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ENERGY RESEARCH

Alberta at a Crossroads: Long-term AIES outlook

October 12th , 2023

Redacted Version

Agenda

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I. **Introduction to today's session**

II. **AIES Overview**

III. **Aurora's Central AIES outlook and key drivers**

1. Aurora's Central AIES outlook
2. Asset investment cases
3. Key input drivers and sensitivities

IV. **Alternative Scenarios**

V. **Next steps**

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We welcome today's attendees for our first AIES workshop

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Sources: Aurora Energy Research

Today's session will focus on the long-term outlook for the AIES market

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Group meeting 1
Long-term AIES outlook and alternative scenarios

- Long term-outlook of pool price, capacity mix and energy mix
- Impacts of Clean Electricity Regulations on price and new capacity
- Alternative scenarios capturing diverse economic and policy outcomes

Group meeting 2
Renewables investment cases

- Deep dive into the project economics of wind and solar
- Endogenous modelling of renewables and conventional capacity decisions while reflecting grid constraints
- Sensitivity and uncertainty assessment of costs and revenue streams for each technology

Group meeting 3
Battery economics & future revenue streams

- Modelling of battery dispatch under conditions of uncertainty and accounting for cycling constraints
- Battery business cases in the wholesale and ancillary markets
- Analysis of hybrid co-location models with solar and wind

Group meeting 4
Transmission Loss Factors and grid bottlenecks

- Analysis of impacts on grid expansion and renewables deployment scenarios on capture prices
- Detailed calibration of the drivers of pricing

Future subscriber meetings

- Subscriber interest will drive future topic selection
- This may include deep dives into:
  - Market design reform
  - Transmission tariff restructuring
  - Carbon Capture and Sequestration for AIES
  - Impact of a hydrogen economy in AIES

▲ Online platform access ▲ Access to historical data explorer

September 28, 2023	February 2024	June 2024	October 2024	Quarterly

Bilateral follow ups and engagement throughout

Quarterly power market forecasts updates:

▲ ▲ ▲ ▲ ▲

Sources: Aurora Energy Research

Aurora provides market leading forecasts & data-driven intelligence for the global energy transition

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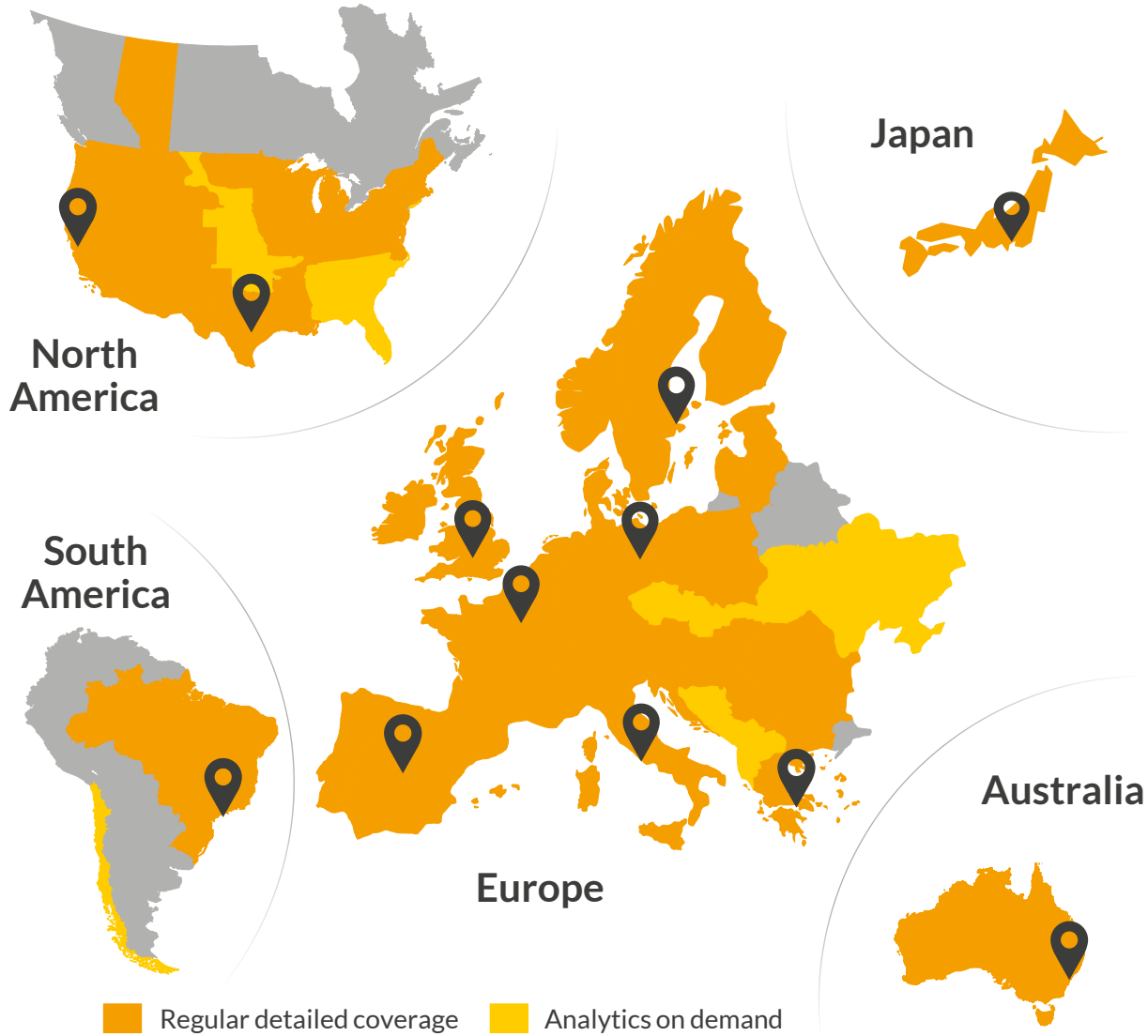
- Power markets
- Renewables
- Storage
- Electric vehicles
- Hydrogen H_2
- Carbon CO_2
- Natural gas



12 Offices

Oxford | Berlin | Madrid | Athens
Paris | Sydney | Austin | Oakland
Rome | Stockholm | Tokyo
São Paulo

600+

market experts (incl. 70 in USA)

750+

subscribing companies

150+

transactions supported in 2022

Source: Aurora Energy Research

Aurora is trusted as a bankable lender advisor across North American, Australian, and European power markets

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Aurora's price forecasts have been relied upon by lenders in recently completed transactions:

471 MW solar financing in ERCOT leveraging our market forecast and transmission modelling

$568MM debt financing of a 350MW Storage portfolio in CAISO

$650MM debt financing of a 215MW Solar + Storage facility in CAISO

$130MM debt financing of a 150MW Solar project in ERCOT

Market advisor for debt financing of Gresham House's 400+MW battery storage portfolio

Debt financing of a 826MW CCGT asset

€28MM debt financing

First subsidy-free wind financing in Poland

£192MM debt financing

Saltend CCGT with CHP. LMA for regular forecasts

Market advisor for the financing of a portfolio of hydro and PV assets

Sell side advisor for the largest operational battery storage portfolio within the frequency containment reserve in Europe (90 MW)

Market advisor for first project financing of battery storage in the UK

€48MM debt financing

220MW Potegowo onshore wind farm of Israel Infrastructure Fund

Ongoing financing projects:

Market advisor for debt financing of a 600 MW onshore wind farm in ERCOT for a global Canadian developer

Debt financing of a solar/storage asset in ERCOT for a global European developer

Market Advisor for Debt financing providing structural floor pricing for term loans

Sources: Aurora Energy Research

Introducing Aurora's speakers and AIES team

Oliver Kerr
Head of North America

Martin Anderson
Head of Research, North America

Dante Orta Alemán
AIES Research Lead

Shawn Bishop
Commercial Associate

Jinia Haldar
AIES Energy Modeller

Cindy Zhang
AIES Analyst

Sources: Aurora Energy Research

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Today's session will cover the long-term outlook for AIES, and investment scenarios for renewables and abated thermal generation

Context in AIES

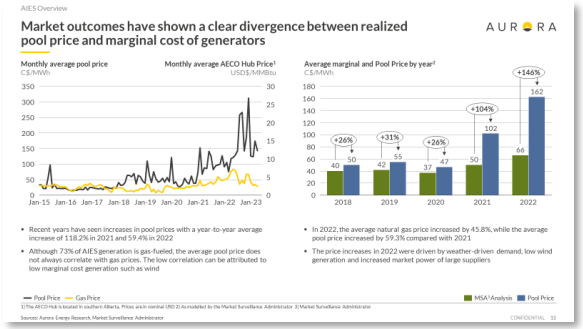
- **High pool price and volatility:** Offer behavior, extreme weather and gas price volatility are drivers of high prices in recent years
- **Large renewables pipeline:** AESO's Connection Project List[1] currently contains 27.8 GW of capacity, out of which 73% are renewable projects
- **Policy uncertainty:** The release of the Clean Electricity Regulations proposal and the moratorium on renewable energy permitting add to the uncertainty on future policy direction in Alberta

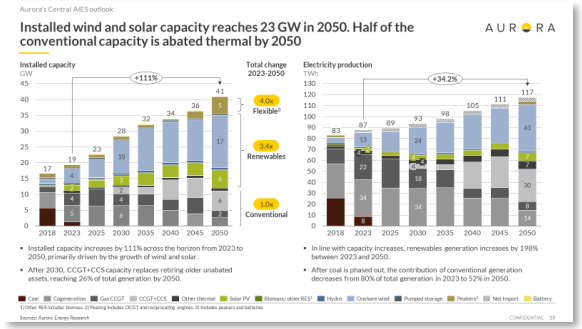
Market Outlook

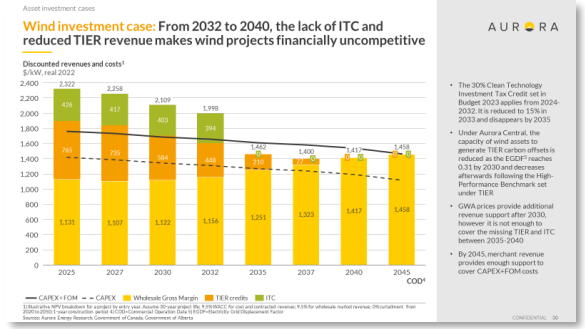
- **Price outlook:** New market participants and renewable capacity expansion are drivers of short-term pool price reductions. In the long-term, pool price sees gains due to capacity mix changes
- **Renewables build:** Wind and solar see large capacity expansions driven by policy incentives and declining costs
- **Abated conventional generation:** Natural gas-fueled generation plays a big role in meeting demand until 2050

Investment Cases

- **Investment Tax Credits:** Renewables and carbon capture technology get significant support up to the mid 2030s
- **TIER[2] carbon offsets:** Wind and solar assets get additional revenue from carbon offsets through 2040
- **Policy impact:** Uncertainty around the future of the TIER carbon market impacts the investment case for renewables and abated conventional assets







1) As of August 2023. 2) Technology Innovation and Emissions Reduction Regulation.

Sources: Aurora Energy Research

AIES is the second largest deregulated market in Canada covering 255,000 sq. miles and 18.3 GW of installed capacity

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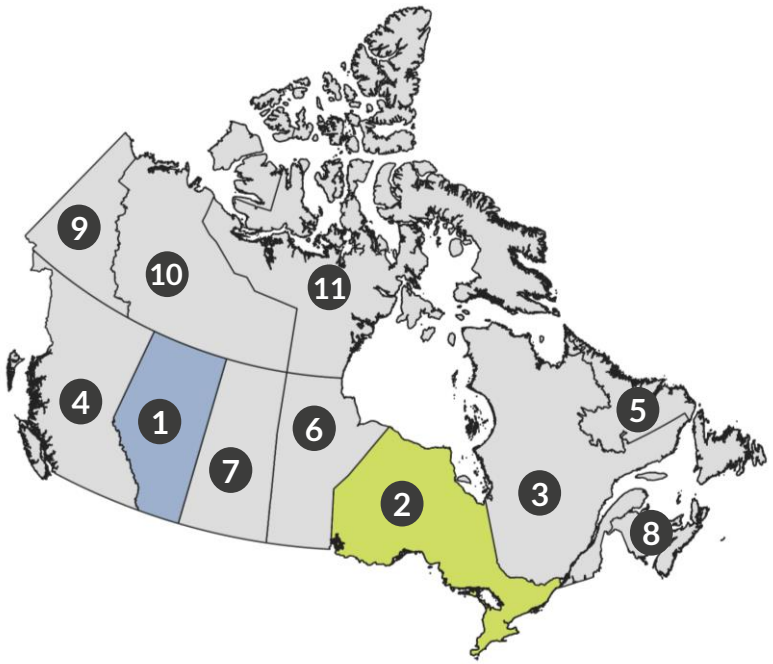
Alberta and Ontario are the only provinces in Canada with a competitive generation and retail markets run by Independent System Operators (ISOs). ISOs use competitive market mechanisms that allow independent power producers and non-utility generators to trade power.

Map of Canadian wholesale electricity markets[1]



ISO/Regional Entity		Installed capacity[2] GW	Annual load[2] TWh	Projected peak load growth through 2030[3]	Renewables share of generation[4]	Reserve margin[5]
AESO (Alberta)	**1**	**18.3**	**86.5**	**3.7%**	**14%**	**21.6%**
IESO (Ontario)	**2**	22.9	137.5	6.8%	26%	13.5%
Quebec	**3**	40.3	212.9	4.8%	98%	12.0%
British Columbia	**4**	11.5	64.3	7.0%	89%	15.5%
Newfoundland and Labrador	**5**	7.8	40.8	NA	96%	NA
Manitoba	**6**	4.6	33.9	7.0%	95%	16.0%
Saskatchewan	**7**	3.8	24.1	8.5%	23%	26.9%
Maritimes (NB, NS, PEI)[6]	**8**	5.6	25.4	4.8%	23%	26.1%
Yukon	**9**	0.14	0.53	NA	92%	NA
Northwest Territories	**10**	0.21	0.72	NA	49%	NA
Nunavut	**11**	0.05	0.25	NA	0%	NA

1) Light gray areas are regulated meaning they are vertically integrated utilities responsible for the production, transportation and sale of electricity to consumers. 2) From AESO and 2022 NERC Long-Term Reliability Assessment and Canada Energy Regulator. 3) Compares 2021 through 2030. 4) 2022 data, includes wind, solar and Hydro. 5) Data from 2022 NERC Seasonal Resource Assessment. 6) NB=New Brunswick, NS=Nova Scotia, PEI=Prince Edward Island.

