



URBAN FORESTRY TREE COMMISSION MEETING

Wednesday March 1, 2023 – 6:00 P.M.

Parks, Recreation & Cemetery Administrative Office

Meeting Room A

50 Officer Manny Familia Way Worcester, MA 01605

Or

If you choose to use the WebEx platform:

- 1) Go to www.webex.com
- 2) Click the “join” button on the top right side of the screen
- 3) Enter Meeting ID#: 2309 576 1186
- 4) Enter password: Treecomm3-01

If you choose to attend via phone:

- 1) Call 1-415-655-0001
- 2) Enter Meeting ID#: 2309 576 1186

AGENDA

1. Call to Order
2. Attendance (Roll Call)
3. Acceptance of Minutes for the (Roll Call) – December 21, 2022
4. To request a reasonable accommodation or interpretation or submit written comments or questions in advance of the meeting, please contact the Parks, Recreation & Cemetery Division by email at Worcestertrees@worcesterma.gov. Please note that interpretation requests must be received no later than 48 hours in advance of the meeting. Para solicitar una interpretacion razonable, o enviar comentarios o preguntas por escrito por favor comuniquese con la oficina de la Division de Parques, Recreo & Cementerio por correo electronico a Worcestertrees@worcesterma.gov. Por favor note que las solicitudes de interpretacion deberan ser enviadas 48 horas antes de la reunion.
5. Public Participation – Pursuant to Chapter 20 of the Acts of 2021 and in order to ensure active, public engagement, the City of Worcester currently allows for both in person and remote participation at the Urban Forestry Tree Commission meetings. To partake in the “Public Participation” section of this meeting, you may join us directly within the 50 Officer Manny Familia Way Meeting Room A, follow the information above to join via the WebEx application or dial the direct line as indicated. If you would like to raise your hand when in the meeting as a call-in user you may dial *3.

6. Assistant Commissioners Report (See Report Topics Below)

5. Old Business

- NA

6. New Business

- NA

7. Date of Next Meeting:

- March 22, 2023
- April 12, 2023
- May 3, 2023
- June 7, 2023
- September 6, 2023
- October 4, 2023
- November 1, 2023
- December 6, 2023

8. Meeting Adjourned (Roll Call)



URBAN FORESTRY TREE COMMISSION MEETING **MINUTES**

Wednesday December 21, 2022 – 6:00 P.M.

Parks, Recreation & Cemetery Administrative Office

Meeting Room A

50 Officer Manny Familia Way Worcester, MA 01605

Or

If you choose to use the WebEx platform:

- 1) Go to www.webex.com
- 2) Click the “join” button on the top right side of the screen
- 3) Enter Meeting ID#: 2308 510 8082
- 4) Enter password: Treecomm12-21

If you choose to attend via phone:

- 1) Call 1-415-655-0001
- 2) Enter Meeting ID#: 2308 510 8082

AGENDA

1. Call to Order – Meeting was called to order at 6:03 PM
2. Attendance (Roll Call) –
 - a. **Commissioners Present:**
 - i. Alexander Elton
 - ii. Joseph Mogel
 - iii. Joy Winbourne
 - iv. Kristin Wobbe - Virtually
 - b. **Administration Present:**
 - i. Robert C. Antonelli, Jr. Assistant Commissioner
 - ii. Milagros Pacheco, Staff Assistant III
 - iii. Denis Tucker – Working Foreman
3. Acceptance of Minutes for the November 30, 2022, Meeting (Roll Call)
 - a. Mr. Ted Conna requested a change of wording on his comments on the November 30 meeting. From: Trees should not be planted on top of the houses/buildings but in fields, forests, and farmland to help with sustainability. To: If we don't put solar installations on the tops of building, we are going to be putting them in fields, forests, and farmland

and people object to that. With some planning, future tree/solar conflicts can be avoided.

- b. Commissioner Elton made a motion to accept Minutes with changes. Second by Commissioner Mogel. All were in favor. Motion was approved 4 -0.
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 6. Assistant Commissioners Report (See Report Topics Below)
 7. Old Business NA
 8. New Business
 - Election of Chairperson and Vice Chairperson
 9. Date of Next Meeting:
 - January 25, 2023
 - March 1, 2023
 - March 22, 2023
 - April 12, 2023
 - May 3, 2023
 - June 7, 2023
 - September 6, 2023
 - October 4, 2023
 - November 1, 2023
 - December 6, 2023
 10. Meeting Adjourned (Roll Call)
-

ASSISTANT COMMISSIONER'S REPORT:

1. General:

- Urban Forestry Master Plan Update
 - Assistant Commissioner Antonelli commented that he's been getting bits and pieces of the Master Plan, small draft copies of individual sections which are being reviewed on a weekly basis and sent back with changes. He also stated that he is working on the ordinance to see which items need to be stronger or if anything needs to be changed within the ordinance, he is working closely with Davey Tree in researching other communities. Planning on releasing some stuff between January and February.
 - Commissioner Elton had some questions such as:
 - Is the ordinance is being enforced?
 - Assistance Commissioner Antonelli answered that yes it has been enforced, and he explained how it works.
 - Commissioner Elton asked if the construction documents from the contractor had been received.
 - Assistant Commissioner Antonelli explained that was done through the Engineering Dept., but Forestry will clarify and confirm tree protection and tree planting.
 - Commissioner Elton asked if inspectors are going to the construction sites to make sure they are adhering to the plan.
 - Assistant Commissioner Antonelli, answered yes, they are and when they see something they let the Forestry Division know.
 - Commissioner Elton asked about the money from fines that are levy where do they go.
 - Assistant Commissioner Antonelli explained that fines go to tree planting and overtime account.
 - Commissioner Elton said it sounds like the fines are more than \$300.00
 - Assistant Commissioner Antonelli stated that the fines are \$300.00 but there are other fees such as tree replacement value if the tree doesn't make it.
- Neighborhood Based Urban Heat Risk Assessment –
 - Did not have info he was hoping to have it for the following meeting.
 - Commissioner Winbourne had a question about reviewing of the mapping of underground infrastructure focusing on roadways. Have they identified any targeted areas to do campaigns to encourage residents to put trees on their properties?
- Worcester Now | Next online survey -
 - [Priority Goals for Worcester now | Next are public: Tell us what you think! \(google.com\)](#)
- Green Worcester Advisory Committee
 - Mr. Conna commented that the Green Worcester Advisory Committee discussed this article, and they did not take any formal action to ask for anything, but the result of the informal discussion was that, yes, let's get sustainability talking to parks and Urban Forestry Tree Commission about that subject and see what comes out of it. He stated he did not have any details to put forward that night. That he was simply an advocate that looks at the problem and thinks about how to solve it.
- Planting –
 - Spring 2023 Planting – No Update
- Customer Service Update
 - Customer Service Contact Information 508-929-1300 &/or 311
- Forestry Informational Flyers
- Street Resurfacing Opportunities & Challenges
- Partnerships –
 - New England Botanical Garden @ Tower Hill
 - Worcester Technical High School
- Grant Applications –
 - NA
- Economic Development Initiatives –
 - NA
- Forestry Vandalism & Graffiti –
 - NA

