Nauru Utilities Corporation

Future Operating Model 2021-2031

Our Future Operating Model

Five years ago, Nauru Utilities Corporation began a journey to become a leading energy and water supply utility within the Pacific region.

Our 5-year Strategic Plan 2015 – 2020 created a rich picture of how we would introduce improvements throughout the organisation in both our energy and water sectors. Five years on and the continuous improvement in both energy and water remain. We can see that NUC is definitely on the right track, except in one key respect – the future is coming at us faster than we have imagined, and we need to be thinking and planning ahead for what this world of new technologies, changing customer expectations, and innovative energy and water services and solutions will hold.

The Nauru Utilities Corporation 2021 – 2031 Future Operating Model provides a renewed perspective on what the future world looks like for our customers and our energy and water network, and on how our work will change to meet the new challenges and opportunities.

Once again, this vision will guide us into what will most certainly be a future with exciting possibilities - one that will be here before we know it.

Table of Contents

What our world and the electricity and water network could look like in 2031

Imagine the World in 2031…

The world has changed dramatically over the last decade, with many new technologies (e.g. Wi-Fi, smartphones and apps, drones) entering our lives, and many new household names emerging as significant new forces in our society (e.g. Facebook, YouTube, TikTok). The pace of change is likely to continue over the next ten years. Already we can see major developments emerging such as 3D printing and robotics, cashless society, electric vehicles and driverless cars including the Internet of Things, that will reshape the way we live, work and play in equally dramatic ways.

You wake up one morning in 2031, and make your way to the kitchen to have breakfast. You remember that you were low on milk and out of cereal, but it doesn't matter because your smart fridge and pantry have ordered them for you, and a drone delivered them to your doorstep overnight.

There's a refreshing feeling while having your first coffee that although the rain tank isn't full because it's been a bit dry, water piped to the home continues to flow at constant pressure. Even the gardens look green and lush.

You join your friends for a chat over breakfast, sitting around a single virtual table created by the immersive augmented reality system that you installed a year ago. Once breakfast is over, you change the immersive scenery, hop on your exercise bike and enjoy a twenty-minute ride through the French countryside.

At 8.30am, your electric or driverless car arrives to take you to work, and you sit back to watch your daily customised news report. Knowing that you are interested in sustainability, the 'reporter' has chosen a short doco-vid on the history of renewable energy in Nauru as today's item. The stories of some of the early challenges of introducing renewable energy sources into the network, back in the mid-2015s, bring a smile to your face, and remind you of just how far things have come. It's hard to really recall what it was like before things like battery storage, electric vehicles and piped and reticulated water were a normal part of most people's experiences.

At lunchtime you call your mother back at Nauru's Modern Health Facility to see how her medical appointment went. Gone are the days when she had to make 3000km round trip even to see a GP. She spoke to a specialist in Sydney over the high-speed video stream, and they were also able to patch in the head technician at Royal Melbourne Hospital to provide some reassurance about the surgery. That evening you plan your upcoming fly/drive holiday to New Zealand.

You have splashed out and decided to hire the latest electric vehicle convertible, brand new out of the high-tech 3D printing facility. In this day and age, there is nothing like the feel of an electric vehicle for high performance, and so much cheaper to run than the petrol and diesel vehicles that some diehards still insist on driving. And now that electric vehicle charging stations are as common on the ground as petrol stations used to be, there's no limits on where and how far you can travel.

On your way to bed, you check in on the daily performance report from your integrated energy management system or smart meter. Your current settings for when you use your appliances have reduced your bills by 25 percent from what you used to pay. It's been a pretty good day – even though it was cloudy in Nauru, you got some credits from the solar panels integrated into the roof of your home, and you still have some electricity stored in your battery unit to tide you over until the sun decides to make a reappearance on the weekend.

It all sounds futuristic – but its already here.

The Customer of the Future

In 2031, our customers will have many new options for how they source, manage and use their electricity and water. Many customers will be very proactive and will invest in new technologies and explore the full range of options available. Others will continue to rely on the electricity network, and will continue to expect reliable supply for the best possible price.

The needs and expectations of our customers will be more diverse, and we will need to be more proactive in understanding the specific circumstances of individual customers and communities, and their particular types of electrical appliances and devices.

Similarly, water customers' needs and expectations will be more diverse and we will need to be more proactive in understanding their specific circumstances. Energy and water efficiency, reliability and security of supply will be expected.

In 2031, many of our customers and communities will have:

- Rooftop Solar - most homes and businesses in Nauru will have solar PV, generating enough energy between them to power the whole country at times of low demand. New homes will increasingly be built with solar PV integrated directly into the roofing material.

