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Enabling Resources Work Plan: Progress Update

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Questions for SAC input

1. Is the assessment of existing resource availability/capability against forecasted system needs an appropriate approach for prioritizing market enablement activities?
2. Are there additional/different considerations IESO should consider in prioritization?
3. Are there additional resource types that should be considered?
4. How might the IESO learn more about the opportunity for emerging resource types for which it has less information (e.g. storage, hybrids?)

Introduction

- As reported in the 2020 Annual Planning Outlook (APO), the IESO forecasts emerging system needs in the 2020s, including a potential need for new build resources
- In recent years, the IESO has identified a number of opportunities to retain or enhance existing resources' contributions to maintaining system reliability and market competition
- With finite resources, the IESO must carefully consider if, how, and when it implements identified opportunities to ensure the value of ratepayer investments are maximized and the delivery of critical operations and projects (e.g. Market Renewal, Resource Adequacy)

Enabling Resources project objective

The Enabling Resources initiative will produce an integrated plan that will outline the sequencing, timing and scope of activities to be undertaken by the IESO to enable existing electricity resources to provide electricity system services that they cannot fully provide under current market architecture taking into account the timing of system needs

Enablement mechanisms

- Resources can be enabled to provide services and be compensated for them through different mechanisms:

Mechanism	Description	Typical application
Pilot	Procurement of services on a time-limited, experimental basis, may or may not feature elements of market participation	Testing capabilities and building operational experience with emerging resources (e.g. IESO York Region Non-Wires Alternative pilot)
Program	Procurement of service(s) typically from a specific resource type, may or may not feature elements of market participation	Integration of policy-supported resources (e.g. prior Demand Response programs)
Market enablement	Establishment of a participation model applicable for a resource type(s) to enable it to compete to provide services in the wholesale market	Resources representing significant proportion of Ontario resource fleet (e.g. the Non-Quick Start participation model for thermal and hydro)

Enablement mechanisms (cont'd)

- To improve market efficiency and/or reliability, the IESO has as warranted:
 - Transitioned resources from being enabled through programs/pilots to market participation (e.g. the transition of capacity demand response resources from an administrative program to the market)
 - Implemented changes to better reflect the operational characteristics of resources in the market (e.g. changes after market opening to enable natural gas resources to specify minimum loading points at which they can reliably operate)

Enablement opportunities

- In recent years, the IESO has identified several opportunities to enable/enhance the enablement of new and existing resources to provide required services, including through:
 - The Expanding Participation in Operating Reserve and Energy (EPOR-E) initiative
 - The Storage Design Project
 - The Distributed Energy Resource (DER) White Papers
- Slide 8 summarizes these opportunities

Enablement opportunities (cont'd)

Resources	Identified enablement opportunities
Imports	<ul style="list-style-type: none"> • Enable resource-backed imports to provide capacity • Enhance existing participation model to more fully enable imports to provide Operating Reserve (OR) (currently limited to Quebec interties)
Variable Generation	<ul style="list-style-type: none"> • Enhance existing participation model to enable variable generation to provide OR
Variable Generation – Storage Hybrids	<ul style="list-style-type: none"> • Establish a participation model to enable hybrid resources to provide capacity, energy, and potentially OR
Storage	<ul style="list-style-type: none"> • Replace interim participation model (whereby storage resources participate as two separate load and generation resources) with an enduring solution to enable/enhance ability to provide energy, OR, and ancillary services
Distributed Energy Resources (DER)	<ul style="list-style-type: none"> • Establish participation models for dispatchable and non-dispatchable distributed energy resources (DER), including aggregations

Enablement opportunities (cont'd 2)

Resources	Identified enablement opportunities
Demand Response	<ul style="list-style-type: none">Enhance the existing Hourly Demand Response (HDR) participation model to enable more flexible HDR resource contributors to provide OR
Regulation Service providers	<ul style="list-style-type: none">Enable resources that provide Regulation Service to simultaneously provide Regulation Service and OR
"Not-So-Quick-Start" natural gas	<ul style="list-style-type: none">Establish a participation model to more fully enable gas resources with operating characteristics falling between Quick Start and Non-Quick Start resources to provide OR

