



**CLEAN ENERGY**  
**LESS WASTE**



**SMALLER**  
**SIMPLER**  
**INHERENTLY SAFE**

# Message from the CEO

*As the world seeks to head off the worst effects of climate change, demand is rising for carbon-free energy sources. However, to be widely adopted, that energy must also be affordable.*

*The challenge is complex: Fossil fuels are low cost but generate vast carbon emissions. Carbon capture offers some hope, but only if it can be made to work cost effectively and on very large scales. Renewables such as solar and wind are clean, but they are intermittent and require other backup sources – usually gas. These inter-linked technology issues will have to be addressed against a backdrop of a massive increase in electricity demand. Additional electricity will be needed to charge EVs, to heat homes and offices and to produce the hydrogen that will be needed in other sectors.*

*Moltex zeroed in on molten salt reactors as a transformative way to meet this complex challenge. These reactors have inherent safety features and solid yet simple engineering, making them low cost both to build and to operate. Moltex has also developed innovative ways to recycle spent fuel from existing conventional reactors, reducing costs while cleaning up the whole nuclear fuel cycle. The use of thermal storage makes Moltex's power dispatchable, allowing it to replace gas as a backup for intermittent renewables. Its high temperature output has direct application to heat production too.*

*Moltex's vision is ambitious but clear: It will reduce the cost of clean, flexible nuclear energy for the whole world, eliminating the need for fossil fuels and enabling a low-carbon future for all.*



**Rory O'Sullivan**  
Chief Executive Officer, North America

# About Moltex

Moltex has emerged as a nuclear technology leader. With its innovative Stable Salt Reactor - Wasteburner (SSR-W) design, Moltex provides a carbon-free electricity generation technology that combines low upfront costs with reliable, large-scale power (300-500 MWe per reactor). This, coupled with inherently safe design features makes the SSR-W suitable for siting in any community.

Moltex's design has caught the attention of governments, utilities and investors worldwide:

- NB Power selected Moltex to develop its technology in New Brunswick, with the goal of deploying first-of-a-kind units next to the existing CANDU 6 reactor at the Point Lepreau site.
- The Government of Canada agreed to provide Can\$50.5 million in matched funding for continued Moltex research and development.
- The United States Department of Energy's Advanced Research Projects Agency (ARPA) provided over US\$7 million for innovative research on rapid construction techniques and digital twins.



# Technology suite

Moltex has developed three unique technologies. These allow the generation of inexpensive electricity by using recycled nuclear waste, and allow this electricity to be dispatched as needed, complementing intermittent renewable sources such as wind and solar.



SSR-W

**Stable Salt Reactor - Wasteburner (SSR-W):**  
Fast reactor that uses recycled nuclear waste as fuel



WATSS

**Waste To Stable Salt (WATSS):** Process for recycling nuclear waste to produce fuel for the SSR-W



GridReserve

**GridReserve:** Thermal energy storage tanks, enabling the SSR-W to act as a peaking plant



## SSR-W

Conventional large reactors have become expensive to build, due to the systems needed to keep them safe, including backups, monitoring, active safety and containment.

By contrast, the SSR-W is passively safe, which means that no human intervention is required to shut it down in the event of a problem. Much of the SSR-W safety case comes from not having hazards in the first place. For example:

- The most dangerous fission products are salts, not gases, so there is no risk of these escaping into the atmosphere.
- There is no contained pressure in the reactor as it operates at atmospheric pressure.
- Because the fission reaction slows down as the temperature rises, the system is self-damping.



## WATSS

Conventional nuclear reactors extract about 1% of the potential energy from the uranium they use, leaving the rest in the form of long-lived and highly radioactive waste. While conventional reprocessing is technically feasible, the costs are often prohibitive, because current reactors need highly refined fuel.

Following a far less expensive WASTE To Stable Salt (WATSS) recycling process, the SSR-W uses nuclear waste to produce clean energy. Additional fuel recycling occurs throughout the reactor's lifetime, further reducing the volume and radioactivity of waste destined for long-term storage.

In locations with existing inventories of nuclear waste, the SSR-W offers a cost-effective, environmentally friendly, and socially acceptable way to reduce waste.



## GridReserve

In many locations, renewable power sources such as solar and wind contribute carbon-free electricity to the grid. However, since these renewables are intermittent, producing power 30-40% of the time, they cannot provide reliable power on their own.

Fossil fuels are a common backup power source because they can scale up and down to meet demand – but they also emit carbon, affecting the health of people and the planet. Unless the world can find an alternative to gas, its entire net zero strategy will be reliant on carbon capture, utilization and storage (CCUS) working both from an economic point of view and on vast scales. This should be seen as a high risk.

Moltex's Stable Salt Reactor - Wasteburner (SSR-W), combined with its GridReserve energy storage technology, offers both reliability and scalability. The energy produced by the SSR-W can be stored as heat and used to generate additional electricity when the sun isn't shining or the wind isn't blowing. For example, a 300 MWe SSR-W can drive 600 MWe of turbines for 12 hours a day or 900 MWe for eight hours a day.

The SSR-W is therefore an ideal partner for renewables and can support a completely carbon-free grid.

# New Brunswick project

Moltex was one of two vendors (of over 90 applicants) selected by NB Power and the Government of New Brunswick to advance its technology in New Brunswick, Canada. The goal is to deploy a 300 MWe SSR-W, WATSS facility and GridReserve tanks at the Point Lepreau site, and power the reactor with recycled waste from the existing CANDU 6 unit.

Having completed Phase 1 of the pre-licensing Vendor Design Review (VDR) with the Canadian Nuclear Safety Commission, Moltex will soon move on to VDR Phase 2 and then to the application for the necessary licences.

The team in New Brunswick is growing fast. Attracted by the prospect of working on cutting-edge technology with the potential to save the planet, Moltex has recruited leading scientists and engineers from around the world.

Moltex has also attracted top talent locally, thanks to a mature nuclear cluster that includes NB Power operations, the resulting supply chain and academia.

With financial and political support from the Canadian and New Brunswick governments, and general support from the community and local Indigenous groups, Moltex has a clear path to operational first-of-a-kind units.



# Market potential

*The world needs clean, low-cost energy to mitigate climate change and reach net-zero emission targets.*

## Canada

Canada will have 5.5 million spent fuel bundles by the time the current fleet of CANDU reactors reaches the end of its life. This spent fuel is sufficient to support 5.8 GW of new Moltex reactors for their 60-year lives. The Canadian government is deeply supportive of new nuclear technology, having taken concrete actions to ensure that nuclear is front and centre in its clean energy strategy.

## Globally

Globally, there is an addressable market of 80 to 120 GW of waste-burning reactors, excluding some locations with challenging finances or politics. The most promising jurisdictions after Canada are the US, the UK, southeast Asia and Europe.



# Economics

People with access to inexpensive energy benefit from better living standards. Cheap and readily available electricity can lift people out of energy poverty. Even in developed countries, there is a clear link between energy prices and quality of life.

In communities that have Stable Salt Reactor - Wasteburner (SSR-W) units, people will benefit from long-term, high-quality jobs in the clean energy sector, while the local economy will benefit from an increase in GDP and tax revenue.

For instance a recent study showed that, between 2020 and 2035, just two new reactors in New Brunswick will create approximately:





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