



City of Beverly School Bus Fleet Electrification

**DOER Green Communities Summit
November 22, 2024**

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Sustainability Director
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Fleet Overview



1 School Bus Fleet

- 46 vehicles:
 - ~23 Type C (71 passenger “big bus”)
 - 7 Type A gas mini bus; 9 gas & hybridized vans
- 5 all-electric school buses leased or leased-to-buy from Highland Electric Fleets
 - 1st deployed in October 2020



2 Charging Infrastructure

- Managed by Highland Electric Fleets:
- 5 50-60kW bidirectional charging stations
- Upsized transformer pad



3 Community Education

- National Drive Electric Week Events hosted at BMS and BHS
- One-time grant-funded professional development

How's it going?



- ✓ Partnership with Highland Electric
- ✓ Use of social cost of carbon in early economic pitch
- ✓ Zero PM, NOx, SOx emissions
- ✗ Early adoption in new industry
- ✗ Forecasting full fleet electrification \$\$





What's next?

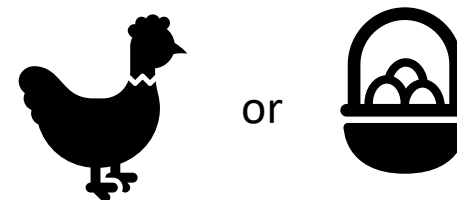
In pursuit of certainty

>\$3M in grants and rebates to deploy 8 more electric buses!

- EPA Clean School Bus rebate (lottery): \$1,455,000
- MassCEC Accelerating Clean Transportation (ACT) Fleet Deployment grant: \$1,459,000
- Anticipated Elective Pay credits: \$320,000 for vehicles

Considerations:

- Can we afford to do this on our own? Can we afford *not* to do it on our own?
- Seeking certainty around procurement law; eligibility and timing of Direct Pay credits
- How do we anticipate project costs, including infrastructure upgrades not covered by utility (due to “Same Site Rule”)?





Procurement

- State contracts: VEH110 and VEH111 have limited vendors and equipment
- Other cooperative agreements: PowerOptions, Sourcewell, BuyBoard National
- Considerations:
 - Turnkey vs. DIY models: *“Under Massachusetts law, the procurement of electric vehicles and their associated charging infrastructure are separate procurements.”*
 - Lease vs. Own: *“EPA does not require you to own the buses, if you just pass through the funds.”*
 - Build America Buy America Act
 - Ch. 25a “Decarbonization activity”
 - Includes EVSE procurement and installation projects, not vehicles
 - Up to \$300k per location, per measure, when using a utility vendor
 - Customer-side vs. utility side costs?





Finance + Cash Flow

- City Council approval required for loan authorization needed to issue purchase order
- Bridging upfront capital needs and reimbursement models:
 - Consider short-term borrowing, phased vehicle delivery?
 - Limited FY25 capital availability
 - No ability to “lock in” bus prices for future delivery



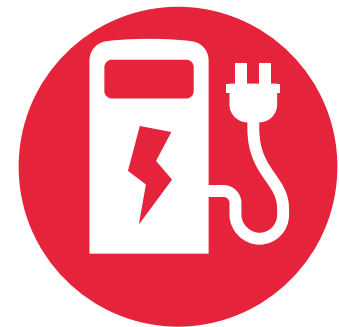
Operations



Bus warranties: Chassis, battery, bumper to bumper



Integration: "There's an issue!"



Charging stations: Warranty, preventative maintenance (optional), networking

Considerations:

- Nice to have vs. necessary
- Forecasting costs after warranty
- TA support, eventually

Thank you!



