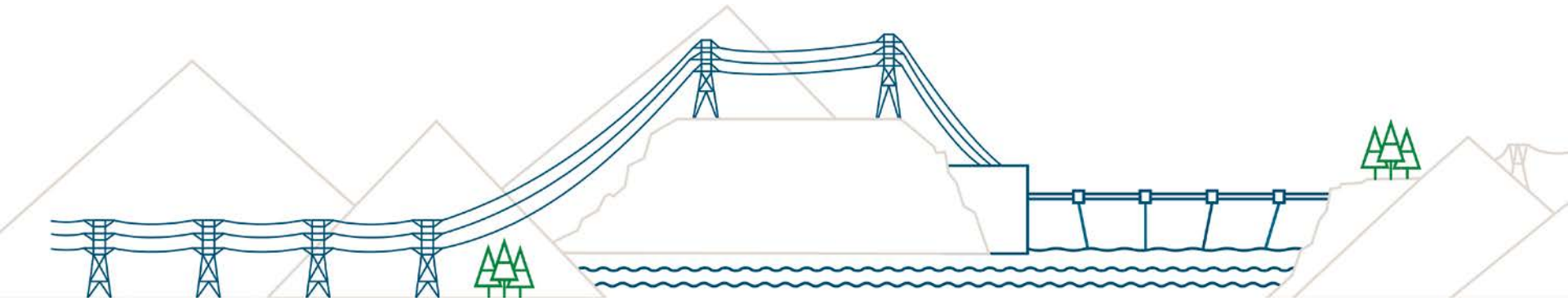
Generation Resource Options Update – Scope of Work



October 2019

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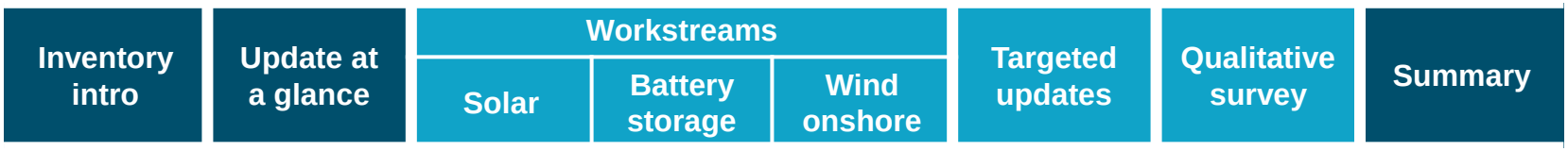
Purpose and outline

This slide deck summarizes the scope of work that BC Hydro and FortisBC are undertaking to update the generation resource options as part of the 2021 Integrated Resource Plan process

- Introduction to the inventory of generation resource options
- Overview of the update “at a glance”
- Scope of the update includes three components:
  - Workstreams for some resource types that have undergone substantive industry changes: solar, batteries, wind
  - Targeted updates for other resource types in our existing database
  - Qualitative update for emerging resource types
- Summary of the scope of work