Proposed prioritization approach

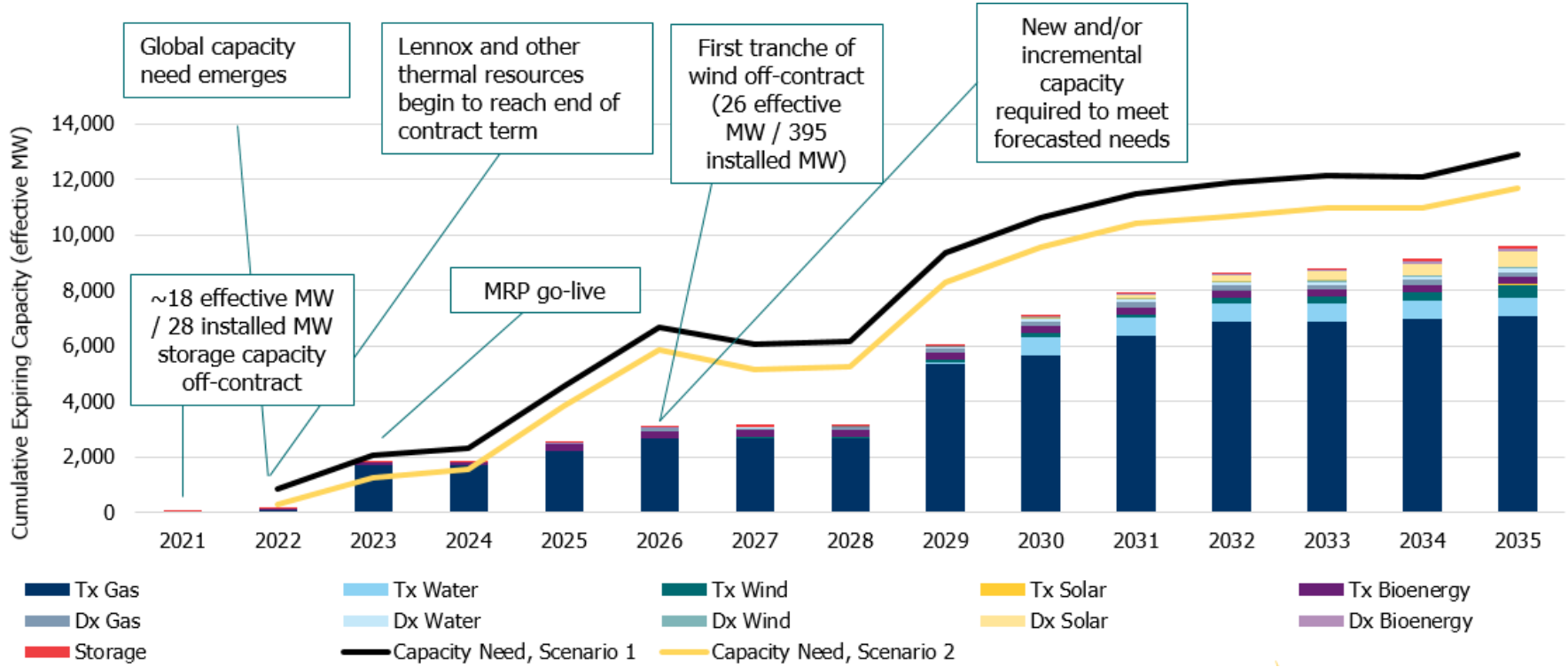
- To identify, prioritize and sequence opportunities to retain/enhance the resource adequacy contributions of existing resources and inform potential work-planning, the IESO proposes considering (over the 2021-2035 timeframe):
 - The timing, quantity (MW), and capability, that would be made available by each enablement opportunity;
 - The timing and magnitude of forecasted system needs;
 - Potential interrelationships between enablement opportunities; and
 - IESO capacity for additional initiatives

Proposed prioritization approach (cont'd)

- The following slide compares forecasted system capacity needs under the two scenarios contemplated in the APO (fast and slow post-pandemic economic recovery) and capacity that will be available from existing resources with expiring contracts 2021-2035¹
- Slide 12 indicates expiring effective summer capacity which is the capacity that can actually be relied upon during the summer once accounting for factors such as variable fuel availability and unplanned outages
- Expiring installed capacity over the study period is captured in the appendix

¹ Expiring capacity data is consistent with the 2020 APO

System need and expiring effective capacity



Example enablement opportunity: VG-Storage Hybrids

- IESO currently assumes that each MW of installed wind and solar provides approximately 0.12 MW and 0.33 MW of effective summer capacity respectively (Source: 2020 APO Supply Module)
- Enabling Variable Generation (VG) resources to pair with storage could “firm” the resources, increasing their capacity contribution
- For example, increasing the transmission-connected VG fleet’s summer capacity contribution factor to 0.40 would represent close to 1200 MW of incremental effective capacity (from approximately 470 MW to 1660 MW)

Relationship to Resource Adequacy framework

- IESO is currently engaging on development of a Resource Adequacy framework to competitively acquire capacity to meet short, mid, and long-term electricity system needs in a way that:
 - Effectively balances cost and risk and;
 - Ensures implementation in time to address larger forecasted capacity needs
- The intent of the Enabling Resources initiative is to ensure robust competition in the Resource Adequacy mechanisms to support cost-effective reliability

