CLIMATE ACTION COMMITTEE
June 13th, 2023
7:00 PM
MEETING AGENDA

Meeting Location:

- In person: Town Hall, Select Board Room, 22 Monument Square., Concord, MA
- Virtual, you may join by video conference:

https://us02web.zoom.us/j/86022691854?pwd=K0NjVVNiY0dDQUJsUVltMjdjWmlNZz09

Meeting ID: 860 2269 1854

Passcode: 950000

Via phone: 888.475.4499, 833.548.0276

1. Welcome – comments and announcements [7:00]

2. Meetings and minutes [7:05]
   a. Approval of May 22, 2023 minutes
   b. Clerk tonight – Jerry Frenkil
   c. Upcoming meeting dates and clerks (Meeting Time: 7PM)
      Jul 12th – Clerk: Cheryl Baggen
      Aug 8th (and subsequent first Tuesdays) – Clerk: Janet Miller

3. Chair's update (Brad) [7:10]
   a. CAC operations, OML
   b. Update on CMLP residential programs

4. Director's update (Eric) [7:20]
   a. Written update attached

5. Discussion of proposed CAC Working Groups and Projects [7:30]
   a. Function of working groups
   b. Proposed work efforts (too many?)
      i. Municipal Building Electrification
      ii. Municipal Solar (participation on Task Force) [Gavin]
      iii. Commercial Solar (in parallel with task force)
      iv. Residential Engagement
      v. Transportation
      vi. Resilience/Vulnerability [Paul?]
      vii. Progress/Metrics/Reporting
      viii. Policy (start Fall 2023) – preparation for 2024 ATM
      ix. Communications [Brad]

6. Vulnerability Assessment Proposal [Paul] [8:15]
    a. Discuss proposal, CAC vote for confirmation
7. Discussion of Hanscom Field and Proposed Expansion [8:30]
    a. Presentation, discussion, vote to take a position
    b. Seeking CAC member to participate in HATS advisory group

8. Brief updates (time permitting): [8:45]
    Library sustainability (Jerry)
    MassEnergize Communities meetings (Brad)

9. New business [8:50]

10. Public comments [8:55]

11. Adjourn [9:00]

Distribution:
Committee Members: Brad Hubbard-Nelson (Chair), Courtney Eaton, Jake Swenson, Paul Kirshen, Ben Slayden, Gavin Colbert, Karen Gibson, Jerry Frenkil, Janet Miller, Michael McDonald, Cheryl Baggen

Town: Town Clerk, Mark Howell (Select Board Liaison), Eric Simms (Sustainability Director)

Local Groups: Mothers Out Front, ConcordCAN, League of Women Voters

Climate Action Committee - Proposed working groups and projects

Brad Hubbard-Nelson, June 4, 2023

My goal is to have all committee members connected with one (or more) work efforts which are appropriate for their interests, skills and time available. My hope is that these will be working groups of 2-3 CAC members plus outside members, including students where possible. Generally not designated subcommittees which governed by Open Meeting Law would need to meet publicly, with minutes and 48 hour public notice, though in all that we do we should follow the letter and spirit of OML. Working groups should ideally meet monthly and be prepared to report out progress to the committee at the monthly CAC meeting, which is where any decisions impacting the town or committee should be made. For each working group the first item is to set SMART goals (specific, measurable, achievable, relevant, and time-bound) for what that group will try to accomplish in the next 6 and 12 months.

The work efforts should be in support of the 2020 Climate Action Plan, which is extensive. I propose the following work efforts, which is perhaps too large a list and we may need to trim it down once we see what people choose to take up.

Name	Description	Goals (TBD)
Municipal building electrification		Develop plan for commercial building electrification (funding for consultant?), including school buildlings
Municipal Solar	Represent CAC on solar task force	Assist in developing plan for municipal in-town solar. Address grid and other barriers for additional solar adoption
Commercial Solar	Parallel effort on commercial solar	Plan how commercial solar potential and sites, and what barriers need to be addressed. Compare incentives with other towns and propose changes
Residential Engagement	Engaging residents for sustainable action	Cooler Concord website, newsletters, social media, event planning
Transportation	EV working group, liaison to transportation comm.	
Resilience/Vulnerability		See through vulnerability assessment, climate adaptation projections
Progress/Metrics/ Reporting		Update emissions inventory for 2022, communicate to community through Sustainable Concord website
Policy (start fall 2023)	Investigate and propose town legislation for ATM	
Communications (chair/clerk)	Communication of CAC work to community	CAC website page, articles in Bridge, logo, chairs meeting, update select board

