Republic of the Marshall Islands
Energy Future

Electricity Roadmap

Policy Working Paper

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Summary

To meet national emissions reductions target, the RMI electricity sector will need to reduce GHG emissions, and therefore diesel use, to 50% below 2010 levels by 2025, and 65% by 2030[1]. This will require a significant scale-up in the use of renewable energy technologies.

This paper outlines the policy issues and recommended responses to enable the rollout of the technology pathways, in particular for Majuro and Ebeye. The recommended policy approaches are devised specifically for the context of the Marshall Islands. It will be helpful for RMI stakeholders and development partners to have a shared view of the issues and why certain approaches may work better than others for the Marshall Islands.

These contextual aspects: relatively short time frames, significant scale up of renewable generation, constraints on human capacity, complexity of execution based on utilising many different small land and roof spaces, mean that in assessing options significant weighting has been given to the benefits of centralised, time bound, planned capital investment, standardised procurement processes, standardised rooftop/access frameworks and processes that otherwise favour lower administrative complexity.

Policy areas discussed include:

- Solar PV issues
    - Small scale distributed solar vs centralised utility scale
    - Access to land and rooftop space
- Sector governance and coordination
- Financing policy
- Regulatory processes
- Policies for energy efficiency and demand side management
- Technical standards – equipment and personnel

Key recommendations include:

- The RMI renewable energy transition occurs based on centrally-planned, utility-scale generation.
- Continue the MEC technical rule that small/ household scale solar cannot feed into the grid
- Support people's private investment decisions around solar PV with information, particularly around there being no feed-in to the grid and the possibility of tariff review for partially sufficient users.
- Develop, with urgency, a standardised rooftop and land access and compensation framework for solar PV.
- Support the effective functioning of the RMI Roadmap Working Group/ Energy Task Force to oversee all aspects of the Roadmap.
- Review free electricity to landowners on Majuro as a subsidy that would be better allocated elsewhere in the electricity sector.

[1] This assumes reductions in other sectors are also achieved as indicated in the NDC.

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Purpose of this document

The RMI has set ambitious goals to reduce GHG emissions by 32% below 2010 levels by 2025, 45% by 2030 and to have net zero emissions by 2050.

While all sectors need to reduce emissions, the Government has committed to a plan of action for the electricity sector as the major contributor in addressing GHG targets for 2025, as this is where the most developed and cost-effective technologies are available.

To meet national emissions reductions target, the RMI electricity sector will need to reduce GHG emissions, and therefore diesel use, to 50% below 2010 levels by 2025, and 65% by 2030[2]. This will require a significant scale-up in the use of renewable energy technologies. The current RMI level of renewables contribution in 2018 is only around 2% and will need to be over 50% by 2025.

At the same time, existing electricity systems are dilapidated and significant investment in the foundations of generation and distribution infrastructure are necessary to enable the renewables journey.

This purpose of this paper is to outline the policy issues and recommended responses to enable the rollout of the technology pathways in particular for Majuro and Ebeye, as described at length elsewhere [ref Roadmap and Technology Pathways report]. The recommended policy approaches are devised specifically for the context of the Marshall Islands. For each of the recommended policy decisions an assessment has also been made of alternative options, so that RMI stakeholders and development partners can clearly identify the trade- offs that are being managed. It will be helpful for RMI stakeholders and development partners to have a shared view of the issues and why certain approaches may work better than others for the Marshall Islands.

Context of the Marshall Islands

Some specific aspects of the Marshall Islands feed into consideration of the policy responses:

- Very ambitious climate change targets and high global visibility of those targets. The policy proposals in this paper assume, and are designed to support, these overarching strategic targets.
- Targeting a rapid step-change from less than 2% renewables to very high levels of variable renewables (wind and solar) on the main grids in less than 7 years. Policy options that support rapid scaling up and high contribution of renewable generation are more favoured than those better suited to an organic growth model at lower levels of renewables.
- RMI is a small country with limited human resources. As a result, it has a limited pool of skills and experience in new technology and in commercial arrangements. The preferred policy options seek to mitigate the risks that RMI capacity and technical capability constraints can give rise to.
- Limited land and rooftop space on Majuro, with traditional land tenure system. Developing substantial solar sites is likely to require multiple land and building owner interfaces. This, combined with the short period for increasing renewable generation and the human capacity constraints , means that policy options that support low transactional costs and standardised arrangement are preferred.
- Poor building quality affecting both roof structures for solar, and building envelopes for energy efficiency.

