# UNLOCKING THE POTENTIAL OF WAVE ENERGY IN ALBANY, WESTERN AUSTRALIA

Nestled along the picturesque coast of Albany, Western Australia, the relentless power of the ocean's waves holds the promise of a sustainable energy future. Here, the M4 Project, a pioneering endeavour, stands as a beacon of innovation and renewable energy development. This ambitious initiative, spearheaded by a collaborative partnership between UWA Marine Energy Research Australia (MERA), the Blue Economy Cooperative Research Centre, the WA State Government Department of Primary Industries and Regional Development (DPIRD), and several esteemed partners, is poised to harness the yet untapped potential of wave energy.

## THE VISION: A SUSTAINABLE FUTURE POWERED BY WAVES

At its core, the M4 Project envisions a future where wave energy can power not only homes but also nearby industries such as aquaculture, reducing carbon footprints and bolstering sustainability. The project aspires to be a catalyst for comprehensive advancements across various ocean renewable energy sectors, offering fresh opportunities for industry growth, cutting-edge research, and vibrant local supply chains.

Furthermore, Albany, with its pristine coastal environment, is set to become more than headquarters to Australia's only wave energy project; it aims to build on its global academic research expertise in ocean renewable energy to facilitate the exchange of knowledge and the birth of innovative ideas in an open source approach to wave energy technology sea trials. Albany could host two test sites in proximity to critical infrastructure and to the MERA research and operations support team – in King George Sound for reduced scale 'nursery site' testing, and at Moodrenup/Sandpatch as the international 'Gold Standard' in wave energy resource for full-size technologies.

# THE M4 PROJECT: PIONEERING THE FUTURE OF ENERGY

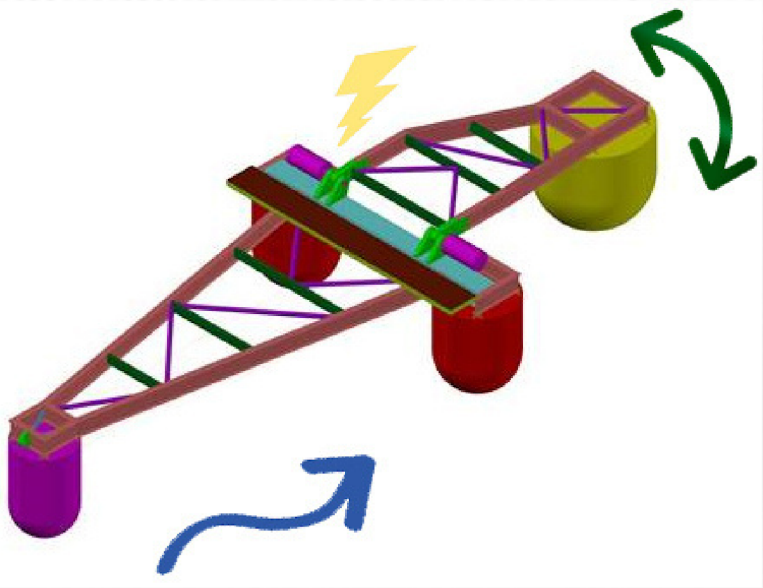
Central to this visionary undertaking is the deployment of the M4 ("Moored MultiModal Multibody") wave energy converter (WEC) in the tranquil waters of King George Sound, Albany. This remarkable project encompasses the complete lifecycle of the M4 prototype, from design and manufacturing to deployment, operation, maintenance, and eventual decommissioning. Unlike commercial projects, the M4 is based on full transparency to advance all sectors together: research, industry, and policy.

The project's objectives are threefold:

- **Blue Economy**: The deployment location of the M4 WEC is ideal to demonstrate a potential use for nearby onshore energy customers, such as the aquaculture industry. Engineered to prove its mettle by sharing data on the reliability and predictability of wave power is a vital step toward developing wave energy into a valuable new 'baseload' resource.
- **Regional Supply Chains**: The project aims to maximise local procurement and business engagement in an innovation context which is an unprecedented reinvestment in Australia. The iterative process of engineering design and fabrication is novel and is being documented for the global community in ocean renewable energy projects to learn from.
- **Pioneering Research**: The M4 Project is sowing the seeds for Albany to become the southern hemisphere's first wave energy test site. This pioneering spirit not only drives innovation but also sets the stage for future breakthroughs in the field – and keeps Australian companies and their technologies in the country.