Town of Concord
Climate Action Advisory Board

Recommendation to Select Board

Preparing Concord for Climate Change

March 01, 2023

Recommendation: Begin preparing Concord for a different and shifting set of future climate conditions by adopting climate projections for temperature, humidity, and precipitation; modeling and mapping future flood patterns and other climate impacts; and conducting an assessment of the town's built, social and natural systems vulnerabilities to climate change.

Justification for recommendation

Climate change driven by human activities – primarily the combustion of fossil fuels – is happening now. The impacts of changing patterns of temperature, precipitation, and sea level can be seen around the world.[1] Furthermore, the stability of our climate – which has endured since the last ice age – has been disrupted. Until the recent past, communities could assume that their climate would stay within a predictable range. Now we have entered into a state of "non-stationarity" where our climate is continuously shifting. This means the way Concord has been designed and developed is based on the climate of the past, so the town is not prepared for the future climate. There is no single set of temperature and precipitation patterns that communities can plan for. However, it is possible to understand the potential and probable range of changes based on science and possible scenarios of greenhouse gas emissions.

The Town has recognized that climate change is happening and has taken action, including:

- Joined the Commonwealth's Green Communities Program in 2013 by meeting five qualifying criteria and implemented energy efficiency and clean energy projects.
- The 2017 Town Meeting adopted Article 51 which established emission and energy reduction goals and called for the establishment of the Town sustainability program.
- Participated in the 2017 MAGIC Climate Change Resilience Plan developed by the Metropolitan Area Planning Council for the member communities in the Minuteman Advisory Group on Interlocal Coordination including Concord.
- Joined the Commonwealth's Municipal Vulnerability Preparedness (MVP) Program in 2018 and conducted a Community Building Resilience Workshop.
- Issued Sustainable Concord in 2020, the Town's first comprehensive climate action and resilience plan.

The Sustainable Concord plan focused on climate mitigation or emission reduction strategies, but also recommended important climate adaptation actions including:

- Develop forest management plan to enhance health of Concord's forests

[1] Intergovernmental Panel on Climate Change, *Climate Change 2022: Impacts, Adaptation and Vulnerability*, February 2022 (https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/)

- Increase indoor and outdoor water conservation
- Work with homeowners to promote sustainable landscaping practices
- Assess the vulnerability of natural resources most at risk to projected climate changes
- Assess and improve Concord's tree canopy
- Develop an integrated water resource management plan
- Conduct a threat assessment for Concord's critical infrastructure
- Update stormwater regulations and create a stormwater utility
- Increase the use of green infrastructure and low impact development

Climate change is already occurring and will continue to become more severe with time. How severe climate impacts will be depends on what happens with carbon emissions going forward. Concord should continue to work on decarbonizing our buildings and transportation systems to do its part for the needed global effort to stabilize greenhouse gas concentrations in the atmosphere that drive climate change. The degree of success the world achieves in decarbonization will determine how much adaptation is necessary. All communities, including Concord, need to act on both decarbonization and adaptation in parallel.

To date, Concord has not conducted a comprehensive climate change vulnerability assessment which would be a critical foundation for adaptation planning. This recommendation goes over the key elements of adaptation planning and suggests some considerations for conducting this work.

<u>How is Concord's climate changing?</u>

While it is clear that the planet's climate patterns are shifting due to the buildup of greenhouse gases in the atmosphere, the effects vary depending on location. For instance, the land and ocean temperatures in New England and Massachusetts are increasing relatively faster than other regions of the globe. So it is important to understand the patterns and trends in our particular location.