- Donations –
 - NA
- Forestry Operations –
 - Tree City USA – The application is at the City Manager’s Office, if awarded the city has been Tree City USA for 37 years and 24 for the Growth Award
 - ALB (Asian Longhorned Beetle)
 - EAB (Emerald Ash Borer)
 - Arbor Day – April 28, 2023
- Budget – Operational & Capital – NA
 - Parks, Recreation & Cemetery Division – NA
 - Capital Improvement Program – NA
 - City Five Point Financial Plan – NA
- Misc.
 - Assistant Commissioner Antonelli said that last thing on his calendar is the Providence document he had included and asked if anyone had any comments.
 - Commissioner Elton stated that at the last meeting he heard how it was brought up a number of times the lack of ordinances in Worcester in terms of trees, and he shared what Providence is doing. Such as: Inter departmental plan review. Every other week. Forestry public works, the Planning department reviews all construction going on in the city and there’s tree requirements. There are requirements for lots of things, but true acquirements for and it’s based on what the zoning is and the size of the parcel and the size of the construction an example of something that Worcester could consider.
- New Business: Election of Chairperson and Vice Chairperson
 - Commissioner Elton made a motion to approve Commissioner Winbourne as the Chairperson. Second by Commissioner Wobbe. All were in favor Motion was approved 4 – 0.
 - Commissioner Wobbe made a motion to approved Commissioner Mogel as the Vice Chairperson. All were in favor. Motion was approved 4 – 0.
- Date of Next meeting – January 25, 2023
- Commissioner Elton made a motion to adjourn. Second by Commissioner Wobbe. All were in favor. Motion was approved 4 – 0. Meeting was adjourned at 6:43 PM.
- **A copy of this full meeting will be available to view and listen to at:**
www.worcesterma.gov/city-clerk/public-meetings/agendas-minutes



ASSISTANT COMMISSIONER'S REPORT:

1. General:

- Door Hanger
- Tree Commission attending neighborhood meetings
- Tree replacement policy
 - Request Only
 - Mandated replacement
- Urban Forestry Master Plan Update
- Neighborhood Based Urban Heat Risk Assessment
- Worcester Now | Next online survey
 - [Priority Goals for Worcester Now | Next are public: Tell us what you think! \(google.com\)](#)
- Green Worcester Advisory Committee
 - Article - Effects of trees on solar panels
- Planting –
 - Spring 2023 Planting - NA
- Customer Service Update
 - Customer Service Contact Information 508-929-1300 &/or 311
- Street Resurfacing Opportunities & Challenges – NA
- Zoning Ordinance Discussion
- Worcester Ordinance Relative to the Protection of Public Trees
- Partnerships –
 - New England Botanical Garden @ Tower Hill - NA
- Grant Applications –
 - NA
- Economic Development Initiatives –
 - NA
- Forestry Vandalism & Graffiti –
 - NA
- Donations –
 - NA
- Forestry Operations –
 - Tree City USA – Submitted
 - ALB (Asian Longhorned Beetle)
 - EAB (Emerald Ash Borer)
 - Arbor Day – April 28, 2023
- Budget – Operational & Capital – NA
 - Parks, Recreation & Cemetery Division – NA
 - Capital Improvement Program – NA
 - City Five Point Financial Plan – NA
- Misc.

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50 Officer Manny Familia Way Worcester, MA 01605

Or

Virtual with WebEx

ASSISTANT COMMISSIONER'S REPORT

GENERAL

TREE PLANTING

Unfortunately, your tree was removed by the City of Worcester Forestry Division, but we do offer a street tree planting program, as well as a set back planting program.

In order to protect these valuable assets, we need to be careful where and how we plant them. It is important that we plant the correct tree species in a suitable location. Arbor Day Foundation calls this “right tree right place.” Proper planting maximizes the tree’s ability to mature and survive within the urban environment. It also minimizes the environmental impacts and on home utilities costs.

In general, the Forester will adhere to the following guidelines:

- Will plant trees only in the public right of way on public streets
- Will plant trees up to 20’ behind the public right of way with the written permission of the property owner
- Will space trees between 25’-50’ apart depending on species and infrastructure
- Planting beneath overhead electric, cable or telephone lines is limited to ornamental trees only
- Will not plant when underground utilities might damage the tree or if digging will cause damage to the utility
- Will not plant near streetlights, hydrants, and driveways to avoid impacting this infrastructure
- Planting will take place each spring.

Please contact 311 or (508) 929-1300 if you would like a tree planted free of charge to you in front of your property



The City of
WORCESTER

Department of Public Works & Parks



Committee Members

Mary Knittle, Chair
Patricia Austin
Ted Conna
Nathan Fournier
Evelyn Herwitz
Dendro Murphy
Mary Leovich

Contacting the Committee

Department of Sustainability and Resilience
Address: 455 Main Street, Room 108,
Worcester, MA 01608 (by appointment)
Email: GreenWorcester@worcestermi.gov
Website:
www.WorcesterMA.gov/GreenWorcester

Department of Sustainability and Resilience

Our Mission:

To implement the ambitious and urgent goals of the Green Worcester Sustainability and Resilience Strategic Plan (GWP), a roadmap for making Worcester the greenest mid-size city in the country.

Our Staff:

John Odell, *Chief*
Jacquelyn Burmeister, *Lakes & Ponds Program Coordinator*
Jessica Davis, *Project Manager*
Robert DeFosse, *Energy Services*
Nick Pagan, *Senior Environmental Analyst*
Sarah Mount, *Energy Analyst*
Luba Zhanova, *Director of Projects*

Accessibility:

The GWAC is committed to ensuring that its public meetings are accessible to all. Should you require interpretation, auxiliary aids, services, translations, written materials in other formats, or reasonable modifications in policies and procedures, please contact the DSR a minimum of 48 hours in advance of the scheduled meeting.

