Incentivizing Heating System Electrification in Canada Without Carbon Taxes

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About the Author

Matt is a mechanical engineer with experience in corporate decarbonization strategy, energy modelling, and data centre HVAC commissioning. He now consults at the intersection of renewable energy and data centres (AI/HPC/bitcoin mining). His work focuses on evaluating waste heat reuse opportunities to support the decarbonization of large-scale heating systems—including thermal energy networks and industrial applications—by improving the economics of replacing fossil fuel equipment with electric alternatives. Beyond this work, Matt is passionate about advancing the energy transition and strengthening the bitcoin network through sustainable, mutually beneficial solutions.

The Bitcoin Coalition of Canada (BCC) was established on January 3, 2024. Our mission is to increase awareness and education—for the public, media, and policymakers—about Bitcoin's positive impact and its many benefits for both Canada and the world. BCC is a federally-incorporated, not-for-profit organization.

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Introduction

For Canadian communities committed to reducing carbon emissions, electrification of heating systems remains a top priority. Yet, despite widespread access to low carbon electricity (i.e., nuclear, hydro, wind, and solar) in most of Canada's population centres, the higher operating cost of electric heat compared to natural gas remains a barrier to adoption. Canada's progress in decarbonization was beginning to pick up pace in recent years, owing largely to the incentive structure of the federal carbon pricing framework and the market's expectation that the price on carbon emissions would increase over time. However, the recent elimination of the carbon tax means that momentum in fuel-switching is likely going to wane. Moreover, the capital investment required to replace fossil fuel combustion equipment with industrial heat pumps can be prohibitively expensive.

Bitcoin mining offers an innovative, market-based solution for electrifying heating systems.

In this context, bitcoin mining offers an innovative, market-based solution for electrifying heating systems. By capturing and repurposing the waste heat generated from large-scale bitcoin mining operations, municipalities, campuses, industrial facilities, agricultural operations, and other large scale heating systems can reduce up-front capital costs and operational energy costs without relying on government subsidies.

Waste heat reuse via bitcoin mining parallels the ongoing (though limited) efforts to capture and reuse waste heat from conventional data centres. However, **bitcoin mining operations offer unique advantages over conventional data centres** and high-performance compute (HPC) or artificial intelligence (AI) clusters. Bitcoin mining operations:

- do not require the 99.99% uptime and associated large backup generators typical of mission-critical data centres and compute clusters;
- can be temporarily shut down incrementally to support electricity demand management programs and help balance the grid;
- are inherently location-agnostic with no need for a major fibre optic interconnection;
- can be sized to meet any heating load and co-located onsite, and even incorporated into existing mechanical rooms;
- can provide higher-grade heat than conventional computer servers;
- are commonly fluid-cooled systems (vs. air-cooled) making heat capture much more practical.

In this sense, **bitcoin miners can be thought of as modular electric resistance heaters that also produce a revenue stream in the form of bitcoin (BTC) to subsidize the heating cost.**

Economic Barriers to Electrification

Canada's decarbonization goals hinge on transitioning from fossil fuels to electricity, a significant part of which is related to the energy used for industrial and comfort heating. Despite considerable efforts across municipal, provincial, and federal levels, the up-front cost of installing electric heating equipment and infrastructure remains a significant hurdle. Operational energy costs are also generally higher for electricity than for fossil fuels, making simple payback analyses unattractive.

Government subsidies can, and have, helped to incentivize this work, but are very limited in their scalability as they draw on public funds and require administrative oversight.

A well-designed carbon tax implemented incrementally – such as the one Canada had in place – has been demonstrated to be the simplest, most effective, most cost-effective, and most equitable policy tool to support the transition away from fossil fuels. For various reasons, Canada recently abandoned its carbon tax and no longer has a pricing mechanism to reduce air pollution in the form of greenhouse gas emissions. Bitcoin mining offers a market-driven alternative to the carbon tax in the efforts to electrify heating.

Applications

Nearly all the electricity consumed by bitcoin mining is converted to waste heat, just as with any computer. **Bitcoin miners can be placed anywhere at any scale and so can be located in the same mechanical rooms that house regular combustion heating equipment**. This allows the waste heat to be easily harnessed at source by any year-round consumers of heat such as municipal district energy systems, airport and campus thermal networks, public pools, and various industrial processes.

Due to the novelty and specialized nature of this solution, it is most often deployed in an energy-as-a-service (EaaS) model with the **capital outlay associated with this new heating equipment taken on by a third-party partner** who then sells the waste heat at a discounted price. The advantage of this to the end consumer is that they see significant savings on the upfront capital required to upgrade their heating systems.

