



State of Rhode Island  
Division of Public  
Utilities & Carriers

April 22, 2020

The Honorable Gina M. Raimondo  
Governor of the State of Rhode Island  
82 Smith Street  
Providence, Rhode Island 02903

Dear Governor Raimondo:

On behalf of the Rhode Island Office of Energy Resources (OER) and Division of Public Utilities & Carriers (DPUC), we are pleased to submit this report on Heating Sector Transformation (HST). This report was conducted pursuant to Executive Order 19-06 (signed July 8, 2019), which directed our agencies to identify the energy, economic, and environmental opportunities and challenges posed by Rhode Island's heating sector in the face of a rapidly-changing climate.

This report comes amidst the global COVID pandemic, its unprecedented impacts on public health, and the resulting economic uncertainty facing Rhode Island citizens and businesses. It is important to recognize that, in some instances, broad-based decarbonization efforts – whether in the heating, electric or transportation sectors – will necessitate near term capital investments (by local consumers and businesses, as well as utilities and public sector entities) to unlock significant, longer-term economic, energy, environmental, and public health benefits. As heating sector transformation advances, the prudence of those investments must be thoroughly examined. On its face, the task of heating sector decarbonization – including its up-front costs, scale of investment needed, practical implementation challenges, and technological uncertainties – seems daunting. However, there are foundational steps that we can do now – at reasonable cost and low risk – to enable heating sector transformation at scale. Now is not the time to pull back from mitigating greenhouse gas emissions and strengthening energy resiliency – such efforts strengthen our economy, not detract from it. The response of our people, communities, and leadership to the COVID crisis has been incredible; it serves as an important reminder that Rhode Islanders can rise up to meet any challenge – even one as formidable as climate change.

A policy framework for Rhode Island's heating sector must be based on an understanding of the relative economic attractiveness of various decarbonization solutions. Working with our consultant, The Brattle Group, we have projected a range of average annual heating costs in 2050 for representative building types in Rhode Island, using either existing fossil fuels or several alternative decarbonized heating solutions. In isolation, decarbonization of the heating sector will be financially challenging given today's widespread use of low-cost fossil fuels that citizens rely upon for their heating needs – fuels which are burned at prices that do not fully reflect their full societal impacts, including health and environmental externalities. Moreover, changing out

heating systems in homes and commercial buildings can also be disruptive undertakings for consumers. These financial and practical issues will not be simple to address.

We do know that, today, payback periods for some decarbonized solutions (e.g. air-source or ground-source heat pumps) are longer than more traditional equipment investments and present larger up-front cost barriers for consumers. *As heating sector transformation progresses, it will be important to take advantage of natural investment opportunities (e.g. replacing a fossil-fuel boiler at failure with a no-to-low carbon alternative) and deploy capital, incentives, and other market strategies that enable residents and businesses to overcome financial barriers to adoption.* This support will be needed to encourage (early) adoption of promising technologies and jump-start the market for decarbonized heating solutions. Due to technological uncertainty, however, this report does not attempt to estimate the aggregate cost of such an endeavor, nor address how it would necessarily be funded – a planning task which must follow.

While the costs of heating decarbonization presents short- to medium-term financing challenges, our work accounts for the fact that heating sector transformation will not take place in isolation. Many other energy system components impact the makeup of a consumer’s total “energy wallet,” spanning heating, electricity, and transportation-related costs. Over time, other investments that facilitate a low-carbon future will be required at both the consumer and system levels (e.g. increased penetration of renewable resources, advanced metering infrastructure, distribution system upgrades, deployment of electric vehicles, etc.). When examining heating within this broader context of energy system decarbonization, our study found that, *by 2050, total consumer energy wallets may be within range of what they are today in a fossil fuel-based economy.* This does not mean that individual consumers or businesses will not see changes in their heating (and energy wallet) costs. Policy will likely play a key role in mitigating any potential energy cost increases as Rhode Island accelerates greenhouse gas emission reductions, particularly where it may affect populations or industries that are most vulnerable to increasing energy costs.