Translations:

Hay disponibles servicios de interpretacion y otras adaptaciones con solicitud previa.
Avisanos por
greenworcester@worcestermi.gov

CITY OF WORCESTER

Meeting Agenda

Green Worcester Advisory Committee

Monday, January 23, 2023 at 5:30 p.m.

Location: Esther Howland Room, City Hall

This meeting will be held in-person with an option to also join remotely (see the bottom of the agenda for details)

Meeting Call to Order: 5:30PM

1. Welcome

- a. New Member – Patricia Austin

2. Elections – Vice Chair (to replace Stefanie Covino)

3. Approval of Minutes – October 24, 2022 and December 12, 2022

4. New Business

- i. Presentations of the completed Urban Heat Risk Assessment Study for Worcester, MA, developed by Dr. Brian Stone and Evan Mallen for the DSR (*presented via WebEx, 20 min presentation, 20 min Q&A*)
- ii. Development of the GWP's 1st Annual Report: Discussion of the High Priority Items (*10 minutes*)

5. Unfinished Business

- a. Update on Miyawaki Forest Pilot and MVP Grant (*10 minutes*)
- b. Update on the AstroTurf Fields as related to the heat island; city policy (*10 minutes*)

6. DSR Updates (*5 minutes*)

- a. Recent ESPC contract
- b. Endicott/Bigelow Complete Streets Design

7. Standing Items

- a. Community outreach
 - Chamber of Commerce and GWP Goals
- b. Community feedback
- c. Upcoming events

Adjournment

2023 Upcoming Meetings

Green Worcester Advisory Committee meetings begin on Mondays at 5:30pm:

<i>March 13</i>	<i>Esther Howland</i>
<i>April 3</i>	<i>Levi Lincoln</i>
<i>May 15</i>	<i>Esther Howland</i>
<i>June 26</i>	<i>Esther Howland</i>
<i>July 31</i>	<i>Levi Lincoln</i>
<i>September 18</i>	<i>Esther Howland</i>
<i>October 16</i>	<i>Esther Howland</i>
<i>November 27</i>	<i>Esther Howland</i>

Virtual Meeting Information

This meeting will be held in-person at the date, time and location listed above. Meeting attendees will additionally have options to participate remotely by joining online or by phone. Note: If technological problems interrupt the virtual meeting, the meeting will continue.

Web: Use the following link to join the meeting via computer <https://cow.webex.com/meet/greenworchester>, or

Call: 415-655-0001. **Access Code:** 2313 821 4580.

ENVIRONMENT

New study: Plant more trees in Worcester to combat rising temperature

A consultant's report says more trees will help solve Worcester's heat island problem. Others support that step, and more.



Henry Schwan

Telegram & Gazette

Published 11:33 a.m. ET Jan. 20, 2023 | Updated 9:02 a.m. ET Jan. 21, 2023

WORCESTER — A new study says more trees that provide shade cover need to be planted to reduce elevated temperatures in some parts of the city.

Some experts support the recommendation, but noted other steps need to be considered to bring down temperatures and safeguard public health.

“Investment in street trees is absolutely a great way go to go, but I would actually argue that there are several different strategies to try,” said John Rogan, geography professor at Clark University.

More: Some Worcester neighborhoods are hotter than others. Here's why it matters

The final report by Urban Climate Consulting LLC is not publicly available, because finishing touches are being worked on, said John Odell, chief sustainability officer of the city's Sustainability & Resilience Department.

Odell expects the final report to be presented during Monday's 5:30 p.m. public meeting of the Green Worcester Advisory Committee.

The \$28,000 study, funded by energy credits earned by the city's solar projects, focused on the city's heat island problem and showed some areas of Worcester that were at least 10 degrees hotter than other sections during the summer. Two hot spots in particular were identified — Green Island in downtown and Route 12 north heading out of the city.

Suburban areas with more trees and parks had significantly cooler temperatures.

More: Tree lover believes 'pocket forests' are just what Worcester needs

“This has real impact on people’s health,” said Odell of the so-called “heat island effect” behind the rising temperatures.

Heat island effect generally occurs when a neighborhood is inundated with concrete that captures and retains heat, and has few, if any, trees that sequester carbon dioxide and provide shade to reduce stifling temperatures.

Rogan's research in Worcester indicates heat island effect has impacts beyond the 10-degree bump cited in the latest report. His team at Clark recorded temperatures at least 20 degrees higher in some areas compared to neighborhoods with up to 30%-40% tree canopy cover.

Next steps

The study's information will be used to help determine where trees should be planted to have the most impact, said Odell. Plus, develop a policy to get the work done.

Those efforts require a steady stream of money, said Odell, and collaboration with many city departments, boards and commissions to hash out the details.

“This isn’t going to happen overnight. It will happen over years before we implement this entirely,” said Odell.

Green materials

The consultant, Odell said, doesn’t think “green materials” will give Worcester as much bang for its taxpayer buck as planting trees to combat the heat island effect.

Green materials can include white paint to cover a black flattop roof and lighter markings on roadways. Dark surfaces absorb heat from the sun’s rays, while light-colored surfaces reflect them back into the atmosphere, a scientific process called “albedo.”

More: Out in the open: Worcester man urges city to replant trees in Vernon Hill neighborhood

Rogan explained cooling materials lower surface temperature, and when that occurs there is cooler air temperature.

Using thermal imagery, Rogan and fellow Clark geography professor Deborah Martin found roofs painted white in Worcester cut surface and air temperature 20% to 30%. A white roof

project at Walmart on Route 146 reduced temperatures by 40%.

There's also the combination of a white roof with a section of rooftop solar panels. The combination on some Worcester municipal and school buildings experienced a “huge reduction” in temperatures, according to Rogan, because the panels absorb the sun’s radiation.

More: Street trees and solar panels: Effort in Worcester to reach a balance

Rogan offered another consideration — there’s often limited public space to plant trees because of obstacles like utility lines, underground cables and sewer pipes. Instead, based on Rogan’s work in Rhode Island and Massachusetts to increase tree canopy cover in urban residential areas, there’s often more space on private lands, where agreements can be made with owners.

“At the end of the day, trees are the greatest heat island mitigation hands down, no doubt,” said Rogan. “But when trees can’t be planted, white roofs and solar is effective. That’s my take on that.”

Multiple approaches

Like Rogan, Worcester environmental activist Paul Popinchalk supports many approaches to curbing the heat island effect. They include planting trees, albedo and energy-efficient construction through the state’s stretch code.

Plus, low-carbon concrete manufactured with fewer carbon emissions that reportedly handles the same amount of wear and tear as traditional concrete.