- Smart connected LED street lights - these can be monitored and controlled remotely, enabling lighting levels to be adjusted up or down at different times to reflect different activity and needs.

- Home energy and water management systems – many homes and businesses will have Energy Management Systems as standard, to control battery storage, water heating, Electric Vehicle charging and smart appliances to make the best use of solar energy and minimise energy costs.

- Electric vehicles – cars, motor bikes will be increasingly common, and owners will enjoy the convenience of charging at home or at public charging stations in most shopping centres, car parks and workplaces.

- Battery storage - will allow home owners and businesses to store surplus energy generated by their solar PV during the day to use in the home in the evening, as well as providing backup power in the event of a loss of supply from the grid.

- Energy and water efficient appliances – energy efficient refrigerators, dishwashers, dryers, ceiling fans and air-conditioning can potentially reduce energy bills by up to 40 percent. Smarter use of our water resource through water saving technologies will ensure reliable water supplies today and for future generations.

What needs will our customers have?

- Home Owners

With increased options for solar PV generation and more affordable battery storage options, many homeowners may be more self-sufficient for some of their electricity needs. They may want to share or sell electricity locally, and will certainly want to optimise their energy use and keep their costs down.

- Electric Vehicle Owners

As electric vehicles become more prevalent, owners will want access to cheap prices and reliable connections for charging their vehicles. They will also want to have access to conveniently located and efficient charging stations that give them the freedom of movement that they need.

- Communities

Renewable generation and storage provide good opportunities for more communities to be more self-sufficient in meeting their energy needs. In many cases, an 'off-grid' solution may be a more sensible option than a more expensive long-distance connection to the main grid.

- Residential Customers

Residential customers will want to monitor the performance of their systems and ensure they are producing optimal results. They will also need someone to maintain these systems and provide expert advice on opportunities to upgrade and reduce running costs as new technologies become available.

- Business Customers

Businesses will want to optimise their own energy usage through new technologies and management systems. Larger businesses will need integrated solutions that reduce costs and protect reliability across larger complexes of buildings and at multiple sites.

- Government

Government and facility owners will be looking for smart solutions that enable them to use electricity more effectively – such as smart lighting in public places and at major facilities which can be adjusted more flexibly at different times of day or night depending on usage times or attendance and the type of ambience they want to create. These might be integrated with other 'smart city' infrastructure such as car parking and Electric Vehicle charging.

- Entrepreneurs / Investors

Entrepreneurial customers will see opportunities that they need help to realise – like cafe owners who want to install Electric Vehicle charging facilities for their customers, shopping centres that want to turn their carparks into Virtual Power Plants and app developers who want to make data available to consumers for a wide range of purposes. New housing subdivisions provide opportunities for installing micro-grids, linking all the houses in the community into an optimised local network of renewable electricity generation and storage, requiring only a 'thin connection' on cloudy days and to trade surplus energy on days when the community is generating more than it can use.

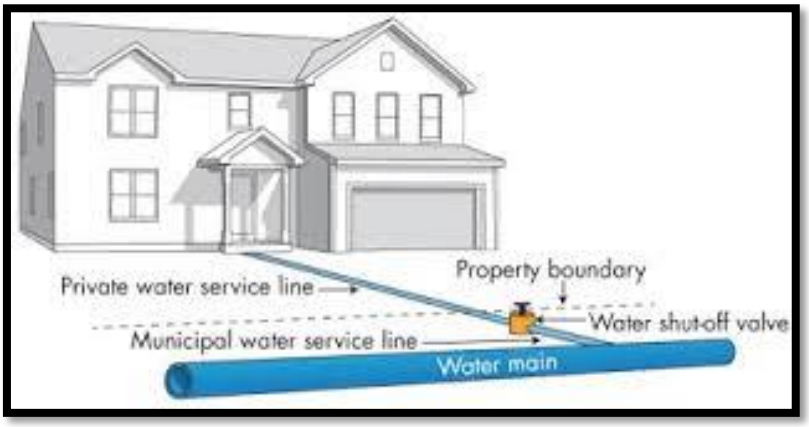
The Energy Network of the Future

In 2031, the network will be much more diverse than today's largely one-size-fits-all network where Nauru Utilities Corporation builds the substations, poles and wires to take electricity to wherever customers need it. There will be wider use of technologies for generating renewable energy and for storing electricity, both at the network level and at local homes, businesses and communities. This will create new challenges for maintaining a safe, secure and reliable generation and distribution platform, but will also present new opportunities for reducing long-term costs and improving network utilisation and performance.

