



Re: Moltex comments on the proposed Clean Technology Investment Tax Credit

Moltex background

Moltex Energy Canada Inc. (Moltex) is a company developing two complementary technologies to both address nuclear waste and produce carbon-free energy. Combined, they can significantly reduce the volume of high-level radioactive waste in Canada, in the process producing at least 6 GW of carbon-free power for 60 years, with no new mining, complete fuel supply security, and at a lower cost than any other long-term solution currently envisioned for spent nuclear fuel.

- **Waste To Stable Salt (WATSS)** is an affordable, small-footprint facility for recycling spent fuel bundles from Canada's existing CANDU reactors, producing safer end products and fuel for a molten salt small modular reactor (SMR).
- The **Stable Salt Reactor – Wasteburner (SSR-W)** is an inherently safe SMR that uses the fuel produced by WATSS to generate up to 500 MW of carbon-free electricity.

An additional technology, called GridReserve, completes a full Moltex power plant. GridReserve is not a new innovation by Moltex; instead, it is a commercially proven system for thermal energy storage transferred from the concentrated solar power industry for use in conjunction with the SSR-W.

The addition of GridReserve to a Moltex power plant enables the plant to provide “peaking” power that is responsive to the dynamics of the modern electrical grid, which includes both variable load and variable generation from renewable sources (wind and solar). Thanks to GridReserve, a Moltex power plant provides dispatchable capacity to the grid (megawatts of power on demand), which complements the intermittent energy (megawatt hours, which are produced when the sun shines or wind blows) from renewable energy sources.

Technology description

- **Use, application, and key equipment:** All SMRs are suitable for producing carbon-free heat and electricity. Some produce low-grade heat (approx. 300-320°C) while others produce high-grade heat (>600°C). The Moltex reactor produces high-grade heat with the core operating above 700°C and GridReserve thermal storage holding heat for on-demand use above 600°C. This temperature range makes the Moltex reactor suitable for efficient, affordable electricity production, district heating, or industrial processes including oil sand extraction and “pink” hydrogen production (i.e., carbon-free hydrogen produced with nuclear energy). “Balance of Plant” (BoP) equipment that goes with a Moltex reactor depends on the application. For example, steam turbines are used to produce electricity; electrolyzers are used to produce hydrogen; and steam distribution piping is used for district heating. The Moltex reactor has a capacity range of 300 to 500 MW electrical (or 720 to 1,200 MW thermal), and the choice depends on the use case at a given site. Importantly, Moltex reactors use spent CANDU fuel, so a complete plant includes the recycling equipment for converting used CANDU fuel to fresh Moltex SSR-W fuel, reducing waste volume, radioactivity, and final disposal costs.
- **Reducing greenhouse gas emissions:** Moltex SSR-W reactors will produce zero-carbon power. If operated at 90% capacity factor (a conservative assumption), a single SSR-W unit can power about 360,000 households with no carbon emissions. However, SSR-W plus



GridReserve does more for decarbonization, by supplying the grid with firm, dispatchable power which supports increased penetration of intermittent renewables, replacing the need for traditional “peaking” power plants that run on natural gas, or in some cases, coal or oil. Firm, “baseload” power provided by 24/7, always-on generation is necessary for maintaining a stable grid, and conventional nuclear offers baseload power, as does the SSR-W. However, conventional nuclear cannot also provide load-following, “peaking” power, which is necessary to complement variable, intermittent energy from wind and solar generation. Peaking power is essential to work in concert with renewable generation, and to ramp up power output, especially during periods of peak demand that occur in mornings and evenings when lighting needs and domestic uses are highest. SSR-W paired with GridReserve offers both baseload and peaking power with no carbon emissions, at a fraction of the cost of battery energy storage systems, enabling a zero-carbon grid.

- **Planned investments and locations:** The first-of-a-kind WATSS and SSR-W units will be built at the Point Lepreau Nuclear Generating Station in New Brunswick and will have a nameplate capacity of 300 MW electric. The next two WATSS facilities and 11+ SSR-W units could potentially be built at the Darlington, Pickering and Bruce nuclear power stations in Ontario, with each SSR-W reactor having a nameplate capacity of 500 MW electric, based on the amount of spent CANDU fuel available at these three sites. At this time, no further deployments in Canada are planned; however, the fleet can increase in size commensurate with any future build-out of other nuclear plants in Canada, as the waste from convention reactors and some advanced SMRs provide the fuel for the SSR-W. The projection of 12 SSR-W units total (one in New Brunswick and 11 in Ontario) is a conservative estimate. In more optimistic scenarios, the total capacity that could be fueled from the existing CANDU fleet could be several GW more, and as new nuclear capacity is added, the potential SSR-W opportunity scales up even more.
- **Known manufacturing in Canada:** Capability assessments have indicated that 50% of the required inputs for building Moltex technologies can be obtained at present in New Brunswick. Up to 80% can be sourced in Canada, with the remaining 20% available in the global market.
- **Investors:** Representatives from nine of the 15 New Brunswick First Nation communities have signed expressions of interest to become equity investors in Moltex (the company itself), and these nine plus more of the others in New Brunswick and Canada are expected to also be investors in the fixed assets of the infrastructure projects when they are built. Other expected Canadian investors include the Canada Infrastructure Bank, the utilities, pension funds, and private sector energy asset investors, as well as high net worth individuals, and eventually banks once the technologies are mature. International investors, including US utilities and institutional investors, have also expressed interest.
- **Typical capital costs:** Independently verified project cost projections of Moltex designs show capital costs for one WATSS unit in the range of CAD \$400-\$800 million and capital costs of one SSR-W unit of \$1.6 billion, equating to about \$3,200/kW installed capacity, which is at or below the capital cost of new coal or gas fired generation.