“There are multiple solutions to cut carbon emissions and help with the climate crisis, and I hope the city looks at all of them,” said Popinchalk.

Contact Henry Schwan at henry.schwan@telegram.com. Follow him on Twitter @henrytelegram

NEWS

Some Worcester neighborhoods are hotter than others. Here's why it matters

Hadley Barndollar USA TODAY NETWORK

Published 5:05 a.m. ET July 29, 2022 | Updated 11:42 a.m. ET July 29, 2022

WORCESTER — The suffocating heat had broken. Trash and recycling piles on Vernon Hill reflected days of surging temperatures.

Empty plastic water bottles and cardboard boxes of recently purchased fans laid out on sidewalks. In the triple-deckers, blankets covered third-floor windows, while small air conditioning units sagged from others — appearing tired, defeated from the prior week of overtime. From their vents, water dripped onto patches of dried, hay-like grass, made so by drought.

Pointing to a third-floor apartment without any obvious air conditioning, Stephen McCauley, co-director of the Global Lab at Worcester Polytechnic Institute, said, "That's a danger zone."

He stared down the hot pavement at the rows of older housing stock on a steep hillside, adding, "These rooftops are all just cooking." The houses were pelted by the sun's unhampered glare.

In some places, the only greenery are weeds reaching up through cracks in concrete, or an overgrown vacant lot where a "for lease" sign hangs on a rusting chain link fence.

Wednesday was the first day residents of the neighborhood said they had felt some relief, after sweltering heat brought temperatures in the 90s to Massachusetts last week, and cities felt well over 100 degrees most days.

The air didn't bear quite as much weight this week, but in Vernon Hill, it was still hot.

More: We created scorching 'heat islands' in East Coast cities. Now they're becoming unlivable

Around 2:15 p.m. Wednesday, the neighborhood registered a temperature of 91.2 degrees Fahrenheit. A simultaneous check of the Weather Channel app said 83 degrees for the area —

a nearly 9-degree difference, demonstrating higher temperatures among concrete, asphalt and few trees.

On sidewalks stretching up Vernon Hill's incline, a resident slowly lugged a grocery cart. At a nearby market selling Spanish, African and American food, a mother and her two small children waited for a ride under the shade of an awning. Barbershops and auto garages seemed to just bake in the sun, absorbing heat without interference.

What is a heat island?

Last week's weather was hot for most people, but it was hotter for residents and workers in areas of Worcester such as Vernon Hill, Kelley Square and Chandler Street. That's because these areas suffer from the urban heat effect and are often designated as "heat islands."

Heat islands are areas made up of primarily impervious surfaces — such as pavement, roofing, industrial and commercial uses — and lack the benefits of a robust tree canopy. They absorb more heat than outlying areas within the same city, and they don't really cool off at night.

High temperatures: Worcester finding ways to cool off during summer heat

According to WPI's Global Lab, neighborhoods in Worcester can be as much as 17 degrees warmer than the air in neighboring towns, particularly in the afternoon and after sunset.

"It's serious," said McCauley, a geographer who focuses on urban change, inclusivity and resiliency, "and it's only going to get hotter."

Historically, heat island neighborhoods nationwide have concentrations of low-income residents, people of color and poorly insulated multifamily housing stock. In many cases, that was by design, as the U.S. government's redlining practices of the 1930s codified the makeup of these neighborhoods and decades of disinvestment.

'By design or neglect': Flood, climate hazards threaten MA's redlined neighborhoods

The urban heat effect can make it harder for the human body to bounce back from a hot day's dangerous impacts, especially in the case of elderly people, children younger than 5 and individuals dealing with asthma, diabetes, high blood pressure and obesity.

And heat waves could become deadlier for those in the Northeast the hotter it gets, as people in New England are structurally less prepared for the type of weather hazard and biologically, their bodies aren't as acclimated to extreme heat.

From 1992 to 2021, extreme heat killed an average of 158 people per year in the U.S., more than any other weather hazard.

Temperatures vary drastically between Worcester neighborhoods

In New England's second-largest city, half the residents once lived in triple-deckers. Most were built during the mid-19th century to the 1930s for people who worked in nearby factories, and nearly 5,000 of those buildings still stand in Worcester.

The structures are poorly insulated — causing problems in both the summer and winter — and often located in areas with lots of "gray" infrastructure, and very little green.

Energy efficiency: Big changes could be in store for nearly 5,000 3-deckers in Worcester

'By design or neglect': Flood, climate hazards threaten Massachusetts's redlined neighborhoods

A few years ago, McCauley was part of a citizen science heat mapping project that ultimately delivered a "heat watch" report to the city. On an August day in 2019, volunteers traversed four study areas in Worcester and collected more than 63,000 measurements of temperature and humidity. The highest temperature difference between areas was 16.9 degrees.

Just 10 minutes away from Vernon Hill is the WPI campus and its surrounding neighborhoods. There, trees are lush and plentiful, and so are water sources like manmade ponds. The housing stock is mostly single-family homes.

Around 3:15 p.m. Wednesday, just after Vernon Hill registered a temperature of 91.2 degrees, the Academy Street area was 84.6 degrees.

'It was so hot, it was hard to do things'

When Wadan Malikzai arrived home from work Wednesday, his children, watching from an open window, ran down from their apartment to greet him on the sidewalk.

Malikzai and his family have lived on the third floor of a Sterling Street triple-decker for three months after coming to the U.S. from Afghanistan nine months ago.

"My apartment is hot," said Malikzai. "(Last week) it was so hot. The kids want to play outside, but the weather is not good."

What did they do to stay cool? Malikzai laughed that they "swam in the bathtub."

Living in an apartment next door is Christine Cooper, who has been working double shifts during the heat as a cashier at a Mobil station. As soon as she gets home, she switches on her fans.

"It's kind of rough," Cooper said. "It was so hot (last week), it was hard to do things."

When asked about how the neighborhood responded to the heat, Cooper pointed to an interconnectedness among her neighbors, specifically that several of the nearby triple-deckers are owner-occupied. She feels people have a stake in her immediate vicinity of the street.

Through his research at WPI, McCauley has studied how areas with high rates of foreclosure, eviction and crime increase overall vulnerability during high temperatures. He pointed to the "social fabric" of a neighborhood being an indicator of whether residents come together to fight the heat and look out for each other.

"Making sure people are connected with other people is a way of making heat waves less deadly," he said.