[2] This assumes reductions in other sectors are also achieved as indicated in the NDC.

These contextual aspects: relatively short time frames, significant scale up of renewable generation, constraints on human capacity, complexity of execution based on utilising many different small land and roof spaces, mean that in assessing options significant weighting has been given to the benefits of centralised, time bound, planned capital investment, standardised procurement processes, standardised rooftop/access frameworks and processes that otherwise favour lower administrative complexity.

Policy areas

Policy areas covered in this discussion paper include:

- Solar PV issues
    - Small scale distributed solar vs centralised utility scale
    - Access to land and rooftop space
- Sector governance and coordination
- Financing policy
- Regulatory processes
- Policies for energy efficiency and demand side management
- Technical standards – equipment and personnel

Design philosophy and principles

For the main grids of Majuro and Ebeye the rapid achievement of high levels of renewable energy while maintaining adequate service levels will be technically challenging. In considering this, the Roadmap adopts a design philosophy of simplicity, efficiency and scalability to give the best chance of achieving the very challenging targets. In practice this means reducing technical and operational complexity, reducing cost and implementing at scale through:

- Centrally planned and controlled utility-scale generation (plants greater than 100kW)
- using fully commercial, proven and off-the shelf generation technologies (the *application and integration* of those technologies will be challenging)
- simplifying/ streamlining and reducing transaction costs of policies, implementation and financing arrangements.

Policies to enable renewable energy

Solar PV generation

Solar PV can be defined by where it is installed, how big it is and who owns and maintains it, whether the power is used on the grid or not. Solar PV will form part of the systems on Majuro and Ebeye, and it is likely that solar PV will be the primary form of generation for mini-grids on some outer islands (e.g. Jaluit, Wotje, Kili).

This section addresses three related design questions for the development of solar generation:

- Whether there should be a strong preference for centralised utility scale generation rather than small scale distributed generation and if so the policy settings that will support this;
- How funding of utility scale generation should be predominantly achieved including how to think about the role of private investment
- What is the best way to address installation and access- in the context of the RMI

Distributed grid-tied household-scale solar PV generation versus centralised utility scale: Issues of compatibility, cost, capability, and scale

In this section when we talk about centralised utility scale solar PV we mean for the main grids of Majuro and Ebeye to have only utility scale (say, over 100kW) solar plants connected to the grid. We contrast this with distributed grid-tied household-scale PV.

Grid-tied small- or household-scale rooftop PV has been important in the early, low penetration, part of the journey to renewable energy for many countries over the last decades. However, as these countries move towards higher levels of variable renewable energy (VRE), they are now coming to terms with the complexity introduced to the grid by small-scale distributed generation.

Overall, the design philosophy of the main grids of Majuro and Ebeye lead us to recommend only utility scale (say, over 100kW) solar plants connected to the grid. While it is strongly recommended that smaller, household-scale systems not be grid-connected on Majuro, RMI stakeholders don't want to constrain individual choice in being able to have private systems for private use. It is not expected that small scale or rooftop solar will feature on Ebeye due to the very limited amount of space around households and the poor quality of building stock.

The key advantages for advancing a centralised utility-scale approach to generation are:

- *Enables scalability within the time frames:* Given the speed at which scale up of renewable generation is required (from 2% current renewable to 50% renewable by 2025), centralised planning and implementation is a critical factor in the success of scaling up. In contrast a small and household-scale distributed model is an organic growth model that would provide little certainty of achieving the scale of renewable generation growth required, let alone within the time frames RMI have set.
- *Avoids technical complexity and technical risks:* Grid-tied small scale solar introduces risks of grid instability and reliability, which are exacerbated as the overall level of variable renewables increases. To have small- and household-scale distributed PV as part of this system would require a state-of-the- art "smart grid" to reduce grid instability and reliability issues. This is an emerging and highly sophisticated technology that even well-resourced countries are struggling with. We consider it is not suitable for the RMI at least until it is more fully developed and demonstrated elsewhere [ref TN-07 Technology Review].
- *Better suited to capability and capacity:* Successfully achieving the road map requires prioritisation of the amount of change to be implemented. Available capacity would be better used on centralised decision making that reduces transaction costs, rather than incremental change.
- *Overall lower cost of electricity*: Household scale PV systems are more expensive to purchase, install, maintain and replace on a per W or per kWh basis, leading to an overall higher cost of electricity for users than utility scale systems. (Note that this is the case also for systems gifted by donors as someone has to pay replacement costs).

