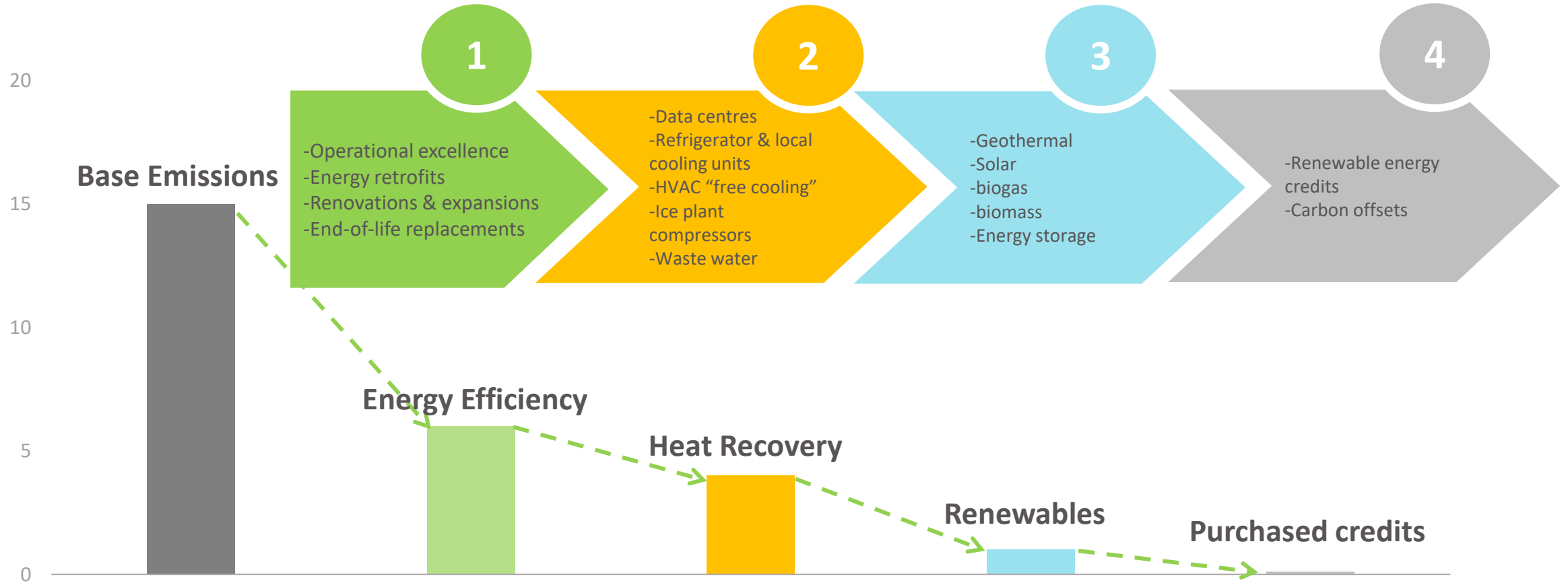
Practical Pathways to Net Zero Carbon Buildings

March 31, 2021 CAP Webinar





Practical Pathway to Net Zero Carbon Buildings





Net Zero Carbon Readiness – Identifying priority buildings

Criteria

- High GHG reduction potential
- Planned capital improvements
- Equipment replacement
- Data availability
- Bundling similar buildings together
- Staff availability
- Other municipal priorities and goals



Net Zero Carbon Readiness – Getting Organized

Understanding building design and current operations and performance is first step in net zero carbon readiness.

- Key drawings - mechanical, refrigeration, electrical (lighting), architectural, schematics
- Previous energy audits, summary of recent measures completed
- Current operating conditions and occupancy schedules
- Building condition assessments
- Asset management plan/capital plan
- Data
 - Monthly (2 years)
 - Interval, if available (2 years)
 - **Submetering or datalogging high energy using equipment and systems**
- Target and savings potential



Net Zero Carbon Readiness – Trends and Building Automation System

- Trends
 - Set up trend logs and archive them for a minimum of 2 of the most recent years.
 - If equipment not connected to the BAS, use temporary or permanent data loggers to collect operational and energy data
- Sequence of operations/controls sequences
 - Have these been documented?
 - If not, use building automation system (BAS) trending, data logging, and facility staff interviews to document sequences (scheduling, temperature resets, setpoints)
- Building automation system procurement
 - Compatibility with existing controllers and systems
 - Consider open source
 - Servicing capability and outcomes-based maintenance requirements



Testing, Adjusting and Balancing

Why testing, adjusting and balancing (TAB) of HVAC systems?

- Meeting or exceeding design specifications and codes to ensure better thermal comfort, indoor air quality, and system energy efficiency.
- Ventilation meeting ASHRAE 62.1 requirements and if systems can (or do) meet ASHRAE COVID recommendations
- Setting stage for BAS installation. TAB contractor can document current operating practices, improve them if needed and set out what would be programmed in BAS when installed.
- Identify where variable frequency drives (VFDs) can/should be installed.



Roadmap to Net Zero Carbon approach

“Low or zero carbon design brief” - the end-point modelled concept or ideal end goal for the facility with the least possible carbon emissions

Includes the following:

- what you need for the business case, specifications and integration into your long-term capital plan for each major piece of equipment or design element
- alignment with trigger events (like end-of-life equipment)
- opportunities to shift operations to be lower carbon
- lifecycle cost analysis
- optional bundling of measures and/or building types

Thank you!

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