The Water Network of the Future

In 2031, our water tank trucks will be a delivery service of the past. Customers now receive clean, safe and reliable water supply directly to their homes through our piped network. Water supply management technology will reduce losses and inefficiencies. Water services will be more affordable due to the lower costs of piped water networks compared to tank truck delivery. Customers realise the convenience of 24-hour access to water, and higher water quality.

Our customer satisfaction is generally high with this level of service and increased water quantity allows for improved health and hygiene. Households have strong incentives to maintain their water-supply infrastructure.



The Future is Now

Although some aspects of this future world may seem far off, initiatives are already underway both overseas and here in Nauru that are bringing the future into the here and now. With technologies rapidly evolving and becoming more affordable, and policies changing to allow new business models and ways of working, the future may be closer than we think.

Many island states have already included targets to increase the share of renewables, expansion of decentralised generation, electrification of transport and higher energy efficiency.

The monitoring and maintaining of flows of energy and management of financial payments is being transformed with introduction of on-line banking, EFTPOS facilities and smart metering. In many countries smart meters are becoming more common and consumer side technology is becoming more affordable.

Customer expectations continue to grow requiring initiatives to provide more options and create more buying power for the consumer.

How Nauru Utilities Corporation could respond

The World has changed and we have too

The world keeps changing, and no one knows exactly what the future will hold. The electricity and water markets continue to evolve as new technologies emerge, customer expectations shift and government policies are implemented in response to major social and environmental issues.

As the operator of the generation and distribution network, Nauru Utilities Corporation needs to continue adapting to this changing context to maintain both its efficiency and its relevance – while also holding true to the vital things that people value, such as our engineering expertise and our commitment to safety and reliability

Similarly, as the operator of the water harvesting, storage and deliver network, Nauru Utilities Corporation needs to continue to enhance its efficiency and delivery of water services to meet increasing customer expectations for safe, reliable and secure water supply.

New technologies continue to enter the market with internet and Wi-Fi, solar panels, smart phones and tablets.

The electricity and water are changing with steady growth in demand, customers installing new energy and water efficient appliances such as air-conditioning and washers.

Nauru Utilities Corporation's focus on augmenting the energy network to accommodate increase demand in renewable energy production, replacing aging assets and infrastructure, developing our water delivery network and building engineering capability to include stronger customer focus.

How will our services change?

In the future, the network will be much more of a platform, with many individual consumers, businesses and communities connecting their equipment for generating and storing electricity to the network. The role of Nauru Utilities Corporation will be to link these different assets, technologies and management systems together into a stable and reliable grid – one that enables an efficient, multi-dimensional exchange of electricity across the whole platform.

Our water delivery service through piped water mains, connecting residential, commercial and government facilities will replace tank truck water delivery and provide consumers with 24-hour access to safe, reliable and secure water supply.

Examples of potential new offers for customers advice on the best options for new technologies, solutions for roof top solar installations and maintenance and software and data monitoring to reduce consumption.

Other customer services might include smart lighting options for property owners and public spaces, installation and monitoring of Electric Vehicle charging facilities.

How will our people and capabilities be different?

As we move towards 2031, we will need to keep investing in the capabilities of our people and the processes they will use. We will need new skills to manage the wider range of energy and water services we will provide to customers, to understand the opportunities and impacts of operating a much more diverse network including many assets that we do not own or control, and to ensure that the needs of the whole community for electricity and water are being met at a price they can afford.

The key attributes of our people:

- Mindful and vigilant about safety for all
- Clear on the importance of their roles in creating great outcomes for customers and for the business
- Quick to respond to issues and committed to effective communication
- Proactive in looking for solutions and continuing to improve the way we do things
- Alert to the realities of a changing world and committed to maintaining the reputation and high quality of Nauru Utilities Corporation work.
- Able to collaborate with many different people both inside and outside the business
- Agile and adept at applying the latest technologies for the benefit of customers and our employees
- Commercially minded, with an eye for well-judged commercial opportunities

How will we plan and manage the network and our assets?

As distributed energy resources become much more common, both at the network level and in local communities, homes and businesses, and demands on the network change, the way we plan and manage the network will also need to shift. New approaches will emerge as to how we plan for future demand, what assets we build, how long we expect those assets to last, and what systems we need to monitor flows of electricity in a multi-dimensional network. We will be working more closely with customers and other infrastructure owners to develop new options, share data and create integrated network solutions.