Sources: Aurora Energy Research, Canada Energy Regulator, NERC, individual system operators

AIES is a single region, energy-only market with no scarcity mechanism and a low-price cap of C$1000/MWh

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Key features of the AIES power market

1 Energy-only market with separate Ancillary Services market

- Supply and demand determine power prices
- The Alberta Electric System Operator (AESO) manages and operates the provincial power grid

2 Is part of WECC[1] and connected to British Columbia, Saskatchewan and Montana

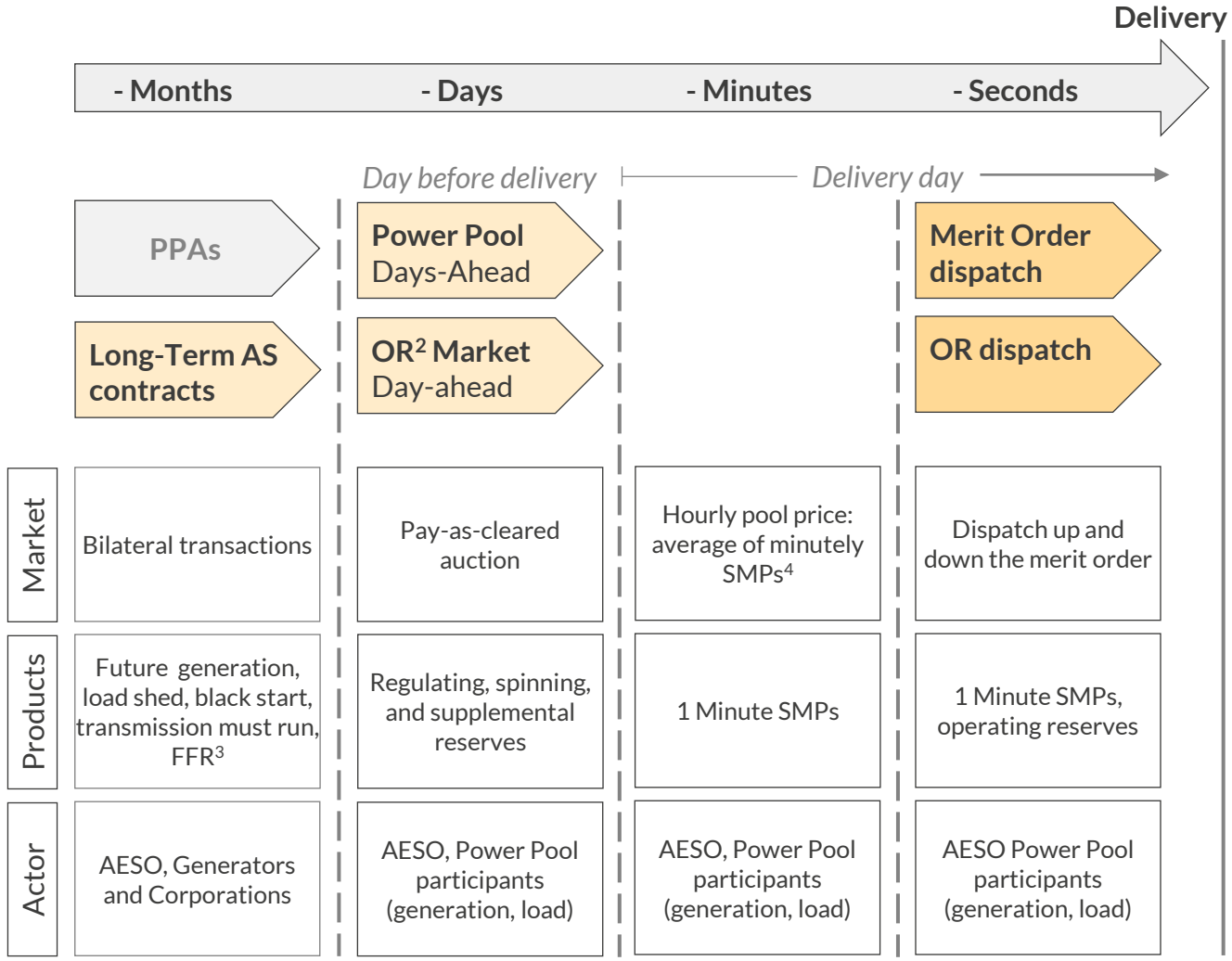
- Installed nameplate capacity (2022): 18.3 GW
- Service territory: ~255,000 square miles
- Net Energy for Load (2022): 61.8 TWh

3 Transmission monopoly operated by AESO

- No transmission rights, transmission is to be unconstrained
- AESO conducts planning of the transmission system and the Alberta Utilities Commission reviews and approves proposed projects

4 Significant gas-fueled generation

- Natural gas is a significant share of the AIES generation and installed capacity mix, with coal set to be phased out by 2023



1) WECC = Western Electricity Coordinating Council. 2) OR = Operating Reserves. 3) FFR =Fast Frequency Response. 4) SMP = System Marginal Price.

Sources: Aurora Energy Research, AESO

Market outcomes have shown a clear divergence between realized pool price and marginal cost of generators

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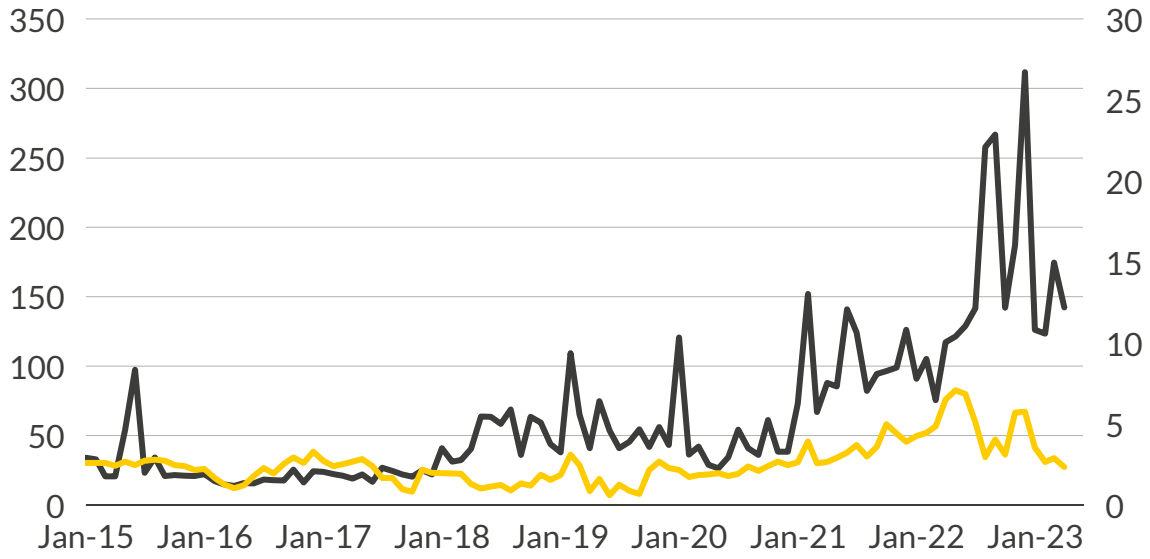
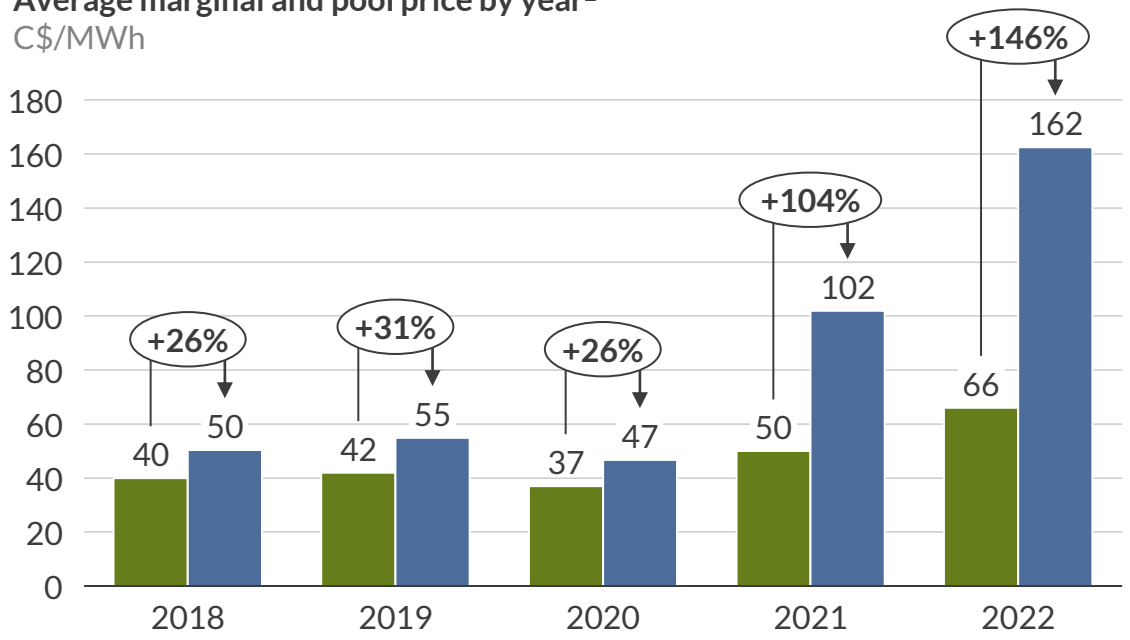
Monthly average pool price
C$/MWh

Monthly average AECO Hub Price[1]
USD$/MMBtu



Average marginal and pool price by year[2]
C$/MWh



- Recent years have seen increases in pool prices with a year-to-year average increase of 118.2% in 2021 and 59.4% in 2022
- Although 73% of AIES generation is gas-fueled, the average pool price does not always correlate with gas prices. The low correlation can be attributed to low marginal cost generation such as wind

- In 2022, the average natural gas price increased by 45.8%, while the average pool price increased by 59.3% compared with 2021
- The price increases in 2021 and 2022 were driven by weather-driven demand, low wind generation, increased market power of large suppliers and the expiry of PPAs held by the Balancing Pool

Pool Price Gas Price System Marginal Cost Pool Price

1) The AECO Hub is located in southern Alberta. Prices are in nominal USD. 2) As modelled by the Market Surveillance Administrator (MSA).

Sources: Aurora Energy Research, Market Surveillance Administrator

There is strong interest in solar and wind development due to policy incentives and high PPAs demand by corporate players

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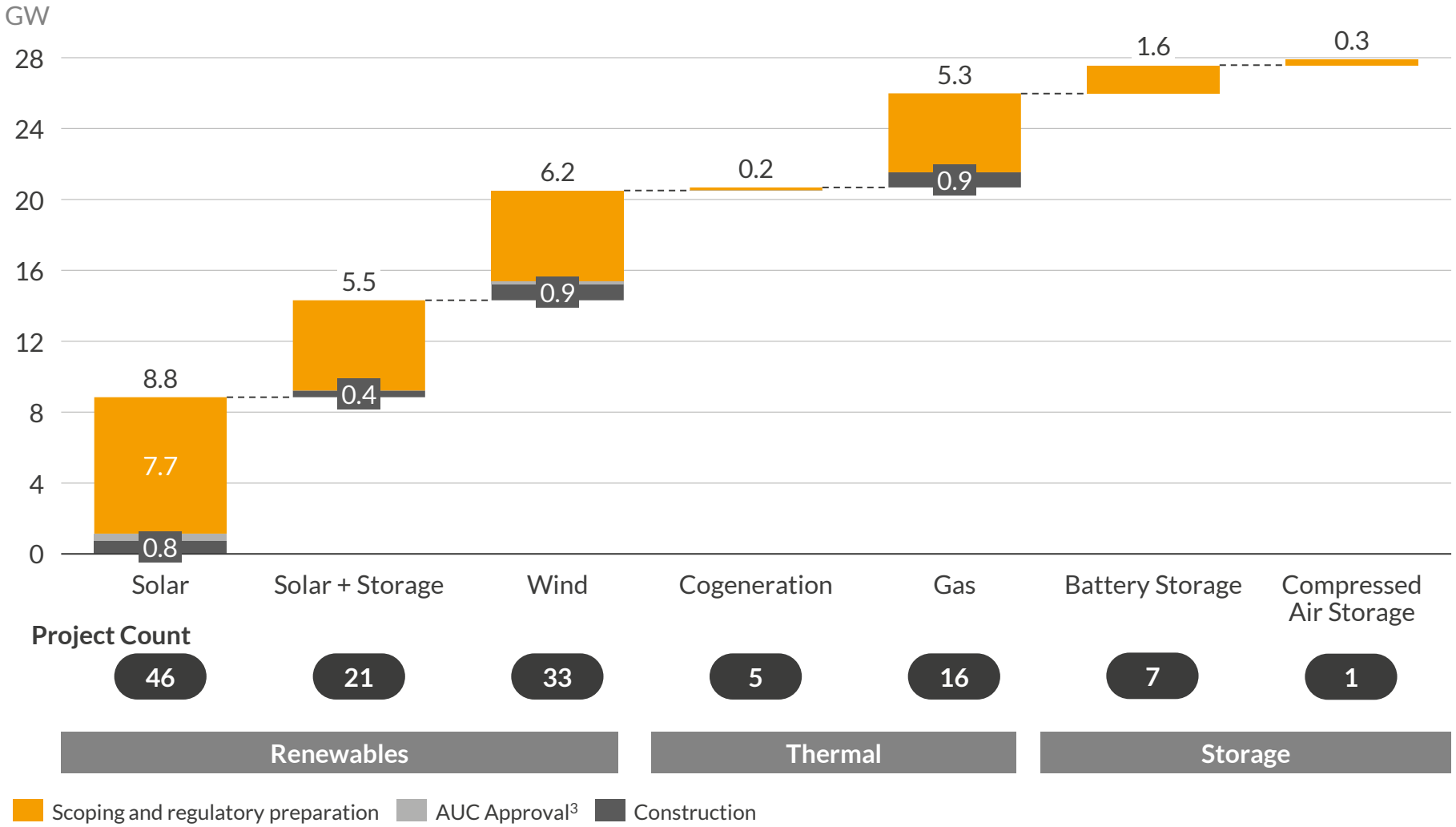
Capacity of projects[1,2] currently in the AESO Connection Project List



1) Includes projects of "Connection" type, excludes "Behind-the-Fence" type projects. 2) As of August 2023. 3) AUC = Alberta Utilities Commission.

Sources: Aurora Energy Research, AESO

- The Connection Project List currently contains nominally 27.8 GW of capacity, which is around 154% of the installed system capacity in AIES
- 51% of the capacity in the list comes from solar, also representing 44% of the number of projects
- Most projects in the list are in scoping, assessment and regulatory preparation, which indicates that a few of them may not be realized
- Only 11% of the capacity in the connection list, representing 15% of projects, is under construction

Alberta has policy support for renewables, but uncertainty is high due to a misalignment in federal and provincial goals

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Indirect support for renewables through carbon pricing has been favored in Canadian policy to date. Most recently, as a response to the US Inflation Reduction Act, direct subsidies for renewables were proposed in Budget 2023 through investment tax credits and increased financing for renewable energy projects

	Indirect support		Direct support	
	TIER — TIER[1] Regulation	CER — Clean Electricity Regulations	ITCs — Clean Energy Tax Credits	Canada Infrastructure Bank's focus on clean electricity
	Active since 2020	*In development[2]*	*Budget 2023*	*Budget 2023*
Policy details	▪ Requires regulated facilities to reduce emissions and establishes emissions benchmarks for electricity production ▪ Creates compliance obligations which can be met through emission reductions, emission offset or performance credits, or purchasing fund credits by paying the carbon price set by the TIER Fund	▪ Require Canada's electricity grid to have net-zero emissions by 2035 ▪ Encourage energy efficiency, demand side management, dynamic pricing and abatement and non-emitting generating technologies ▪ Limits capacity factor on unabated gas assets after 2035 ▪ Sets a 20-year prescribed life on thermal assets	Two schemes available: ▪ **Clean Technology Investment Tax Credit:** Refundable credits of up to 30% of capital cost for eligible renewable energy projects ▪ **Clean Electricity Investment Tax Credit:** Refundable 15% tax credit on capital costs of investments made in renewable energy, storage, and interprovincial transmission	▪ Deepened role as investor in private sector-led infrastructure projects. Enable low-cost financing for renewable energy, energy storage and transmission projects ▪ Support electrification and affordability with C$20 billion of financing for clean electricity and clean growth infrastructure projects
AIES details	▪ Replaces the Greenhouse Gas Pollution Pricing Act (GGPPA) ▪ Aligns the provincial carbon price with the federal requirements	▪ Would require phasing down large amounts of gas-fueled generation ▪ Cogeneration would be included if part of the Power Pool	▪ Incentivize renewable generation in Alberta ▪ Improved economics for CCUS[3] projects	▪ Incentivize renewable generation in Alberta ▪ Incentivize energy storage projects

1) TIER = Technology Innovation and Emissions Reduction Regulation. 2) In consultation period until Nov 2, 2023. 3) CCUS = Carbon Capture, Utilization and Storage.

Sources: Aurora Energy Research, Government of Canada, Government of Alberta, Alberta Utilities Commission

Alberta's energy policies and support for renewables have been in constant change in the last few years

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2019:
The federal Greenhouse Gas Pollution Pricing Act (GGPPA) is implemented. Provides a backstop on emissions using a carbon levy on fuels and an output-based pricing system for large emitters

2020:
The TIER[1] system is enacted Meets the federal carbon standards for large emitters. Is applied in parallel with the federal carbon tax on fuel. Allows RES to generate carbon offsets that can be traded in the market

2022:
Updates to the TIER regulation align the price of carbon with the federal price. The updates establish a benchmark tightening rate for large emitters and accelerated credit expiry. Post 2030, conventional and RES are subject to the same emissions/offset standard[3]

2023:
Budget 2023 establishes a 30% tax credit on capital cost of investment for clean energy and up to 40% tax credit on green hydrogen[2] among other measure in response to the US Inflation Reduction Act

2023:
The Government of Canada released its proposed Clean Electricity Regulations (CER) for a net-zero grid by 2035. The regulation would establish emissions standards for generation units as well as financial compliance requirements

2023:
Alberta's Provincial Government enacted a moratorium on renewable energy permitting. The moratorium stops the AUC[4] from issuing permits to new renewable projects until February 29th, 2024

2019 — 2024

Federal Policy | Provincial Policy

1) Technology Innovation and Emissions Reduction Regulation. 2) Refundable credits on the cost of purchasing and installing equipment. 3) The High-Performance Benchmark matches the Electricity Grid Displacement Factor (EGDF) in 2030. 4) Alberta Utilities Commission.