Environmental Sustainability Internship Course

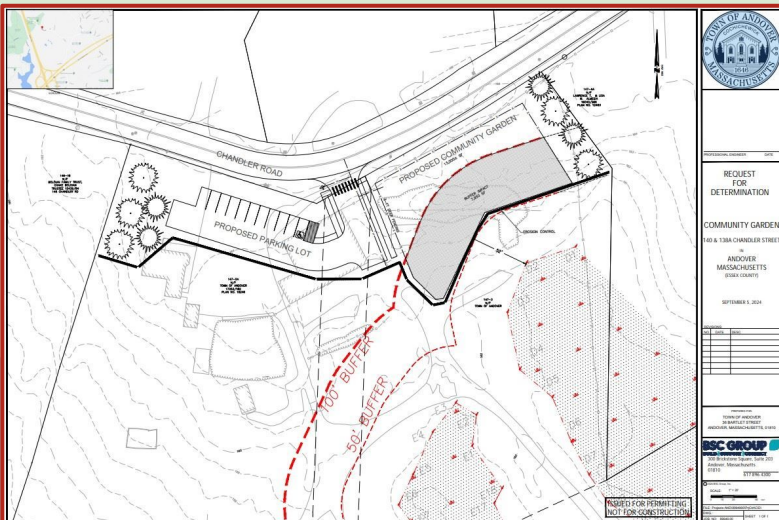


Melanie Cutler
Science Teacher
Andover High School
melanie.cutler@andoverma.us

About me...

- 2 kids, 1 husband, and 1 crazy chihuahua mix dog
- Lifelong Andover Resident, Andover HS graduate
- BS Biology, Bates College
- MEM, Yale School for the Environment
- Member, Andover Green Advisory Board (AGAB)
- Teach Biology, Environmental Science, and ESIC
- Run Sustainable Garden Project at AHS
- Faculty Advisory for Environmental Club
- Student travel leader: Costa Rica, Iceland, Galapagos, Baja, Thailand
- Awards: EPA's Presidential Innovation Award for Environmental Educators, Rotary Club Teacher of the Year, Chamber of Commerce's Community Service Award, NAGT Outstanding Earth Science Teacher, NSSSA Outstanding Science Teacher, Project Green Schools Outstanding Green Program Director





AHS ESIC Intern, Sofia Duran-Clark
Mentor Monica Gregoire,
Andover Planning Department
**Helping to Plan New Chandler
Road Recreation Area**

AHS ESIC Intern, Lincoln Pekock

Mentor, Mary Pritchard, Andover WECAN

Planning and Implementing the Andover Youth Sustainability Fair

Hosted by Andover WECAN

- Increase youth engagement and Awareness in Environmental issues
- Highlight community work done by youth-led groups
- Promote community building actions among youth



Environmental Sustainability Internship Course (ESIC)

- WHY run an internship course?
- WHAT is the ESIC course?
- HOW do you set up an internship course?

WHY RUN AN INTERNSHIP COURSE?

STUDENTS BENEFIT and COMMUNITY BENEFITS

THE Andover ONLINE
Townsman

 Lawrence General Hospital +  Flooding Hospital for Children at Tufts Medical Center
Together we deliver advanced care.

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Real-world lesson

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■ AHS interns helping to shape Andover's future growth

StoryImage (2)

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Posted: Thursday, September 25, 2014 1:25 am

By Bill Kirk bkirk@andovertownsman.com

Children, as the saying goes, are the future.


In Andover, that's especially true as student-interns from the high school are focusing on a host of issues that could shape the way the town looks for many years to come.

The high school's Environmental Sustainability Internship Course, overseen by science teacher Melanie Cutler, has paired 12 students with local mentors to study critical issues facing the town.

Last Wednesday, Sept. 17, six of the interns toured downtown with Steven Fink, founder of Sustainable Andover. They were there to learn about how the town is trying to bring vibrancy to the property around the Town Yard as well as a wider area reaching down to the

Real-world lesson

THE Andover ONLINE
Townsman

 Lawrence General Hospital +  Flooding Hospital for Children at Tufts Medical Center
Together we deliver advanced care.

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Town Yard rezoning branches out; Vision extends down to Shawsheen River and beyond


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■ Vision extends down to Shawsheen River and beyond

StoryImage (8)

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Posted: Thursday, September 25, 2014 1:55 am | Updated: 10:08 pm, Wed Oct 8, 2014.

By Bill Kirk bkirk@andovertownsman.com

It's not just about the Town Yard anymore.

During a series of walking tours of the Plant and Facilities Department off Lewis Street, economic development leaders and town officials are touting a rezoning plan that includes a much larger area — stretching up the hill toward North Main Street, down the hill to the Shawsheen River, across the railroad tracks to Dundee Park, and down Railroad Street to Whole Foods.

