NC Division of Air Quality

Ozone and Particulate Matter Advance Programs

Path Forward

October 2019

NORTH CAROLINA
Department of Environmental Quality

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Introduction and Purpose

The NC DAQ joined the EPA Advance program in September 2017. The EPA Advance Program encourages collaborations between state, local and community organizations to encourage ozone and PM2.5 emissions reduction. The program is specifically for areas that are currently in attainment of the ozone and PM2.5 National Ambient Air Quality Standards (NAAQS). The program provides a flexible framework for organizations who want closer involvement and support from EPA.

The NC DAQ has proactively reduced ozone precursor and particulate matter emissions for years. The entire state of North Carolina is currently in attainment for ozone and PM2.5. It is critical over the next few years that ozone and PM2.5 emissions continue to decline so that attainment can be maintained, and violations avoided should the NAAQS be revised in the future. It is NC DAQ's objective to continue to maintain the NAAQS for ozone and PM2.5 in perpetuity.

We also realize that regulatory actions in combination with voluntary actions are the best strategy for successfully reducing emissions. The NC Air Awareness program provides ways in which voluntary actions can result in improved air quality. Developing meaningful relationships with like-minded communities, organizations and governments will help strengthen the commitment to clean air, thereby protecting human health. Providing the Path Forward for the Advance program allows us to meet our objectives through determining our own goals and the measures we want to implement in order to reach them. The plans described in this Path Forward leverage the NC Air Awareness program projects through on-going and new initiatives. The culmination of these efforts will improve air quality, provide health protection, position North Carolina to maintain the NAAQS, allow community engagement and also reduce greenhouse gas emissions as an added benefit.

History and Early Strategies for Improving Air Quality

Early Action Compacts in NC

The Early Action Compact (EAC) process gave certain local areas the opportunity to develop local control strategies to meet the 1997 8-hour ozone standard earlier than would be required by the Clean Air Act. The early reduction in emissions would benefit the citizens in the area since the air quality would improve sooner than would otherwise be required. The EAC process has encouraged early action to reduce ozone precursor emissions using innovative measures.

North Carolina had four areas sign compacts: the Cumberland County (Fayetteville) Area; the Mountain Area (Buncombe, Haywood, Henderson, Madison and Transylvania Counties); the Triad Area (Alamance, Caswell, Davidson, Davie, Forsyth, Guilford, Randolph, Rockingham, Stokes, Surry and Yadkin Counties); and the Unifour Area (Alexander, Burke, Caldwell and Catawba Counties). This collaborative effort was very effective in its time and we gained experience using innovative strategies to reduce emissions which is why we are joining the EPA Advance program.

Clean Smokestacks Act

The Clean Smokestacks Act (the Act), officially titled the Air Quality/Electric Utilities Act (SB 1078), required significant actual emissions reductions from coal-fired power plants in North Carolina. The Act differed from federal rules, which allowed utilities to buy pollution credits from other states instead of cutting air pollution from power plants in state. The Act did not include trading programs; therefore, sources were required to reduce emissions rather than purchase credits as slowed by some federal programs.

Emissions reductions: Under the Act, North Carolina's utilities were required to reduce actual emissions of nitrogen oxides (NOx) from 245,000 tons in 1998 to 56,000 tons by 2009 (77% reduction). Utilities were also required to reduce actual sulfur dioxide (SO2) emissions from 489,000 tons in 1998 to 250,000 tons by 2009 (49% reduction) and 130,000 tons by 2013 (73% reduction). This represented about a one-third reduction of the total NOx emissions and a one-half reduction of the total SO2 emissions from all sources in North Carolina.

