



Draft Scoping Plan Comments
NYSERDA
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Bedrock Energy

Written Comments on the New York State Climate Action Council Draft Scoping Plan

Summary of Bedrock Energy's Comments & Recommendations

Thank you for the opportunity to comment on the New York State Climate Action Council Draft Scoping Plan. Bedrock Energy is a provider of geothermal heating & cooling systems for large buildings. Our mission is to transform the heating & cooling of the commercial real estate sector, using geothermal energy to radically reduce costs for people and impact on the environment. Bedrock Energy is thrilled about New York State's vision and progress to date in implementing the Climate Leadership and Community Protection Act (CLCPA), and supports this Council's findings that "energy efficiency and end-use electrification are essential parts of any pathway that achieves New York State emission limits."¹

The Draft Scoping Plan recommends achievable pathways to meet the CLCPA requirements and support the installation of up to 1.8MM heat pumps by 2030² and creation of over 200,000 jobs with associated workforce training. The Draft Scoping Plan also supports the goal of the CLCPA in ensuring that 40% of clean energy & efficiency program benefits accrue to disadvantaged communities. **Enclosed herein, Bedrock further recommends 6 additional legislative and regulatory actions that the Council should endorse in the Final Scoping Plan** to strengthen the implementation of the CLCPA, generate more savings for New York constituents, and sustain New York's leadership in climate action.

- #1. **Adopt regionally appropriate drill depth thresholds**, up to 2,500 feet, for exempting safe, closed-loop geothermal boreholes from drill permit requirements.
- #2. **Sustain and enhance public financial incentives** for geothermal heating & cooling systems to motivate building owners to install heat pumps at the necessary scale to meet the CLCPA requirements.
- #3. **Expand tax incentives** to lower overall system costs.
- #4. **Expand low-cost finance offerings** to ensure the benefits of clean, high-efficiency geothermal heating are available to all building owners.
- #5. **Sustain the recommended timelines for adopting all-electric State building codes** for new construction to meet the CLCPA requirements.
- #6. **Couple Zero-emission standards for heating & cooling of existing buildings** with additional incentives to meet the CLCPA requirements.

¹ New York State Climate Action Council Draft Scoping Plan, p. 72-73, December 30, 2021.

² Draft Scoping Plan p. 73

Full Comments and Recommendations by Bedrock Energy

Geothermal energy has a critical role to play in decarbonizing the building sector and transitioning to a clean energy economy. New York State is already a national leader in supporting a robust geothermal market. The New York State Energy Research & Development Authority's (NYSERDA) groundbreaking clean heating & cooling program, with rebates now administered by the utilities, has supported thousands of heat pump installations. The NYSERDA loan program also provides a critical financing option for customers. Yet as the Draft Scoping Plan highlights, New York still needs to do more.

Introduction: Benefits of Geothermal Heating & Cooling Systems

Geothermal energy is among the **most efficient** ways to heat & cool buildings, according to the U.S. Environmental Protection Agency.³ It drives the **lowest energy cost** for building owners to heat & cool properties. Geothermal heat pump systems have the potential to **remove direct carbon dioxide emissions from heating** and provide a a 40-50% reduction in the total annual energy costs, factoring in both savings in gas and A/C electricity costs. As such, geothermal heat pumps represent a key technology for advancing energy affordability and value, supporting the growth of the green economy, providing respiratory health & safety benefits to residents, and decarbonizing the economy while moderating or reducing peak power demand.

Geothermal heating & cooling systems also **offer significant grid benefits**; they increase baseload demand, decrease summer peaks, and avoid winter peaks despite the electrification of heat. This is in contrast to technologies like air source heat pumps, which provide electrification benefits, but also increase peak demand. A study by the Brattle Group found that fully electrifying the Northeast using geothermal heat pumps would only minimally impact peak demand and leave energy prices unchanged.⁴ Sensitivity analysis conducted in support of the Draft Scoping Plan found that increasing the proportion of geothermal heating & cooling systems and geothermal district heating versus air source heat pumps for New York State would decrease annual electric loads by 2.8% and peak electric loads by up to 10.8% by 2050, with resultant benefits of over \$10 billion.⁵ **Achieving these benefits will require additional incentives and regulatory support for geothermal heating and cooling system' deployment, workforce development, and technology enhancement.**

Furthermore, adopting regionally appropriate drill depth thresholds and exempting safe, closed-loop geothermal boreholes from drill permit requirements may double the benefits above, as this will double the total addressable market to include large urban buildings. For large buildings in urban areas, drilling to 1,500-2,500 feet is essential due to the lack of space for high quantities of shallow geothermal boreholes (under 500 feet) to provide the full thermal energy loads needed for those large buildings. By drilling deeper, entire gas-burning mechanical systems can be fully removed and their direct carbon emissions avoided.