Heat is no friend of dogs: 'They can't...pour themselves a glass of water'

On nearby Harlem Street, Justin Noonan lives in a three-story building across from a gospel church, where two mighty trees used to provide great shade out front on hot days — their branches creating a canopy across the street and over the front of his apartment.

But a few years ago, when an Asian long-horned beetle infestation struck parts of the city, the trees were cut down and never replaced, though thousands of other new trees were replanted across the city. Today, Noonan says you can cook an egg on the side of his house between 2 and 6 p.m.

Downhill getting closer to the highway, Kamil Rodriguez stood outside her mother's house on Fairfax Road holding a plastic water bottle. She watched a group of kids, including her daughter, play with bikes and scooters across the street.

"They've drank more water in the last couple days than in the last year," she said.

Rodriguez said her mother comes out on the porch in the morning to get a short respite of cooler air and then spends the rest of the day inside.

When the AC is off, "it's terrible," Rodriguez said.

The 15-acre Vernon Hill Park is surely a source of cool for the neighborhood, with the Dennis F. Shine Memorial Swimming Pool featuring a spray park. The pool usually extends its hours into the evening during high temperatures.

The Worcester Senior Center is also located in Vernon Hill. It's a city-designated cooling center on hot days and an example of green infrastructure efforts to ward off the urban heat effect at a 75% impervious site. The city reconstructed the parking lot to feature rain garden and bioswales, which are vegetated ditches used as alternatives to concrete gutters and storm sewers. Trees and plants were added, too.

How trees can help cool down a neighborhood

Worcester has a new Urban Forestry Tree Commission, created to focus on the future of the city's tree canopy while advancing the mission of the Green Worcester plan, an extensive roadmap to bring sustainability values to all aspects of city life.

A specific task for the commission is to prioritize the expansion of trees in the urban core: "to provide shade, mitigate the urban heat island effect and allow absorption of rain and storm water."

More: Climate change a 'grave concern' in Worcester, and city has a plan, but is it achievable?

Planting new trees in neighborhoods disproportionately impacted by heat will prove critical as Massachusetts is predicted to see an increase each year in the number of days reaching 90 degrees or hotter.

The Environmental Protection Agency says shaded surfaces can be 20–45°F cooler than the peak temperatures of unshaded surfaces.

Worcester residents and business owners in certain areas can also request trees — for free — via the Massachusetts Urban Canopy Project, which says "the net cooling effect of a healthy tree is equivalent to 10 room-size air conditioners operating 20 hours a day."

The only string attached is an agreement to water the tree for two years. The program offers more than 40 types of trees, with shade trees as the priority.

Drought in Massachusetts: DPW says Worcester water supplies are safe

McCauley said he's impressed by the city's efforts around green infrastructure thus far, and he hopes WPI's data continues to inform where and how efforts should be directed.

In February, McCauley and student Tarang Shah published a report about improving resilience in Worcester during hot weather. Their recommendations include street tree planting, housing retrofits and making analysis and data accessible to the public.

Watertown ... these names mean something: Coastal flooding may impact people as far inland as Arlington. Can mitigation steps help?

This story is part of an extensive USA TODAY Network reporting project called "Perilous Course," a collaborative examination of how people up and down the East Coast are grappling with the climate crisis. Journalists from more than 30 newsrooms from New Hampshire to Florida are speaking with regular people about real-life impacts, digging into the science and investigating government response, or lack of it.

STATE

Experts: More trees needed to mitigate effects of climate change

City trees can be part of larger plan to address climate change in Massachusetts

Kinga Borondy Telegram & Gazette

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WORCESTER — In his 1913 poem "Trees," American poet Joyce Kilmer eulogized the beauty of a tree, created by God and nature, never to be equaled by humans.

What Kilmer's poem failed to mention in its 12 lines is that the worth of a tree far exceeds its beauty — offering habitat, sustenance, carbon sequestration and even improving humanity's mental health and extending life expectancies of people who live in or close to nature.

A group of experts presenting information at the annual Urban Tree Symposium presented by the New England Botanic Garden at Tower Hill in Boylston Friday offered expert information and historic perspectives on urban forestry measures. The symposium was co-sponsored by Speak for the Trees and Ecological Landscape Alliance.

More: New study: Plant more trees in Worcester to combat rising temperature

In their presentations, the experts indicated that as climate change becomes an undeniable reality, the value of trees and their ability to mitigate effects of global warming are being factored into policy decisions made by local, state and federal agencies as ways to combat the crisis.

Planting trees is one of the avenues to mitigate climate change.

Programs to increase tree canopy in urban areas

"Cities in the United States and around the world have engaged in ambitious programs to plant trees and increase tree cover," said Lara Roman, a research ecologist with the USDA Forest Service who studied the changes in urban tree canopies in her native Philadelphia, and in Holyoke and Chelsea in Massachusetts.

More: Empty tree wells: A rooted and frustrating problem in Worcester

In her research, Roman found that many factors over the course of decades influence the current state of a community's tree canopy, from natural disasters such as fires, storms and floods to population shifts, socio-economic factors, development density as well as policy decisions made in the mid-20th century.

"The hot topic is the spatial distribution of a community's tree cover," Roman said. Where trees are located in a city is related to the factors that shaped the city including whether it was forested or farmed in its past. Philadelphia, which has a 20% canopy, is aiming to increase it by 10% overall by 2025.

And yes, Roman pointed out, where white people live and in more affluent communities, the canopy is denser and reflects a greater diversity of species.

A website, treeequityscore.org, calculates the tree canopy of communities across the country, with sparser areas showing in orange and denser canopy areas in green.

Tree cover is dynamic, Roman said. What drives changes in the canopy is different in every community. In Holyoke, between 1952 and 2014, the tree canopy increased by 2.3%. Changes were precipitated by highway construction in the 1950-60s, Dutch elm disease in the 1950s and the construction of a new medical center and wastewater treatment plant in the 1970s.

During those same years in Chelsea, construction, a 1973 fire, storm damage in the 1990s and new development in the 2000s changed the city's tree canopy.

Planting on city roofs, installing window boxes

Roman offered alternatives to trees to "green up" urban communities that includes green roofs, installation of window boxes and planters as well as creating new planting areas. As communities increasingly turn to public transportation, parking spaces can be recaptured as park spaces, areas where plants can thrive, she said.

Worcester, where a consultant recently informed the city that some 34,000 new trees are needed, will be receiving 100 new trees this spring from the Botanic Garden through its Horticulture Outreach Program. The organization received a \$70,000 grant from Greening the Gateway Cities, a program offered through the Executive Office of Energy and Environmental Affairs, the Department of Conservation and Recreation, Urban and Community Forestry Program, Department of Energy Resources and the Department of

“The trees will be planted on private property in the Main South, Bell Hill and Grafton Hill neighborhoods,” said Amy Nyman, the garden’s horticultural outreach manager. “These are communities that were identified as environmental justice neighborhoods and needing more tree cover.”