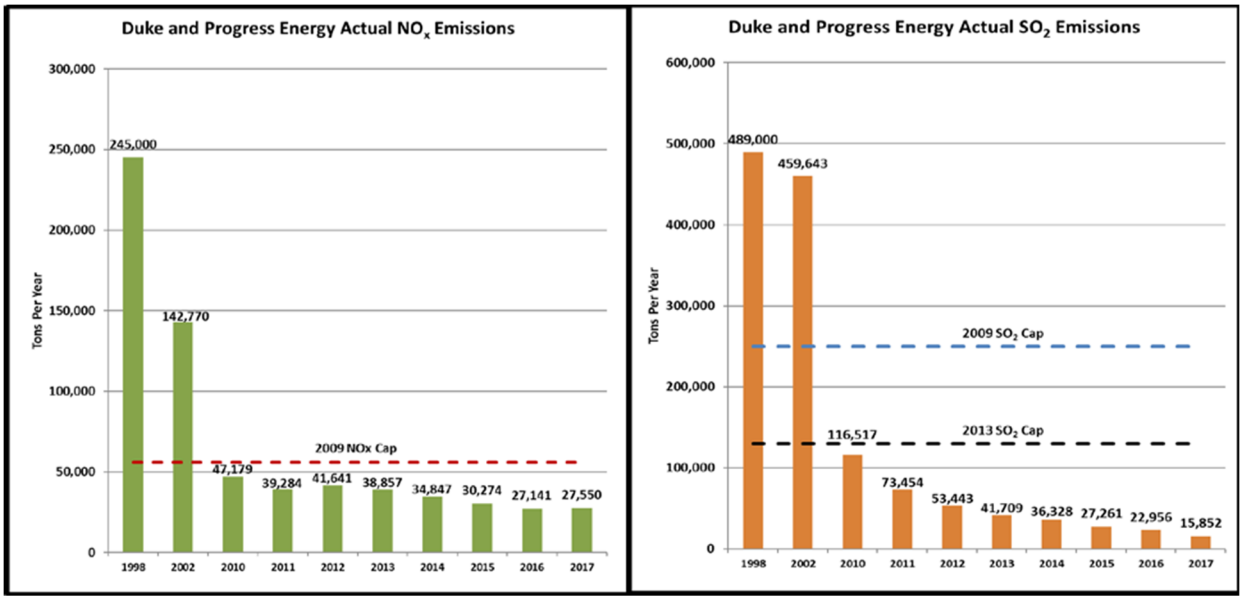
Health benefits: The emission reductions had, and continue to have, health benefits for people of North Carolina and other states by significantly reducing pollution events that can trigger asthma and other respiratory problems. The cuts in both SO2 and NOx emissions reduced acid rain and serve as a significant step toward meeting the current fine particle and ozone standards throughout North Carolina.

Visibility: Air pollution had reduced visibility in the Smoky Mountains from 93 miles to between 24 and 36 miles (National Park Service report, "Clearing the Air at Great Smoky Mountains National Park", September 1999). The Act helped, and continues to help, North Carolina reach its goal of improving visibility in the mountains and from other scenic vistas in North Carolina by reducing pollution from North Carolina sources that contribute to the problem. Because air pollutants from sources in other states significantly contribute to our mountain air quality problem, the Act stated an intention of using all means available to achieve air quality improvements in those states as well.

Mercury emissions reductions: Reducing SO2 and NOx, by using certain technologies, had the additional benefit of reducing mercury emissions. A statewide mercury advisory now warns against consumption of four ocean fish species and three freshwater fish species in the eastern half of North Carolina because of high mercury levels. The Act also required the Department of Environmental Quality (DEQ) to evaluate issues related to the control of mercury and carbon dioxide emissions and make recommendations on the development of standards and plans to control these emissions.

This is the most important impact on stationary sources and air emission trends in NC to date. It also highlights an emissions reduction strategy that was innovative, collaborative and remarkable for its time.

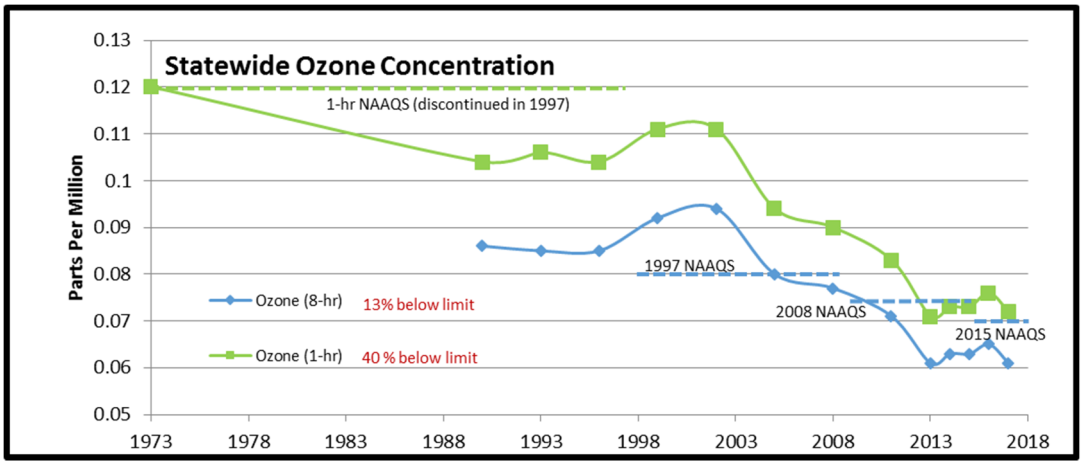
Figure 1. Clean Smokestacks Act Emissions Reductions