The key advantages for small household-scale distributed energy are enhanced spread of capital costs and risks for generation (though until technology and technical capability develops in this area, there are corresponding grid costs and operational complexity). The technical benefits of distributed PV in moderating the impacts of transient clouds are expected to also be there for the distributed utility scale PV proposed. In the current context the advantages of centralised utility-scale outweigh a household-scale distributive model.

The key policy recommendation for supporting a centralised utility scale renewable generation approach over distributed small scale household PV is to continue the MEC technical rule that does not allow household-scale solar to feed in to the grid.

Impact of private solar PV on tariffs and grid costs:

When households or businesses on Majuro and Ebeye install solar without feeding into the grid, they are most likely to also retain a connection to the grid, as sufficiently sized storage to meet energy needs for more than a few hours is very expensive. This means that the utility needs to maintain enough generation capacity to meet load when all these users are on the grid (say, after a day or two of little sun), and also to maintain the distribution grid and connections. However, these users are also using less electricity from the grid and therefore they pay less. This has an impact on the financial sustainability of the utility, and in the long-run, often shifts costs to those grid customers who can afford it less.

Some countries (e.g. New Zealand) are introducing higher tariffs for customers with rooftop solar to compensate for this. Another option is the introduction of a monthly fixed line charge to support the fixed costs of the grid.

If the situation arises of a large private solar installation, it is recommended that consideration be given to requiring them to have storage sufficient to cover overnight use, or to change the tariff structure for that customer to cover having grid as a backup and for overnight use (e.g. have a flat-rate line charge).

It will be important to signal to the wider public the potential for a tariff review of fair pricing for partially sufficient users, so that people can factor these into their investment decisions when thinking about private solar PV generation.

Reasons for people wanting private solar generation:

Anecdotally, private householders and businesses who wish to have small-scale PV systems seem to be motivated by the following:

- desire to have backup power when the main grid goes down, or to go “off-grid” entirely and avoid being dependent on an unreliable grid,
- desire to save money,
- the feeling that they are ‘doing the right thing’ and making a contribution to reducing GHGs, and
- in some cases, customers may expect MEC to pay a feed-in-tariff, as this is often recommended again based on the early stages of renewable energy journeys in other countries (for example, JICA Masterplan 2015).

Quality control and safety issues:

Poor quality or mismatched components, poor installation and inadequate maintenance can all lead to fire risk. Currently there are no standards or regulations governing the equipment or installation, or the qualifications of the person installing. Some small-scale PV owners will be motivated and will have the means to ensure the maintenance of these systems, while other owners may, particularly if they are lower-income and if the equipment was provided under a grant. There are a couple of private businesses established in Majuro who can supply, install and maintain these systems. Finally, the quality of the roof structures of many dwellings on Majuro, and most dwellings on Ebeye, make them unsuitable for the installation of PV panels. It is recommended that some standards for equipment and licensing of installers be considered, and that the new building code under development ensure that roof structures, particularly large roof structures, are designed to support rooftop PV installations.

Recommendations

Given the benefits described above in supporting the achievement of RMI’s climate change targets, it is recommended that RMI renewable energy transition occurs based on centrally planned, utility-scale developments. Given the broader considerations around household-scale solar above, it is recommended that with the current levels of small- and household-scale PV systems, a ‘soft’ policy approach be taken that, while it does not actively encourage household scale solar, allows for those who wish to install private solar PV generation at their homes or

businesses. In order to protect the grid, it is necessary to not allow this small-scale solar to feed in.