Importantly, our analysis assumed that cost-effective energy efficiency investments, particularly weatherization measures, are implemented in essentially all Rhode Island buildings. Doing so lowers the challenge to decarbonize heating and saves consumers money, which is relevant for all homes and businesses, but may be particularly important for disadvantaged communities. We also know that these investments not only improve the health of our buildings, but they also grow jobs – in fact, six out of ten clean energy jobs in the state today are linked to Rhode Island’s nation-leading energy efficiency programs and services. Energy efficiency is proven to lower electric- and heating-related energy consumption, bills, and emissions at costs lower than traditional supply. Therefore, *long-term extension of the state’s least-cost procurement and energy efficiency programs will be vital to any future in which Rhode Island successfully achieves its greenhouse gas emissions reduction targets.*

Another important insight from this analysis is that, given the large uncertainty related to how the costs of various decarbonized heating solutions will evolve over the coming decades, *no one solution is clearly more economically attractive than all the others.* Because the relative attractiveness of heating decarbonization options is sensitive to peak electric demand and gas

volume, developing a better understand of these effects – as well as opportunities to mitigate them – will be an important policy focus in the coming years. As noted in the report,

Decarbonization of heating along any of the identified pathways will likely require significant ramping up of a range of activities. The next ten years must set the stage for the deployment of decarbonized heating solutions at large scale by enabling the transformation at many levels. This includes removing barriers and addressing challenges to enable the technologies themselves, the workforces needed to install and implement them, customers' willingness to adopt them, and utility programs, regulatory structures, etc. There is still uncertainty about the long-run cost and performance of many of the potential decarbonization technologies, and it is not yet clear which one (if it is one and not multiple) may ultimately be the best solution...but that is not reason to wait; it is in fact a reason to push forward, since experience, and not just the passage of time, accelerates the resolution of this uncertainty.

Our near-term focus should be on foundational activities that will facilitate a dramatic acceleration of decarbonization in the future. Rather than establish discrete technology mandates that may prematurely dictate technological and economic outcomes, we recommend a set of guiding principles for further policy development. These principles are designed to provide consumers, utilities, and heat solution providers with flexibility to respond to changing circumstances, information, and innovation. In the short- to medium-term, heating sector policy should remain technology-agnostic, while promoting early demonstration and development of a number of promising, carbon-reducing technologies. In parallel, we must work to develop programs and incentives that help enable consumer-adoption of decarbonized heating solutions that meet the unique circumstances of our homes and businesses; fill information gaps; and take actions to future-proof the heating system.

Without question, the path to a decarbonized heating sector – and broader achievement of the greenhouse gas emission reduction targets specified in the Resilient Rhode Island Act – is intricately linked to a clean, affordable, and reliable electric grid. We strongly support your efforts to ensure that Rhode Island meets one hundred percent of its electricity demands with renewable resources by 2030 (Executive Order 20-01) – a nation-leading endeavor. Over the coming months, OER will be conducting robust energy and economic analyses to inform development of actionable pathways to meet this goal. Informed by stakeholder engagement, HST insights, and accounting for a lower-carbon transportation system, OER will provide you with an implementable plan to further accelerate renewable adoption by December 31, 2020.

Finally, we wish to acknowledge the active engagement of numerous private- and public-sector stakeholders during this HST initiative. Our three public workshops each attracted more than sixty participants who contributed valuable insights on the economic, technological, industry, and workforce implications of heating sector decarbonization at scale. Additionally, our Project Team conducted a series of one-on-one stakeholder interviews that provided constructive information and helped refine our study scope. This robust participation indicated substantial interest in pursuing innovative policy and programmatic solutions to deploy no-to-low carbon heating solutions that work for *all* Rhode Islanders, while fostering new job and investment opportunities throughout the clean energy sector. Furthermore, it made clear that our collective

success is dependent upon strategic industry partnerships and community adoption of more sustainable (and affordable) heating technologies. We truly thank these stakeholders for their contributions and welcome their continued engagement.

We look forward to working with you, the General Assembly, our state's utilities, industry, and other stakeholders as we begin down this critically-important path toward a decarbonized heating future – one vital to long-term economic growth, environmental stewardship, improved public health, and quality of life for all Rhode Islanders.

Sincerely,



Nicholas S. Ucci  
Acting Commissioner  
Office of Energy Resources



Linda George  
Acting Administrator  
Division of Public Utilities & Carriers