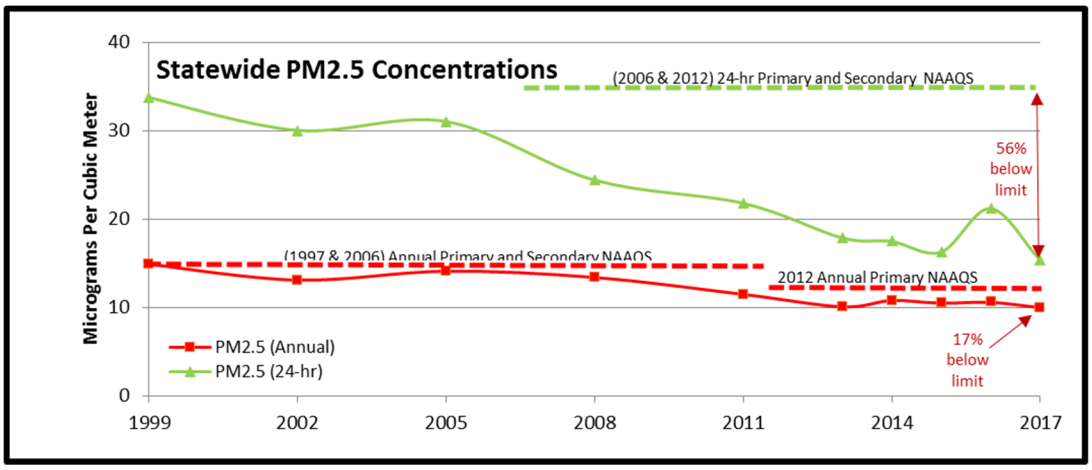
Air Quality Trends and Emission Reductions in North Carolina

Ambient air concentrations of ozone and PM2.5 precursor emissions have been declining over time because of regulatory, legislative and voluntary actions.

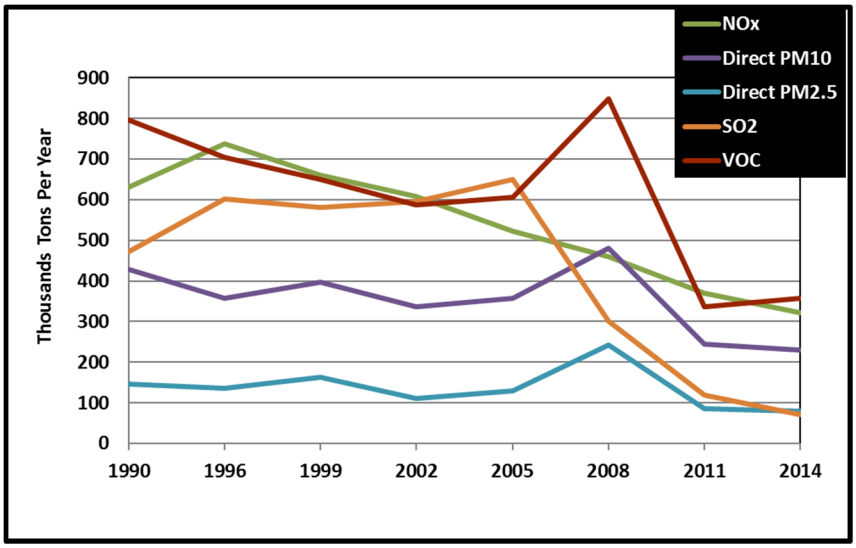
Ambient ozone concentrations have been monitored and reported in NC since 1973. The figure below shows the decline in ambient ozone concentrations as compared to the associated NAAQS. This figure also shows that the ambient statewide concentration for ozone is below the current NAAQS.