Moltex recommendations for an effective Clean Technology Investment Tax Credit

Moltex commends the Canadian government for including in the list of technologies eligible for the “Investment Tax Credit for Clean Technologies”,

- “equipment to generate heat or electricity from small modular nuclear reactors”.



In fact, demand from Canadian utilities for SMR technologies and Canada's favorable policy environment are the reason that Moltex selected Canada for the company's global headquarters and first projects. Moltex is a proudly Canadian company, and proud to be a "Canada first" buyer for all components and labour the Canadian market can provide.

However, as currently drafted, the proposed incentives are insufficient to provide the needed stimulus to the sector, create strong investor confidence, and competitively attract private sector investment dollars and talent to meet Canada's decarbonization timelines.

Moltex considers the following amendments essential:

- **Flexibility:** As provided by the USA's Inflation Reduction Act, project developers must be able to choose between an Investment Tax Credit (ITC) and a Production Tax Credit (PTC). The ITC lowers capital costs, while the PTC guarantees minimum revenues over the life of the project. Large private investors generally prefer to put more dollars to work as opposed to less. That is, they may find little value in reducing capital costs as provided by the ITC. They generally prefer guaranteed minimum returns over time, which the PTC delivers. Canadian SMR developers need both options, the ITC and the PTC, to be on equal footing with US-based projects.
- **Timeline:** Phase-out of the ITC starting in 2032 and ending in 2034 is far too short a timeframe for the development cycle of nuclear power. Most SMRs planned today will only just be coming online in 2032 and the majority of the Moltex fleet is planned to enter commercial operation in 2035 or later. The ITC and PTC must be available for SMR projects coming online up to at least 2040. This reality may justify a separate category for SMRs, distinct from other zero-carbon technologies that face less time-consuming regulatory processes and construction timelines.
- **Capacity premium:** Not all energy (MWh) is of equal value. Energy produced by renewable resources when the sun shines or wind blows is of no use for loads that require power during cloudy days or windless nights. To serve critical loads with intermittent renewables, either energy storage or dispatchable, "peaking" power is required. **Capacity** (MW), available on demand when needed, is therefore more valuable than energy that is not coincident with loads. Hence, SMRs, in particular SMRs paired with thermal energy storage like GridReserve, merit special consideration. All else equal, investors are inclined to favor solar and wind projects because the technologies are more mature, and the development cycles are much shorter. However, a market that treats all energy equally, regardless of when it is produced, will cause under-investment in essential, firm, baseload and peaking power capacity. For this reason, relative to renewables, SMRs should receive a premium ITC that recognizes the value of firm, baseload generation, and SMRs plus thermal energy storage, a yet greater premium that recognizes the value of dispatchable capacity, with equivalent premiums reflected in the PTC option.
- **Hydrogen:** SMRs that produce high-grade heat are ideal for hydrogen production, as adding heat to the hydrogen electrolysis process greatly increases efficiency. Incentives for SMRs and zero-carbon hydrogen must be stackable.
- **Heat:** It is highly impractical to replace natural gas for heating the built environment and industrial processes with renewable energy in northern latitudes, where the solar resource is least available in the same season that heating is most important. Any technology that can reliably, space-efficiently produce heat near the point of use, without carbon emissions, deserves targeted incentives that recognize this unique value.



- **Waste reduction:** Canada is a world-leader in affordable, low-carbon energy thanks largely to its 19 CANDU reactors, which are run by world-class operators, and which are widely recognized as being absolutely fundamental to Canada's zero-carbon future. However, conventional nuclear comes with the stigma of long-lived, high-level radioactive waste. Moltex is the only company, as well as the only all-Canadian SMR company, that is addressing the issue of waste from Canada's existing nuclear fleet head-on. Ontario's Independent Electricity System Operator is calling for at least a doubling of Ontario's nuclear fleet, and more nuclear generation will be required Canada-wide to achieve decarbonization. To enable growth in the nuclear sector, grant social license to the industry, and extract maximum energy value from nuclear fuel, Moltex has a lynchpin role to play in the energy ecosystem as nuclear generation ramps up over the coming decades. Special consideration is warranted to ensure any technology that reduces the volume, radioactivity, and final disposal costs of nuclear fuel is deployed quickly and at scale.
- **Stackable incentives:** Waste reduction; firm, dispatchable baseload and peaking capacity; zero-carbon energy; high-grade heat; efficient hydrogen production; small footprint; and energy security are only possible with one technology stack that is under development today. The combined Moltex WATSS, SSR-W, and GridReserve power plant solves more critical challenges at once than any other approach to decarbonization, and enables all others, from conventional nuclear, to wind and solar, as described above. As well, Canada's only homegrown SMR company working with Canada's nuclear operators and focused on maximizing Canadian supply chain content, is poised to be a world-leader in solving these challenges, with significant export potential. All incentives that can be applied to any of these benefits should be stackable to accelerate market adoption and deployment.

Sincerely yours,

A handwritten signature in black ink that reads "Tristan Jackson".

Tristan Jackson

Vice President, Corporate Development, Moltex