In choosing trees, Nyman has opted for species that will be adaptable to urban conditions and have the greatest chance of survival, as well as diversifying the species planted. A diverse tree list creates a more resilient urban forest that will be more resistant to weather issues and pest infestations, Nyman said, referencing the devastation caused by the infestation of the Asian long-horned beetle. The beetle, genus *anoplophora*, an invasive species originally from China, was first found in Worcester in 1997 by a local exterminator and later identified as a pest in 2008 by the federal government.

In its efforts to slow the spread of the pest, which attacks hardwoods including the sugar maple, Worcester cut down 35,000 trees in a 110-mile radius. By 2014 the city and surrounding communities had lost 35,000 trees. Replacing those trees could cost about \$20 million, according to an analysis by a member of the Green Worcester Advisory Committee.

What is a tree worth?

As communities around Massachusetts and the country look to trees to mitigate some of the consequences of climate change, experts say that calculating the intrinsic value of trees is one way to prompt policy decisions.

More: Some Worcester neighborhoods are hotter than others. Here's why it matters

In his symposium presentation, Laurance Wiseman, a senior adviser on urban forestry and American forests, pointed out that humanity’s relationship with trees dates back to the primeval forests; humans were comfortable and felt safe and protected when amongst trees.

Wiseman was the founder and CEO of the American Forest Foundation and also served as the chairman of the National Urban and Community Forestry Advisory Council.

“What are the benefits?” Wiseman asked and answered the rhetorical question. “Trees provide oxygen, protection for wildlife and combat climate change.” He cited a number of studies that demonstrate that living in or near natural areas increases the quality of life, mental health and life expectancy.

“How can we characterize the value of trees to make it meaningful to policymakers?”

runoff mitigation, carbon sequestration, even energy savings on heating and cooling costs.

“We can appraise trees similar to how we appraise homes,” Wiseman said. The tool factors in a tree’s condition, its overall health and its location, to determine its overall contribution to community well-being.

“It’s all about context,” Wiseman said.

Presenters also included Felicia Hubacz, a forest health specialist with the DCR; Nina Bassuk, Cornell professor emeritus with the Urban Horticulture Institute; and Tonay Gooday-Ervin, who works as an inventory arborist with the Davey Resource Group.

NEWS

Out in the open: Worcester man urges city to replant trees in Vernon Hill neighborhood

Enough is enough, according to one Vernon Hill property owner. The time has come for the city to plant trees in the neighborhood.



Henry Schwan

Telegram & Gazette

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WORCESTER – Brian Keyo has a question that has been eating at him for several years: When are some streets in Vernon Hill going to get trees?

Keyo stood at the hilly intersection of Sterling Street and Euclid Avenue, with its breathtaking view of the city.

But what Keyo wanted to point out were what he called empty “tree wells.” These are depressions in city-owned sidewalks where trees are normally planted by the city.

There are dozens of empty wells in Vernon Hill, according to Keyo’s calculations. The most egregious example is Sterling Street, and Keyo motioned with his arm in both directions of the street to show that no wells in sight had a tree in them.

Only weeds grew in the depressions.

“I’m disappointed,” said Keyo to describe his mood.

There are two issues going on here.

Some trees in those wells were cut down because of the Asian longhorned beetle infestation that hit Worcester in 2008.

Second, some wells were constructed by city crews during road projects, Keyo said, and never had a tree planted in them.

Keyo has counted a total of nearly 40 empty tree wells among numerous streets in Vernon Hill, and said he knows of two wells that definitely had their trees cut down because of the beetle.

He's confident other wells never had a tree, because he's never seen one in them in the 18 years that he's owned a three-decker on Euclid Avenue.

What really bothers Keyo are empty wells in Vernon Hill, while hundreds if not thousands of trees were replanted in Greendale and Burncoat after those areas were devastated by the beetle.

"An empty tree well is a rare thing in Burncoat and Greendale, compared to (Vernon Hill)," said Keyo in disgust.

Meanwhile, Keyo shared his findings with City Hall several years ago. He shared an October 2019 email from the late Paul Moosey, the city's former public works director, to City Councilor George Russell, that said, "We will look at these for planting next spring as long as funds allow."

Robert Antonelli, Worcester's current assistant commissioner of public works and parks, was copied on the email.

To Keyo's knowledge, the plantings never happened.

Why are wells still empty?

Keyo isn't sure why.

He suspects more absentee landlords in Vernon Hill rent out their properties, compared to Greendale and Burncoat, where he said many residents own the homes that they live in.

As a result, many Vernon Hill property owners don't place a high priority on trees, which doesn't put pressure on the city to plant - or replant - them.

"A lot of landlords (in Vernon Hill) don't care as much about the trees," said Keyo.

When asked to supply the percentage/number of residents in Vernon Hill, Burncoat and Greendale who are homeowners versus renters, a city spokesman said City Hall doesn't have demographic data broken down that far.

Antonelli acknowledged that neighborhoods with more owner-occupied housing tend to be the areas that more frequently request trees.

“Owner-occupied, we found little more of a request for (tree replacements). Those not owner-occupied, as rental, there is a little less request for tree planting,” said Antonelli.

Many factors

There are many factors when the city decides where to plant trees, according to Antonelli.

One is finding the right species that will survive in a particular location.

Another is tree size.

When a big tree has to come down because it's in poor health, the stump is ground down to 10 inches below grade, but it's not removed because it can damage the surrounding infrastructure. As a result, a new tree can't be planted on top of the stump.

Large trees also have extensive underground root systems, so a new tree can't be planted on top of the roots. Crews have to determine if the lands around the roots can support a new tree.

In the case of smaller trees, the city removes the stumps and a new one can be requested by a resident or property owner. It can go in the existing tree well or the city could cut a new well into the sidewalk.

However, there are instances when a renter wants a tree, but the property owner doesn't.

There's also the issue of the city's limited budget.

Antonelli estimated that 90% of residents in Greendale and Burncoat who live on streets that lost every tree because the beetle wanted their trees replaced.

Neighborhoods with a critical mass of residents who want trees generally means they're likely to help maintain them, said Antonelli, including watering them. That can be a good return on investment from the city's perspective, because it costs at least \$550 in taxpayer money for each replanting.