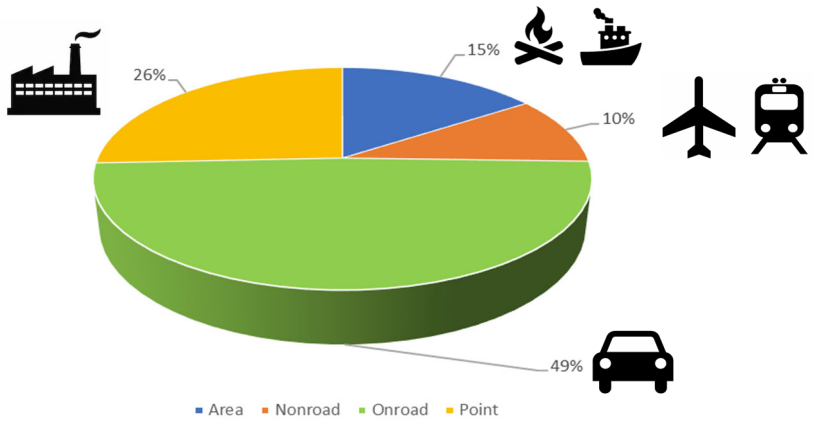
Ambient PM2.5 concentrations have been monitored and reported in NC since 1999. The figure below shows the decline in ambient PM2.5 concentrations as compared to the associated NAAQS. This figure also shows that the ambient statewide concentration for PM2.5 is below the current NAAQS.



State-wide ozone precursors and PM2.5 emissions have been declining over time in NC because of regulatory and legislative actions. The chart below shows statewide emissions data from the EPA National Emission Inventory from 1990-2014. Note: The spike in VOC emissions in 2008 is a result of an extreme fire event that occurred in NC during the months of July and August.



Transportation is the biggest contributor to ozone precursor emissions in NC; however, emissions associated with everyday operation of passenger vehicles and trucks have also declined significantly. The decline in on-road emissions is associated with several on-the-books national rules that have been phased in over time, starting with the federal Tier 1 emissions standards from 1994-1999, national low-emissions vehicle standards from 1999-2003, Tier 2 emissions standards from 2004-2010 and heavy-duty vehicle standards from 2007-2010. Further reductions are expected to occur in the future under the Tier 3 vehicle emissions and fuel standards from 2017-2025. As a result of these standards, North Carolina's vehicle fleet has become cleaner as newer low-emitting vehicles replace older higher-emitting vehicles, and the emissions controls on the vehicles are more technologically advanced - thus lasting longer and less prone to malfunctions or failures. A closer look at NOx emissions from 2014 show that the main sources are transportation related, with almost 50% from on-road mobile sources.



Local Air Quality Partners

In August 2017, the Mecklenburg County Air Quality (MCAQ) agency joined the EPA Advance program with the support of NC DAQ. We continue to support the efforts in MCAQ by partnering with them on a variety of projects. Presently we financially support a Local Air Awareness coordinator who works with business coalitions and promotes ozone season to raise awareness. We are also technically and financially supporting the planning, construction and deployment of an Air Quality Learning Station (AQLS). This station will inform the public in an engaging way about ozone and PM2.5 levels in their immediate area. The AQLS unveiling is scheduled for Spring 2020. Finally, we have provided support and technical guidance on MCAQs *Breathing Room* Advance program. We are looking forward to learning about their successes with this program soon.

We also partner with the Forsyth County Office of Environmental Assistance and Protection (Forsyth County). We financially support a Local Air Awareness coordinator in Forsyth County who works with K-12 schools teaching children and teachers about air quality to raise awareness.

NC Air Awareness

The NC Air Awareness program began in 2008. The purpose of the NC Air Awareness program is to advocate for voluntary actions which aid in relieving traffic congestion, reducing harmful tailpipe emissions, achieving and maintaining the national ambient air quality standards (NAAQS) and reducing unnecessary vehicle idling. The NC Air Awareness program also uses monitoring information to inform the public about air quality across the state. NC Air Awareness maintains projects and partnerships which aim to reduce transportation-related emissions through education, community outreach and partnerships statewide. The primary goals of the NC Air Awareness program are to: 1) inform and provide information about air quality issues, 2) provide tools to educators about air quality and health topics and 3) empower citizens to take actions now or in the future to reduce air pollution and congestion.