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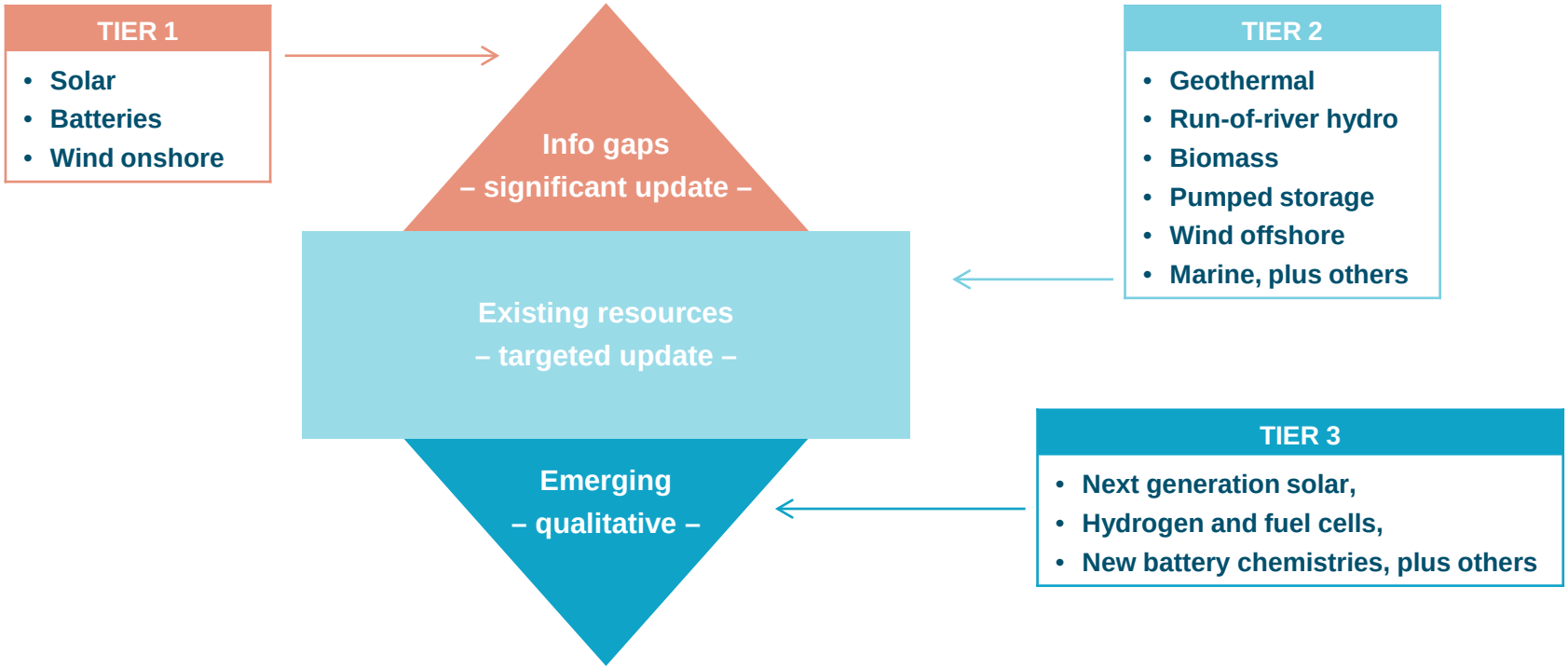
What is the Generation Resource Options Inventory?

A database describing the generation resource options used to inform planning purposes

- A well-established database containing potential resource options in B.C.
- Characterizes at a high level, B.C.'s generation resource options in terms of technical, financial, environmental and social attributes
- Resource information is used for general planning purposes only
  - Does not lead to projects being built or acquired
- Updated in 2010, 2013, 2015 and 2017
- Will be an input into the 2021 Integrated Resource Plan

Overview of the Generation Resources Update

Builds on our existing database to address information gaps related to some rapidly changing technologies and a qualitative look at emerging future resources



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Solar – our update approach

Information we're collecting through a technical workstream

- Province-wide assessment of technically viable solar resources
- Updated representative solar costs for large scale (~100 MW), distributed scale (1-15 MW), and customer scale (kW scale)

Source: SunMine

Battery storage – our update approach

We're collaborating with the National Research Council in a joint research project

- Assessment of resource potential for transmission connected and distribution connected energy storage facilities
- Representative cost assessment of battery storage facilities at transmission, distribution, and customer scale

Source: Tesla

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Wind onshore – our update approach

Information we're collecting through a technical workstream

- Performance characteristics for new turbine technologies
- Review current costs of wind resources

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Targeted updates of our existing database

Characteristics we're updating through review of existing technical reports

Resource	Data to be updated
Geothermal	Cost and lead-time update for flash and binary technologies.
Wind – offshore	Cost and performance of new offshore turbine technologies.
Biomass – wood	Resource potential and fibre costs updated with information from the 2018 wood based biomass potential for new electricity generation report.
Biomass – municipal solid waste	Update tipping fees.
Pumped storage	Small-scale (100 to 200 MW) pumped storage added to inventory. Escalate costs based on historical construction escalation factors.

Targeted updates of our existing database ...continued

Characteristics we're updating through review of existing technical reports

Resource	Data to be updated
Natural gas	Update fuel costs.
Run-of-river	Escalate costs based on historical construction escalation factors.
Small storage hydro	Update resource potential and costs based on the 2018 small storage hydroelectric report.
Marine – wave/tidal	Update costs based on literature review.
Biogas	Review and confirm negligible potential considering alternate use of biogas as clean natural gas.

Qualitative update of emerging resources

We're tracking what's on the horizon, and keeping an evergreen list, such as floating solar, hydrogen and fuel cells, and others

Each technology type will be described in terms of:

- Summary of the technology concept or innovation
- Technology maturity and commentary about B.C. context

Source: Sungrow Power Supply

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Summary

Through the fall of 2019, BC Hydro and FortisBC technical staff will collect and review information on generation resource options to ensure our inventory is informed by recent trends in the industry

- The inventory includes generic resource options with representative costs and potential
- We are establishing technical workstreams for some resource types, and conducting targeted updates using existing reports and information to update the others
- Emerging technologies will be qualitatively assessed
- To contribute to the technical workstreams and to find out more about the process, please refer to the BC Hydro Electricity Supply Options website

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