This synergy has already been demonstrated by several pilot projects worldwide. Notable examples include installations where bitcoin mining provides the base load heat for district energy systems in North Vancouver and several communities in Finland; a ski club lodge in Labrador City; a boutique hotel in Windsor; a large spa in New York City; as well as many other smaller projects in Canada and around the world.

In remote communities with untapped renewable resources, bitcoin mining can be used to help finance the development of those off-grid resources by offering a paying, on-site, flexible load while simultaneously producing heat that could be used by local residents.

Supporting the Energy Transition

The demand for electricity – for heat, transportation, data centres, etc. – will continue to grow for the foreseeable future in Canada and around world. However, the push to electrify is driven by the need to decarbonize and so upstream grid emissions must be reduced in the process. This increasing demand is straining electrical grids and creating an acute need to develop renewable energy resources to not only displace existing fossil fuel-fired thermal generation but to keep up with the growing demand. Bitcoin mining, in addition to supporting the energy transition by offering an alternative incentive mechanism for electrifying heat, can also provide grid ancillary services in the form of a scalable, flexible load. This scalable, flexible load improves grid resilience and accelerates renewable energy resource development in remote areas. Large-scale **bitcoin mining can serve as an interruptible load** within utility demand response programs, adjusting operations based on real-time grid conditions, and helping utilities avoid blackouts or expensive spot market prices during peak hours.

In urban centres there is an opportunity to combine both the waste heat reuse and grid balancing services together. In remote communities with untapped wind, hydro, or solar resources, bitcoin mining can act as a transitional load centre and power buyer to improve the economic feasibility of developing those resources, creating local employment, and providing a reliable source of heat as a by-product. Often, these types of projects

face lengthy delays while they await grid interconnection or they are never realized due to their distance from any grid (and market for the electrons).

Supporting Decarbonization Commitments and Job Growth

Energy from heating operations represents a major portion of Canada's greenhouse gas emissions as most heat is still currently produced by fossil fuel combustion. By making electric heating more economical, waste heat from bitcoin mining can be used to accelerate the energy transition across Canada, and help municipalities, provinces, and the federal government reach their ambitious emissions targets.

Additionally, waste heat reuse via bitcoin mining supports innovation in the domestic cleantech sector. Several Canadian companies such as MintGreen, Hestia, Constellation Heating, and JoulePort are already leaders in this space, creating products and services that leverage bitcoin mining computer chips to generate useful heat. These pioneers exemplify Canada's potential to innovate in both cleantech and fintech and continue to exemplify how we can reduce emissions even when there is waning policy support. With abundant hydro, wind, and solar resources – alongside high heating needs – Canada can continue to expand this market, attracting investment, and reaping the environmental and economic benefits.

Policy Hurdles and Anti-Bitcoin Sentiment

Misconceptions about bitcoin mining's environmental impact and energy demands have led some jurisdictions to impose bans or to curtail miners' access to energy sources. Such policies are typically based upon false information and overlook the net carbon reduction potential that this unique industry offers. The bitcoin network has been outpacing most other industries in its decarbonization trend, and a growing chorus of researchers is now recognizing this sign of promise for broader decarbonization efforts. As of the end of 2024, according to the April 2025 Cambridge Digital Mining Industry Report, the global bitcoin network was operating on 52.4% low carbon, mostly non-rivalrous energy, putting it at the forefront of the energy transition. Rather than broad prohibitions or curtailments, governments should shift toward nuanced regulations that acknowledge the potential for emissions reductions, cost savings, grid stability, and renewable energy resource development.

Conclusion

Electrification of heating is a cornerstone of Canada's decarbonization strategy, yet financial barriers persistently constrain progress, a reality made even more challenging with the recent elimination of the carbon tax. Waste heat reuse via bitcoin mining provides an open-market pathway to subsidize heating system electrification without socializing those costs through taxes or other taxpayer-funded incentive mechanisms. By co-locating miners with large-scale, 24/7 heating loads such as thermal energy networks and industrial processes, operators can repurpose otherwise wasted heat to displace fossil fuels, reduce carbon emissions, and foster energy innovation.