Examples of work under the NC Air Awareness program include, but are not limited to:

- Environmental Education: This work includes direct outreach and environmental education. On average, approximately 15,000 students are reached annually, and over 300 education programs and events are conducted statewide.
- Trainings / Workshops: 15-25 “train the trainer” style education workshops have been conducted since the start of the program that reach 20,000 to 30,000 students annually. The teachers learn how to talk and teach about vehicle idle reduction, reducing harmful tailpipe emissions and how to improve air quality.
- Community Events: 50-85 community events have been organized, hosted or attended to communicate air quality messages and encourage actions to reduce air pollution and congestion since 2008. NC Air Awareness reaches over 100,000 members of the general public annually with air awareness messages, reminders and tips to improve air quality.
- Partnerships: 40-80 ozone season or partner events are hosted by the business community annually. Over 4,000 coalition members and partners attended either an ozone season, partner, or networking event held by our Local Air Awareness Coordinators in 2015 who then disseminated air quality information to approximately 30,000 of their employees across North Carolina. NC Air Awareness worked with local governments, health groups and environmental advocacy groups to accomplish like-minded goals.

- Air Quality Forecast Subscriptions / Online and Media Efforts: Through a variety of online platforms, social media and through Enviroflash, NC Air Awareness shares information about how to reduce air pollution and congestion with over one hundred thousand citizens annually.

The Path Forward

The continuing challenge for the state is maintaining the NAAQS in key areas should the standards become more stringent over time. Also, we need to include more robust strategies for PM2.5 emission reductions for diesel vehicles while continuing to reduce NOx emissions from cars and trucks. NC DAQ foresees that new strategies for reducing air emissions voluntarily will be needed over regulatory options. To implement these strategies, we will leverage the NC Air Awareness program because the new projects and established partnerships align well with the goals of the Advance program.

The projects described below include plans of where we can leverage the Advance program in key areas and networking with partners in those areas. We find that working regionally or locally achieves more significant emission reductions than working statewide because of the ongoing relationship with key partners. Specifically, we will work in regions that are currently in attainment for the ozone[1] and PM2.5[2] NAAQS; starting first with those areas in the greater Charlotte area where attainment is most recent. These plans range from Plan 1, which can be implemented quickly without significant staffing resources or funding, to Plan 4 that will require creating new partners using new technology and may also require additional funding.

Each of these phases include:

1. Partner(s) – onboard and committed first
2. Possible projects
3. How to get started
4. Time frame
5. Funding
6. Staffing

Plan 1 – Working with Local Air pollution Control Agencies + Partners

Overview: In this plan we will build on our relationship with existing local partners like Mecklenburg County Air Quality (MCAQ), Forsyth County, possibly Buncombe County air control agencies and Sustainable Sandhills (Cumberland Co.).

Phase 1 – describes promoting a combined project (like It's Our Air) within key counties such as Mecklenburg, Forsyth, Buncombe and Cumberland.

Phase 2 – describes encouraging our existing partners to pursue a project of their own that best matches their goals and interests. The role of NC DAQ would be as a technical advisor and collaborator. Either phase could use current and future NC Air Awareness funding.

Phase 1 – Promoting It's Our Air[3] in key counties with existing partners

[1] https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/planning/attainment/mapping/NC_Designation_O3.pdf
[2] https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/planning/attainment/mapping/NC_Designation_PM_25.pdf
[3] http://www.itsourair.org/about

1. **Partners:** For this project, we propose leveraging our existing relationship with local air agencies to promote the It's Our Air project in key counties (Mecklenburg, Forsyth, Cumberland[4]) around the state. We would also like to renew our relationship with the local air agency in Buncombe county.
2. **Project:** The It's Our Air project is a high school curriculum that contains information about sources of pollution, how air pollution is forecasted and solutions to pollution. Both ozone and PM2.5 are part of this program.
3. **How to get started:** Conversations with MCAQ, Cumberland and Forsyth counties have already started. We need to re-engage with Buncombe.
4. **Time Frame:** This project could start quickly – as early as Fall 2019 but no later than January 2020; this project will be ongoing for the entire length of the Advance program.
5. **Funding:** Because we already provide funding to MCAQ and Forsyth no additional funding will be needed. For Cumberland and Buncombe counties, funding would come from existing CMAQ agreements. Costs include: (1) marketing materials, (2) teacher workshops and (3) workshop materials - total costs could range from $5K to $10K.
6. **Staffing:** Staff time has already been designated to implement this project over the next few years and has been incorporated into staff goals. At a minimum, one staff person designated as the Team Leader will be needed to coordinate this project to work closely with partners so that the project is accepted, included in planning documents, marketed and executed in a timely fashion. It is possible that one person initiates and markets this project and then passes the project off to local partners to implement the project.