Last week, Steven Fink of the group Sustainable Andover, led a half-dozen high school interns working on a variety of environmental projects on a tour of the neighborhood, discussing what is there now and what

Mary Schwalm

WHY? Students Benefit

“The **best class** I ever took at AHS” - Sophia

“I gained **real world** experience that no other class at AHS could have taught me. Communication, seizing presented opportunities, time management, and actually **caring about my work**: all were facets that were truly unique to this class.” – Matt

WHY? Students Benefit

“This internship helped me not only to prepare for internships in college and future jobs, but has also forced me to **grow and mature** immensely in a short span of time.”

—Maddie

WHY? Students Benefit

“Most importantly, I learned how I, myself, can **make a difference.**” --Chris



WHY? Students Benefit



- Most ESIC interns got into the college of their choice
(including Dartmouth, Yale, and Brown)
- Past interns say the class helped them immensely, changed their career path

WHY? Organizations Benefit

- Municipal and nonprofit employees are strapped for time and budget
- Interns help share workload
- Good PR for town and organizations
- Interns present at public meetings - people sometimes listen better to youth than adults
- Saves town time, money, and carbon emissions

WHY? Town Benefits

ESIC Interns have:

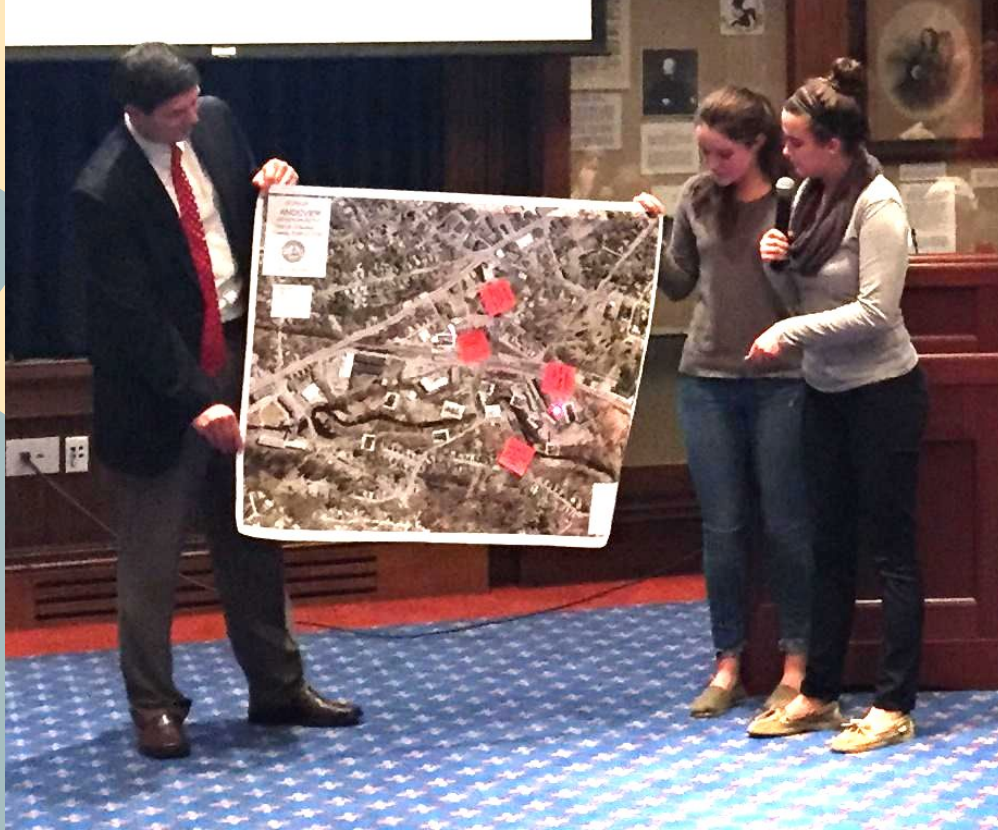
- **Run public meetings** for the **Historic Mill District**
- **Replaced old refrigerators** in town buildings with new energy efficient models, saving energy and money
- Helped to start the **Andover Community Garden**
- **Produced a marketing campaign** for AHS energy
- **Instituted recycling** in public school cafeterias
- **Blazed new trails** on town conservation land
- **Conducted an IAQ study** at AHS using EPA guidelines
- **Removed invasive species** around town...and others

WHAT IS ESIC?