Next Steps

- Receive input from SAC on feedback questions
- Establish formal Enabling Resources work plan engagement
- Share draft work plan through engagement by end of Q1 2021

Questions for SAC input - review

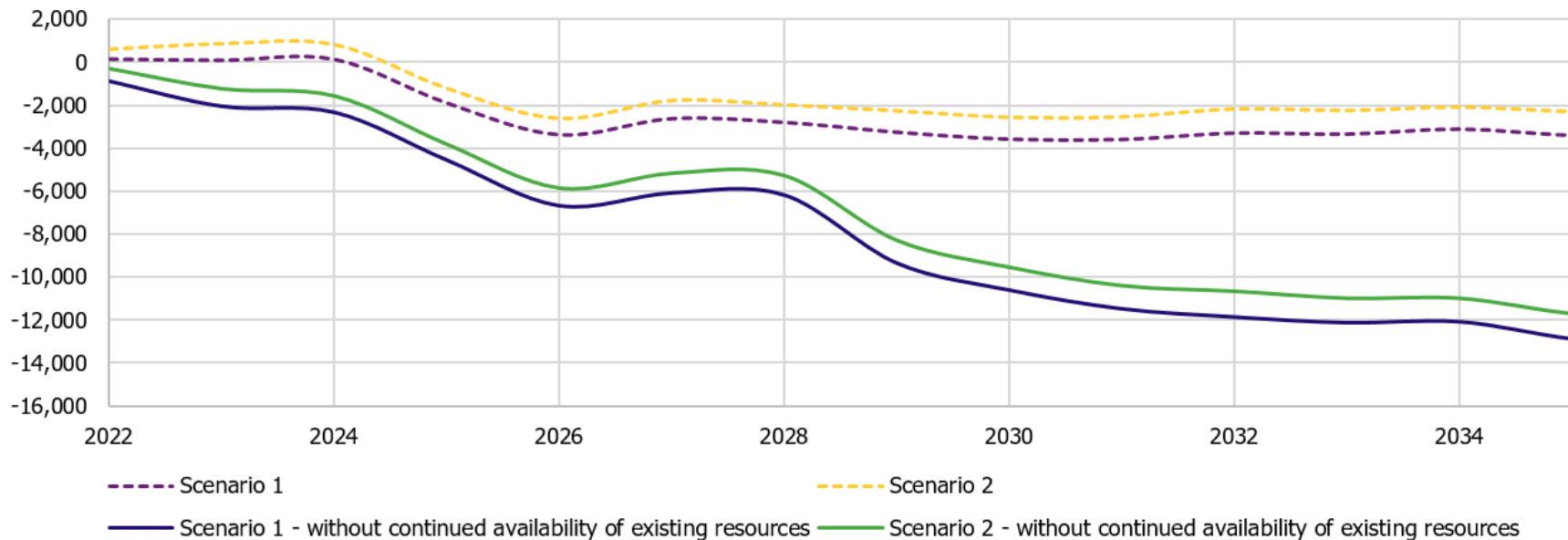
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Appendix: System needs and expiring contracted capacity

Summer capacity surplus/deficit (MW)

Summer Capacity Surplus/Deficit (MW)