Sources: Aurora Energy Research

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Summary of scenario input assumptions

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		Aurora Central
Demand	Underlying demand	+30 TWh between 2023 and 2050 driven by population and industrial growth
Commodities	Gas price	AECO Hub prices increase to USD$3.57/MMBTU in 2030 and USD$4.52/MMBtu in 2050
Technology	Renewables	Between 2023 and 2050 wind CAPEX falls by 28% and solar by 51% Battery CAPEX falls by 58% by 2050
	CCGT + CCS	After 2035, new thermal buildout is abated apart from peakers
Policy	Clean Electricity Regulations	The implementation of the Clean Electricity Regulation in Alberta is delayed to 2040, a 5-year delay compared with the proposed legistration[1,2]
	TIER[4] Regulation	EGDF[3] goes from 0.52 ton[5]/MWh in 2023 to 0.31 in 2030 matching the High-Performance Benchmark (HPB). Afterwards, the HPB is reduced by 2% annually until 2035
	Renewables incentives	ITC for renewables and batteries are 30% as set in Budget 2023 ITC for carbon capture technologies is set to 50% from 2024-30, 25% from 2031-40 Limited buildout in 2024-25 due to the 2023 permitting moratorium
	Carbon price	C$170/ton by 2030, 2% annual increase after 2030
	Transmission upgrades	Enough transmission is built to accommodate new supply. New renewables have a Transmission Loss Factor of 8%

1) The CER draft published in August 2023 sets the start date for the Emission Performance Standard to 2035. 2) The EPS replaces Alberta's High-Performance Benchmark in 2035. 3) EGDF=Electricity Grid Displacement Factor. 4) Technology Innovation and Emissions Reduction Regulation. 5) Metric tons.

Sources: Aurora Energy Research

Installed wind and solar capacity reaches XX GW in 2050. Half of the conventional capacity is abated thermal by 2050

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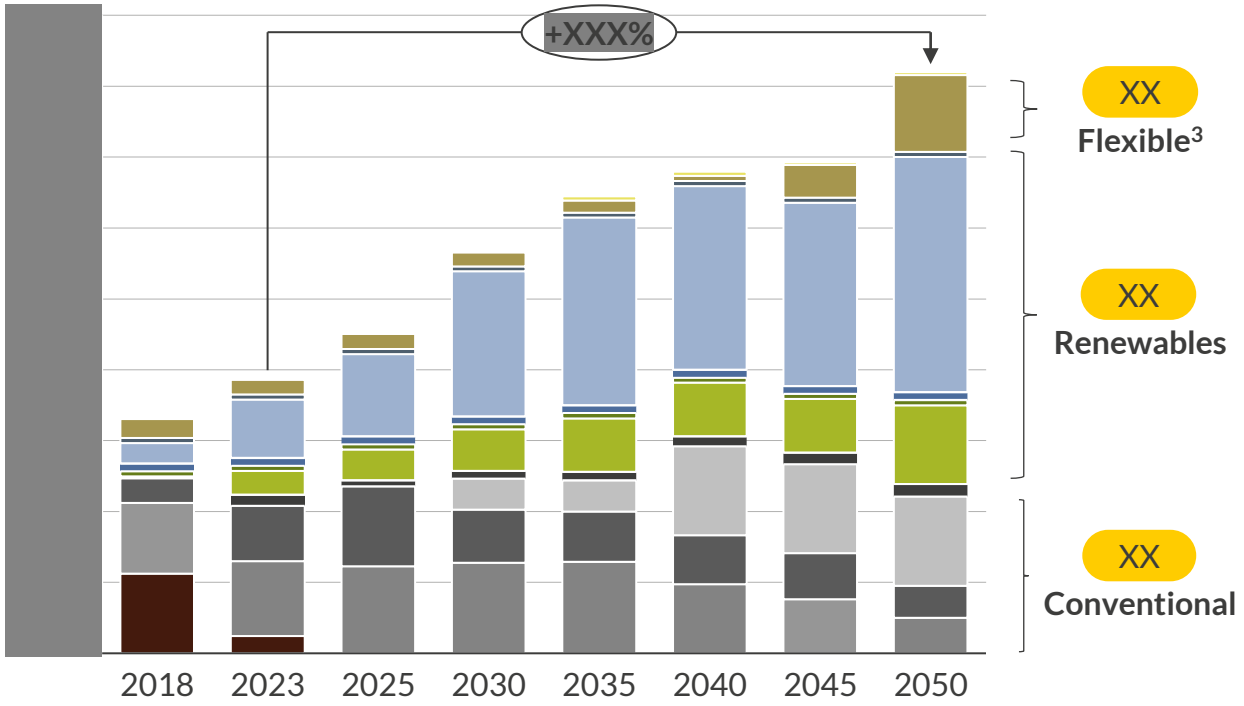
Installed capacity
GW



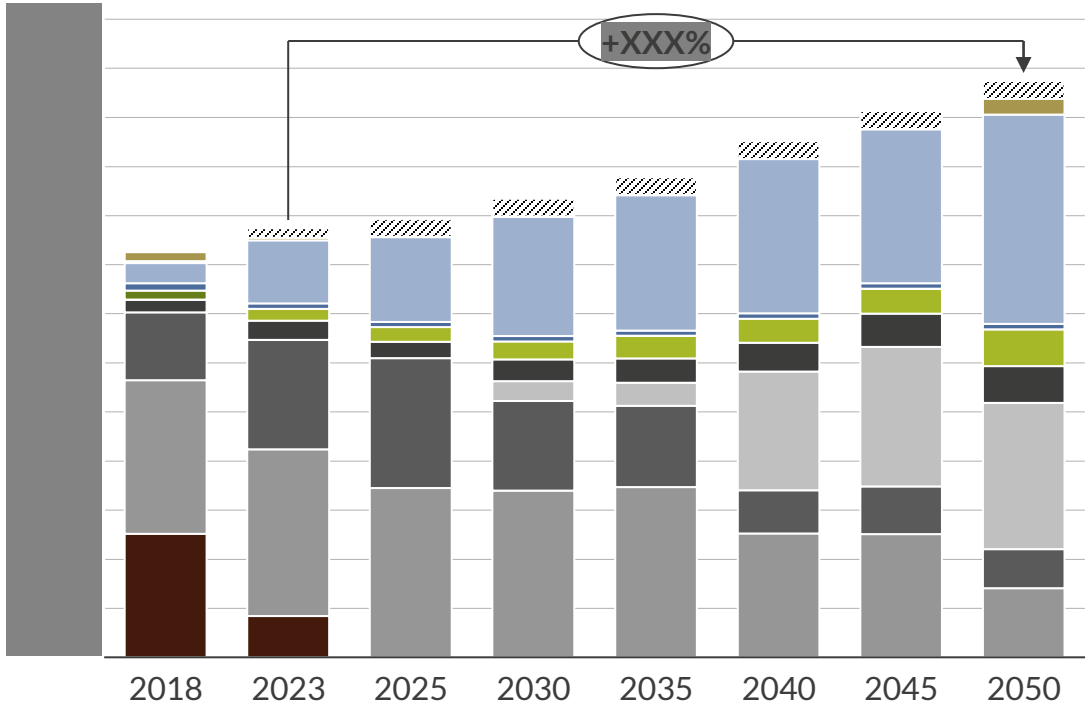
Total change 2023-2050

XX
Flexible[3]

XX
Renewables

XX
Conventional

Electricity production
TWh



- Installed capacity increases by XXX% across the horizon from 2023 to 2050, primarily driven by the growth of wind and solar
- After 2030, CCGT+CCS capacity replaces retiring older unabated assets, reaching XX% of total generation by 2050

- In line with capacity increases, renewables generation increases by XXX% between 2023 and 2050
- After coal is phased out, the contribution of conventional generation decreases from XX% of total generation in 2023 to 52% in 2050

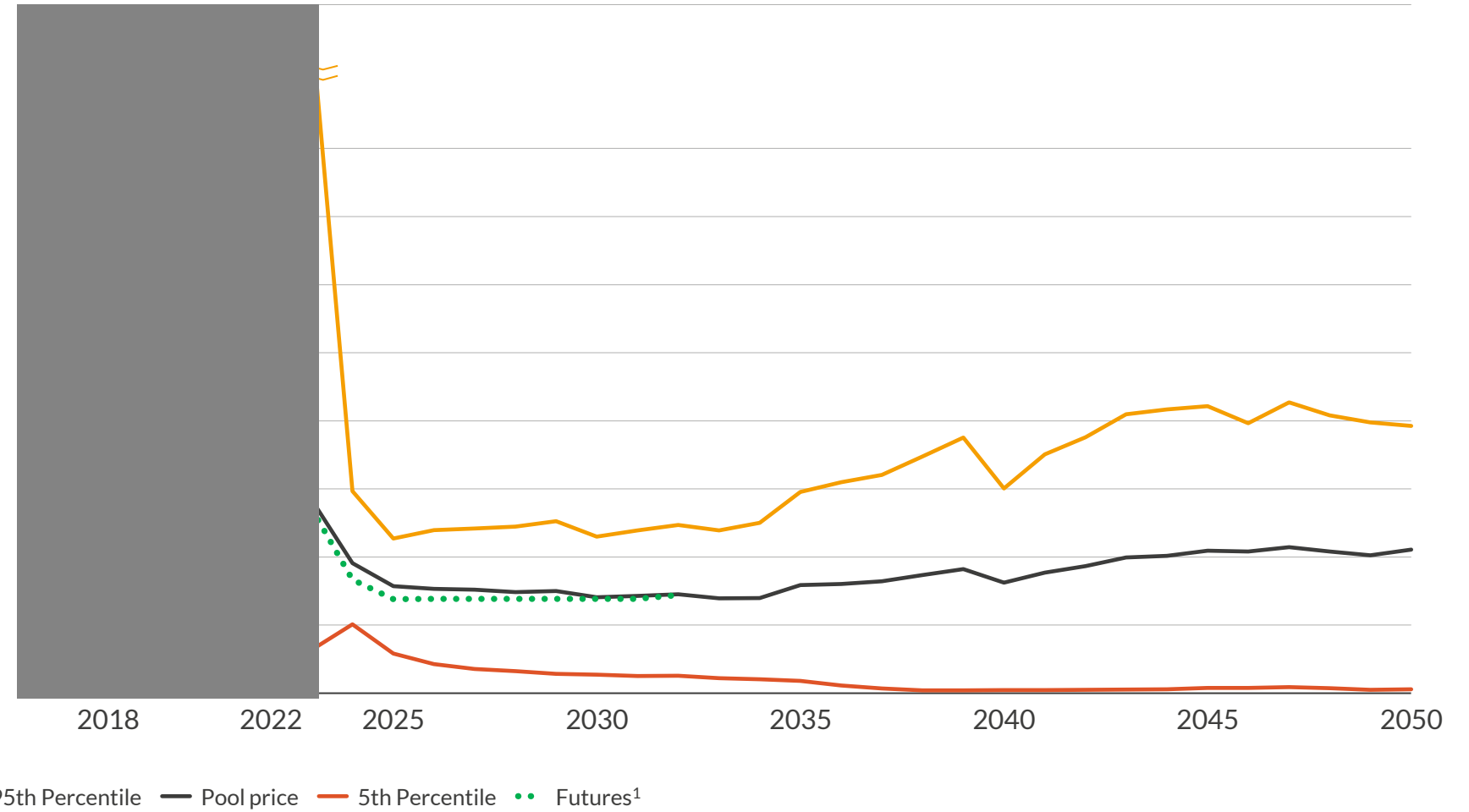
Coal | Cogeneration | Gas CCGT | CCGT+CCS | Other thermal | Solar PV | Biomass/ other RES[1] | Hydro | Onshore wind | Pumped storage | Peakers[2] | Net Import | Battery

1) Other RES includes biomass. 2) Peaking includes OCGT and reciprocating engines. 3) Includes peakers and batteries.

Sources: Aurora Energy Research

Pool price rises to C$XXX/MWh by 2050, price volatility increases after 2035 due to thermal retirements and increased renewables

Pool price and percentiles
C$/MWh (real 2022)



1) NGX Fin FF, annual averages as of Sept 20th 2023.

Sources: Aurora Energy Research

- The average pool price is expected to decrease in the short term, reaching C$XX/MWh by 2034 as new market participants enter the market
- After 2034, average pool price slowly increases to reach C$XXX/MWh by 2050
- In the medium term, volatility in the pool price is expected to decrease, with new thermal and renewable generation coming into the market
- After 2035, volatility is expected to increase due to thermal retirements and the increased role of CCGT+CCS as price setter
- Another driver of price volatility after 2035 is the higher renewable penetration, which set the price in at least X% of the time

Increased wind and solar capacity lowers the pool price over C$XX/MWh from 2024-2035

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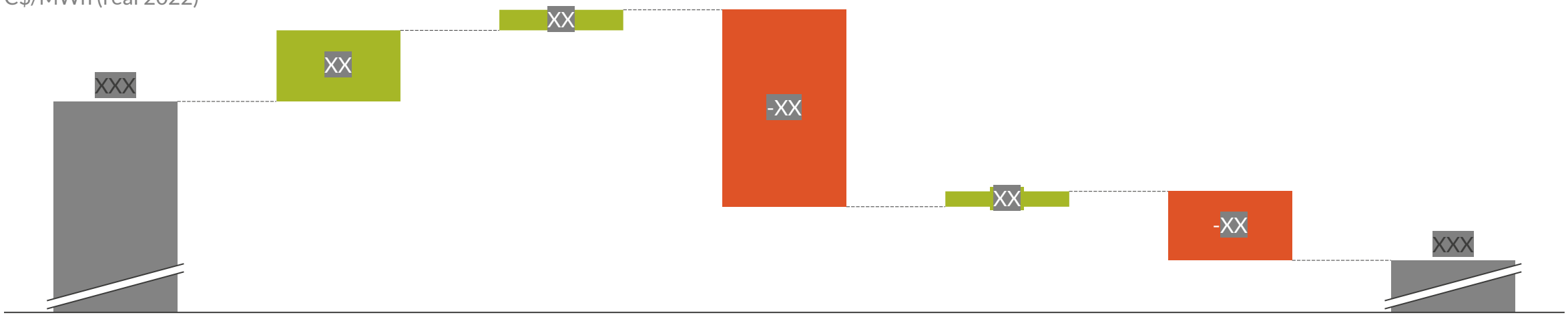
Decomposition of pool price drivers
C$/MWh (real 2022)



Changes

+XX	+XX	+XXX	+XXX
USD$/MMBtu	TWh	GW	C$/ton[4]