"It's all about partnerships. The more you have, the more that work together, the better trees can survive. It's no different than anything else," said Antonelli.

He added, "The city has limited resources, and we want to get as much as possible in the ground to benefit the community across the board."

Keyo doesn't buy it.

He wonders how Antonelli knows that 90% of people in Burncoat and Greendale wanted trees, and asked rhetorically if Antonelli knows how many in Vernon Hill want them.

Besides, Keyo argues that trees in Vernon Hill lost to the beetle fall outside the city's normal procedures for deciding if and when to replant.

From Keyo's perspective, that means the trees should definitely be replaced, end of discussion.

What are the numbers?

Approximate numbers are available for trees removed in Vernon Hill, Burncoat and Greendale.

However, the number replanted in each neighborhood is unclear.

Significantly more trees were removed in Greendale and Burncoat compared to Vernon Hill, according to the United States Department of Agriculture: 3,027 trees in Greendale, 1,041 in Burncoat and 182 in Vernon Hill.

Those numbers are approximations, because the USDA said the methods it uses to collect field data have changed over the years.

Antonelli said more than 35,000 trees were cut down in Worcester and surrounding areas because of the beetle, and more than that total number were replanted.

As for the specific number of trees taken down and subsequently replanted in Vernon Hill, Greendale and Burncoat, Antonelli said the city doesn't have specific numbers by area.

The Worcester Tree Initiative was involved in replanting trees destroyed by the beetle, but it doesn't have figures for those neighborhoods, according to Mark Richardson, director of horticulture at the New England Botanic Garden at Tower Hill, the nonprofit that now runs the initiative.

Record keeping to track specific locations where trees were planted was one of the initiative's goals, but it didn't have the resources to do it, said Mary Knittle, the initiative's former co-

chair.

The hope was Worcester would assume the goal, said Knittle.

The USDA was in charge of cutting down trees infested with the beetle, and local communities along with the state Department of Conservation and Recreation handled replanting, according to Knittle.

An email from the DCR said it planted 19,228 trees in Worcester. In total, more than 30,000 were planted in Worcester and surrounding communities by the DCR, Worcester city crews and the Worcester Tree Initiative.

The DCR did not provide a breakdown of plantings in Vernon Hill, Burncoat and Greendale, per a Telegram & Gazette request.

Some of the varieties planted by the DCR include cherry, fir, oak, spruce, serviceberry, dogwood, tulip tree and linden. Plantings were mostly on private property, with some on public lands, including schools and parks.

USDA, Animal and Plant Health Inspection Service and the U.S. Forest Service paid for the plantings.

Waiting for answers

Russell, who represents Vernon Hill as a city councilor, wants to know when the empty wells in Vernon Hill will be filled with trees. He sent a letter this week to Acting City Manager Eric Batista and Antonelli, asking them what can be done to fill the wells.

Russell isn't sure how many of the empty wells are due to the beetle.

He suspects many trees in the wells were planted years ago and could have toppled after being hit by a car, or asked to be removed by a resident because tree roots buckled sidewalks or interfered with sewer lines.

Bottom line for Russell is "empty tree wells should be replaced," and he's waiting for an answer from the city on how it's going to do it.

Master plan

One development that could potentially bring more public trees to Vernon Hill is the city's initial Urban Forest Master Plan. It's being developed at City Hall and will serve as a

roadmap to manage and expand the city's urban tree canopy.

An online survey on the city's website solicits input from residents to help drive the eventual plan.

Heat island

It's a common term these days to describe areas devoid of trees, with a lot of concrete sidewalks and roads that absorb and reflect the sun's rays that bake residents.

This describes the scene where Keyo stood at Euclid Avenue and Sterling Street, where lines of three-deckers roasted on a hot summer day.

A small sign placed in a public square in the middle of this heat island advertised free trees available through the Greening the Gateway Cities Program.

Vernon Hill was chosen, the DCR said, because of a high population density and low tree canopy cover; a high level of surfaces, like concrete, that don't allow water to run through them; and its status as an environmental justice community.

That type of community, the DCR said, is where tree canopy levels have historically been lower than in more affluent areas.

Tree planting is scheduled to begin this fall but could be delayed due to the severity of drought conditions.

The goal is to plant 80% of the new trees on private property that is residential or commercial, and 20% on city-owned property. The program is optional and those that opt-in commit to watering the new trees for two years after they're planted.

Planting is done by foresters from the state Department of Conservation and Recreation Urban & Community Forestry Program.

Head-scratcher

It's a head-scratcher for Keyo when he thinks about all the years that have passed without replacement trees since the devastation caused by the Asian longhorned beetle. Plus, all the wells that never had trees.

Standing along Sterling Street, where not one public shade tree was spotted and plenty of tree wells remain empty, Keyo thought about his neighborhood and what he feels is an

injustice.

“I just want trees replanted,” he said.

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NEWS

Street trees and solar panels: Effort in Worcester to reach a balance

Some say it's time for the city to do something about public street trees that have a negative impact on rooftop solar projects.



Henry Schwan

Telegram & Gazette

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WORCESTER — Judy Mitchell has owned her home on Englewood Avenue for over 40 years.

Eight years ago, she added solar panels to the front of her roof. Now she has a problem.

A tree planted by the city on the public right of way is in front of her house, and Mitchell said it casts a shadow in the afternoon over half of the panels, virtually wiping out their effectiveness to supply the electricity that powers her home.

Mitchell called the city a few weeks ago to ask if it could prune the tree, but hasn't heard back.

“If the city came out and would prune all the time, at least I would have some of my solar,” said Mitchell.

This example of a street tree blocking a private rooftop solar system is one that could become much more common in Worcester — and nationwide — in the years ahead, as the city moves from fossil fuels to renewable sources of energy to combat climate change.

That movement is spelled out in the Green Worcester Plan, approved last year by the City Council. The plan is meant to be a roadmap to make Worcester one of the most sustainable and climate-resilient mid-sized U.S. cities by 2050, and it includes many strategies, including increasing solar systems and street trees.

The result could be many replications of Mitchell's predicament, where homes and businesses that invested in solar systems can't get what they paid for because of street trees that cast shade.

Mitchell shared her concern with Ted Conna, who sits on the Green Worcester Advisory Committee. Its members are appointed by the city manager to essentially serve as a watchdog to make sure the city is meeting the goals in the Green Worcester Plan.

Get ahead of the curve

As Conna sees it, the city needs to get ahead of the curve and develop a policy to balance the needs of planting street trees with protecting investments that homes and businesses make in rooftop solar.