Similarly, as our piped water network is developed and more customers are connected to the system, the way we plan and manage our water production, storage and delivery network will also need to adapt. New capabilities within the organisation will need to be developed working closely with customers to provide new options and create water supply solutions.

How we will plan and manage the network

- Make it easy for consumers to install their own distributed energy resources (DERs) and connect to the network.
- Increase the scope and sophistication of our planning processes to address more complex flows arising in a high DER network.
- Find new ways to meet demand without augmenting the network or replacing existing network assets (e.g., via non-network solutions).
- Change assumptions about the lifecycle of assets and what type of assets we will need to build.
- Monitor and manage the flows of electricity much more closely in both the HV and LV network.
- Improve network reliability and resilience while catering for a diverse range of renewable energy sources.
- Collect and share data to enable customers and owners of DER assets to get the best outcomes from their equipment.
- Transition to a network design and architecture that is more highly optimised for high-penetration DER.

How we will manage our assets

- Install sensors and use drones to enable remote monitoring of equipment.
- Upgrade the Asset Management System to cope with much higher volumes of data and generate new insights and efficiencies.
- Use real-time network and asset data to enable pro-active maintenance and more targeted inspections.
- Decommission assets if they are no longer needed.

How will our power generation, water production and field services teams operate?

Our power generation, water production and field services teams will still be delivering many of its core services – restoring power after outages, attending to water supply outages and leaks, conducting routine maintenance of generation plant, water production facilities and of powerlines, and managing vegetation.

The main differences will be in the range of technologies used, the amount of information and the quality of communication with customers, and the seamlessness of the experience for both customers and technical teams.

Our teams will have more real time information about our networks and better access to work on the system. They will better be able to prioritise the most urgent work first, respond resourcefully to new issues and find suitable jobs to fill in unexpected gaps in their schedules.

This will also enable accurate communications to our customers about timeframes for completing both planned and unplanned works.

NUC staff and field teams will have access to information on the history of the equipment and site, as well as which customers are connected, enabling them to understand the context, be aware of past issues and communicate more effectively with customers.

New technology, tools and equipment used by our field staff will enable staff to effectively and efficiently operate and maintain our assets in the field.

New work techniques and procedures will strengthen and enhance our workers' health and well-being.

How will we develop and deliver new energy and water services?

Today, Nauru Utilities Corporation provides its expertise and capability in constructing and maintaining large scale infrastructure as a service to a small number of other organisations. In the future, there will be many new opportunities to provide energy services to a much more diverse range of customers, outside of our traditional role of supplying electricity and water. This will create a whole new range of considerations about how best we can meet these new customer needs.

What this will mean for us.

- Continually refreshing our understanding about our customers and their changing needs.
- New capabilities to develop and deliver services that customers value, and creating great experiences for them.
- New approaches to how we market our services and engage with our customers.
- New support systems and better customer data to enable us to deliver new services efficiently and effectively.
- New partnerships and collaborations with manufacturers, suppliers, stakeholders and customers.
- A new cultural focus not just on delivering a great service as we supply electricity and water to our customers, but on seeing new opportunities and responding in a timely and agile way.

From Vision to Action

This high-level vision for our future guides our strategic thinking regarding the future of our business. Our strategic response to this future is captured in our Strategic Plan.

The world keeps changing though, and our thinking and strategies need to change with it.

We will keep monitoring what's happening in Nauru and overseas, paying attention to changes in customer needs, new energy technologies, stakeholder expectations, industry best practice and competitive shifts in the marketplace.

We will continue to re-evaluate our thinking as major disruptions and changes are identified and where appropriate update our Future Operating Model.

As an organisation we need to be ambidextrous - maintaining and improving the core of what we do and our high standards for safety, trust, and reliability, while also being agile enough to adapt and embrace new opportunities and create new value.

In 2031 we want to look back with pride on what we have achieved, with wonder at all the new things we are now doing, and with confidence that we will remain relevant to and valued by our customers and the community well into the future.

Nauru Utilities Corporation has developed the 2031 Future Operating Model through a series of workshops attended by staff, key stakeholders and subject matter experts from across the business.

The workshops examined NUC’s future customers, their needs, values and expectations, as well as the impact of those customers and emerging technologies on our network.

In appreciation of the donor community comprising the Government of Australia, the Asian Development Bank, the European Union, the Government of New Zealand, the Republic of China (Taiwan), USAID, the International Union for the Conservation of Nature (IUCN), South Pacific Community (SPC), and Japan International Cooperation Agency JICA) for supporting the development and augmentation of our network, renewable energy development and water services.