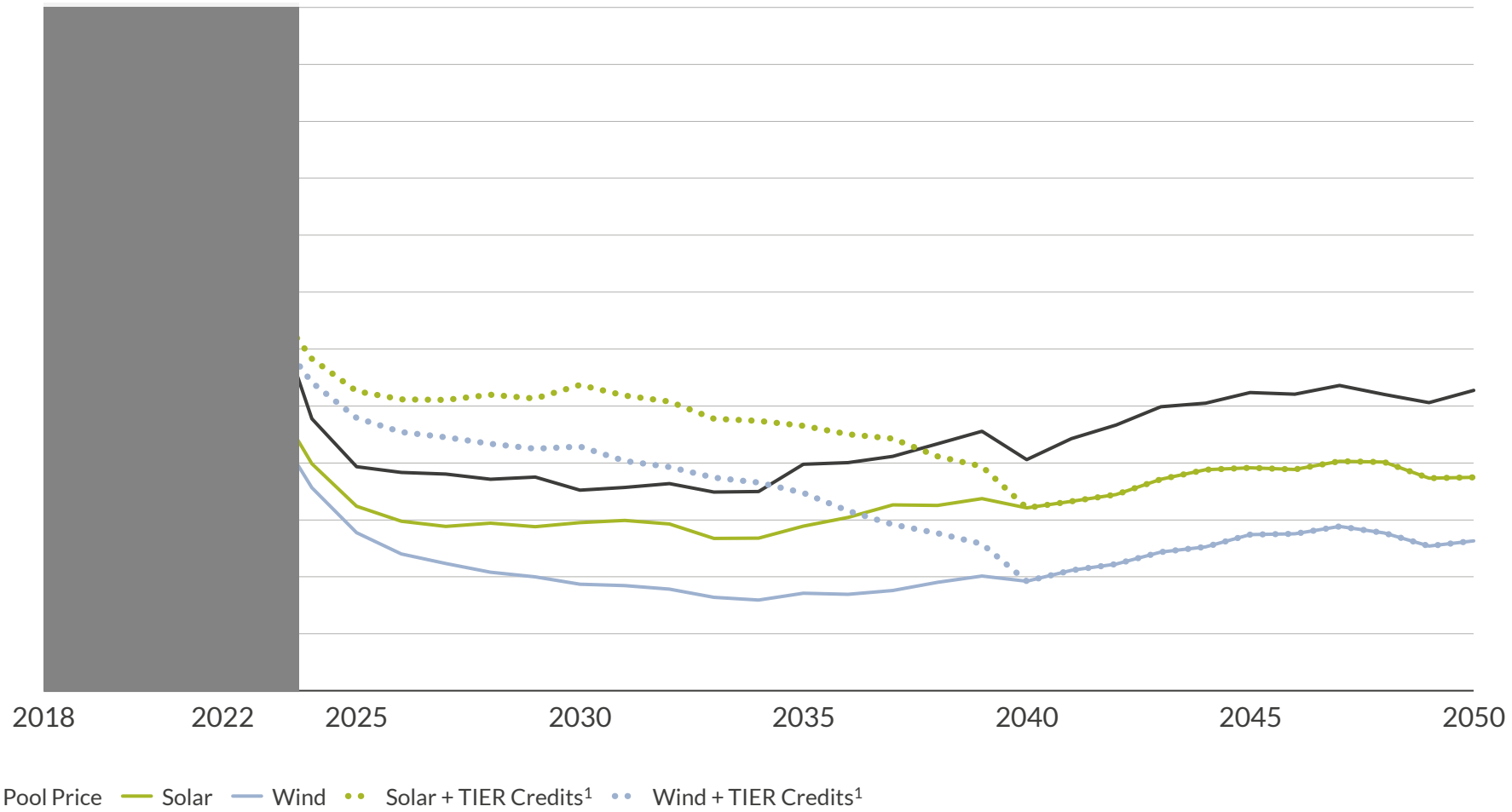
- From 2024 to 2035, gas price, demand, and CO_2 abatement costs put upward pressure on price totalling C$XXX/MWh combined
- Renewables deployment contributes with a C$XXX/MWh decrease, and offsets price increases caused by other factors
- Fast CO_2 price increases in 2024-2035 further incentivises renewable penetration, marginally contributing to a price decrease
- New market participants decrease market power exercise, increasing the downward pressure on pool price

1) Alberta Internal Load. 2) Quantities are in nominal Canadian dollars. 3) "Other" includes all other input changes, and any balancing effects from interactions of individual drivers. 4) Metric tons.

Sources: Aurora Energy Research

Wind and solar GWA prices are at a discount to pool price; including TIER credits they achieve a premium until the mid-to-late 2030s

Pool price and GWAs (Generation Weighted Average Prices) for wind and solar[2,3]
C$/MWh (real 2022)



1) Assumes revenue from emission offsets determined by the EGDF. 2) Uncurtailed GWAs. 3) Historical values are as of August 2023. 4) Technology Innovation and Emissions Reduction Regulation.
Sources: Aurora Energy Research

- Solar GWA prices track overall pool price with an average discount of XX% from 2024 to 2050
- However, when including TIER[4] credits, the GWA price of solar is above the pool price from 2024 until 2037
- Wind GWA prices also track pool price with an average discount of XX% from 2024-2050
- Wind's higher discount is caused by production in non-peak price hours as well as the high installed capacity
- Solar's discount is a result of low capacity factors and non-peak price production resulting in higher overall LCOE

As renewables penetration increases, a duck curve appears with average peak hour prices increasing to C$XXX/MWh by 2050

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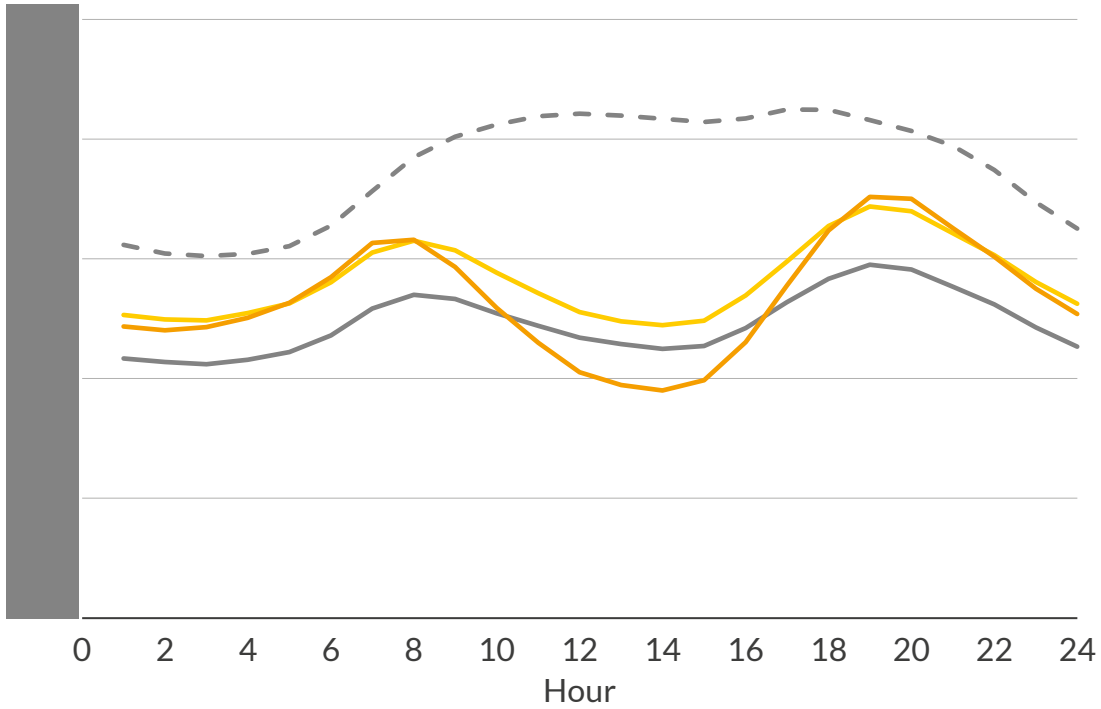
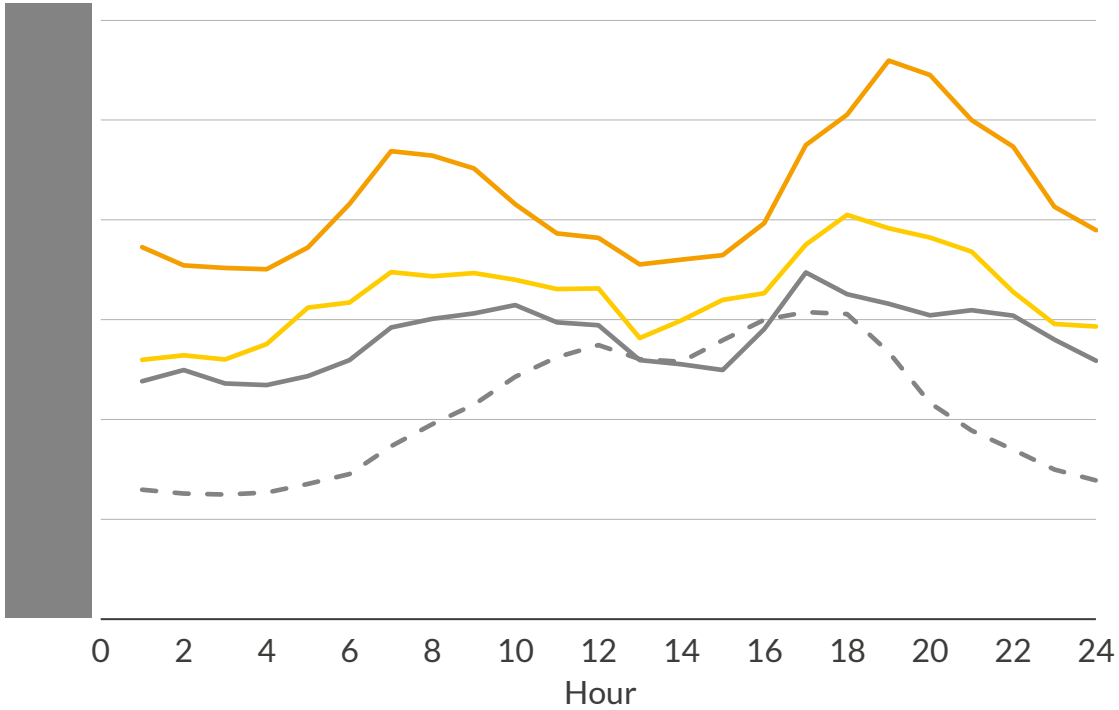
Hourly net load[1]
GWh



- By 2030, the increased wind and solar capacity shifts the peak net load from the middle of the day into the evening
- The combined renewable generation pushes down the net load values even as the net load spread increases for an average day

Hourly pool price[2]
C$/MWh (real 2022)



- The changes in net load shape causes a shift in peak prices from 5PM in 2020 to 7PM after 2030
- The difference in daily average price spread increases from C$XX/MWh in 2020 to C$XX/MWh in 2040 and C$XX/MWh in 2050. After 2030, the increasing renewable capacity deepens the shape of the duck curve

2020 2030 2040 2050

1) Net Load = Alberta Internal Load minus wind and solar generation. 2) Average over each year.

Sources: Aurora Energy Research

Seasonal variations in AIES will create significant differences in supply and demand dynamics

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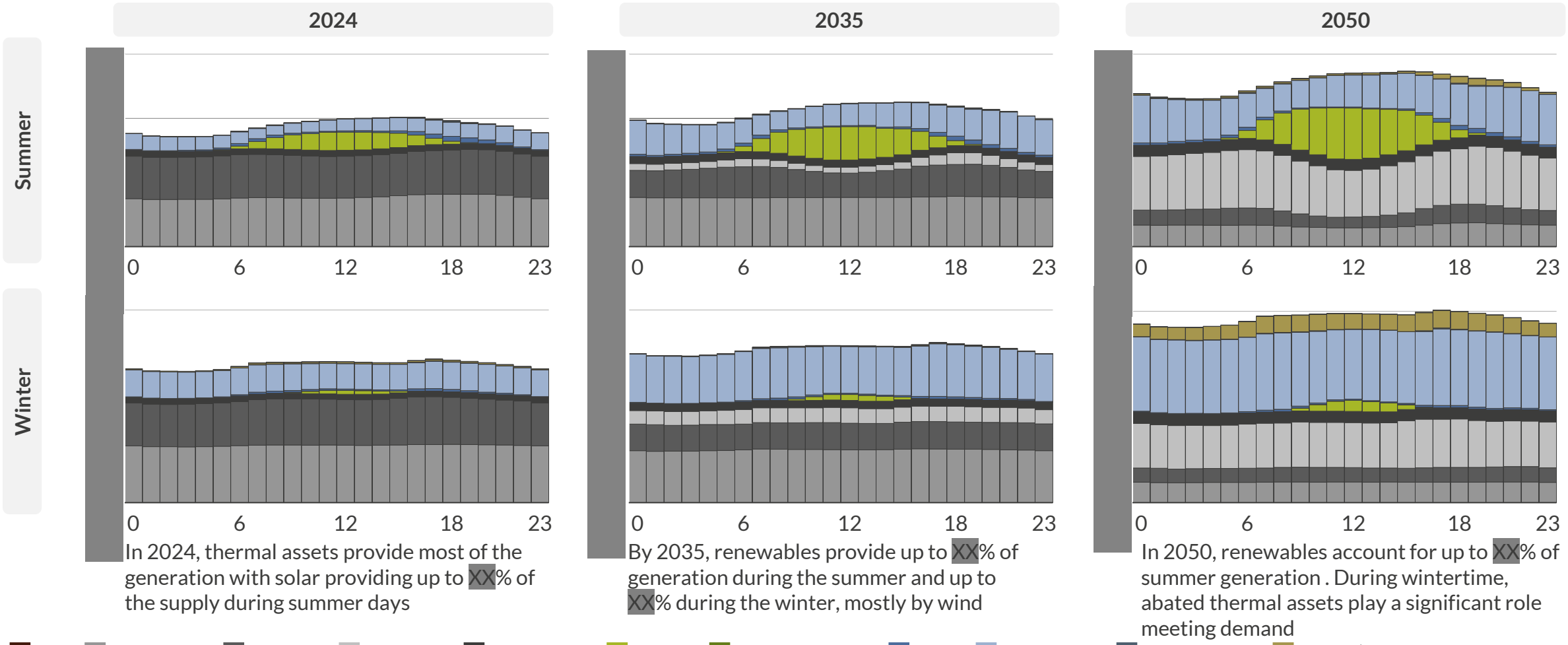
Average daily generation (Summer vs Winter days in AIES Central)
GW



1) Peaking includes OCGT and reciprocating engines.

Sources: Aurora Energy Research

Wind produces over XX% of the electricity in XX% of the days. Thermal assets generate over XX% of daily generation for XX% of the time

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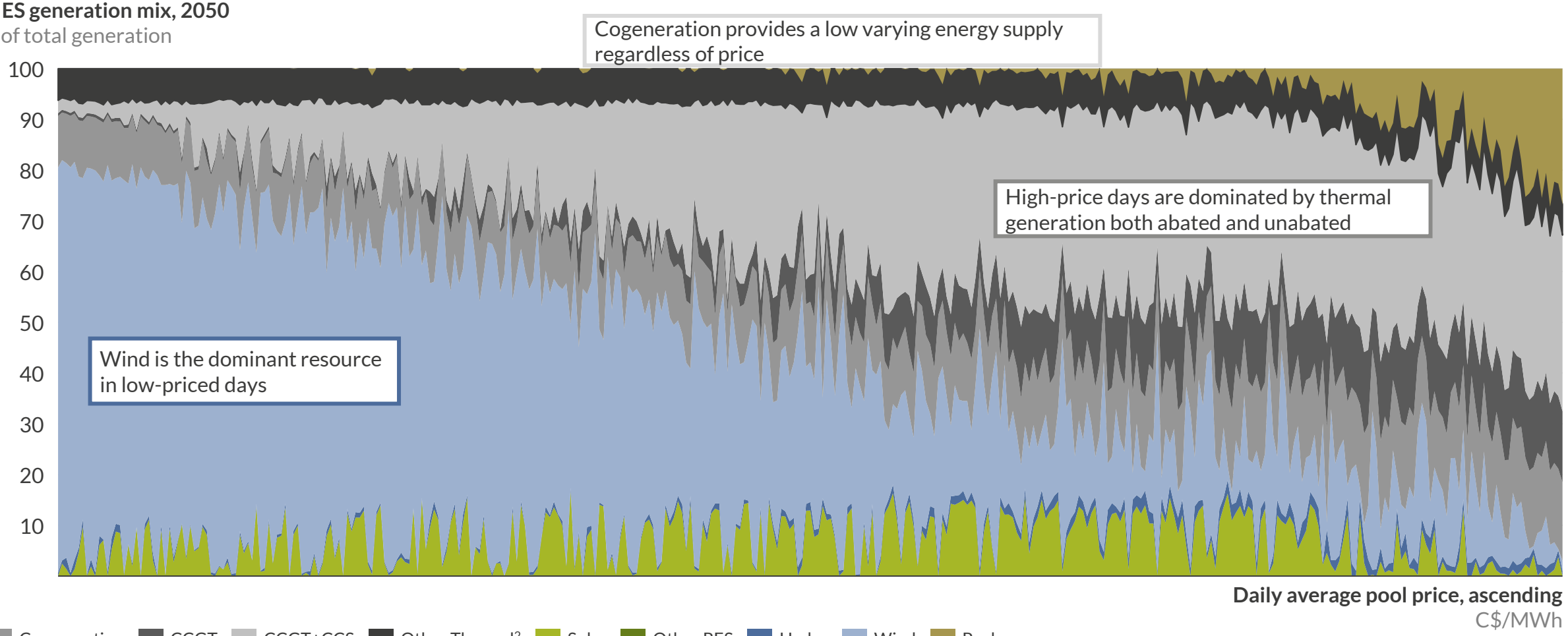
Despite high renewables generation, AIES still relies on significant thermal generation by 2050. While most of the thermal generation is CCGT+CCS, during high-scarcity, high-price periods, most supply comes from thermal assets, included unabated ones such as peakers