Phase 2 – Encouraging local goals and interests, providing technical expertise and collaboration with existing partners

1. **Partners:** We envision coordinating with our existing partners, MCAQ and Forsyth County, and perhaps Sustainable Sandhills in Cumberland county.
2. **Projects:** We realize that each area has different air quality challenges that may not transcend to state-wide air quality challenges. Each area would be encouraged to work on their own projects, which could be applied to the EPA Advance project for their area. We propose strengthening our relationship with the local air agencies by championing their individual projects. The NC Air Awareness/NC DAQ role for this phase would be to coordinate the regional projects. We could do this by highlighting their efforts in news releases, quarterly Facebook posts and including them in the EPA Advance reports.
3. **How to get started:** This will depend upon whether the local air agencies are interested in continuing in or joining the Advance program.
4. **Time Frame:** January 2020, or later, given current priorities and outreach events.
5. **Funding:** Depending upon the project, direct funding may not be an option; however, we could help with printed materials, marketing, stakeholder involvement and execution. NC DAQ already provides funding to MCAQ and Forsyth to fund local air awareness coordinators.
6. **Staffing:** Presently one Air Awareness staff in the central office 15% of the time and will continue to provide guidance and support for the local air agencies.

[4] Sustainable Sandhills is our partner in Cumberland County

Plan 2 - Working with Council of Governments (COGs): Ride Sharing / Alternative Commuting Programs

There are 16 councils of government (COGs) in North Carolina. Several of these organizations have worked with NC Air Awareness in the past. However, in recent years, work with COGs has been greatly reduced. Plan 2 focuses on reaching out to key COGs like Triangle J Council of Government (TJCOG), Piedmont Triad Regional Council (Piedmont Triad), Centralina Council of Government (Centralina), and Land of Sky Council of Government (Land of Sky) to re-establish working relationships and give local government entities an opportunity to be involved in voluntary actions to improve their community and the regional air quality. In coordination with NC DAQ, the COGs would select commuter-based projects that they may be involved in currently or are interested in executing in the future. We envision NC DAQ could provide some level of funding for this Plan; funding would support the purchase of marketing material and / or purchase of a commuting platform that the COGs would then promote. Many COGs already have robust Transportation Demand workgroups and planning groups that work on congestion and traffic issues. COGs would be ultimately responsible for marketing, staffing, disseminating and collecting data, providing feedback on project success, and submitting an annual report for their COG. NC DAQ would collect the various annual activity reports to combine them into the required Advance report.

1. **Partner(s):** Select COGs such as: TJCOG, Piedmont Triad, Centralina and Land of Sky.
2. **Possible projects:** Smart commute challenges, ridesharing programs using commuting platforms and idle reduction projects. Additional projects led by COGs that relate to vehicle emission reductions would also be considered.
3. **How to get started:** Initial discussions with presidents of select COGs would be followed up by a kickoff meeting of stakeholders or webinar to discuss Advance, as well as build buy-in.
4. **Time frame:** These projects could begin at the beginning of 2020. Initial buy-in and commitments from COGs would need to be obtained first before timeline could be established.
5. **Funding:** Depending upon the projects, direct funding may not be an option, however we could help with printed materials, marketing, stakeholder involvement, and execution. Some COGs may look to or be encourages to utilize their own funds.
6. **Staffing:** NC DAQ would have a coordinating role. One staff person be utilized to roll out program for the first six months.

Plan 3 – Forming New Partnerships: University Transportation Initiatives

Plan three would differ from Plans 1 and 2 with regard to established relationships and would focus on new partnerships. This project would take longer to get off the ground than Plans 1 and 2. It is dependent on finding university partners willing to participate in the Advance program. Many universities have sustainability projects and energy efficiency projects on their campus that will realize emission reductions. Projects to reduce energy usage have been used in other states as part of Advance. This phase would need to include a research and learning phase to access what is currently happening on campuses and what types of projects could be included. The initial phase would focus on education and outreach which would share information about transportation options that would reduce air pollution from mobile sources.