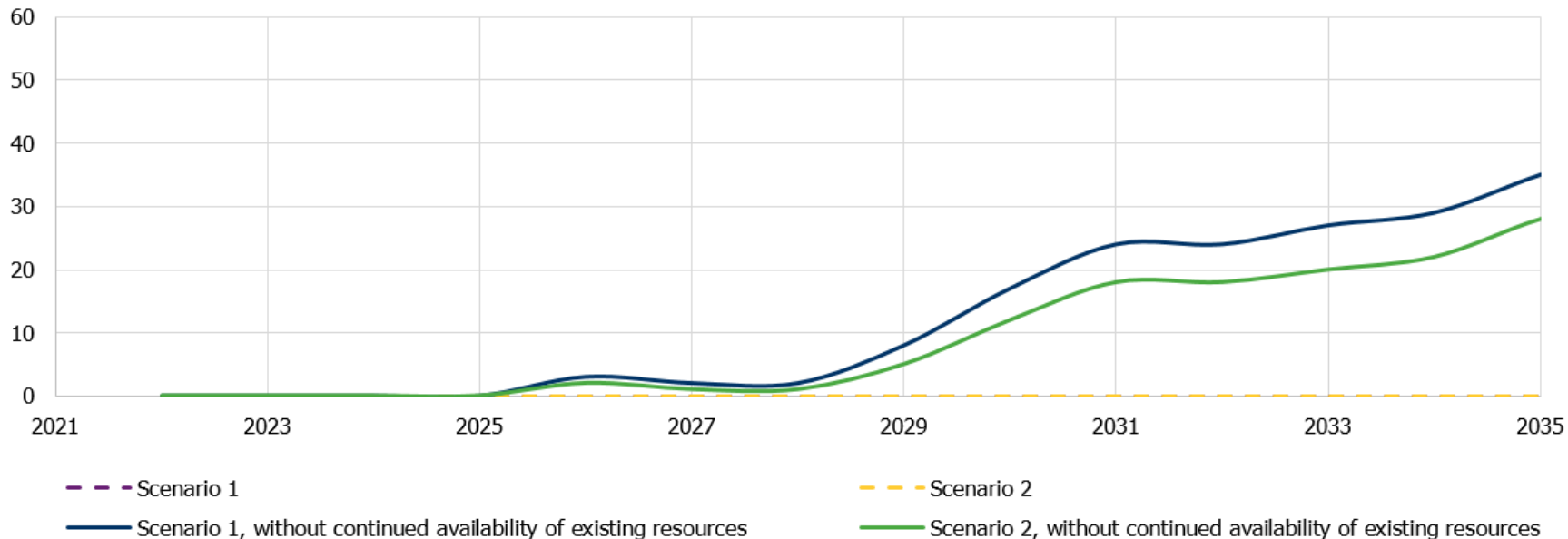


Note: Scenario 1 represents a quicker economic recovery from COVID-19 vs. Scenario 2

Source: 2020 APO

Potentially unserved energy (TWh)

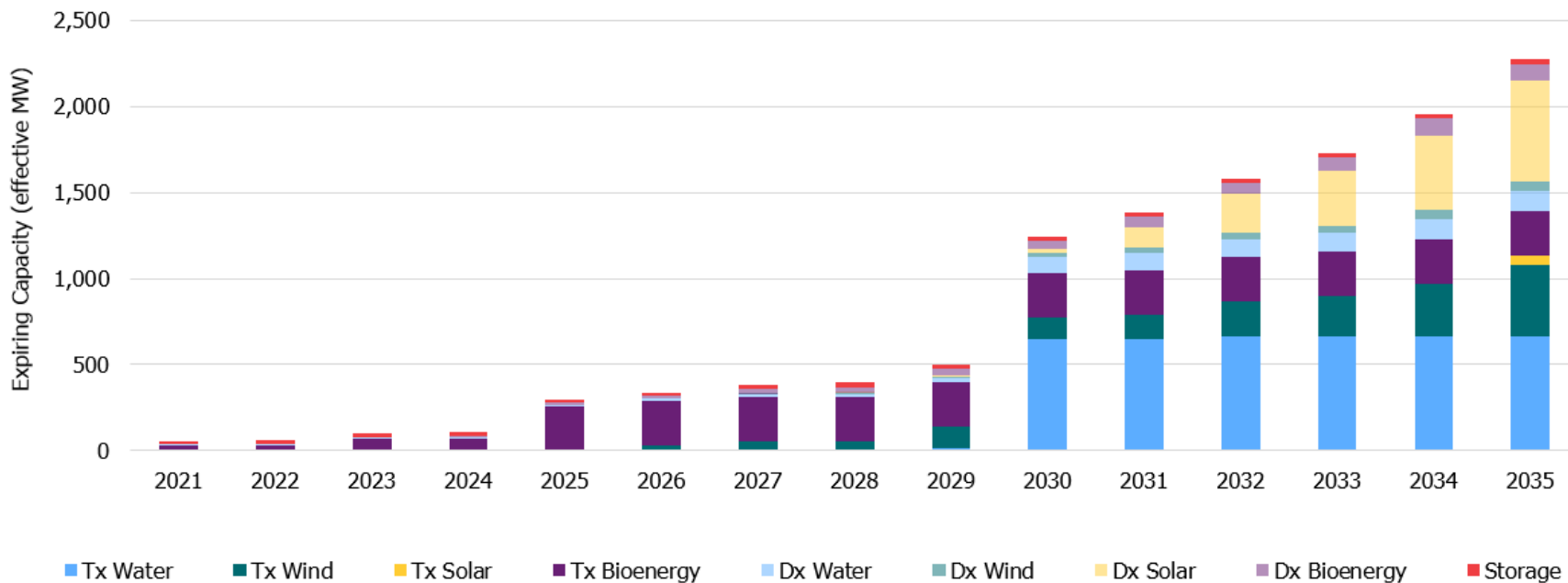
Potentially Unserved Energy (TWh)



