REGULATORY AUTHORITY
OF BERMUDA

Integrated Resource Plan (IRP) Guidance

Invitation To Comment

Consultation Document Matter: 20210716
Date: 16 July 2021
Responses Due: 8 August 2021
Revised Due Date: 18 August 2021

1st Floor, Craig Appin House, 8 Wesley Street, Hamilton HM 11, Bermuda
T: (441) 405-6000 • E: info@ra.bm

Invitation to Comment

1. An Integrated Resource Plan ("IRP") is a plan that seeks to balance the future demand and supply of electricity. Broadly, the IRP's purpose is to set out the strategy for the procurement and retirement of generation assets as well as demand side resources that meets the needs of consumers in a cost efficient manner that is also consistent with Bermuda's energy policy objectives.

2. Accordingly, this plan should incorporate the latest evidence on the costs and technical characteristics of different generation and load management technologies in order to evaluate the least-cost capacity expansion plan for the electricity market of Bermuda. The plan should include both a resource plan—including a forecast of expected demand and the state of the existing generation resources—and a procurement plan, which details how the TD&R Licensee proposes to meet the expected demand.

3. In accordance with the National Electricity Sector Policy of Bermuda (the "Electricity Policy"), the reformed electricity sector will introduce competition between existing generation facilities, prospective third-party bulk generators (i.e. independent power producers), distributed generators, and other demand-side resources.

4. In order to achieve greater efficiency while maintaining an appropriate level of overall system reliability, the costs and benefits of all competing resources and sectoral developments will need to be considered when developing future investments plans, to ensure that these plans are efficient.

5. The precursor to the final version of IRP is the IRP Proposal which is prepared by the TD&R Licensee and present to the Regulatory Authority of Bermuda (the "RA").

6. In preparing the IRP Proposal, the TD&R Licensee is required to produce an IRP Proposal that contains a resource plan and a procurement plan specifically designed to address future sectoral demand.

7. The TD&R Licensee is also required to consider (i) all possible resources, including new generation capacity, demand side resources (including demand response and energy efficiency), and retirement of generation capacity; and (ii) a range of renewable energy and efficient generation options, and a prudent diversification of the generation portfolio.[1]

8. The IRP Proposal is required to (i) prioritise actions that most meet the purposes of the EA, conform to Ministerial directions, and be reasonably likely to supply electricity at the least cost, subject to trade-offs contained in the Ministerial directions or instructions from the Authority; (ii) include recommendations on whether any resources should be procured through competitive bidding; and (iii) propose limits for total distributed generation capacity over the planning period.[2]

[1] Electricity Act 2016, Section 40(2)(a).
[2] Electricity Act 2016, Section 40(2)(b)–(d).

IRP Guidance

9. The RA provides guidance on the development of the IRP Proposal to the TD&R Licensee in line with the EA and sector policy documents, mainly the Electricity Policy and the National Fuels Policy of Bermuda.

10. This IRP guidance document will provide information on the scope of electricity generating technologies, types of fuels that can be used in generating electricity and prohibitions that are to be used for the development of the IRP Proposal.

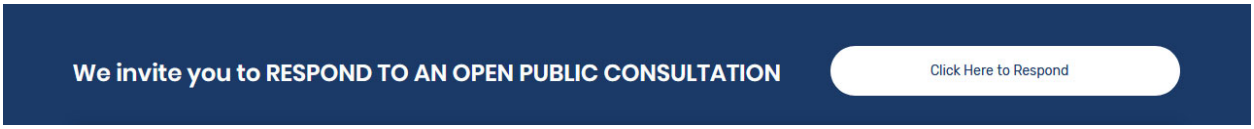
11. Demand side resources such as energy efficiency and energy conservation programs and distributed solar PV may also identified to be considered for inclusion in the IRP.

Invitation to Comment

12. The RA invites comments from members of the public, electricity sectoral participants, sectoral providers and other interested parties to provide their views on the contents of IRP Guidance, on what should be included and excluded in the IRP, as well as any other aspects of the assumptions, demand and supply side resources, time frames and outputs from the IRP. The suggestions may provide alternatives that may provide for an electricity generation mix that is more consistent with the purposes of the EA (e.g., least-cost provision of reliable electricity).

13. Comments must reach the RA no later than 11:59pm on 18 August 2021 to be considered. Comments should be sent to the RA via email at consultation@ra.bm with the subject line "IRP Guidance".

14. Responses to this Invitation should be filed electronically in MS Word or PDF format. Parties wishing to file comments should go to the RA's website www.ra.bm and click on the "Click Here to Respond" button on the RA's home page:



Assumptions

15. The main assumption to the IRP includes the evaluation of the IRP of a 20-year time frame that would include an outcome of electricity generation from 100% renewable energy resources, elimination of Heavy Fuel Oil as a fuel resource with diesel or propane being used as a fuel resource for backup power generation. For the commencement of the IRP Proposal development, data will be made available from the RA's desktop wind study.

    i. Time frame 2021 – 2041;

    ii. 100% energy from renewable energy resources;

    iii. 100% elimination of Heavy Fuel Oi;

    iv. Nominal supply of diesel or propane or similar light fuel for backup power; and

    v. August 2021 RA desktop wind study is completed.