In order to realize these benefits, policymakers and communities must remain open-minded to the potential. Tailored frameworks that permit bitcoin mining as an interruptible load and thermal energy provider can unlock private capital and accelerate the decarbonization process. In regions with relatively clean grids, the environmental benefits are maximized, making this an ideal fit for most of Canada's population centres. By leveraging the convergence of the bitcoin mining and heating industries, Canada can continue to make progress on decarbonization efforts in the absence of a carbon tax.

A Final Note on Bitcoin's Broader Purpose

A few foundational questions often emerge when discussing the concepts within this article: 'What's the point of bitcoin mining in the first place? Isn't it inherently a waste of energy if bitcoin is redundant or has no intrinsic value? Won't bitcoin just be replaced by some other cryptocurrency?' These concerns can be dispelled with abundant evidence. However, it requires that one examine how both the bitcoin network and our existing fiat monetary system function. It requires taking some time to understand the numerous economic, social, and environmental challenges that bitcoin helps tackle.

This author, a skeptic by default, began studying bitcoin in 2019 expecting to confirm his preconceived notion that it was a scam. After consuming countless articles, books, and interviews by economists, bankers, hedge fund managers, bond traders, human rights advocates, professors, computer scientists, entrepreneurs in developing economies, and so many others, it became clear that bitcoin is the most significant development in monetary technology since the advent of double-entry accounting or even coinage itself. The steady growth in bitcoin's ascribed value is a testament to its superior properties as a permissionless, trustless, immutable, digitally-native form of peer-to-peer money; one that cannot be controlled by any single entity, one that preserves absolute scarcity on a publicly-auditable open-source ledger, and one that is completely voluntary to use. The fairest, most globally accessible form of money ever devised, bitcoin (BTC) offers financial inclusion for billions of unbanked and financially censored people worldwide. It enables financial independence *from* banks and other centralized financial institutions, and it is a store of value that cannot be debased through inflation of the money supply. Today's fiat monetary system does not possess *any* of these characteristics.

Bitcoin is not a speculative tech stock nor a software product destined to be replaced through innovation. Bitcoin is not even a company. It is simply the base layer protocol for the peer-to-peer transmission of value – just as TCP/IP is the open-source protocol for the peer-to-peer transmission of information underpinning the entire internet today. The energy intensive nature of bitcoin mining is what makes it so incorruptible. The thousands of other imitation cryptocurrencies that have since spawned rely instead on computer code and a controlling group for consensus; they sacrifice security and decentralization for superficial energy efficiency and centralized control. They are typically created by for-profit companies capitalizing on bitcoin's success and exploiting most people's general lack of awareness of the characteristics that set bitcoin apart from the rest of "crypto".

Regardless of your views on bitcoin's value, it is important to recognize that bitcoin mining is a non-rivalrous consumer of electricity. In other words, **bitcoin mining does not compete with or displace other consumers** because it is generally uneconomical to operate at retail electricity prices. Mining is therefore relegated to finding inexpensive, stranded, or curtailed energy (which would not otherwise be used) or to finding other ways to subsidize its power prices by providing some reciprocal benefit like grid balancing or harvesting waste heat. It is beyond the scope of this article to delve into these topics, but curious readers can find a few suggested resources below. There are countless more, and a wide number of them are curated on the Bitcoin Coalition of Canada website.

Suggested Articles

Bitcoin First – Fidelity Digital Assets

The Bullish Case For Bitcoin – Vijay Boyapati

10 Essential Essays on Bitcoin – Various authors

Human Rights Foundation on Bitcoin – Explores bitcoin's role in promoting freedom

Suggested Books

Broken Money by Lyn Alden

The Price of Tomorrow by Jeff Booth

Magic Internet Money by Jesse Berger

The Bitcoin Standard by Saifedean Ammous

Layered Money by Nik Bhatia

Select Peer-Reviewed Journal Papers Concerning Energy & Environmental Impact

How Bitcoin Can Support Renewable Energy Development & Climate Action
https://pubs.acs.org/doi/10.1021/acssuschemeng.3c05445

Bitcoin's Carbon Footprint Revisited
https://www.mdpi.com/2078-1547/14/3/35

Bitcoin and Its Energy, Environmental, and Social Impacts
https://www.mdpi.com/2078-1547/14/4/47

Can bitcoin mining increase renewable capacity?
https://www.sciencedirect.com/science/article/pii/S0928765523000313

An integrated landfill gas-to-energy and Bitcoin mining framework
https://www.sciencedirect.com/science/article/pii/S0959652624029652?via=ihub

Renewable Energy Transition Facilitated by Bitcoin
https://pubs.acs.org/doi/10.1021/acssuschemeng.2c06077