Closing the Loops: Energy, Carbon and Water

Clean Energy and Water Technologies Pty Ltd (CEWT)

For more than two decades, my work has focused on a simple but often overlooked principle:
sustainable industrial systems must allow energy to flow while materials circulate in closed cycles.

At the beginning of this millennium, I was among those advocating the introduction of hydrogen into
the energy system as a pathway to reduce emissions. Over time it became clear that hydrogen is best
understood as an energy vector rather than the final carrier of energy.

The deeper challenge lies in how our industrial systems handle carbon.

For more than a century, modern industry has operated with an open carbon loop:
extract fossil carbon → use it once for energy → release it into the atmosphere.

Nature operates very differently. In natural systems, carbon circulates continuously through closed cycles.
Plants, oceans, soils and the atmosphere exchange carbon constantly, maintaining a dynamic balance.

The same systems perspective also applies to water. During my earlier work in desalination and energy systems,
I often wrote that water and energy are two sides of the same coin. Water infrastructure requires energy,
and energy infrastructure depends heavily on water for cooling, processing and transport.

Over time a broader systems insight emerged:

Energy flows through the system.
Carbon and water should circulate within it.

When industrial systems break these natural cycles, instability appears — whether in the form of
resource conflicts, environmental stress, or energy insecurity.

Closing the carbon loop therefore becomes one of the most important engineering challenges of our time.
If renewable energy produces hydrogen, that hydrogen can combine with captured carbon to create fuels
that circulate in a closed cycle. In this way carbon becomes a recyclable carrier of energy rather than waste.

The future energy system may ultimately resemble nature more closely than the fossil system it replaces:
a system where energy flows continuously while materials circulate in stable loops.

Clean Energy and Water Technologies (CEWT) is founded on this principle — integrating energy, carbon
and water into a coherent industrial system designed for long-term sustainability.