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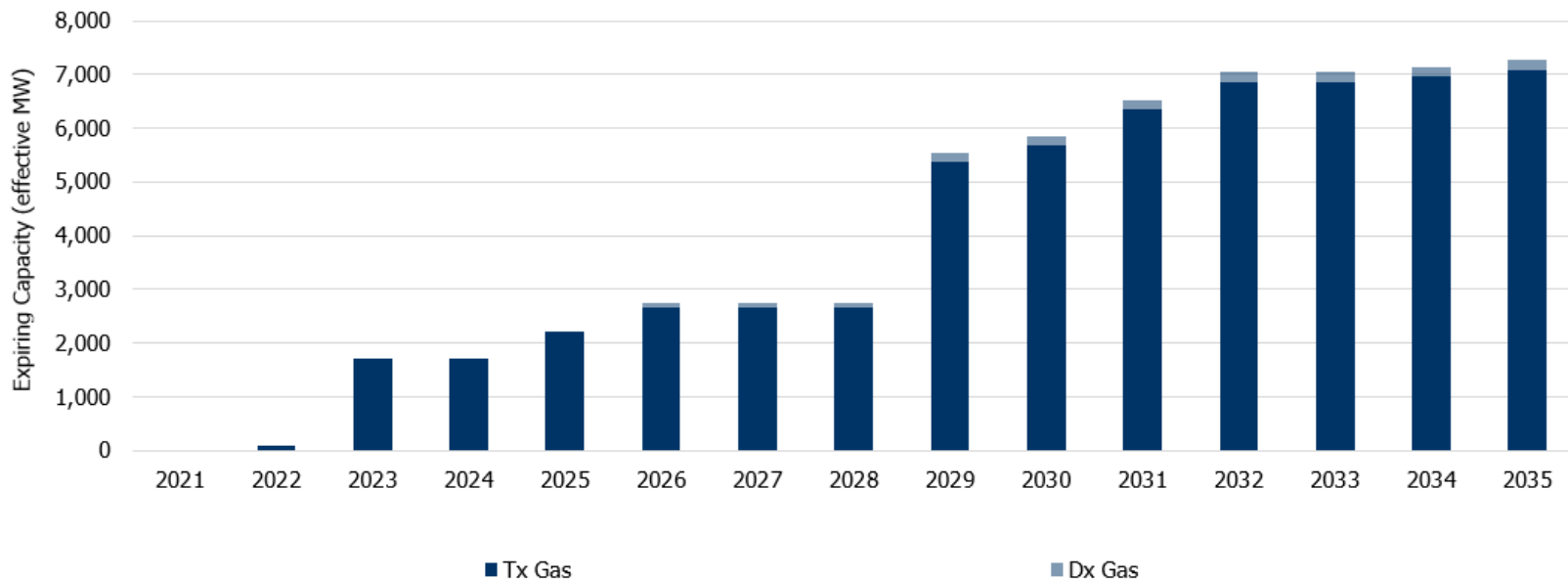
Source: 2020 APO

Expired contract effective capacity (cumulative)



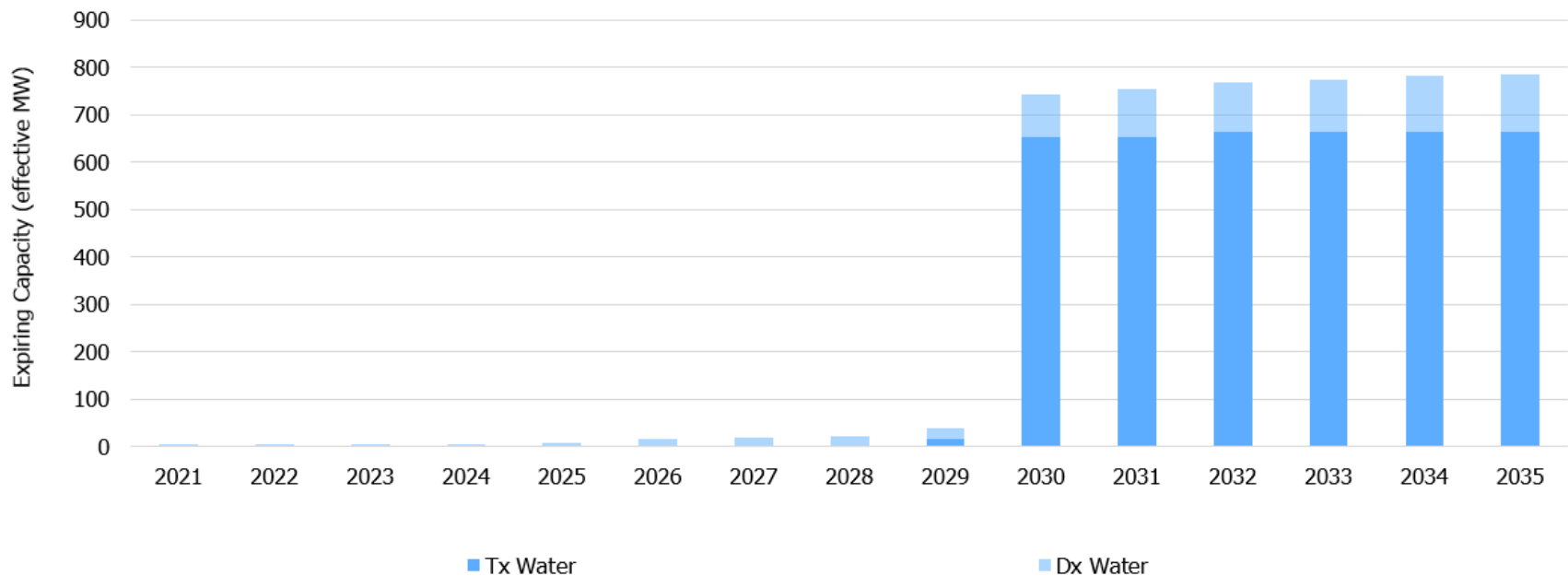
Note: data is consistent with the 2020 APO