Fortunately, Concord is part of a state that is taking climate change seriously. A significant amount of climate science specific to our region is available to inform our understanding and decisions. The Commonwealth recently issued a statewide Climate Change Vulnerability Assessment and the University of Massachusetts, Boston issued the Greater Boston Research Advisory Group (GBRAG) report synthesizing the latest climate science for the metropolitan Boston area.[2,3] The statewide study only contains projections for a scenario of high GHG emissions and has large subareas (the state is divided into 7 regions). The GBRAG study reviewed existing climate change projections for the MAPC area and recommended the most reasonable sets to use. Projections for several plausible GHG emission scenarios are given but the areal extent varies from individual sites where extensive research has been done to counties to the entire region. Another source of projections is the ResilientMA site (resilientma.org) but this only appears to have projections for one, high climate change scenario. Examples of trends from the GBRAG report include:

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[2] Commonwealth of Massachusetts, *Massachusetts Climate Change Vulnerability Assessment*, 2022 (https://www.mass.gov/info-details/massachusetts-climate-change-assessment#read-the-report-)

[3] Ellen Douglas & Paul Kirshen, University of Massachusetts Boston, *Climate Impacts and Projections for the Greater Boston Area: Findings of the Greater Boston Research Advisory Group Report*, February 2022 (https://www.umb.edu/editor_uploads/images/school_for_environment/GBRAG_report_05312022@1915.pdf)

- Average annual temperature –Average temperature in Middlesex County is presently 49.3 Fahrenheit (F), could increase to 52F - 58.1 F by 2070s
- Number of days over 90 degrees F -Presently 9.2 days in Middlesex County, could increase to 20 - 65 days by 2070s
- Average annual precipitation – For Suffolk County, the mean annual total precipitation of 46.1 inches. Could increase by 1.7 - 9.5 inches by 2090s.
- Change in extreme precipitation - In Boston, 10 Year, daily precipitation could increase by 15 - 30 % by 2090s
- Flood Discharges- In the region, by late century, small flood flows (2 year recurrence interval) could increase by 20-50 %, 100 year recurrence interval flood flows could increase by 15-70 %.
- Groundwater projections- for Pepperell MA , annual recharge rates could decrease by 18% under low emission scenario by late this century – this will negatively impact water supplies, wetlands, and low flows in rivers and streams.

While these data trends are useful at the regional scale, it is important for the projections to be as meaningful as possible for local planning and design decisions; the climate of Concord is not the same as the climate of Massachusetts coastal communities. Currently, a full set of projected climate parameters specific to Concord is not available to our knowledge. Since a range of local plausible futures should be considered, the Town should consider developing Concord-specific projections, which would probably not be too costly. The Town should review options and discuss tradeoffs on how best to develop local climate projections before proceeding.

Vulnerabilities of concern

Vulnerability to climate change can be understood in terms of exposure, sensitivity, and adaptive capacity. Exposure represents climate impacts, such as flooding; sensitivity is about how much an impact can affect an individual, population, physical asset, or system; and adaptive capacity involves the ability of individuals, populations, physical assets, and systems to take action, withstand, and/or recover from the impacts. Adapting to climate change and increasing resilience involves modifying the three parameters. Exposure can be modified through global reductions in greenhouse gas emissions, through local measures that relocate specific populations or facilities, or reduced urban heat islands. Sensitivity can be reduced in people and physical systems by improving population health or replacing equipment to make them less susceptible to heat or moisture. Adaptive capacity can be increased through efforts such as emergency preparedness and increasing social capital. A robust vulnerability assessment provides the technical foundation to understand exposure, sensitivity, and adaptive capacity at the local level and inform the types of strategies that can be effective in adaptation and resilience.

Climate projections are the first step in conducting a vulnerability assessment. But the changes in parameters such as temperature and rainfall do not tell us what the impacts are. To understand the implications of the changing climate parameters, it is also necessary to model and map impacts. For example, the projections may tell us that rain will fall more intensely, but they do not tell us where flooding will go and how deep it will be. Hydrologic modeling with future climate parameters is needed.

Concord is fortunate to be located away from the coast and will not experience the direct impacts of sea level rise and storm surges. This is not to say that Concord will escape the effects of sea level rise entirely. Sea level rise will affect the regional economy, prompt migration away from the coast, and have other indirect effects that will reverberate.