    Do you agree with the list of assumptions? If not, please state why and/or provide additional or alternative assumptions.

Prohibitions

16. The RA seeks to exclude several technologies or fuel resources from being considered in the IRP. The prohibitions include:

    i. Nuclear Energy;

    ii. Heavy Fuel Oil (transition only);

    iii. Natural Gas; and

    iv. Ethane.

    Do you agree with the list of prohibitions? If not, please state why and/or provide additional or alternative prohibitions.

Supply-side Resources

17. The supply side resources provide the base load and intermittent bulk generation capacity. These resources are intended to provide a stable and reliable power supply to meet the load demands needs of the country.

i. Fixed-mount wind turbines;

ii. Floating wind turbines;

iii. Land based utility-scale solar photovoltaic;

iv. Fuel cells;

v. Bio-mass;

vi. Ocean thermal;

vii. Battery Energy Storage Systems;

viii. Hydrogen (Proton Exchange Membrane Electrolysis or alternatives); and

ix. Reversible fuel cells (Proton Exchange Membrane, Solid Oxide or alternatives);

Do you agree with the list of supply-side resources listed above? If not, please state why and/or provide additional or alternative supply-side resources.

Demand-Side Resources

18. The Electricity Policy defines demand-side resources as "conservation measures to limit or reschedule electricity use so that the size and number of generating facilities can be reduced or delayed…and can include reducing overall energy consumption (energy efficiency), shifting consumption to off-peak times (peak load shifting), and reducing consumption during peak times (interruptible load)". The following demand-side resources are being considered:

i. Energy efficiency (specific programmes should be listed) – (e.g., lighting upgrades, air conditioning, appliances, etc.);

ii. Conservation (specific programmes should be listed) – (e.g., Water heater insulation and timer installation programmes, etc.);

iii. Distributed Generation - Solar Photovoltaic;

iv. Battery Energy Storage Systems – (particularly low-income and medically-vulnerable/life assistance), establish a target (MW, MWh) for general behind the meter battery energy storage systems; and

v. Electric Vehicles Import/Export (Smart/Non-Smart Charging, Vehicle to Grid (V2G) (ADR and standard export) & Vehicle to Home (V2H)) Demand Response.

Do you agree with the list of demand-side resources? If not, please state why and/or provide additional or alternative demand-side resources.

Tariffs

19. As a part of demand-side management, rate structures can also be used to facilitate changes in energy consumption behaviours and peak demand reduction. Various tariffs are being considered to assist in these behavioural changed. These tariffs include:

i. EV public charging Tariff;

ii. Low-income Tariff;

iii. Time of Use Tariffs;

iv. Demand Response Tariff;

v. Vehicle to Grid Tariff; and

vi. Economic Development Tariff.

Do you agree that the listed tariffs would facilitate behavioural changes in energy consumption? If not, please state why and/or provide additional or alternative tariffs.

Time Frames

20. The IRP has a 20-year outlook, however various resources and/or goals in the IRP are considered short/near, medium or long term. The time frames are categorised as:

i. Near term – 0-5 years – Immediate delivery;

ii. Medium term – 6-10 years; and

iii. Long term – 11-20 years.

Do you agree with the time frame categories? If not, please state why and/or provide additional or alternative time frame categories.

Outputs

21. In addition, the IRP including a forecast of expected demand, the retirement schedule of the existing generation resources and a procurement plan for new generation resources, there are various other outputs to the IRP. The list of output considered are:

i. 20-year demand projections;

ii. 20-year generation projection include reserve capacity, if any;

iii. 20-year Transmission capital plan and alternate topologies (radial, ring, hybrid);

iv. 20-year Distribution capital plan;

v. Sensitivities for retirement of HFO plants;

vi. Alternatives and substitutes (e.g., electric vehicles for internal combustion engine vehicles);

vii. Electric vehicle uptake programme (target > 60% EV's of new vehicles imported annually by 2030?);

viii. Timelines;

ix. Benefits;

x. Risks;

xi. Potential obstacles; and

xii. Proposed procurement plan.

Do you agree with the Outputs? If not, please state why and/or provide additional or alternative Outputs.

Utility Scale Resources Under Development - 6MW Capacity Limit (Sandbox)

22. It is proposed that emerging technologies have limited consideration in the IRP. These emerging technologies will be restricted to technologies that are near-commercial operation. The proposed set of emerging technologies include:

    i. Wave Power Generation,

    ii. Floating solar.

    Do you agree with the technologies to be considered for the Sandbox? If not, please state why and/or provide additional or alternative technologies in be included in the Sandbox.