AIES generation mix, 2050
% of total generation

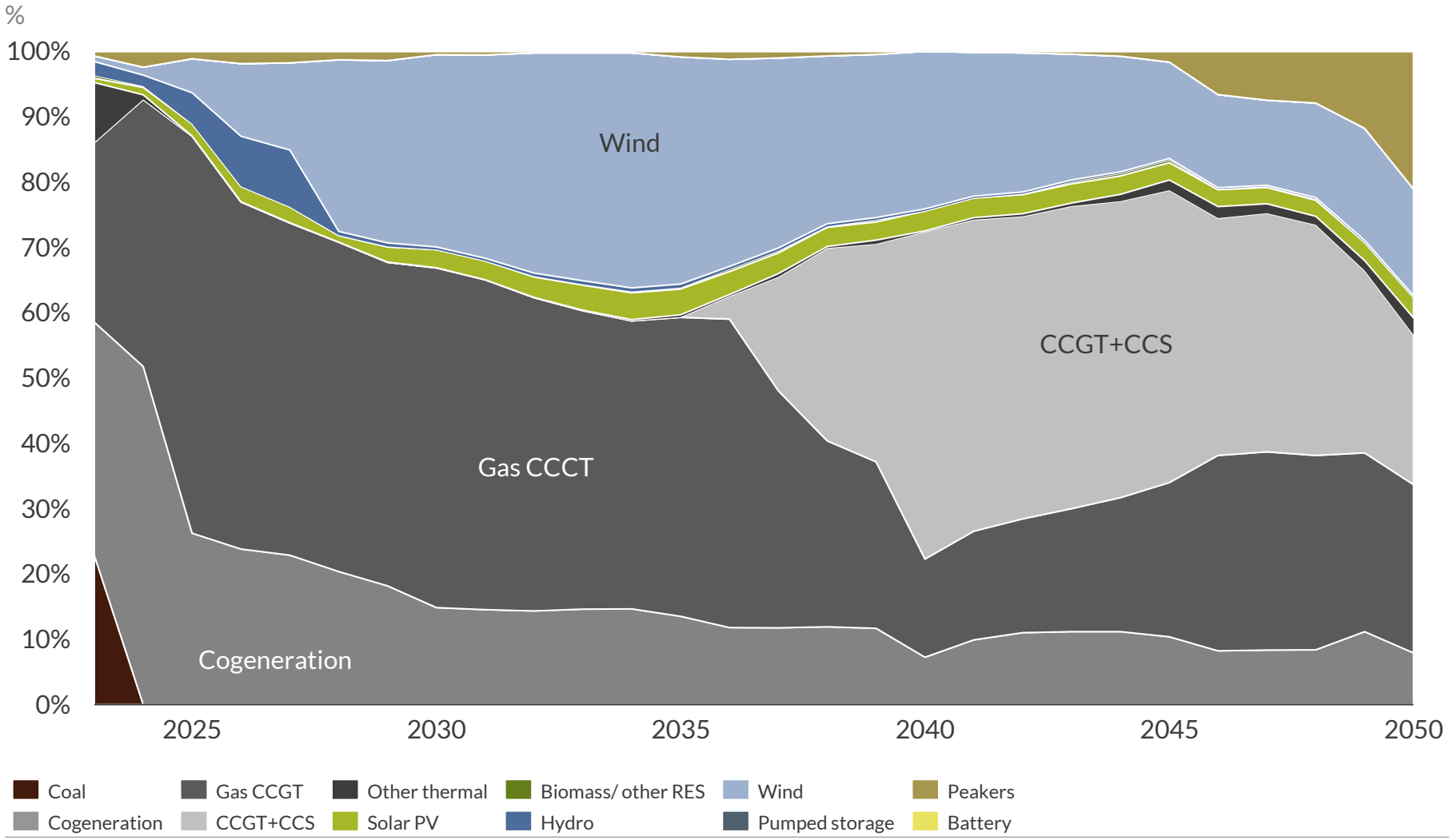


1) For presentation purposes, the hourly data has been grouped into 24-hour intervals. 2) Other Thermal includes coal-to-gas conversions and gas fuelled steam turbines.

Sources: Aurora Energy Research

Thermal generation is the dominant price setter in AIES from 2024 through 2050

Marginality[1] by technology



1) Marginality by technology is defined as the technology that would be dispatched to provide an incremental MW of power at a certain time.

Sources: Aurora Energy Research

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- Throughout the forecasting period, thermal generation is the dominant price setter in AIES
- After 2025, wind increases the percentage of time on the margin, peaking in 2034 at XX% of time
- After 2035, the unabated thermal retirements and increased CCGT+CCS capacity reduce the marginality of wind
- By 2040, CCGT+CCS reaches XX% of marginality. Thermal assets set the price for XX% of the time
- In 2050, thermal generation sets the price during XX% of the time

Agenda

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I. Introduction to today's session

II. AIES Overview

III. Aurora's Central AIES outlook and key drivers

1. Aurora's Central AIES outlook
2. Asset investment cases
3. Key input drivers and sensitivities

IV. Alternative Scenarios

V. Next steps

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Wind investment case: TIER credits provide XX% of the revenue for the first 10 years of a project; ITC offsets XX% of the CAPEX

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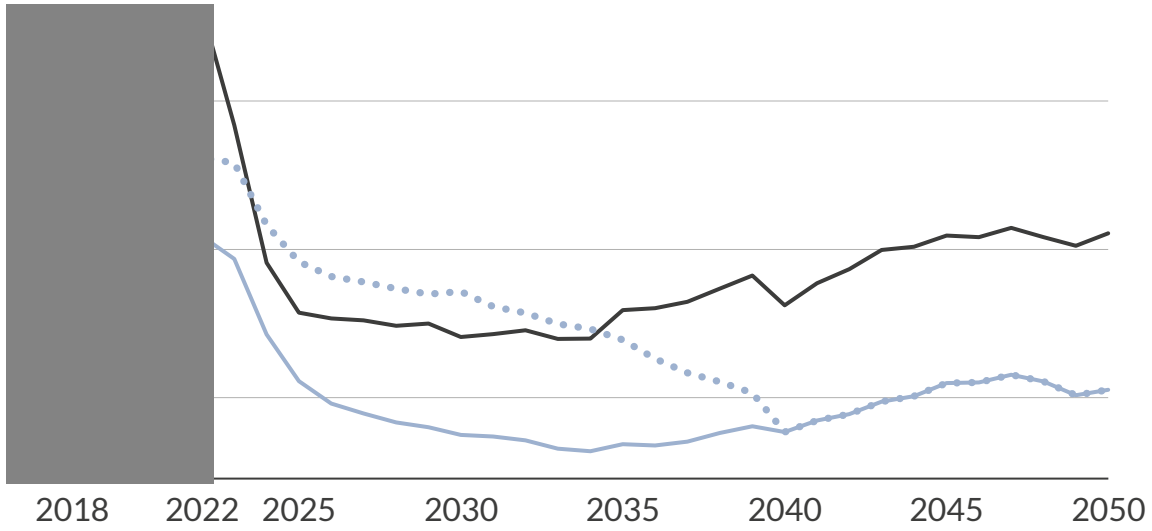
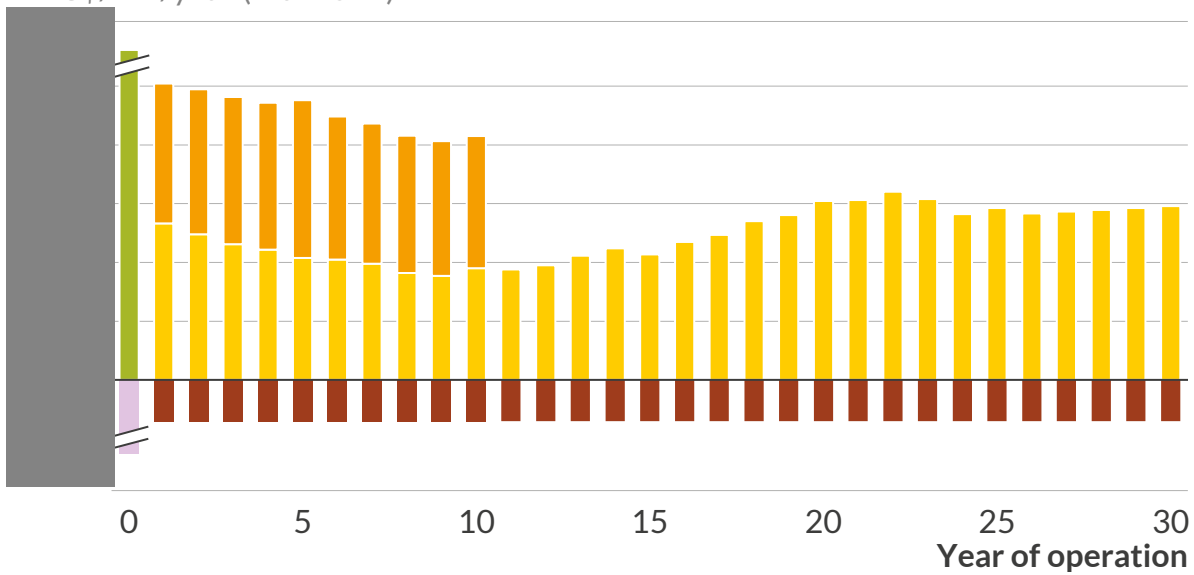
Wind GWA[1] price and pool price[2]
C$/MWh (real 2022)



Wind undiscounted revenues and costs – 2025 COD[3,4]
C$/kW/year (real 2022)



- Wind GWA prices are lower than pool price throughout the forecasting period with a XX% average discount
- Increased wind buildout pushes down the GWA prices to reach a minimum of C$XXX/MWh by 2034
- TIER[5] carbon offsets can provide additional revenue to wind assets through 2040 depending on the COD of the asset

- For an asset with a 2025 COD, the ITC offsets XX% of the CAPEX while TIER credits provide an average of XX% of the revenue for the first 10 years of operation
- The same asset obtains an IRR of XXX% assuming a 30-year lifetime[3]

Pool Price — Wind ·· Wind + TIER Credits

CAPEX FOM ITC TIER credits Wholesale Gross Margin

1) GWA= Generation Weighted Average. 2) Average over a year. 3) Assume 30-year project life; 0% curtailment from 2020 to 2050; 1-year construction period. 4) COD=Commercial Operation Date. 5) Technology Innovation and Emissions Reduction Regulation.

Sources: Aurora Energy Research, Government of Canada

Wind investment case: From 2032 to 2040, the lack of ITC and reduced TIER revenue makes wind projects financially uncompetitive

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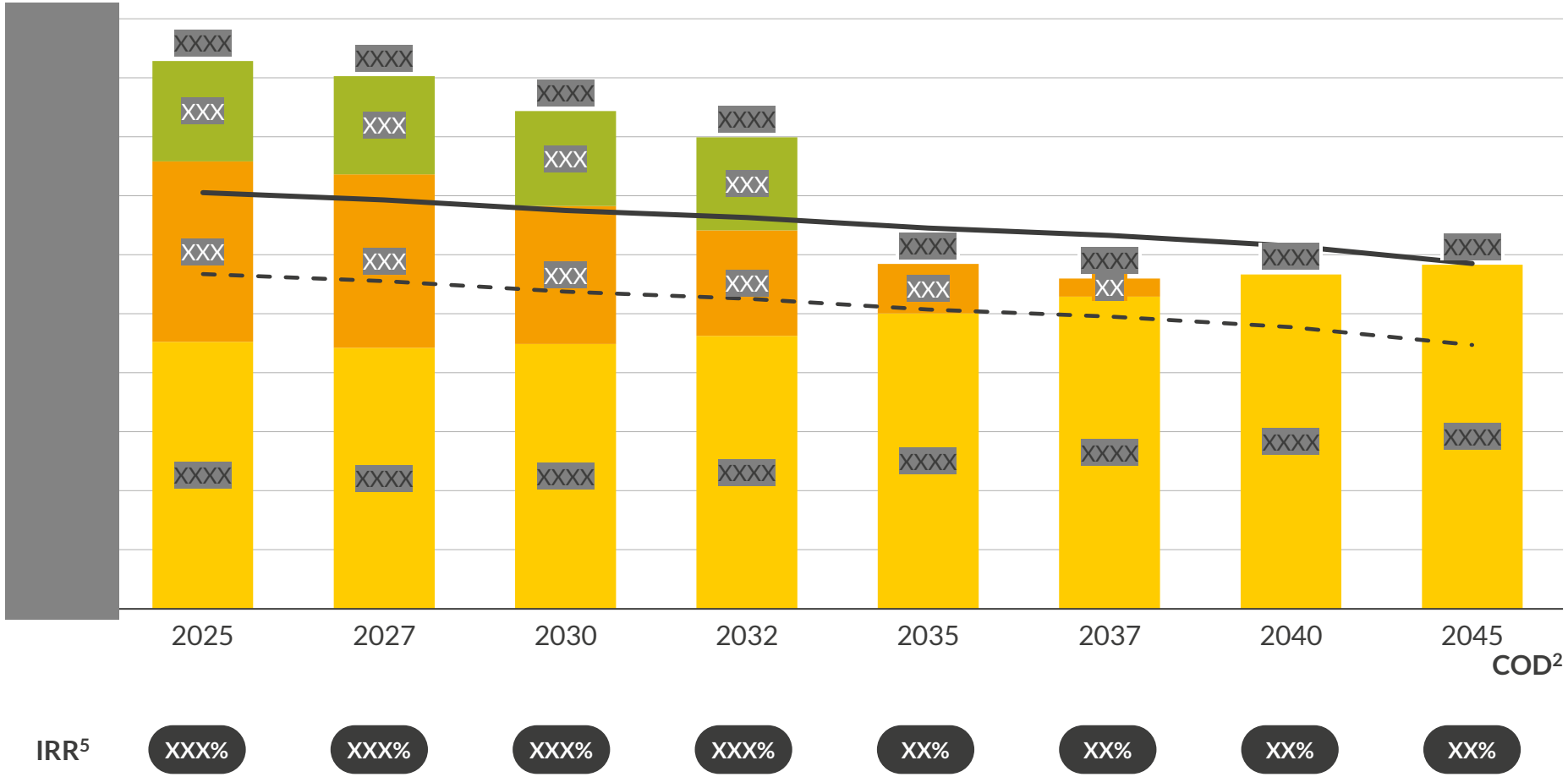
Discounted revenues and costs[1]
C$/kW (real 2022)



- The XX% Clean Technology Investment Tax Credit set in Budget 2023 applies from 2024-2032. It is reduced to XX% in 2033 and disappears by 2035
- Under Aurora Central, the capacity of wind assets to generate TIER[3] carbon offsets is reduced as the EGDF[4] reaches XXX by 2030 and decreases afterwards following the High-Performance Benchmark set under TIER
- GWA prices provide additional revenue support after 2030, however it is not enough to cover the missing TIER and ITC between 2035-2040
- By 2045, merchant revenue provides enough support to cover CAPEX+FOM costs

1) Illustrative NPV breakdown for a project by entry year. Assume 30-year project life; 9.5% WACC for cost and contracted revenue; 9.5% for wholesale market revenue; 0% curtailment from 2020 to 2050; 1-year construction period 2) Commercial Operation Date. 3) Technology Innovation and Emissions Reduction Regulation. 4) Electricity Grid Displacement Factor. 5) Pre-tax real.
Sources: Aurora Energy Research, Government of Canada, Government of Alberta