Initially, we would build or tap into an existing stakeholder group of university transportation leaders or sustainability leaders. We would focus on communicating to faculty, staff and community members near the universities. The project emphasis includes working with staff and faculty to promote commuting alternatives and idle reduction campaigns on campus. We envision partnering with student organizations, such as Net Impact[5], and other sustainability focused groups to launch a grassroots social marketing campaign focused on driving less, alternative commuting or idle reduction (projects may vary depending on campus partner's interests). Further marketing through "TED" talks hosted by staff, faculty and students would broaden the reach of NC Air Awareness messages. Talks would focus on the experiences of commuters using alternative transportation, ride sharing, etc. and would be used to both share information about the topics but also encourage positive behavior change. The project could also include using a commuter platform with NC DAQ funding, as described in Plan 2. University employees could compete against each other or other universities in competitions with the goal of reducing harmful emissions.

1. **Partner(s):** North Carolina Universities or Colleges (begin with one or two universities), student groups like Net Impact, sustainability committee members and university employees and students.
2. **Possible projects:** Social media campaigns in partnership with universities, TED talks and emission reduction competitions.
3. **How to get started**: Hold initial discussions with universities groups, sustainability teams, and engineering teams involved with campus transportation would need to occur. Advance would be a new concept for stakeholders. The idea would be pitched to get additional credit for projects they have already started or plan to start and to partner with state and federal agencies. Initial discussions would need to be followed up by a kickoff meeting of stakeholders and/or webinars to discuss Advance, Advance requirements, roles, commitments etc. to eventually establish buy-in.
4. **Time frame:** These projects could begin within 8-12 months but may take longer identifying and connecting with stakeholder groups.
5. **Funding**: This could be supported using NC Air Awareness funds to pay for ride sharing and gamification platform to hold alternative commuting type challenges on campus.
6. **Staffing:** NC DAQ would have a coordinating role but initial launch of the effort would require a more involved NC Air Awareness effort. One staff person would be utilized to roll out the program for first six -12 months. Temporary staff with support from planning staff would be needed to support initial phases of this plan.

Plan 4 - Forming New Partnerships: University Sustainability Initiatives

Plan four continues to utilize existing relationships developed in Plan 3 by building or tapping into an existing stakeholder group of university sustainability leaders that coordinate green building projects, energy efficiency projects, or other projects that have a positive impact on air quality. We would likely contact Georgia Tech and Fayetteville State University partners who already submitted their plans as part of Advance projects for guidance. The stakeholder group would then put forward projects to include in a portfolio of projects to submit under the Advance program. NC DAQ would coordinate the annual Advance report based on reports provided by university partners. We would work with select universities

[5] Net Impact https://www.netimpact.org/

in the UNC system (such as NC State, UNC-Charlotte, UNC-Greensboro or Winston-Salem State) that are interested in participating.

1. **Partner(s):** Potential partners include North Carolina Universities or Colleges (beginning with one or two universities), Division of Energy, Mineral and Land Resources (Energy Group), Policy Advisor for Energy and Innovation, Green Building Associations, Energy efficiency organizations or advocacy groups, other energy efficiency stakeholders, weatherization groups (internal DEQ or other) or NC Clean Technology Center.
2. **Possible projects:** Possible ideas include green building projects, energy efficiency projects, and other projects that have a positive impact on air quality.
3. **How to get started**: To get started, we would hold initial discussions with universities groups, sustainability teams or engineering teams responsible for campus power would need to occur. Advance would be a new concept for stakeholders. Idea would be pitched to get additional credit for energy projects they have already started or plan to start and to partner with state and federal agencies. Initial discussions would need to be followed up by a kickoff meeting of stakeholders and/or webinars to discuss Advance, Advance requirements, roles, commitments etc. to eventually establish buy-in.
4. **Time frame:** These projects could begin within 8-12 months but may take longer identifying and connecting with stakeholder groups.
5. **Funding**: Projects would not be funded by NC DAQ.
6. **Staffing:** DAQ would have a coordinating role but initial launch of the effort would require a more involved DAQ NC Air Awareness effort. One temporary staff person (graduate student fellowship or internship) could be utilized to roll out program for first six -12 months. Temporary staff with support from planning staff would be needed to support initial phases of this Plan.

PROJECTED TIMELINE