- Experiential
- Project-based learning
- Mentor-student relationships
- Service-based learning



WHAT? DELIBERATE SKILLS DEVELOPMENT



1. LEADERSHIP
2. PROJECT MANAGEMENT
3. SUSTAINABILITY
4. PROFESSIONAL SKILLS

Presentations
Resume writing
Job interviewing
Communication

What? SAMPLE WEEKLY SCHEDULE



MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Work on PSR, set goals for week	Work on project in classroom	Meet with mentor	Work on project in the field	Work on project in classroom

HOW? What do you need to think about?

- **COURSE PROPOSAL**
- **ADMINISTRATIVE APPROVAL**
- **PROMOTE COURSE**
- **STUDENT SAFETY**
- **CLASS WEBSITE**
- **SOLICIT MENTOR VOLUNTEERS**
- **SPEED INTERVIEWING EVENT** for mentor-intern matches

- **COURSE DOCUMENTS**
- **ADMINISTRATIVE ASSISTANCE**
- **FUNDING:**
 - **SOURCES: GRANTS, PRIVATE AND SCHOOL ORGANIZATIONS**
- **FINAL PRESENTATION SESSION**
- **ASSESSMENT / EVALUATION**

COURSE WEBSITE

- <https://sites.google.com/a/k12.andoverma.us/esic> (old)
- Meeting dates/times
- Communication
- Projects
- Forms
- Skills and Accomplishments

Environmental Sustainability Internship Course (ESIC)



[ABOUT ESIC](#)

[ASSIGNMENTS AND MEETING DATES FOR 2018-2019](#)

[CLASS LIST](#)

[MENTOR/INTERN MATCHES](#)

[EVALUATION FORM](#)

[FORMS, DOCUMENTS AND PROCEDURES](#) for mentors and interns

[MESSAGE BOARD](#)

[2018-2019 PROJECTS](#)

[SKILLS AND ACCOMPLISHMENTS](#)

[ESIC PROJECT VIDEOS](#)

ASSESSMENT = JOB EVALUATION (old)

Mentor / Intern Evaluation

The goal of the Environmental Sustainability Internship Course (ESIC) is to help students develop **leadership** and **project management** skills in order to improve **environmental sustainability** in our community. Every other week, on the days designated in the ESIC Course Syllabus and Scope of Work, the mentor and intern should sit down together to review the intern's progress, based on the following rubrics. The evaluation process is designed to be a conversation and professional critique in order to facilitate growth. Your conversations should be candid and productive, and a printed copy of the evaluation form should be **turned into me** by the intern at the next class meeting. Please don't hesitate to let me know if you have any questions or concerns. Thank you both for taking the time to honestly participate in the evaluation process. - Melanie Cutler

STANDARDS
BASED

SKILLS
BASED

LEADERSHIP SKILLS

	Below Standard	Approaching Standard	At Standard	Above Standard (include clarifying notes)	Grade or N/A
Grade Range:	F* to 69	70 - 79	80 - 92	93 - 100	
Critical Thinking	<p>Is unable to integrate information in a cohesive product</p> <p>Accepts information at face value, does not evaluate sources or quality</p> <p>Does not conduct independent research</p> <p>Does not demonstrate independent thought</p> <p>Cannot give valid reasons or supporting evidence to defend work product</p>	<p>Is able to integrate some information in a cohesive product</p> <p>Evaluates sources and quality of some information</p> <p>Conducts some independent research, still needs lots of guidance</p> <p>Demonstrates some independent thought</p> <p>Gives some reasoning to support work product</p>	<p>Integrates information from various sources into cohesive product</p> <p>Evaluates sources and quality of all information</p> <p>Conducts research independently, with minimal appropriate guidance</p> <p>Asks thoughtful questions and shares independent thoughts</p> <p>Supports product with valid evidence</p>		
Creativity and Innovation	<p>Just "follows directions" without understanding the project or context</p> <p>Uses only simple information</p>	<p>Understands the project, but does not thoroughly consider the needs of the target audience</p> <p>Finds more than two sources of information</p>	<p>Fully understands the purpose driving this project (who needs this? why?)</p> <p>Uses more than 2 trusted sources</p>		

ASSESSMENT = JOB EVALUATION

(current - Google Form with 3 questions)

Leadership Standards: *

An excellent student leader will:

- think critically and creatively about their project
- actively engage with their mentor, other students, and community members and present their results to the public when applicable
- take the initiative to drive their own project forward and seek assistance from their mentor when needed, including finding project-related work to do on their own while waiting for mentor feedback.