Expired contract effective capacity – natural gas



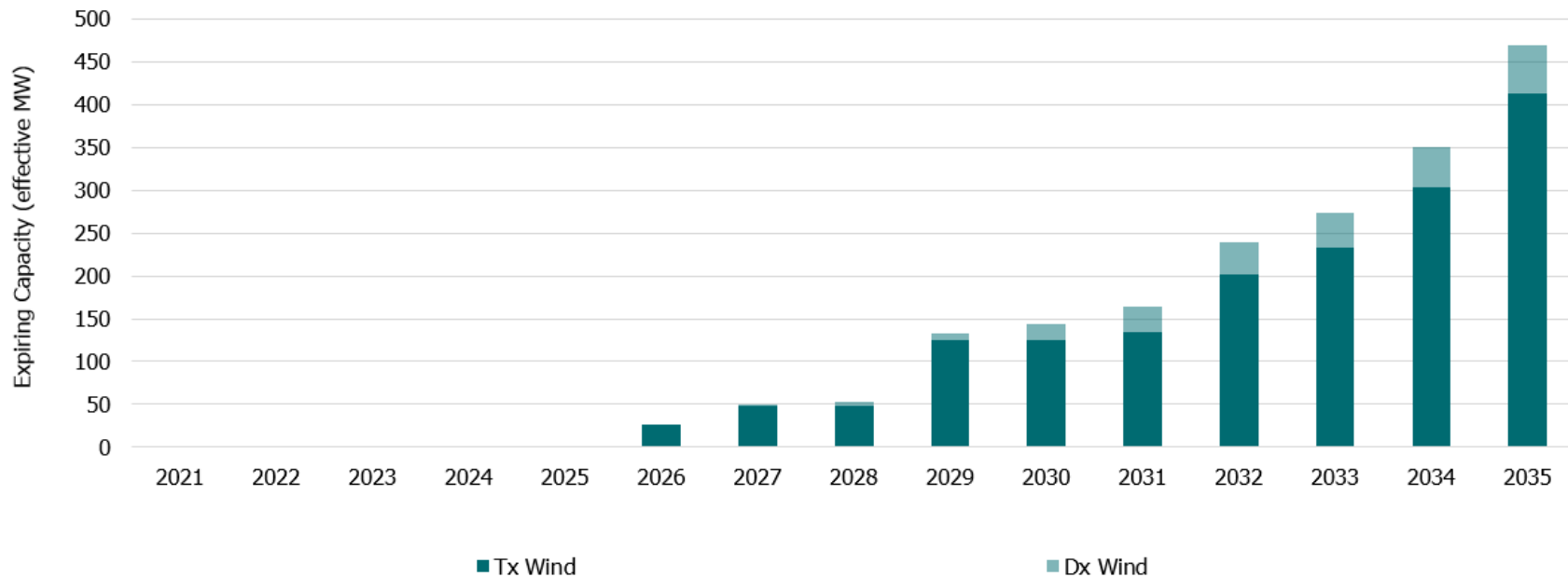
Note: data is consistent with the 2020 APO