Recommended measures for private solar PV are:

- Continue the MEC technical rule that rooftop solar cannot be connected to, or feed into the grid. Establish a similar rule for KAJUR.
- Signal that there will continue to be no net metering or feed-in-tariff for Majuro and Ebeye to support their investment decisions.
- Signal that there could be a tariff review to ensure partially sufficient users are paying a fair price for being able to access the network, to better inform their future investment decisions.
- Increase reliability of grid and build public confidence in the grid so people are less likely to seek alternatives as backup.
- Provide a statement to development partners that that small rooftop solar systems in urban grid areas are outside of RMI priorities.
- Continue the import tax exemption for solar PV panels but do not actively promote it.
- Consider standards for imported equipment, and licensing of installers.
- Include integrity of roof structures, with a view to supporting PV installations especially on larger roofs, in the new building code under development.

Solar PV- Summary of Policy Issues and Recommended Responses

Scale	Who owns PV	Who owns rooftop/ land	Who uses power	Policy issues	Recommended responses
Utility >100kW	Utility	Gov't	Grid/ MEC	Roof owner is responsible for maintenance of roof while MEC is responsible for PV.	Fair compensation for roof maintenance and access for MEC via a *rooftop and land access framework*.
	Utility	Private	Grid/ MEC	Roof owner would seek rent for use of resource (rooftop). Roof owner is responsible for maintenance of roof while MEC is responsible for PV.	Commercial compensation arrangements for use of space, roof maintenance and access for MEC via a *rooftop and land access framework.*
	Private	Private	Grid/ MEC	This is an IPP. At high levels of renewables, utility would have to curtail large and increasing amounts of power, making it very difficult to construct feed in tariffs (FITs) or power purchase agreements (PPAs).	In line with the centrally planned design philosophy, IPPs will be sought only if or when there is a need for the RMI to pursue alternative sources of financing. The Roadmap pathways show there is no need for more solar on the grid until after 2025. Solar IPPs could be considered at that time, although curtailment is likely to be high.
	Private	Private	Private	This is an system where the private sector purchases, installs, maintains PV and consumes all the power for their own use. Issues only arise when the power user(s) served by this are also connected to the grid for backup, but their tariffs don't reflect a fair price for this service.	If the situation arises of a large private solar installation, consider requiring them to have storage sufficient to cover overnight use, or increase tariff for that customer to cover having grid as a backup and for overnight use.
Household or small scale	Utility	Any	Any	This approach is high cost, entails complex grid controls and maintenance, and does not align with the design philosophy for Majuro and Ebeye.	The utility continues to avoid owning and managing small scale solar installations.

	Private	Private	Grid/ MEC	This often recommended approach is considered unsuitable for the RMI[3] for several reasons including: grid technical complexity, higher cost, grid stability issues with high levels of renewables, complexity of maintenance. Current policy is an MEC internal technical rule that household or small-scale solar systems cannot be connected directly to the grid.	Continue the MEC technical rule that rooftop solar cannot be connected to, or feed into the grid. Establish a similar rule for KAJUR
	Private	Private	Private	This is an entirely self-sufficient system where the private sector purchases, installs, maintains PV and uses the power. Issues arise when these users are also connected to the grid for backup, but their tariffs do not reflect a fair price for this service. This is only an issue when there are a significant number of private household systems. Private installations appear to be motivated by these reasons: • to avoid being dependent on an unreliable grid, • to save money, • to feel that they are 'doing the right thing' • in some cases, customers may expect MEC to pay a feed-in-tariff. Safety issues also arise due to poor quality of equipment and installation (e.g. fires). Household systems have been provided on Majuro by donors, and do not come with associated ongoing maintenance support.	• Increase reliability of grid and build public confidence in the grid so people are less likely to seek alternatives as backup • Continue to provide no net metering or feed-in-tariff for Majuro and Ebeye • Establish or adopt equipment and installation standards [from PPA?], inspection regimes [this might be difficult as few enforcement regimes function well in the Marshall Islands, as not that many are expected it may be adequate] • Provide a statement to development partners that that rooftop solar systems in urban grid areas are outside of RMI priorities • Continue the import tax exemption for solar PV panels but do not promote it.

[3] Notwithstanding several existing net metering connections on Majuro that were done as demonstrations.