Rating Scale:

1 = fails to meet all standards

2 = needs improvement in most standards

3 = meets most standards, needs some improvement

4 = meets all standards

	1	2	3	4	
Fails to meet Leadership standards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Meets all Leadership standards

MENTOR SUPPORT

ESIC MENTOR ORIENTATION HANDBOOK

ENVIRONMENTAL SUSTAINABILITY INTERNSHIP COURSE (ESIC)



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The goal of the Environmental Sustainability Internship Course (ESIC) is to help students develop **leadership** and **project management** skills in the context of improving **environmental sustainability** in our community.

Handbook Table of Contents

[Introduction](#)

[Important Dates For Mentors](#)

[Writing Your Project Blurb](#)

[Speed Interviewing](#)

[Scope of Work Template](#)

[Course Syllabus for Students](#)

[Using the ESIC Course Website](#)

[Mentor / Intern Evaluation Process](#)

[Mentor / Intern Evaluation Form](#)

[Tips on Being a Great Mentor](#)

[Administrator / Mentor Check-Ins](#)

[FAQs](#)

CONCLUSION

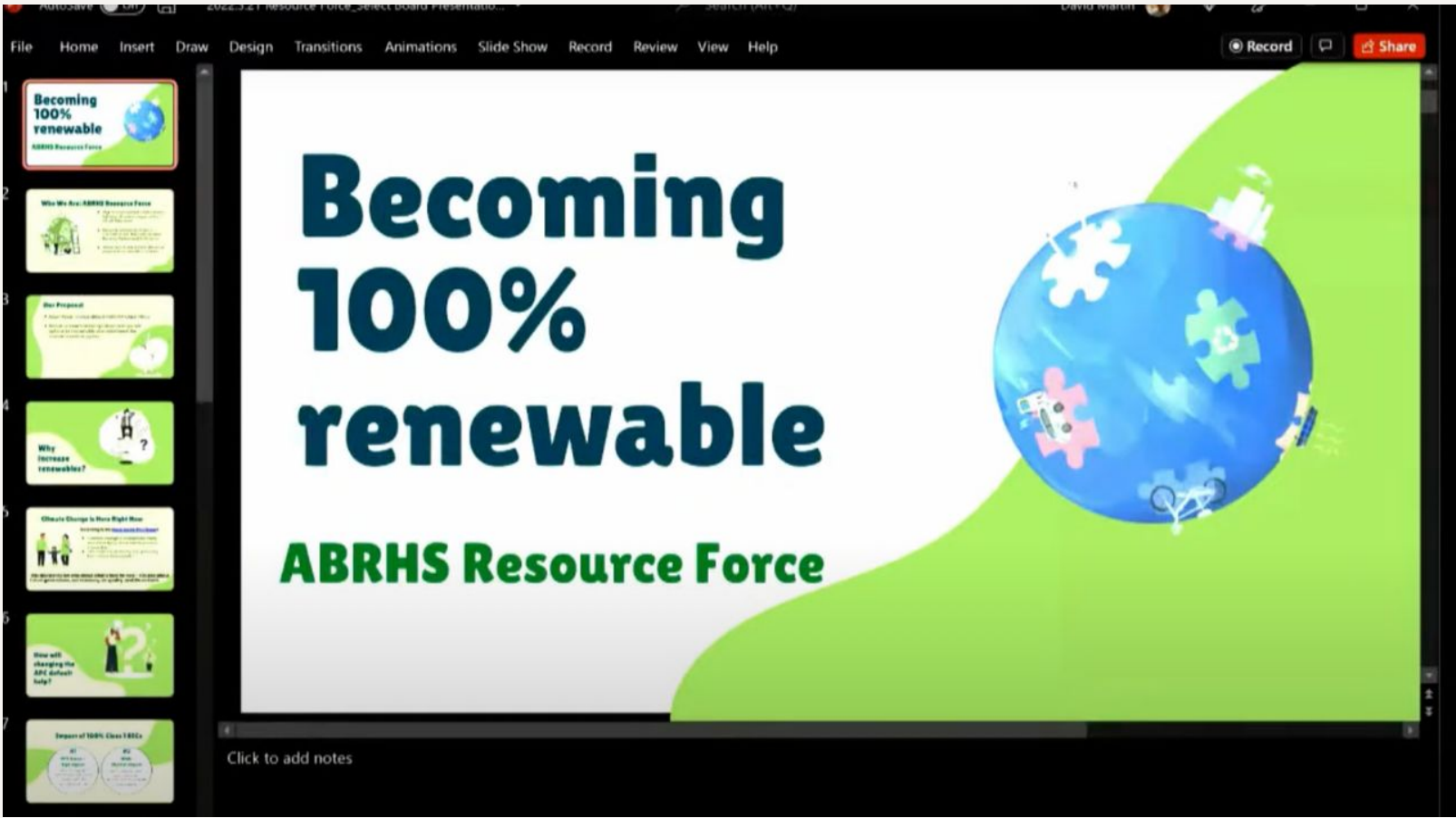
1. **Internship course is possible** in public high schools
2. **Students benefit**
3. **Town and organizations benefit**