Solar investment case: TIER credits provide XX% of the revenue for the first 10 years of a project; ITC offsets XX% of the CAPEX

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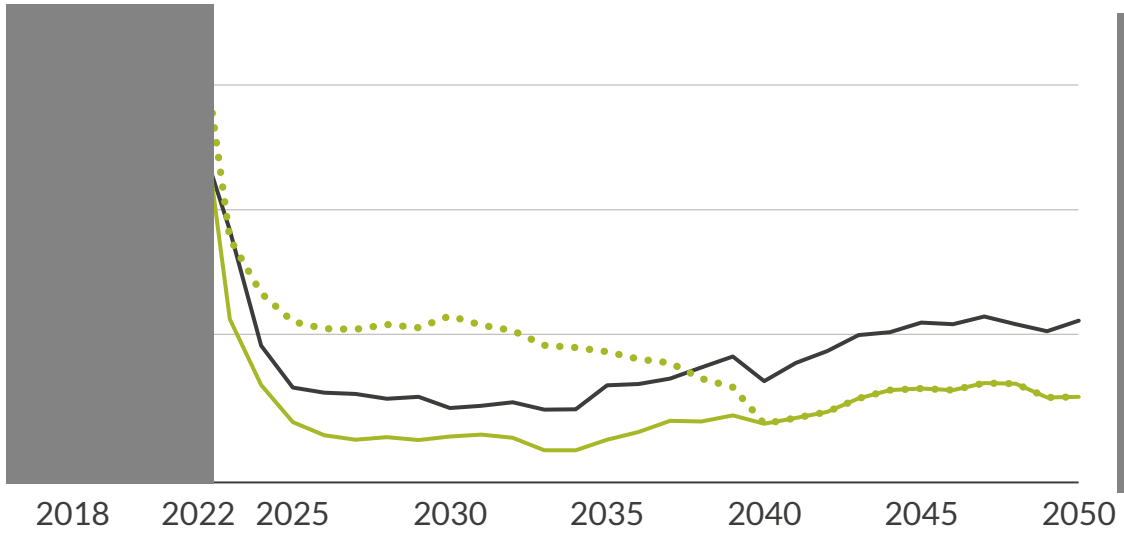
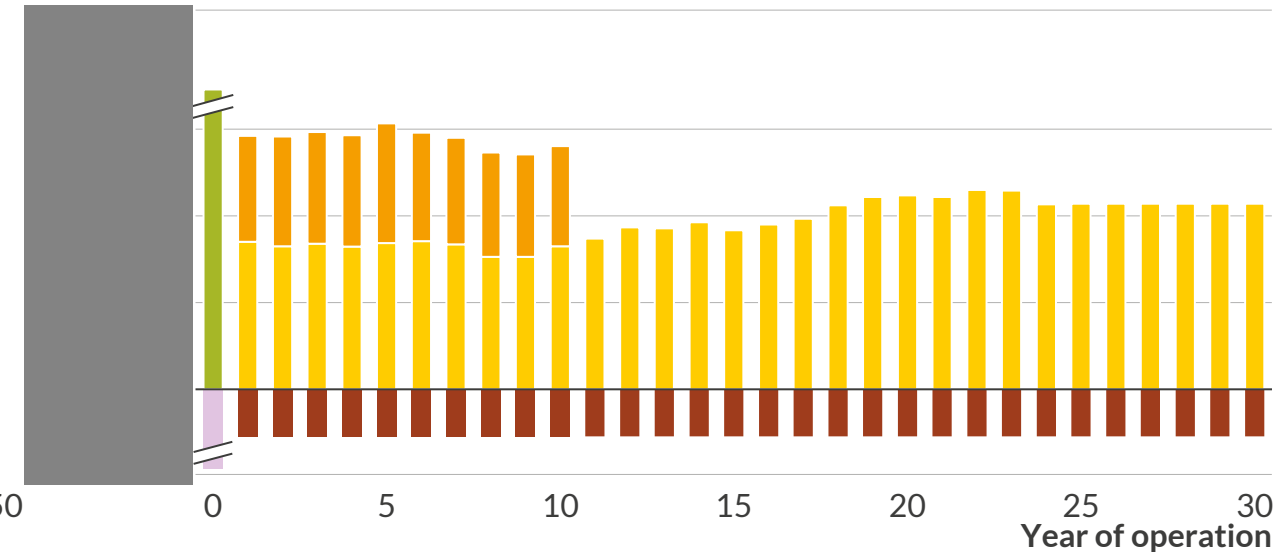
Solar GWA[1] price and pool price[2]
C$/MWh (real 2022)



Solar undiscounted revenues and costs – 2025 COD[3,4]
C$/kW/year (real 2022)



- Solar GWA prices are lower than pool price throughout the forecasting period with a XX% average discount
- After 2034, solar GWAs begin increasing to reach C$XX/MWh by 2050. This increase closely tracks pool price behaviour
- TIER[5] offsets provide additional revenue through 2040 depending on the COD of the asset

- For an asset with a 2025 COD, the ITC offsets XX% of the CAPEX while TIER credits provide an average of XX% of the revenue for the first 10 years of operation
- The same asset obtains an IRR of XXX% assuming a 30-year lifetime

Pool Price — Solar •• Solar + TIER Credits

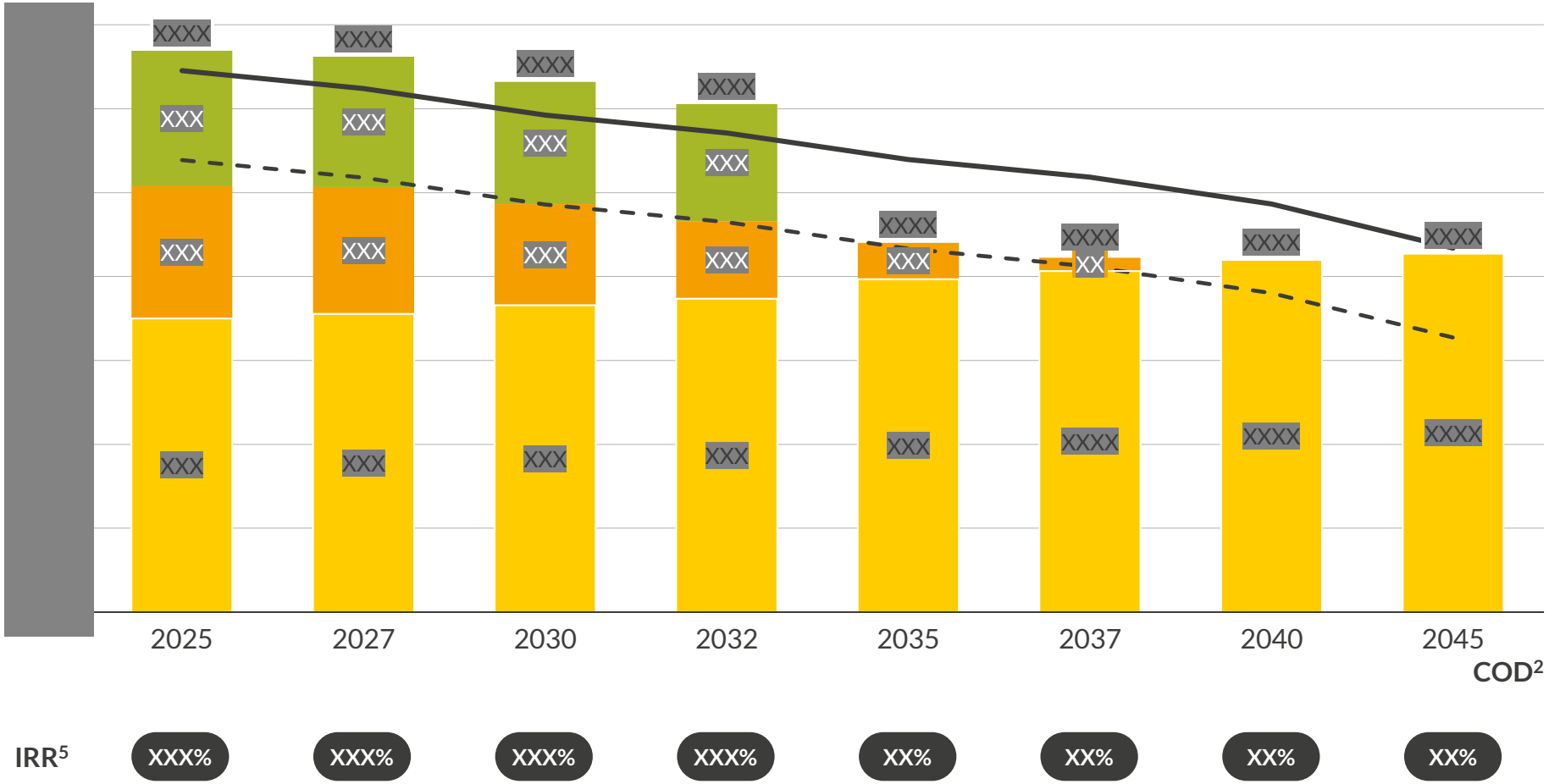
CAPEX FOM ITC TIER credits Wholesale Gross Margin

1) GWA= Generation Weighted Average. 2) Average over a year. 3) Assume 30-year project life; 0% curtailment from 2020 to 2050; 1-year construction period. 4) COD=Commercial Operation Date. 5) Technology Innovation and Emissions Reduction Regulation.

Sources: Aurora Energy Research, Government of Canada, Government of Alberta

Solar investment case: After 2032, the lack of ITC and reduced TIER revenue makes wind projects financially uncompetitive

Discounted revenues and costs[1]
C$/kW (real 2022)



1) Illustrative NPV breakdown for a project by entry year. Assume 30-year project life; 9.5% WACC for cost and contracted revenue; 9.5% for wholesale market revenue; 0% curtailment from 2020 to 2050; 1-year construction period. 2) Commercial Operation Date. 3) Technology Innovation and Emissions Reduction Regulation. 4) Electricity Grid Displacement Factor. 5) Pre-tax real.
Sources: Aurora Energy Research, Government of Canada, Government of Alberta

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- The XX% Clean Technology Investment Tax Credit set in Budget 2023 applies from 2024-2032. It is reduced to XX% in 2033 and disappears by 2035
- Under Aurora Central, the capacity of solar assets to generate TIER[3] carbon offsets is reduced as the EGDF[4] reaches XXX by 2030 and decreases afterwards following the High-Performance Benchmark
- GWA prices provide additional revenue support after 2034, however it is not enough to cover the missing TIER and ITC between 2035-2040
- By 2045, merchant revenue provides enough support to cover CAPEX+FOM costs

CCGT+CCS investment case: High GWA prices provide support for merchant revenue through 2050; TIER credits represent XX% of average early revenue

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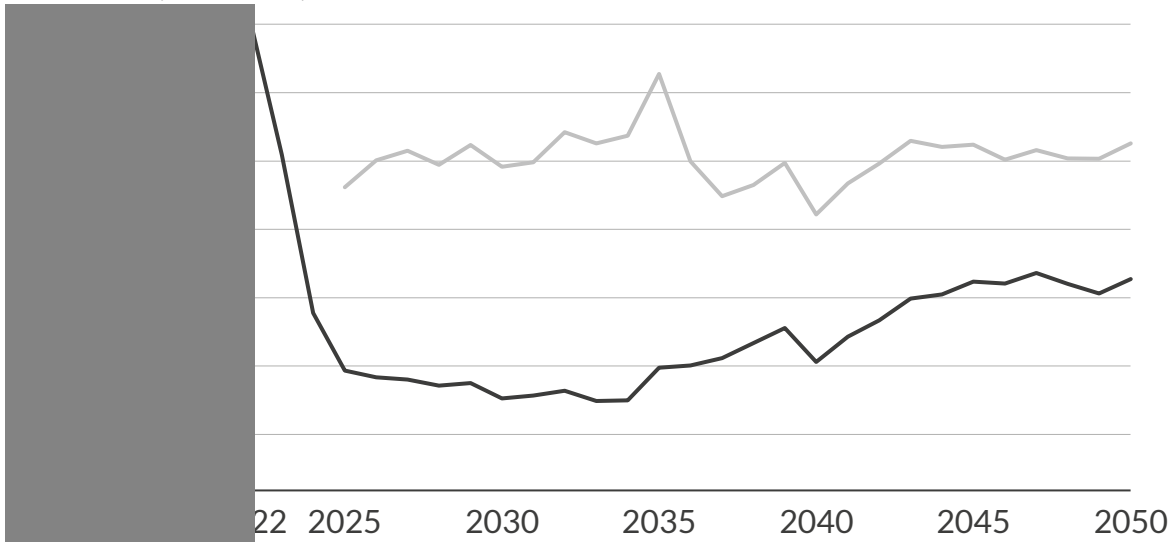
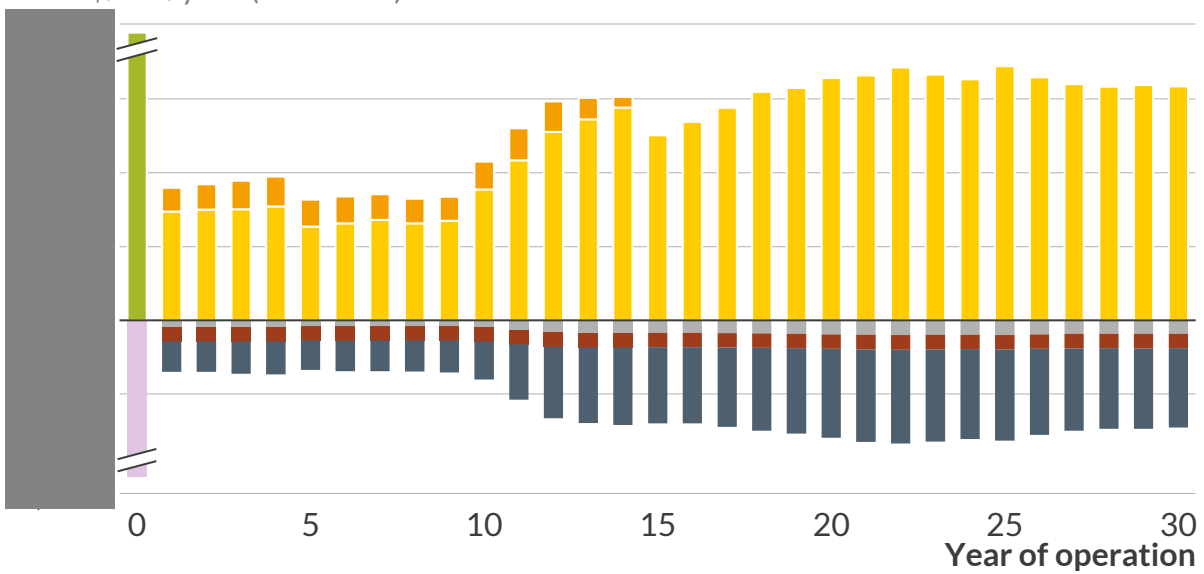
CCGT+CCS GWA[1] price and pool price[2]
C$/MWh (real 2022)



CCGT+CCS undiscounted revenues and costs – 2025 COD[3,4]
C$/kW/year (real 2022)



- From 2024-2050, CCGT+CCS GWA prices are at a premium with respect to pool price by XX% on average
- The premium is driven by thermal assets' ability to capture high prices during peak demand hours combined with the capacity to continuously run throughout the day
- In the period 2025-2035, a CCGT+CCS plant is expected to have an average load factor of XX%. From 2036-2050, load factor increases to an average of XX%, driving larger merchant revenues

ATC CCGT+CCS

- For a CCGT+CCS asset with a COD in 2025, the ITC offsets XX% of the CAPEX while TIER[5] carbon capture credits represent XX% of the gross revenue for the first 15 years[6]
- Under Aurora Central, the ability of the plant to generate TIER carbon capture credits disappears in 2040 due to the CER implementation, limiting the credit-generating period to 15 years instead of the maximum of 20 years
- The same asset obtains an IRR of XXX% assuming a 30-year lifetime

CAPEX FOM TIER credits Wholesale Gross Margin
VOM ITC Fuel Cost

1) GWA= Generation Weighted Average. 2) Average over a year. 3) Assume 30-year project life; 0% curtailment from 2020 to 2050; 1-year construction period; 40% average load factor throughout the period; 40% efficiency. 4) COD=Commercial Operation Date. 5) Technology Innovation and Emissions Reduction Regulation. 6) Carbon capture credits can be generated for up to 20 years under current TIER regulations.