However, changes in temperature and precipitation patterns will present challenges to Concord. Some of these challenges are inferred in the recommendations of the Sustainable Concord plan. Vulnerabilities over time and associated uncertainties that the Town should focus on include:

- Changes in frequency, extent, and depth of river, stream, and pond flooding and the impacts on buildings and infrastructure and natural systems
- Changes in groundwater levels and effects on drinking water supply, river and streamflows, pond levels, and wetlands
- Effects on agriculture and horticulture as temperature and moisture regimes change affecting crop suitability, growing season length, and pest populations and other plant diseases
- Effects on forest cover and composition as temperature and moisture regime changes cause species such as red maple, red oak, American beech, and others to be replaced by more southerly species or convert to grassland; potential for wildfire
- Effects on wildlife and plant habitat
- Potential for disruptions in energy supply and distribution, particularly electricity, as demand increases or distribution lines and equipment are damaged
- Potential for disruptions of telecommunications systems, including the Internet, due to extreme weather events
- Impacts on more vulnerable individuals and populations, particularly the elderly, very young, people with health conditions or who take certain medications (e.g., some medications reduce ability to regulate body temperature), households with lower income
- Impacts on emergency management and response capacity
- Impacts on tourism
- Impacts on commuting out of and into Concord

The table below from the recent statewide assessment shows the two most urgent impacts per sector for the Eastern Inland region. Urgency is a function of the impact, the timing of the impacts of the next century, and how effective planned adaptation actions are in meeting the threats over time.

To assess these vulnerabilities, the Town will need to conduct modeling, mapping, and analyses that have not been performed in the past.

Getting to a vulnerability assessment

The ultimate goal for the Town should be to invest in analyses and planning to enable strategic decisions to be made that raises Concord's preparedness and resilience in the face of climate change. Without a systematic approach, the Town risks taking random and isolated actions that do not achieve overall resilience. CAAB recognizes that the technical work and process to develop a climate change vulnerability assessment are complex and financially costly, particular for a small community like Concord. So it will be important for the Town staff working with boards and committees to think through how best to approach this task. However, it is also important to bear in mind that there are significant costs to inaction, which may exceed the cost of adaptation. While not precisely analogous, the National Institute of Building Sciences found in 2022 that investments in preparing buildings for natural disasters yields benefits of 4 to 6 times the cost.[4]

[4] National Institute of Building Sciences, *Natural Hazard Mitigation Saves*, January 2022 (https://www.nibs.org/projects/natural-hazard-mitigation-saves-2019-report)

Human Sector

- **Increase in Vector Borne Diseases Incidence and Bacterial Infections**, including West Nile Virus and Lyme disease due to more favorable conditions for ticks and mosquitoes.
- **Reduction in Food Safety and Security** due to production and supply chain issues, as well as spoilage during power outages.

Infrastructure Sector

- **Damage to Electric Transmission and Utility Distribution Infrastructure** associated with heat stress and extreme events.
- **Damage to Inland Buildings** from heavy rainfall and overwhelmed drainage systems.
- **Damage to Rails and Loss of Rail/Transit Service**, including flooding and track buckling during high heat events.

Natural Environment Sector

- **Freshwater Ecosystem Degradation** due to warming waters, drought, and increased runoff.
- **Forest Health Degradation** from warming temperatures, changing precipitation, increasing wildfire frequency, and increasing pest occurrence.

Governance Sector

- **Increase in Costs of Responding to Climate Migration**, including planning for abrupt changes in local populations.
- **Increase in Demand for State and Municipal Government Services**, including emergency response, food assistance, and state-sponsored health care.

Economy Sector

- **Reduced Ability to Work**, particularly for outdoor workers during extreme heat, as well as commute delays due to damaged infrastructure.
- **Reduction in the Availability of Affordably Priced Housing** from direct damage (e.g., flooding) and the scarcity caused by increased demand.

Key components of a climate change vulnerability assessment include:

- Downscaling global climate models to generate parameters such as future temperature, humidity, and precipitation. Global climate models (GCM) can be downscaled using statistical methods and calibrated to nearby weather station data. It will be necessary to specify time horizons (e.g., 2040, 2050, 2070, 2100). It is also possible there are sources of downscaled data that could be drawn upon without directly performing the work . Since future GHG emissions are uncertain and projections are very sensitive to them, particularly after 2050, projections need to be developed for several GHG emission scenarios. There are also uncertainties across the GCMs- thus multiple GCMs should also be used. The field of downscaling is well-developed. . The important objective is to generate parameters that are relevant to Concord
- With the basic parameters generated, which will be in ranges, scenarios of climate changes can compiled by the Town for different planning horizons
- With the scenarios, various modeling efforts could be undertaken, such as hydrologic modeling of our rivers and streams to project where flooding will extend to, how deep it will be, and the frequency that can be expected. Future land use, population, and human-value changes may also need to be considered.