## MEET THE M4 MACHINE: CONVERTING WAVES INTO ELECTRICITY

At the core of this endeavour stands the remarkable M4 machine, a wave energy converter (WEC) engineered to capture the kinetic energy within waves and transform it into electricity. This innovative device consists of two steel segments connected by hinges and attached to buoyant floats that gracefully ride atop the waves. The ingenious aspect lies in motion in the central hinges, allowing for controlled rotational movement as waves pass through, and generating electricity.



## EMPOWERING ALBANY THROUGH THE M4 PROJECT

The M4 Project signifies a transformative journey filled with opportunities. Nestled in a region abundant with wave energy potential, this initiative strives to cultivate ocean renewable supply chains and technical processes, stimulating economic growth and sustainability. Over the past five years, MERA has grown Albany into an ocean engineering hub, drawing researchers and students to facilitate knowledge dissemination.

Beyond its pivotal role in generating electricity, the M4 Project ushers in a new era of scientific exploration. Researchers eagerly delve deeper into the ocean's energy potential, aiming to refine the M4 machine's efficiency and reliability through experimentation and data analysis. Moreover, it extends its support of Australia's 'Blue Economy' by quantifying the potential of supplying clean energy, reducing operational costs, and minimising environmental impact. As emerging industries and supply chains take root, ocean energy projects can offer opportunities for job creation and economic prosperity. Most significantly, by harnessing the power of waves, these projects make a substantial contribution to environmental sustainability, diminishing dependence on fossil fuels. The M4 Project's impact reaches far beyond demonstration of energy generation, illuminating a path toward a brighter, more sustainable future for Albany.

# EMPOWERING ALBANY THROUGH THE M4 PROJECT

The M4 Project not only addresses today's challenges but also positions Albany as a focal point for the renewable energy revolution. It plays a pivotal role in an unprecedented initiative to develop the Great Southern region as a demonstration site for wave energy technologies, highlighting electricity production and distribution capacities to end-users and customers.

The M4 Project represents a significant step toward a cleaner and more sustainable future – for WA, Australia, and the world. By harnessing the energy of the waves, this initiative has the potential to drive economic growth, regional capabilities, and scientific discovery. Albany stands on the cusp of becoming a renewable energy pioneer, and the M4 Project is leading the way toward this exciting future.


The M4 Project, a collaboration between UWA Marine Energy Research Australia (MERA), the Blue Economy Cooperative Research Centre, the WA State Government Department of Primary Industries and Regional Development (DPIRD), and with BMT, M4 WavePower Ltd, Huon Aquaculture, Albany Shellfish Hatchery, University of Tasmania, University of Queensland and Climate-KIC Australia (via Australian Ocean Energy Group, AOEG).

Published research on the project can be found:

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Hansen, C.L., Wolgamot H., Taylor, P.H., Orszaghova, J., Kurniawan, A. & Bredmose, H. 2023. Design Wave analysis for the M4 wave energy converter. Proceedings of the 15th European Wave and Tidal Energy Conference. UK: European Wave and Tidal Energy Conference (EWTEC 2023) (pp. 476-1), 3-7 September, 2023, Bilbao, Spain.

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Orszaghova, J., Lemoine, S., Santo, H., Taylor, P.H., Kurniawan, A., McGrath, N., Zhao, W., & Cuttler, M.V.W. (2022). Variability of wave power production of the M4 machine at two energetic open ocean locations: Off Albany, Western Australia and at EMEC, Orkney, UK. Renewable Energy, 197, 417-431. ISSN 0960-1481. https://doi.org/10.1016/j.renene.2022.07.053.