Expired contract effective capacity – hydroelectric



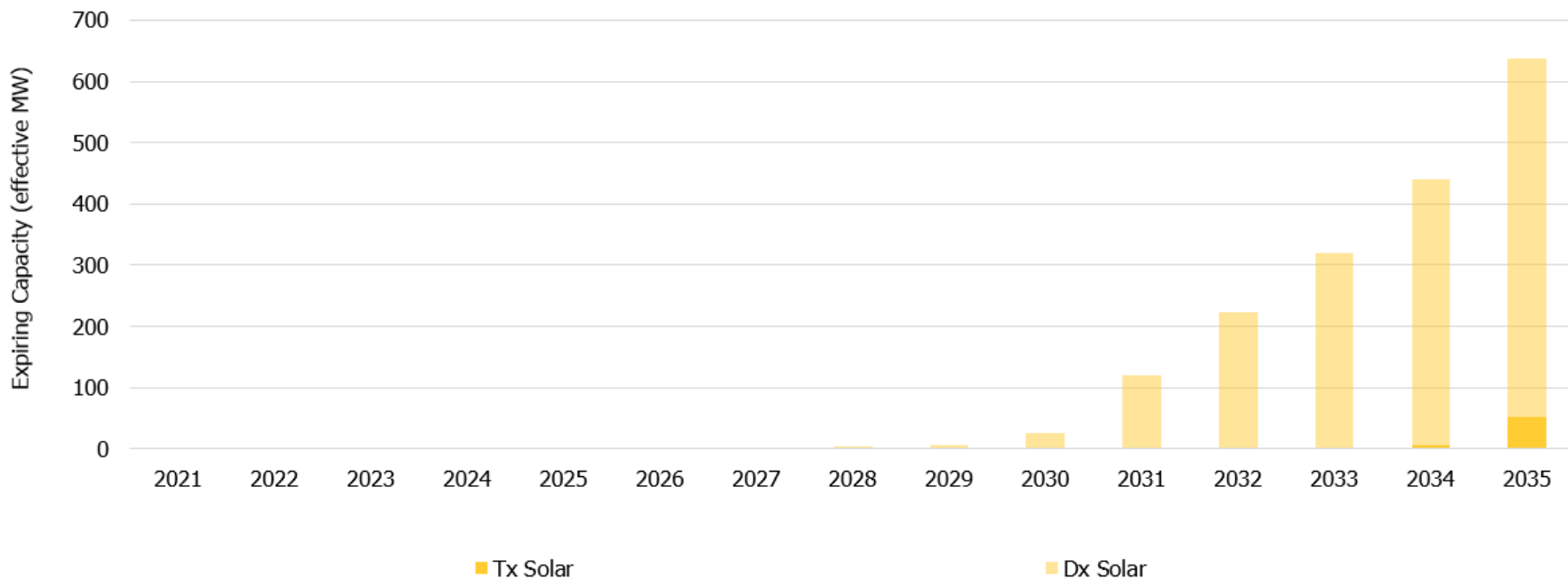
Note: data is consistent with the 2020 APO