- Map existing and projected conditions such as heat islands; tree canopy and forest cover; impervious area, buildings, infrastructure facilities; critical public and institutional facilities (e.g., public safety offices, hospital and health care, etc.); population demographics.
- Overlay the climate impacts data (e.g., future flood maps) with the maps of assets and demographic factors to identify which areas, facilities, and populations that face future risks.
- Rate vulnerabilities of facilities and populations based on exposure to risks, sensitivity to the exposure, and adaptative capacity (i.e., ability to withstand, cope, and recover).
- Prioritize vulnerabilities for action.

A vulnerability assessment should serve as a planning resource for Town agencies, but can also help inform businesses, institutions, and residents of their climate risks. Ultimately, making Concord a more resilient community will require both public and private actions. The Town government cannot achieve community resilience on its own. Conducting the assessment in an open and transparent manner can help build confidence in and buy-in of the results. The Town should consider forming a committee of Town staff and community stakeholders.

The cost of a robust vulnerability can be expensive. Other communities such as Boston, Cambridge, and Somerville have conducted vulnerability assessments, but they are larger cities with more resources. Some components of the assessment may not be expensive, such as generating downscaled climate projections. Modeling, particularly hydrologic modeling tend to involve significant costs since outside consultants are usually needed. Some of the supplemental data such as land cover may already exist (e.g., the Commonwealth has mapped surface temperatures for all 351 Massachusetts municipalities and will release it soon) and some data may be relatively inexpensive to generate, such as tree cover (e.g., University of Vermont Spatial Analysis Lab maps tree and forest cover at a very competitive price). The Town could develop a process that involves conducting the assessment in stages in order to manage costs.

Once a vulnerability assessment has been completed, the next step to develop a local adaptation plan that covers actions to be taken over time to prepare the community and build resilience. Adaptation strategies should be robust to the uncertainties of climate change and other futures, such as land use. Robust meaning that the strategies function reasonably no matter what the future. Adaptation planning is reasonably well-developed process.

CAAB would be happy to respond to any questions or discuss this recommendation with the Select Board or Town agencies.

Sustainability Director's Update

June 13, 2023

Recent Highlights

- Attended Metropolitan Area Planning Council (MAPC) – Minuteman Advisory Group on Interlocal Coordination (MAGIC) Legislative Breakfast. This annual event brings together 13 communities northwest of Boston working collaboratively on issues of regional concern. Attendees received legislative updates on various matters including PFAs, stormwater management, zoom hybrid meetings, and electrification, from Rep. Simon Cataldo, Rep. Carmin Gentile, Rep. Kate Hogan, and Rep. Dan Sena.
- Attended the Resilient Cities Summit on June 7-8 with Concord DPW Director, sponsored by Massachusetts Municipal Association, National League of Cities, and the Urban Land Institute. The event included sessions on climate resilience, panel discussions, and networking with regional municipal leaders and staff, state and federal agencies representatives, and consultants.
- Attended the CPS Sustainability Committee meeting – I'm scheduled to meet with the two CCHS AP Environmental Science teachers to discuss possibly integrating local sustainability content into the course.
- Participated in the third DPW Integrated Water Resources Management Plan workshop, including making that group aware of our interest in doing a Town climate vulnerability assessment and considering how these efforts dovetail.
- Accepted invitation to participate I the selection process of a consultant for the development of a Stormwater Utility
- Met with Laura Scott (CMLP) to improve understanding and discuss strategies to address CMLP infrastructure challenges to increased electrification demands
- Have started weekly meetings with the UNH Sustainability Fellow
- Have started attending weekly DPLM meetings at the request of the Deputy Town Manager to better raise awareness and collaboration across departments/divisions
- Have started attending monthly meetings of an internal Town workgroup to identify funding opportunities within and between departments/divisions
- Participated in networking opportunities with regional and sub-regional sustainability staff in an attempt to identify collaborative opportunities
- Participated in meeting with Town Counsel and representatives from Lexington and Acton for next steps on the Fossil Fuel Free Building Demonstration Program application process
- Met with Concord Bridge reporter for article on food composting in Concord