Last month, Conna gave the Green Worcester Advisory Committee his draft proposal during a public meeting, and asked if he could make a motion to put the committee on record that it feels the city needs to consider a policy on how to handle street tree-rooftop solar issues when they arise.

The committee said it needed more time to digest the draft.

John Odell, the city's chief sustainability officer, told the committee he would share the draft with his staff and report back.

One detail in Conna's draft: If a city tree needs to be removed or pruned to install rooftop solar, the city will have to approve the work and the property owner will pay the costs. In the case of a tree that grows and sends shade on an existing rooftop solar system, the city could prune the tree and assume the costs.

Conna acknowledged his draft is a starting point for discussions, that there's a lot work to do to iron out the details to create a formal, comprehensive policy.

That work could come with challenges.

"Some people who have looked at the draft see it as a big threat to trees. I also want to protect trees," said Conna, who ticked off their numerous environmental and aesthetic benefits.

'Tree hugger'

Calling himself a “tree hugger,” Conna stressed that he’s not trying to pit tree lovers against owners of rooftop solar.

“This (draft policy) is not intended as a threat. I think we need to get ahead of this to minimize conflicts.”

Standing outside Mitchell’s home, Conna pointed to two nearby homes that have rooftop solar panels. Two street trees are directly in front of one of the homes, presenting an apparent shade threat.

“A single street has three homes with rooftop solar and street trees. It’s already an issue. I don’t know how people can say it’s not a common problem,” said Conna, who has lived in Worcester for 39 years and has rooftop solar panels on his home that experience minimal shading from a public street tree.

"I'm inclined to live with (that tree)," he said.

Discussion needed

Reaction to Conna’s draft proposal appears to be universal — more discussion is needed.

That message was given not only by Odell, but also Robert Antonelli, assistant commissioner of the Department of Public Works and Parks and the city's tree warden.

"We want to discuss this further with John Odell and the sustainability staff. Think through it a little bit," said Antonelli.

The city's Urban Forestry Master Plan could potentially have a connection to this issue. Antonelli explained a series of community meetings recently wrapped up to get public input on the plan, and draft recommendations could be put forward in January. A public hearing is expected on those recommendations.

Meanwhile, the city's new Urban Forestry Tree Commission has not held its first public meeting since members were appointed by the city manager and the city council confirmed the appointments in July. Antonelli cited scheduling conflicts to explain why there hasn't been a public meeting, and said city staff is trying to find a date in the next few weeks to hold one.

Alexander J. Elton is one of the four Worcester residents whose appointment was confirmed to serve on the Urban Forestry Tree Commission, and expects Conna's draft proposal will be a topic of conversation when the commission holds its first open meeting.

"As soon as the committee [meets] for the first time, it should start discussing (Conna's) proposal, that is the bottom line," said Elton, who works as the city forester in Providence and director of that city's Forestry Division.

"Street trees don't belong to an individual that lives in front of them," continued Elton. "They belong to the community, the neighborhood. It's not up a single person to make decisions to collect benefits from solar power.

"There's a lot we can discuss on this (proposal)."

The numbers

Any impact of public street trees on rooftop solar requires a close look at the numbers.

A total of 2,778 homes and businesses in Worcester have a rooftop solar system, according to a city spokesman.

The number supplied by the state Department of Energy Resources is 2,495 solar projects in Worcester that generate roughly 36.6 megawatts of power. Those projects participate in the department's various solar programs, including the Solar Carve-Out I and II Programs, Solar Massachusetts Renewable Target Program, and the Renewable Energy Portfolio Standard.

Whether it's 2,778 or 2,495, Conna noted that rooftop solar numbers will likely rise significantly in the future as more homes and businesses catch the wave of renewable energy.

What that total number ends up being is unknown, but it could be quite large given Worcester's supply of more than 40,000 residential properties and upward of 2,000 commercial/industrial properties, based on city assessor records.

There are 23,137 public street trees in Worcester, based on a count completed in June. Antonelli noted the number changes as the city removes and plants trees. The expectation is that Worcester will plant a total of 200 to 300 trees every spring, including on public rights of way and in public parks.

Legal consideration

What are the legal rights of municipalities to plant street trees, and what are the rights of homeowners and businesses to protect their investments in rooftop solar?

The city did not respond to a request to interview City Solicitor Michael Traynor to pose those questions. A similar request did not receive a response from the state Executive Office of Energy and Environmental Affairs.

An existing Worcester ordinance to protect public trees does not mention rooftop solar. It generally says anyone requesting the cutting, trimming, or removal of a public shade tree must get approval of the tree warden, and pay for the cost of the work and tree replacement.

Financial hit

Mitchell's panels supply all the electricity she needs, so she doesn't get a monthly electricity bill from a public utility. She signed a 10-year lease with the solar company that installed the panels on her roof, and she pays a fixed price for power. After 10 years, she owns the panels.

But since the public street tree outside her front door started casting half of her rooftop panels in shade during many afternoons, Mitchell's monthly bill climbed from roughly \$58 to \$100.

"Before I was scot-free on (electricity bills). Now, they're going up higher and higher," said Mitchell.

'Pretty significant impact'

That is how John Pitcavage, part owner of Modern Energy, a renewable energy company based in Worcester, described the impact of shade on rooftop solar.

Pitcavage, who has 14 years of experience in the solar industry, described a scenario of a residential rooftop solar project that faces south, with a large tree directly in front. In this scenario, shading is a problem from September through April, when electricity from the panels could be reduced by 10% to 30%.

In June through August, shading continues to be an issue in early morning and later evening hours, said Pitcavage. Shading impact is determined by a sun's position in the sky, which varies by season.

Pitcavage went deeper with his explanation of how shading impacts solar panels. The vast majority of each panel in an average residential rooftop solar system is divided into three parallel sections. If a portion of one of the sections is in shade, then power production from the panel could be reduced by one-third. Also, if a portion of each of the three sections is in shade simultaneously, then it's possible to reduce the panel's production entirely.

Commercial rooftop solar panels generally experience similar impacts in shade, said Pitcavage.

What is the answer?

What Conna wants is a city policy that is an intelligent balance of solar energy rooftop production and public street trees. That could be as simple as the city carefully planting trees that only grow to heights that will not interfere with rooftop solar panels.

"If you plant trees in the right places and prune them, you can come out ahead and still have solar potential," said Conna.

Mitchell just wants the tree in front of her house trimmed, so her electricity bills will drop.

"If they want to keep the trees, at least come down and prune them, so it's not interfering with what we're paying for," she said.

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