³ "Geothermal Heat Pumps," Energy Star, U.S. Environmental Protection Agency, accessed June 29, 2022, https://www.energystar.gov/products/geothermal_heat_pumps

⁴ The Brattle Group, Heating Sector Transformation in Rhode Island: Pathways to Decarbonization by 2050, Pages 30-31, <https://www.brattle.com/reports/heating-sector-transformation-in-rhode-island>

⁵ Draft Scoping Plan, Appendix G, p. 80, December 2021.

Permitting and Regulatory Updates

Recommendation #1. Adopt regionally appropriate drill depth thresholds, up to 2,500 feet, for exempting safe, closed-loop geothermal boreholes from drill permit requirements.

Current regulations limit geothermal borehole depth to 500 feet, or impose significant costs & procedural burdens on boreholes deeper than 500 feet even if the boreholes are safe, closed-loop systems that do not inject, withdraw, or otherwise interact with subsurface natural resources. These application fees, requirements, and processes increase the costs of each borehole by many thousands of dollars, and the increase the timelines of a project by several weeks or multiple months. These costs & procedures apply to closed-loop geothermal boreholes above 500 feet despite no significant technological or geological distinction from boreholes below 500 feet.

These limitations therefore significantly increase geothermal adoption costs for building owners, and disincentivize installation of geothermal energy systems, which will be critical to meeting the CLCPA requirements. For large buildings in urban areas, especially those about 50,000 square feet, boreholes shallower than 500 feet are simply not practical in the limited space available; at these shallow depths, the required surface area is too large to fit within available space. On urban properties with limited surface space, the thermal energy load provided by shallow geothermal boreholes is too low to fully remove the building's gas- or fuel-fired heating system, therefore unable to decarbonize the building to the fullest electrification potential of geothermal heating & cooling.

In contrast, constructing closed-loop geothermal boreholes as deep as 2,500 feet unlocks the conversion of large existing urban buildings to geothermal heating & cooling. The City of New York, for example, encourages urban geothermal heat pump systems as part of its One New York commitment to reduce greenhouse gas emissions by 80% by 2050.⁶ However, in most of the property lots characterized in its Geothermal Webtool, boreholes of 1,500-2,500 feet in depth will be required to provide those buildings' full heating & cooling load while remaining on property lines in urban areas.

The Council should recommend that New York State establish tailored exemptions and streamlined permitting processes for closed-loop systems deeper than 500 feet, including depths up to 2,500 feet, based upon an updated environmental review to account for regional variations in bedrock depth. Bedrock Energy's co-founder is a Professor of Petroleum and Geosystems Engineering at the University of Texas at Austin, long-time Chief Scientist in the oil & gas industry, Director in the global Society of Petroleum Engineers, and an Advisor to the Texas Geothermal Institute; as such, Bedrock Energy is happy to be an additional technical resource for the Council in its evaluation of environmental implications of closed-loop boreholes above 500 feet.

Being able to economically install geothermal heating & cooling systems in large buildings above 50,000 square feet requires drilling to borehole depths of 1,500 to 2,500 feet. Doing so will reduce installation times by 80%, reduce surface area by 75%, reduce installation costs by 50%, and increase energy performance by 50% for a large swath of the building sector in New York State.

⁶ "New York City Geothermal Pre-feasibility Tool," New York City Mayor's Office of Sustainability, accessed July 1, 2022, <https://www1.nyc.gov/assets/ddc/geothermal/geothermalTool.html>.

Long-term Funding and Stability for Incentives

Recommendation #2. Sustain and enhance public financial incentives for geothermal heating & cooling systems, to motivate building owners to install heat pumps at the necessary scale to meet the CLCPA requirements.

Bedrock Energy supports Key Sector Strategy B4, *Scale Up Public Financial Incentives*, and the Council's finding that "expansion of financial incentive programs to motivate early adoption in market-rate housing and commercial buildings will be needed for at least the coming decade."⁷ On the residential side, the New York State Clean Heat Program and the Long Island Public Service Electric and Gas Company (PSE&G)'s Home Comfort Program have demonstrated success in motivating homeowners to invest personal funds, supported by utility, state, and federal incentives, to decarbonize their homes.

In addition to direct customer incentives, Bedrock urges New York State and its utilities to enhance midstream and upstream incentives for heat pump and heat pump water heater manufacturing and distribution to support continued growth of the broader heat pump industry. Expanded and enhanced incentives across building owners, manufacturers, and distributors will be necessary to strengthen the value proposition and ensure New York can achieve 1.8 million heat pumps installed in buildings by 2030.

Tax and Low-Cost Financing Incentives to Improve Access

Recommendation #3. Expand tax incentives to lower overall system costs.

Recommendation #4. Expand low-cost finance offerings to ensure the benefits of clean, high-efficiency geothermal heating are available to all building owners.

The current federal investment tax credit (ITC) for residential geothermal heat pump systems is set to decrease from 26% in 2022 to 22% in 2023 and to expire altogether in 2024, and for commercial geothermal heat pump systems, are only at 10%. Given the uncertainty regarding continued federal incentives, state tax incentives and utility-provided rebates are even more critical in motivating building owners to invest in carbon-free heating and cooling systems.