Rooftop and land access framework for solar PV

Solar PV generation requires large amounts of space. The technology pathways for Majuro show that under either the wind or no-wind scenarios, between 13 MW and 34 MW of solar PV will likely be required before 2030, equating to between 13 hectares (32 acres) and 34 hectares (84 acres). This requirement will greatly exceed the amount of suitable government rooftop space available and will likely require the use of commercial and residential rooftop space, construction of new roof spaces, ground-mounted solar and floating solar in the lagoon. Although space will also be required for wind turbines and other components such as batteries, these are expected to be large one-off projects and can be dealt with under the standard land-leasing framework.

In the RMI, land is held under modified traditional tenure. Land is essentially inalienable but can be leased. Currently, government pays $4,000/acre/year but an increase to $6,000/acre/year is apparently being considered by the Government. The private sector can pay more. Leases are currently for a maximum of 25 years.

Current projects underway (the WB SEDEP project) require 7.5 acres (3 hectares) or more of land or rooftop space for mounting 3MW of solar PV panels. While most of the likely sites identified are on government owned buildings or areas (schools and the water reservoir), experience with existing rooftop PV installations on government buildings shows the need to compensate the entity responsible for the use of rooftop space and to ensure workable arrangements for access.

The likely mix of government, commercial and residential rooftop space means that any rapid scale up of solar generation will require negotiations with multiple property owners, and ongoing access requirements will similarly have multiple counter parties.

There is a strong case for developing a rooftop and land leasing/access/compensation framework to address the imminent need for access to space under the World Bank project. This framework would apply to every property if the property owner choose to make space on the property available for solar generation. This framework should establish a suitable compensation structure so that meeting the future increasing need for space remains affordable, and that transaction costs are minimised through having standardised terms. The framework should cover government buildings, commercial and residential buildings and land area (where that is not already covered by existing arrangements).

The alternative options considered but not recommended are:

- No standardised framework with each property owner negotiating its own terms . This approach is likely to be inefficient, adversely impact on the speed of accessing space given the capability constraints, and potentially risk timeframes for scaling up renewable generation;
- An “opt in “ standardised framework-each property owner can opt into the standardised terms but is not compelled to do and can seek bespoke terms if it wishes. This approach does provide standard terms if a property owner elects them, and as such should reduce the transactional costs of implementing the regime. However, there is a risk that owners will prefer to negotiate variations with a resulting adverse impact on the speed at which roof site terms can be agreed, as well as increasing complexity over time for ongoing access if negotiations result in a varied number of access agreements.

While the simplest approach to compensation is in the form of direct payment for space, further work will need to be undertaken to assess the benefits and risks of alternative forms of compensation. For example suggestions have been made that community spaces could be provided by constructing covers for car parks, basketball courts and playgrounds and that compensation could be provided in water and lighting for the space.

These alternative forms of compensation would need to be developed in a manner that ensured any compensation in the form of power was fairly priced, incentivised efficient use of power, and would be simple to administer over time. Similar schemes whereby land owners have been

provided with Government-paid-for-power (see below) have expanded over time and have resulted in poor incentives on the efficient use of power.

Recommendation:

It is recommended that a standardised rooftop and land leasing/access/compensation framework be developed as a TA under the current WB-funded SEDEP project, as it will be prerequisite for deploying the 3MW of planned solar on Majuro under this project.

Sector governance and coordination

There are several key actors in the RMI electricity sector, and overall, the pool of people is very small and there is a need to work closely together. The focus should be to build coordination and collaboration, with the key people sharing information and working effectively together. Frameworks and legislation are helpful, but the focus should be on relationships, information sharing and effective decision-making. This section briefly addresses some of the formal aspects of this. More detail can be found in the Financing and Implementation Working Paper (forthcoming).

RMI Roadmap Working Group/ Energy Task Force

An RMI working group has been established to oversee the development of the Roadmap. It is recommended that this group continue and evolve into the steering committee for the implementation of the Roadmap. The details of this are discussed further in the Financing and Implementation Working Paper. Core members include CEO and CTO of MEC/KAJUR, National Energy Planner (EPD), Director of Division of International Development Assistance (DIDA), Chief Secretary or Assistant Chief Secretary. The National Energy Policy calls for reestablishment of the Energy Task Force (ETF) – this group could perform that role. While NEP states that the ETF requires requires a legal mandate, these consultants do not consider that to be necessary. What is important is that there is focus on providing secretariat support and ensuring the group meets regularly. Note should be taken of the effective role that the Coastal Management Advisory Group (CMAC) has performed in coordinating natural resources policy and activities over the last 15 years in the absence of any legal mandate.