Sources: Aurora Energy Research, Government of Canada, Government of Alberta

CCGT+CCS investment case: ITCs and TIER credits are required until 2030

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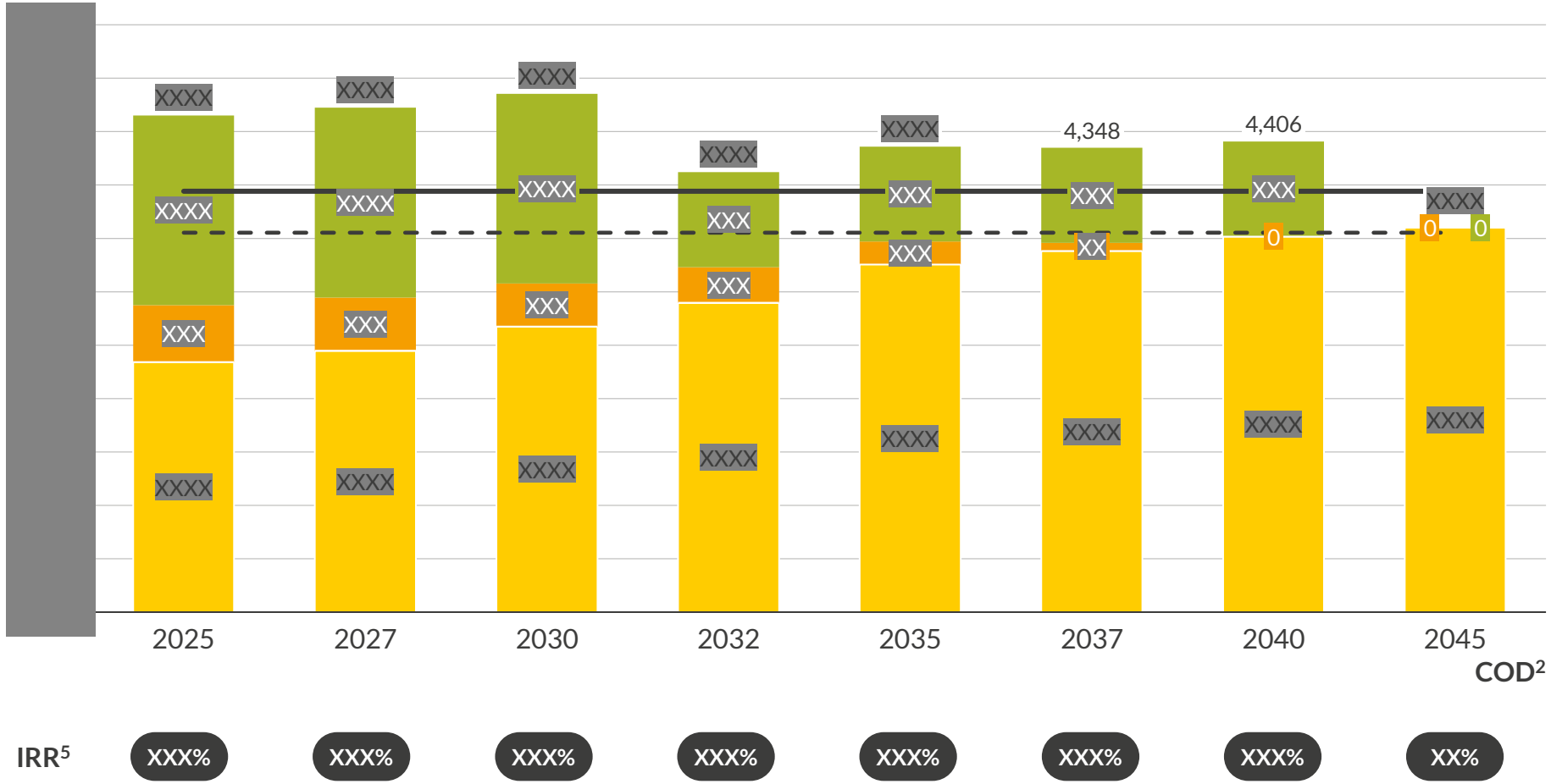
Discounted revenues and costs[1]
C$/kW (real 2022)



- A XX% ITC applies from 2024-2030. It is reduced to XX% from 2031-2040
- Pre-2032, the ITC and TIER[3] revenue provide needed support to make CCGT+CCS financially possible.
- After 2032, the reduced TIER revenues and ITC make the financial case for CCGT+CCS more challenging
- High GWA[4] prices and increased capacity factors do not provide enough merchant revenue to cover all costs in any year
- Abated thermal assets can generate carbon offsets for up to 20 years. However, under Aurora Central, their capacity to generate them disappears in 2040 due to the enactment of the CER

1) Illustrative NPV breakdown for a project by entry year. Assume 30-year project life; 9.5% WACC for cost and contracted revenue; 9.5% for wholesale market revenue; 0% curtailment from 2020 to 2050; 1-year construction period 2) Commercial Operation Date. 3) Technology Innovation and Emissions Reduction Regulation. 4) Generation Weighted Average. 5) Pre-tax real.
Sources: Aurora Energy Research, Government of Canada, Government of Alberta

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Aurora's analysis considers the impact of 9 policy and market key sensitivities on energy prices and capacity outcomes

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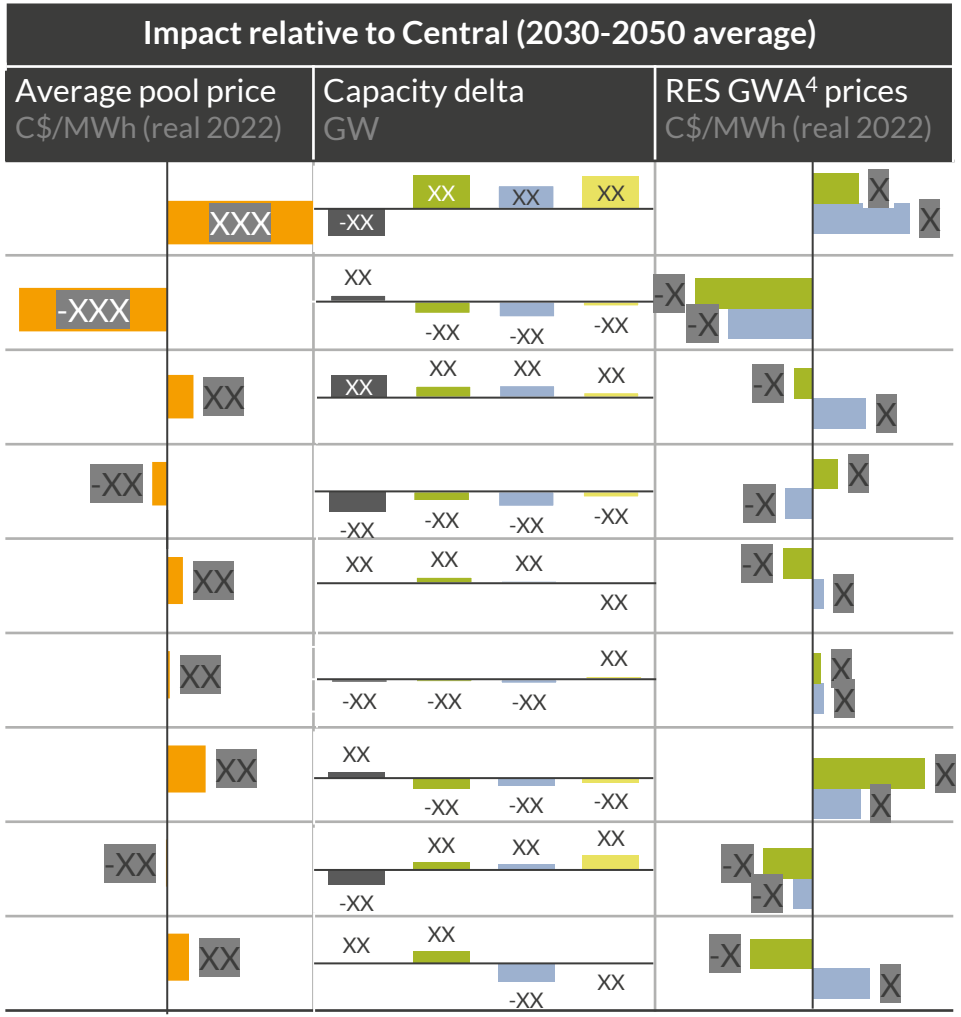
	Sensitivity	Description
Market	High gas price	Gas price[2] increased XX% from Central in 2030 (USD$XX/MMBtu) and XX% (USD$XX/MMBtu) in 2050.
	Low gas price	Gas price[2] decreased XX% from Central in 2030 (USD$XX/MMBtu) and XX% (USD$XX/MMBtu) in 2050.
	High load growth	Total annual load increased +XX% from Central by 2030 and +XX% by 2050
	Low load growth	Total annual load decreased -XX% from Central by 2030 and -XX% by 2050
Policy	High carbon price	Carbon price increases at XX% after 2030 reaching C$XXX/ton[5] (nominal) by 2050
	Low carbon price	Carbon price stays at C$XXX/ton[5] (nominal) after 2030
	Inflexible CER[1]	The emissions cap is enacted in 2035 as set in the proposed legislation
	CER[1] delay	The emissions cap is enacted in 2045, 10 years delay from proposed legislation and 5 years delay vs Aurora Central
	Interconnection delays	Renewables face extended connection delays which limit their growth[3]



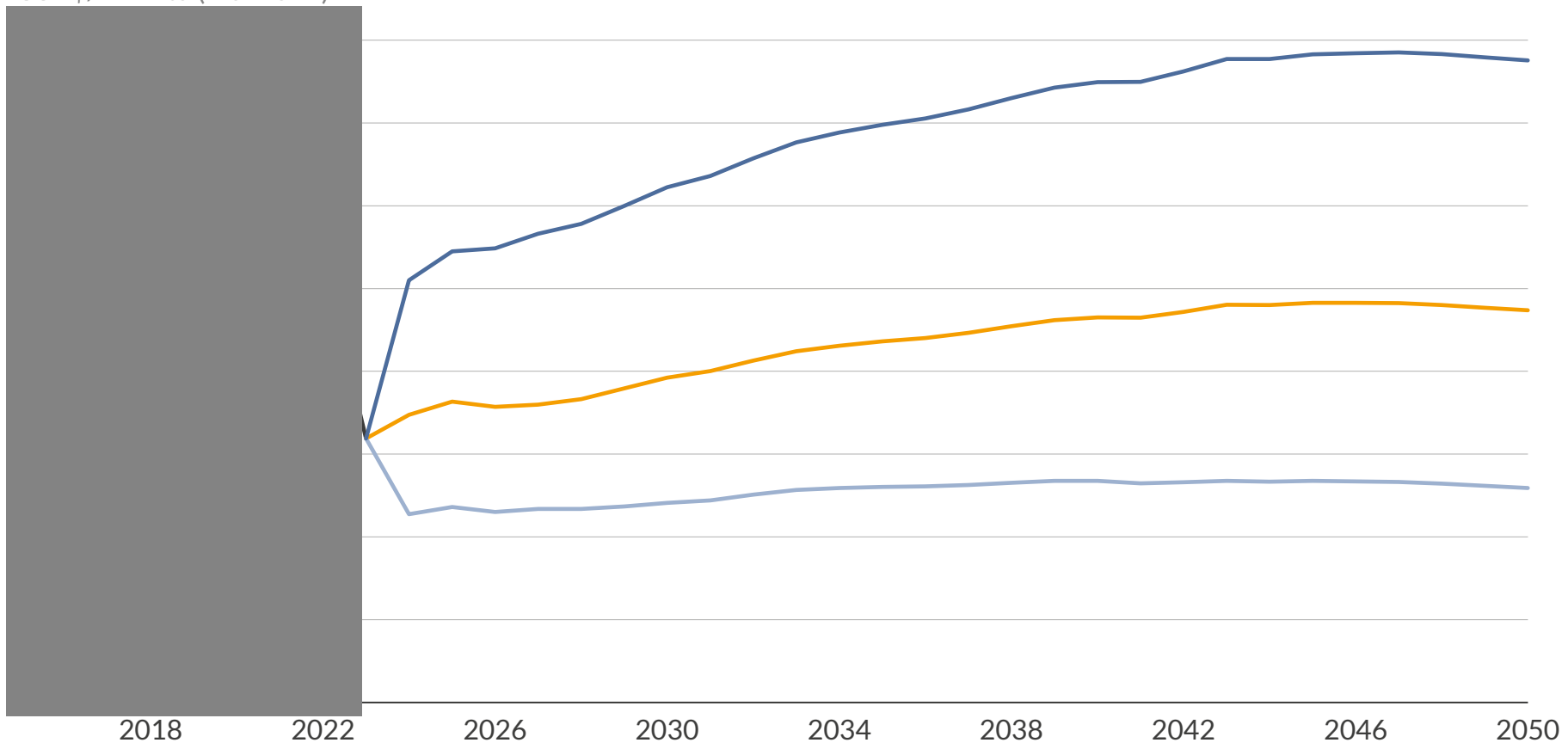
Conventional Solar Wind Flexible

1) CER = Clean Electricity Regulations. 2) Prices at AECO Hub. 3) Buildout limits of 570 MW/year for wind and 350 MW/year for solar through 2050. 4) GWA= Generation Weighted Average. 5) Metric tons.

Sources: Aurora Energy Research

Gas price sensitivity: Gas-fuelled generation set the price XX% of the time on average between 2024-2050

Wholesale natural gas prices[1]
USD$/MMBtu (real 2022)



1) For years 2023-2027, the prices shown consider latest futures prices for the years in question, with declining weights. In year 2023, forecast prices include historical prices up to August .