The Final Scoping Plan should also endorse legislative action to provide a sales tax exemption for installation costs and the cost of supplies and equipment for geothermal heat pumps to reduce overall costs and further incentivize building owners to install the most efficient heating systems. These sales tax exemptions for installation, equipment, and supply costs will help mediate the impact of increased industry-wide costs that are currently causing increased prices. Providing these incentives for geothermal systems will help reduce costs and move the industry from mere hundreds to many thousands of installations each year. This increased magnitude is needed to meet the necessary milestones for decarbonizing the building sector.

In addition to incentives that lower the total installation cost, financing offerings at a low cost of capital and with simple structures should also be expanded to reduce the upfront capital required and thus enable more property owners to finance and access clean energy retrofits.

⁷ Draft Scoping Plan, p. 132

Regulatory and Building Code Enhancement

Recommendation #5. Sustain the recommended timelines for adopting all-electric State building codes for new construction to meet the CLCPA requirements.

Recommendation #6. Couple Zero-emission standards for heating & cooling of existing buildings with additional incentives to meet the CLCPA requirements.

Bedrock supports inclusion of Key Sector Strategy B1, *Adopt Advanced Codes for Highly Efficient, All-Electric, and Resilient New Construction*, in the Final Scoping Plan. The Draft Scoping plan establishes aggressive timelines for adopting all-electric State codes to prohibit gas/oil equipment for space conditioning, hot water, cooking, and appliances for new construction and additions/alterations in low-rise residential buildings (2024) and buildings over four stories and commercial buildings (2027). These timelines will be essential in meeting the CLCPA requirements.

The legislature should pass and the governor should sign the All-Electric Building Act (S6843C/A8431B) to provide legislative support to these goals; the New York Fire Safety and Building Code Council should further pass building codes that create the same outcome. Enactment of the Advanced Building Codes, Appliance and Equipment Efficiency Standards Act of 2021 (S7176/A8143A) would further enable building code updates to support building decarbonization. These actions would align New York with other states such as Washington⁸ and California⁹ which have already taken steps to decarbonize through updates to building codes.

Workforce Development and Technology

Bedrock appreciates the attention to workforce development and just transition issues in Key Sector Strategy B7, *Invest in Workforce Development*, and urges the Council to include additional details in the Final Scoping Plan regarding workforce development strategies to drive collaboration between state agencies, utilities, community groups, and industry. Bedrock is creating trades jobs such as drilling, plumbing, and HVAC installation jobs. Just as the solar industry retrained local contractors, the geothermal industry does the same for the HVAC contractors and for oil, gas, and water well drillers. To service new markets, we will open new regional hubs and train new drilling crews and installers. Bedrock therefore supports the Draft Scoping Plan's recommendation to invest in a variety of training and resources for the building electrification workforce, including "training and industry partnerships to increase the number of qualified geothermal drillers."¹⁰ Hiring enough qualified, experienced personnel to complete geothermal heat pump installations represents one of the most significant barriers to growth.

⁸ Gallucci, Maria, "Washington state moves to electrify new buildings by requiring heat pumps," Canary Media, April 29, 2022, <https://www.canarymedia.com/articles/carbon-free-buildings/washington-state-moves-to-electrify-new-buildings-by-requiring-heat-pumps>.

⁹ California Energy Commission, "Energy Commission Adopts Updated Building Standards to Improve Efficiency, Reduce Emissions From Homes and Businesses," August 11, 2021, <https://www.energy.ca.gov/news/2021-08/energy-commission-adopts-updated-building-standards-improve-efficiency-reduce-0>

¹⁰ Draft Scoping Plan, p. 141.

Workforce development efforts to leverage federal, state, community, and industry training will be critical to growing the necessary workforce.

Technology Research & Development

The Draft Scoping Plan also recommends support for research and development for building decarbonization as part of Key Sector Strategy B9, *Support Innovation*, including support for “continued improvement in cold climate performance across a range of heat pump products and sizes.” The New York Clean Heat and Long Island PSE&G Home Comfort programs should actively partner with industry to incentivize innovations that improve efficiencies and bring down costs to building owners, including supporting deployment of new types of heat pumps and other system design innovations. Bedrock is significantly investing in research and development of new technologies – such as smaller drilling rigs and machine learning software for optimizing the large building energy load – and looks forward to opportunities to partner with NYSERDA, New York State, and other stakeholders to reduce costs and make geothermal heating and cooling more accessible to all New Yorkers.

Conclusion

Bedrock Energy supports the Draft Scoping Plan, with particular emphasis on the proposed strategies for sustained incentives for residential and commercial building decarbonization, permitting updates, electrification of new building construction, and decarbonization of heating, cooling, and water heating in existing buildings, specifically in existing large buildings. Bedrock urges the Council to strengthen the Final Scoping Plan through endorsement of these additional legislative and regulatory actions, among others, which can further reduce greenhouse gas emissions, generate additional savings for New York residents, and sustain New York’s leadership in climate action.