QUESTIONS







What is CRS Coalition?

- MA Climate Resilient Schools Coalition
- Network of students, teachers, parents, professionals
- Change the way our schools operate...
 - So that all students (1 million) learn about climate change
 - Our 1,840 school buildings are updated – more safety less emissions!



 **UNDAUNTEDK12**



**REWIRING
AMERICA**



Our Districts

- Arlington Public Schools
- Boston Public Schools*
- Brookline Public Schools
- Cambridge Public Schools
- Everett Public Schools*
- Framingham Public Schools
- Gill-Montague Regional Schools
- Greenfield Public Schools*
- Hudson Public Schools
- Lowell Public Schools*
- Newton Public Schools
- Northampton Public Schools
- Pittsfield Public Schools
- Revere Public Schools*
- Salem Public Schools*
- Somerville Public Schools
- Springfield Public Schools*
- Wayland Public Schools

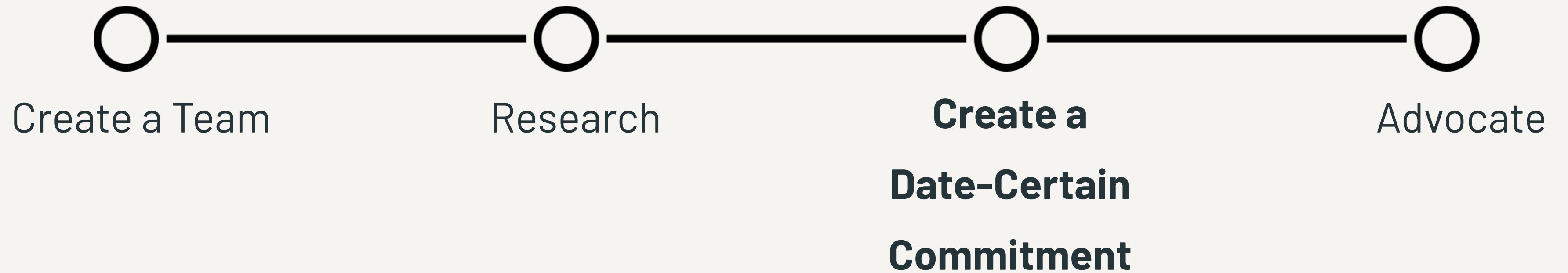
CRS Coalition Youth Cohort

Fifteen paid high school students
from across MA, participate in a
structured skill-building program,
lead district organizing team.

“Date-Certain Commitments:”

- The WHAT: Local policy, i.e., comprehensive school board resolutions, schools component of town CAP, plan for IRA funds, adding specificity or resilience components to existing policy.
- The WHY: institutionalize climate action, build momentum for state level policy (laws + funding).

Roadmap for District Organizing



Stay Connected!



CRS Coalition Website:

- climateresilientschools.org
- Join our mailing list under “stay connected”

Set up a 30 Min Onboarding Call:

- <https://calendly.com/sara-alana-karp/30min>

Questions?

skarp@massaudubon.org