Ministry for the Environment, Climate Change and Energy

There is a proposal to establish a Ministry for Environment, Climate Change and Energy, bringing together the offices of EPA, OEPPC and EPD. A bill for an Act providing a framework for this Ministry is to be put to the Nitijela in late 2018. [insert substance on what this Act does when we see a copy]

National Energy Policy

A National Energy Policy was drafted in 2009 and updated in 2014/5. The RMI Electricity Roadmap builds on and updates the NEP in the area of electricity only. The update is required for two key reasons:

1. The RMI's greenhouse gas reduction targets declared in the NDC in 2015 supercede the previous targets of 20% renewable energy by 2020 and associated energy efficiency target, which are the overarching goals of the NEP.
2. The very substantial amount of development partner investment in the electricity sector in recent years was not apparent when the NEP was developed in 2014/15.

Although many of the goals and actions contained in the NEP remain relevant, these two new conditions create a very different context for the development of the RMI electricity sector, requiring significant scale-up of effort and coordination, and a focus on the development of renewable electricity infrastructure.

One area where the NEP diverges very significantly from the Roadmap is that the NEP contains actions to promote distributed small-scale solar generation and private investment through technical standards and feed-in-tariffs. As discussed in this paper, the high levels of renewables and large, rapid steps required mean this is not a viable strategy for the RMI.

In addition, the NEP is due for renewal this year: the NEP was developed in 2014 and the planning period ends in 2019. It is also noted that the NEP and the Roadmap have a different scope: the Roadmap addresses only parts of the energy sector related to the generation, transmission and use of electricity, while the NEP is comprehensive across all energy in the RMI including petroleum, transport and energy for cooking.

In effect, the Electricity Roadmap will supercede the NEP in the areas of electricity generation, distribution and use and become the framework document for development of the RMI's electricity sector.

Energy Sector Management Act

The NEP identifies the need for an Energy Sector Management Act to better define roles and responsibilities of actors across the sector. Sensibly, the NEP also states that: "Although energy matters are important to all sectors of the economy and all agencies of government, the human resources of RMI are modest; it is important that a review and an assessment of all existing legislation be carried out as a first step to determining the extent to which a legal framework may be established."

The EU is providing TA to develop the Energy Sector Management Act in the later part of 2018. Some issues that could be considered in that Act include processes and responsibilities for:

- setting electricity tariffs and subsidies
- monitoring and controlling fuel prices
- collection and collation of energy data
- regulations/ standards for equipment
- licensing of electricians and other skilled personnel.

It will be important to consider capacity, resourcing and planning to implement this of legislation. Often in the RMI these issues are neglected and legislation is not implemented in its intended form.

Financing policy

Process for reviewing loans

Due to the RMI's high level of debt and risk of debt stress, if the electricity sector takes on loans or enters into other contractual arrangements, there is the risk that it could affect the RMI's financing from multilateral development banks across all sectors. There is therefore a need for a formal process to ensure the RMI Ministry of Finance reviews and approves proposals for financing. This is discussed further in the Financing and Implementation Working Paper.

Private sector investment

Private investment in renewable generation is both a feature of large economies where there is a strong private sector, less risk and vibrant competition, and a developing area within smaller Pacific economies. Previous studies have recommended that RMI develop attractive financing arrangements for private on-grid and off-grid solar investment [IRENA 2015] or feed in tariffs [JICA 2015]. This section discusses a possible role for non-utility owned generation, based on the whole investment program for achieving the targets.

As discussed above, the successful execution of the RMI's rapid transition to renewables means a centrally planned and managed capital investment programme. The Marshall Islands has access to relatively large amounts of grant financing but beyond this has capital constraints due

to restrictions on loans. The investment need, pathway and available finance will be determined early and is focused on the capital programme requirements as a whole (grid, wind, solar, diesel generators and enabling technologies). If the process of assessing investment need and available finance means there is a need/case for private investment , that private investment will need to be actively procured as part of the centrally planned and managed capital investment programme , based on the specific requirements of the system (technology compatibility, timely delivery, pricing sustainability etc), as opposed to responding to unsolicited proposals.