Expired contract effective capacity – wind



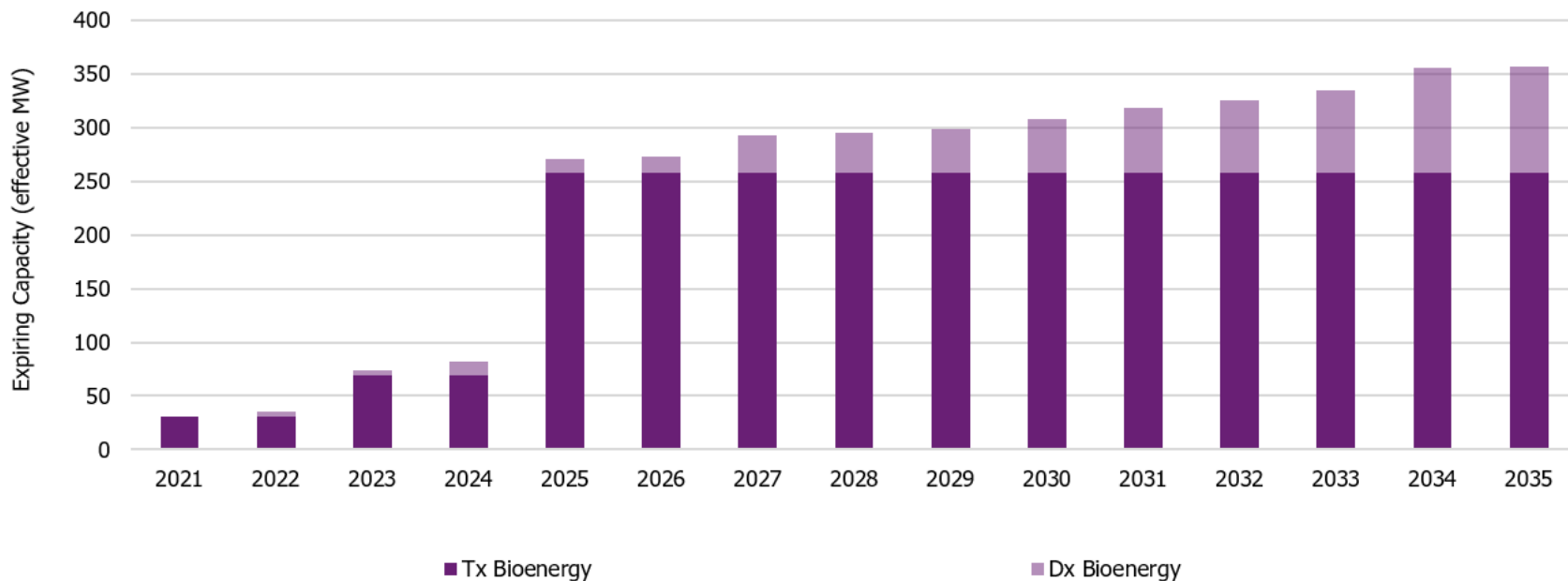
Note: data is consistent with 2020 APO

Expired contract effective capacity - solar



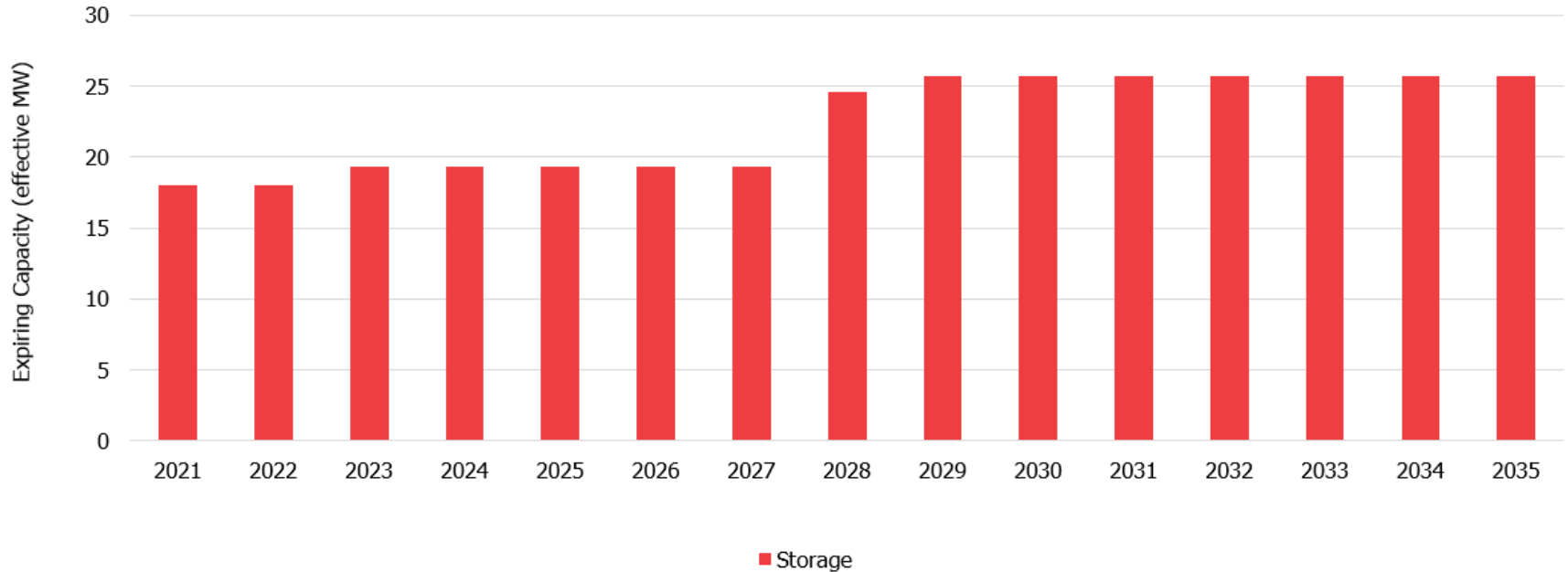
Note: data is consistent with 2020 APO

Expired contract effective capacity – bioenergy



Note: data is consistent with 2020 APO

Expired contract approx. effective capacity - storage



Note: data sourced from internal IESO correspondence re: storage contracts

Expiring installed capacity (2021-2035)

Fuel Type – Connection Type	Cumulative Installed Expired Capacity in 2035 (MW)
Gas - Tx	8,830
Gas - Dx	252
Solar - Tx	280
Solar - Dx	1,856
Water - Tx	1,029
Water - Dx	166
Wind - Tx	3,881
Wind - Dx	488
Bioenergy - Tx	284
Bioenergy - Dx	120
Storage	40
Total	17,226

Note: consistent with 2020 APO (except for storage data sourced from internal IESO correspondence)

Thank You

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