Active procurement will need to be managed through strong governance so that a rigorous assessment is based on the electricity network's needs as opposed to supplier driven preferences. Specialised technical assistance will be required to prepare tender specifications and contracts.

If IPPs are to be considered, we would want to ensure the benefits to the RMI, including a price competitive with the cost of utility-owned generation. In particular:

- the technology would benefit from specialised ownership and operation- which may be the case for wind on Majuro and Ebeye, or even island mini-grids
- there may be a project that does provide efficiently priced energy
- where the RMI has severe capital constraints and an IPP could overcome that
- there are multiple benefits for which it would be better for the RMI utilities to purchase that energy as a service (for example, it might be worth thinking about this approach for the WTE plant).

Additional considerations for IPPs include:

- IPPs face a high-risk, high-cost environment reflected in a price premium for power (i.e. it may be more expensive than utility-owned power)
- outsourcing energy generation may reduce RMI 'ownership' and responsibility (could be further explored).

The RMI does receive regular unsolicited proposals for such projects, as do other countries in the Pacific. It is recommended that the RMI does not engage with unsolicited IPPs, but instead actively seeks IPPs to address needs identified through central planning.

Policies for energy efficiency and demand side management

Free power to landowners on Majuro

Currently over nine hundred MEC customers on Majuro receive 1000kW/h per month of free electricity, paid for by the RMI Government. Analysis of electricity use shows that, in general, these customers use more power each month than customers who do not receive free power. Aside from the high cost of the subsidy to government, there is little incentive for these customers to conserve energy. One key recommendation is to remove free power to these nine hundred customers in order that customers face appropriate incentives to conserve electricity (i.e. conserving electricity will save them money). If there is, in fact, a need to compensate landowners for electricity poles crossing their land, it is recommended this be done as a direct payment and not as free electricity.

Energy efficiency and conservation measures

There are many possible measures for energy efficiency and conservation- only some of these require consideration as policies, as noted below:

- Minimum energy performance standard (MEPS) and appliance labelling scheme.
- Ban incandescent lightbulbs
- Mandate purchase of Energy Star (or similar energy rated labelling) appliances for all government agencies ('soft' internal government policy)

- Prescribe air conditioning temperature set points for government agencies ('soft' internal government policy)

Regulatory processes

As noted above, there are several areas where transparent regulatory processes may be useful including tariffs and standards for equipment and personnel. It is expected that both the EU TA to develop an Energy Sector Management Act, and the MEC reform TA provided by the ADB, will explore these issues in more detail. If processes are sufficiently transparent, there may not be need for an independent regulator.

- **Electricity tariff and subsidy setting**—the combination of tariffs and subsidies should be set to provide for the long-term financial sustainability of MEC and KAJUR, including allocation of future capital needs, while at the same time ensuring affordability to users. At present MEC sets tariffs from an 'Approved Tariff Template' based on imported fuel prices. Tariff settings are proposed by the utility and approved by Cabinet. Free electricity allocations on Majuro do not provide incentives for conservation of energy use. It would support the financial sustainability of the utilities and the government to have tariffs and subsidies set against objectives that focused on the long term interest of users.
- **Technical standards on equipment**—There is a need to establish some technical standards for network and equipment, including solar home systems to ensure safety and technical compatibility. Standards (such as minimum energy performance standards, or MEPS) could also be applied to appliances.
- **Licensing of electricians and skilled personnel**—A regulator could set standards and licensing for electricians and other skilled technicians. This could be done by adopting… [check if there are PPA licensing standards?]
- **Potential for shared authorities**—The possibility could be explored of a shared utilities regulator that covers power, gas, fuel, water and sewer, and waste management. Another way to consider sharing the regulator roles would be in the area of price control across fuel, electricity, food and prices for other utility services.

Building code

A building code is being developed under TA from the Italian Government [is that correct?]. The important considerations in terms of the electricity roadmap are:

- The building envelopes are designed with energy efficiency in mind- either allowing for orientation and air flow so the building is cool without air conditioning, or with insulation and minimising leakage and draft when using air conditioning.
- That roof structures, particularly those of larger buildings, are suitable for mounting solar panels.