Sources: Aurora Energy Research

- Natural gas is the most important commodity in AIES as gas-fuelled generation is price setting XX% of the time on average from 2024-2050
- Alberta's pipeline capacity and geographical location away from export hubs reflects in discounted gas prices compared to Henry Hub
- Aurora Central scenario considers an annual average prices of USD$XXX/MMBtu by 2050
- The Low Gas price scenario considers an annual average price of USD$XXX/MMBtu by 2050
- The High Gas price scenario considers prices reaching on average USD$XXX/MMBtu by 2050

Gas price sensitivity: High gas prices cause a XXX% average increase in pool price; low gas prices decrease prices by XX% from 2024 to 2050

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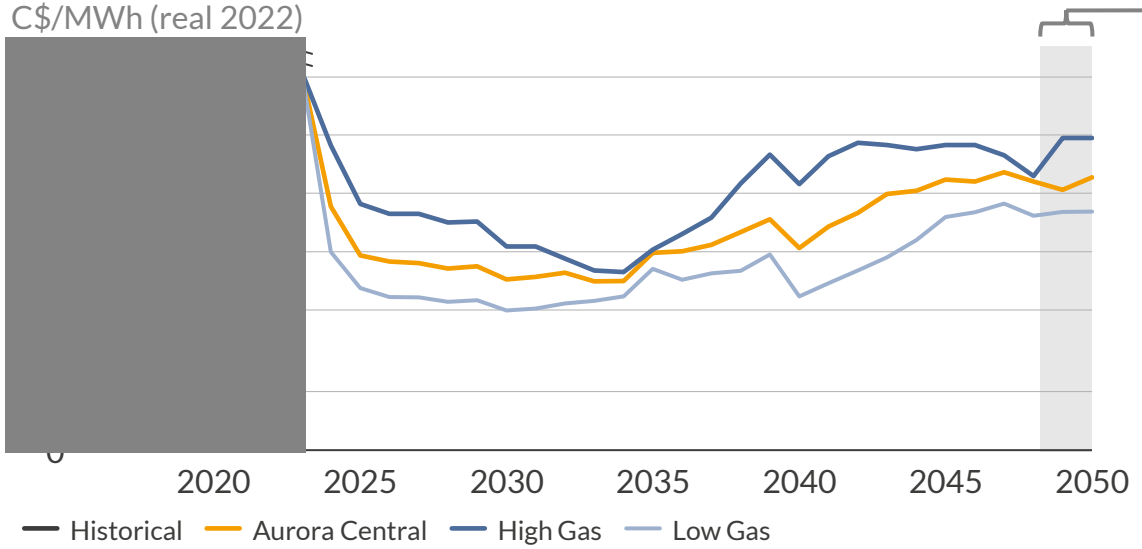
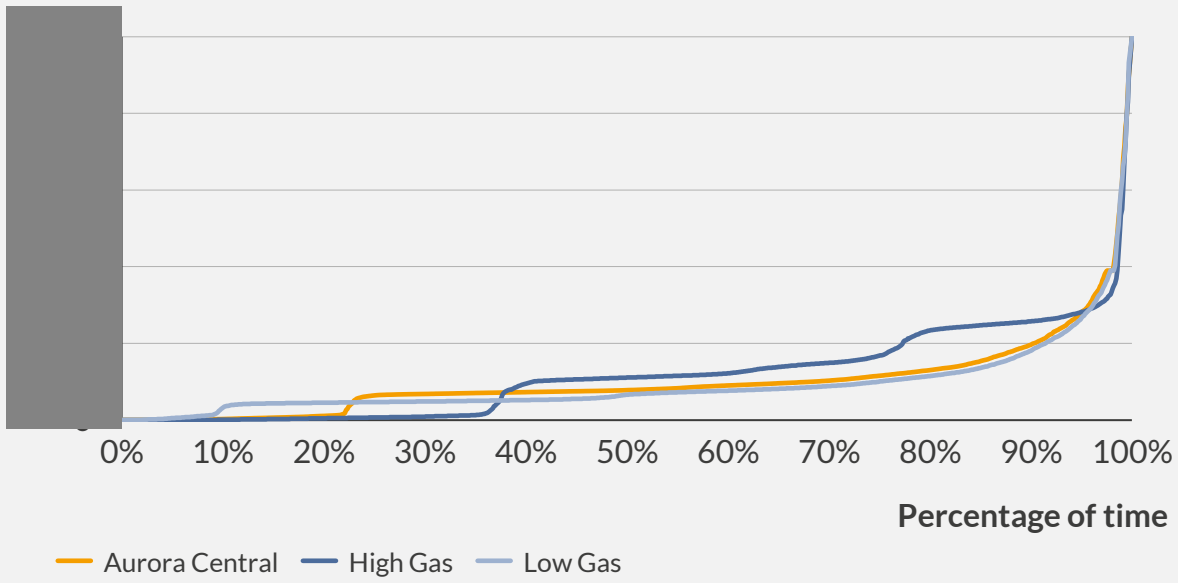
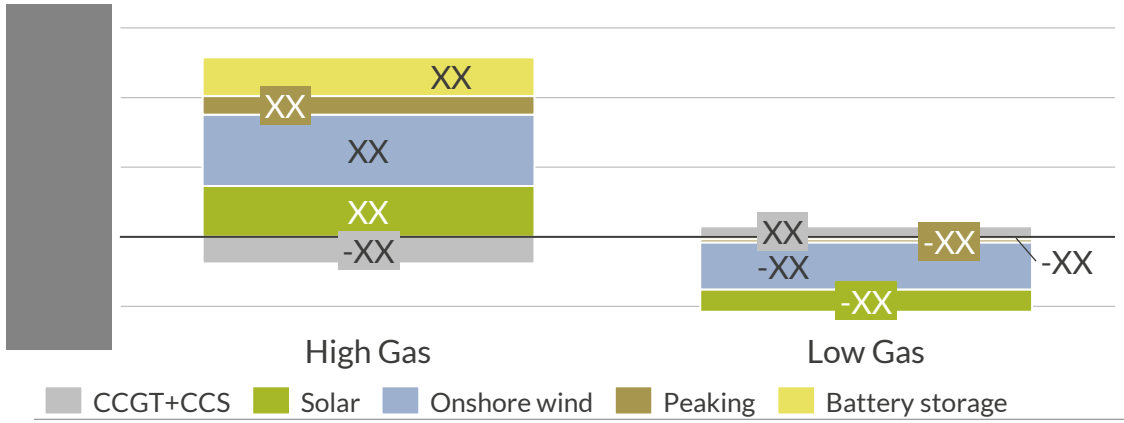
Pool price
C$/MWh (real 2022)



PDCs for Central, High, and Low Gas Sensitivities, 2050
C$/MWh, real 2022



Capacity delta to Central, 2050
GW



- High gas prices result in a XXX C$/MWh increase in annual pool price from 2024 to 2050. An additional XX GW of renewable capacity are built in the high gas price scenario, out of which XX GW are wind.
- Low gas prices drive the average pool price by XXX C$/MWh from 2024 to 2050. Under this scenario, there is a decrease in renewable capacity totalling X GW, out of which XX GW are wind and XX GW are solar

Sources: Aurora Energy Research

Load sensitivity: Total load is forecasted to rise to XXX TWh by 2050 driven by urban growth and electrification of transportation

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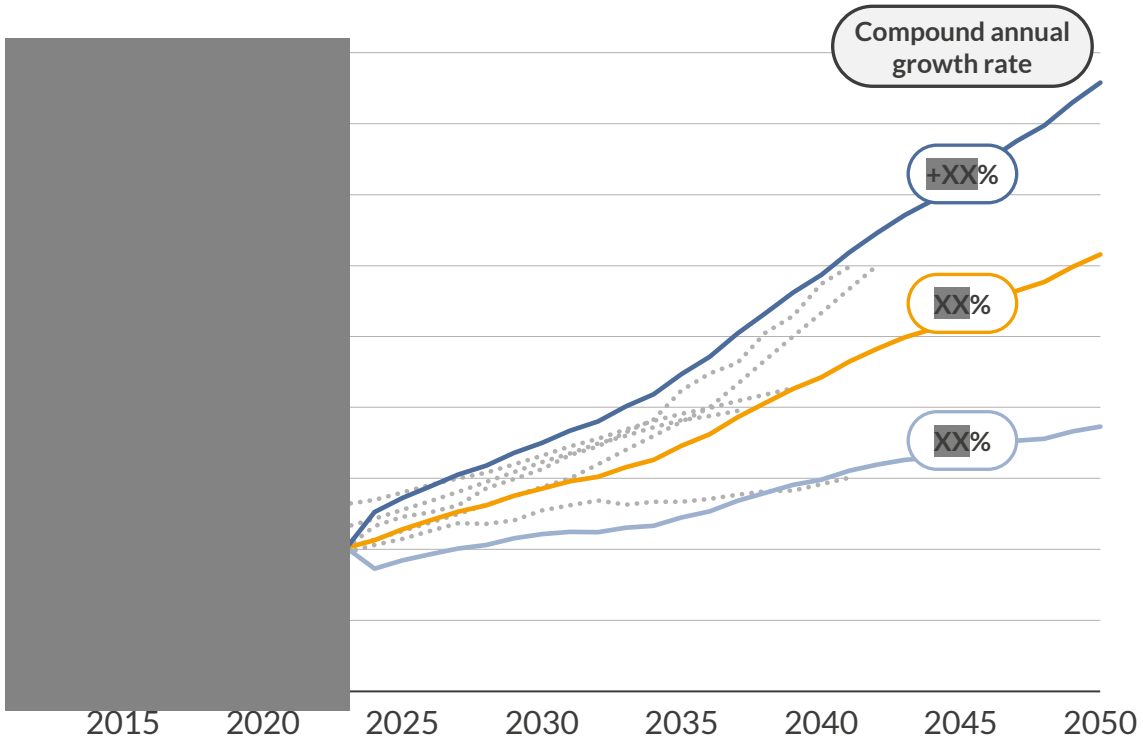
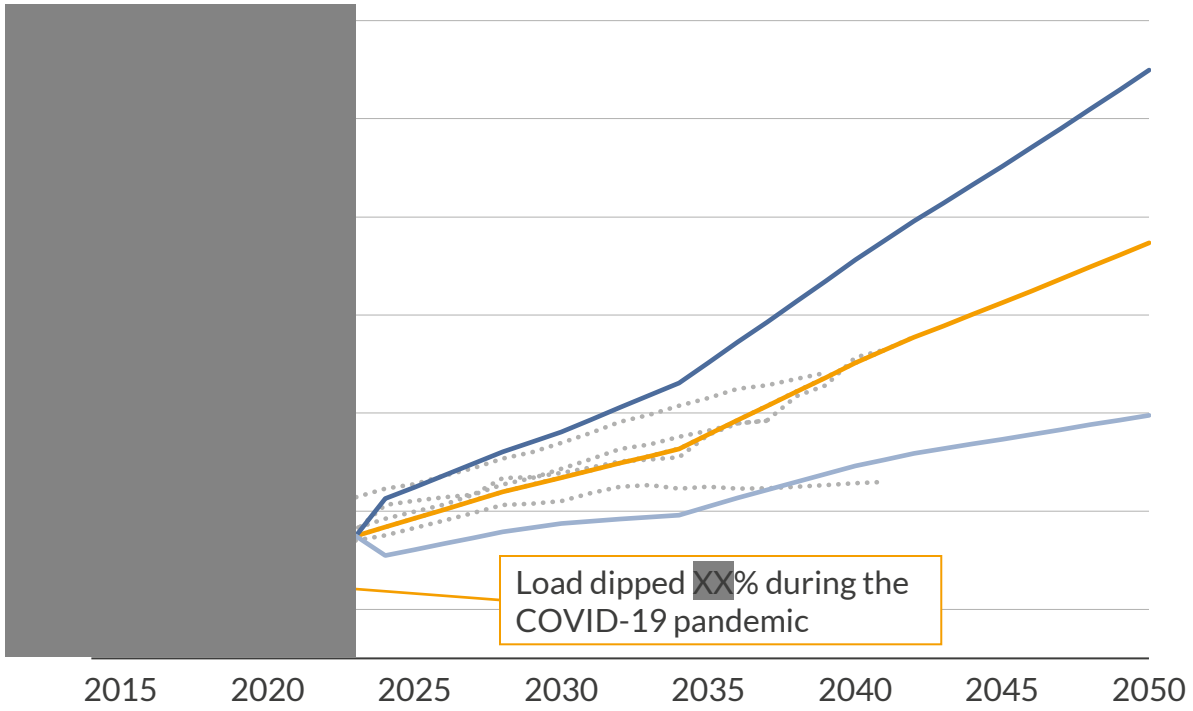
Alberta Internal Load – Winter peak
GW



Alberta Internal Load
TWh



- Future load is driven by economic growth, electrification of vehicles and buildings
- The High Load and Low Load sensitivities explore a ±XX% load difference by 2050 with respect to Aurora Central

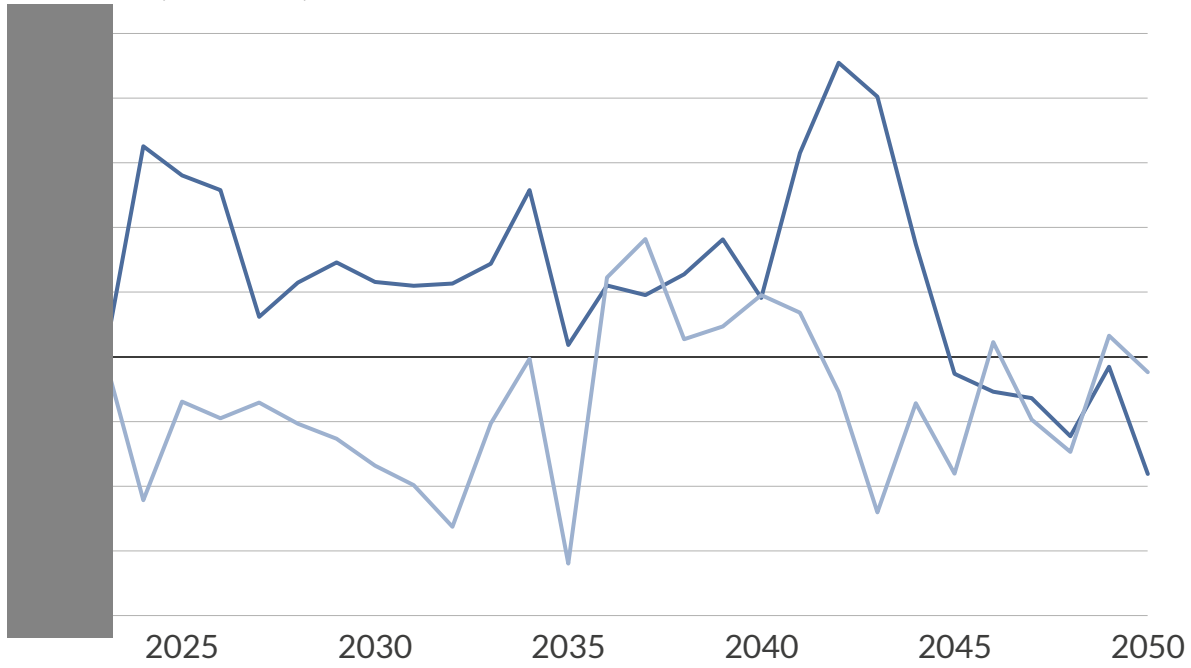
- Annual energy demand is set to increase in line with peak demand and reaches XX TWh by 2035.
- Demand from oil sands is expected to be less significant compared to the past decade

Previous AESO Forecasts | Historical | Aurora Central | High Load Growth | Low Load Growth

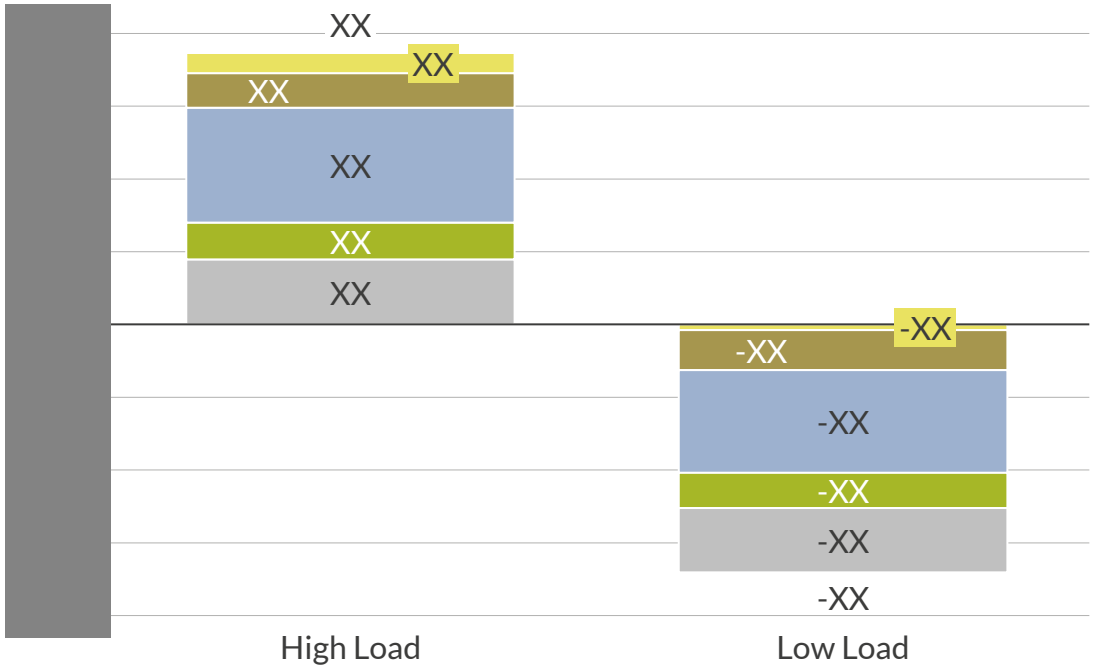
Sources: Aurora Energy Research, AESO

Load sensitivity: Pool price shows low sensitivity to load changes, with average changes between +XX C$/MWh and -XX C$/MWh

Pool price delta to Central
C$/MWh (real 2022)



Capacity delta to Central, 2050
GW



- The High Load scenario slightly pushes up pool price by an average of C$XX/MWh from 2024-2050
- A Low Load scenario results in a small pool price decrease of C$XX/MWh from 2024-2050 with most of the differences between 2024-2035

High Load Growth Low Load Growth

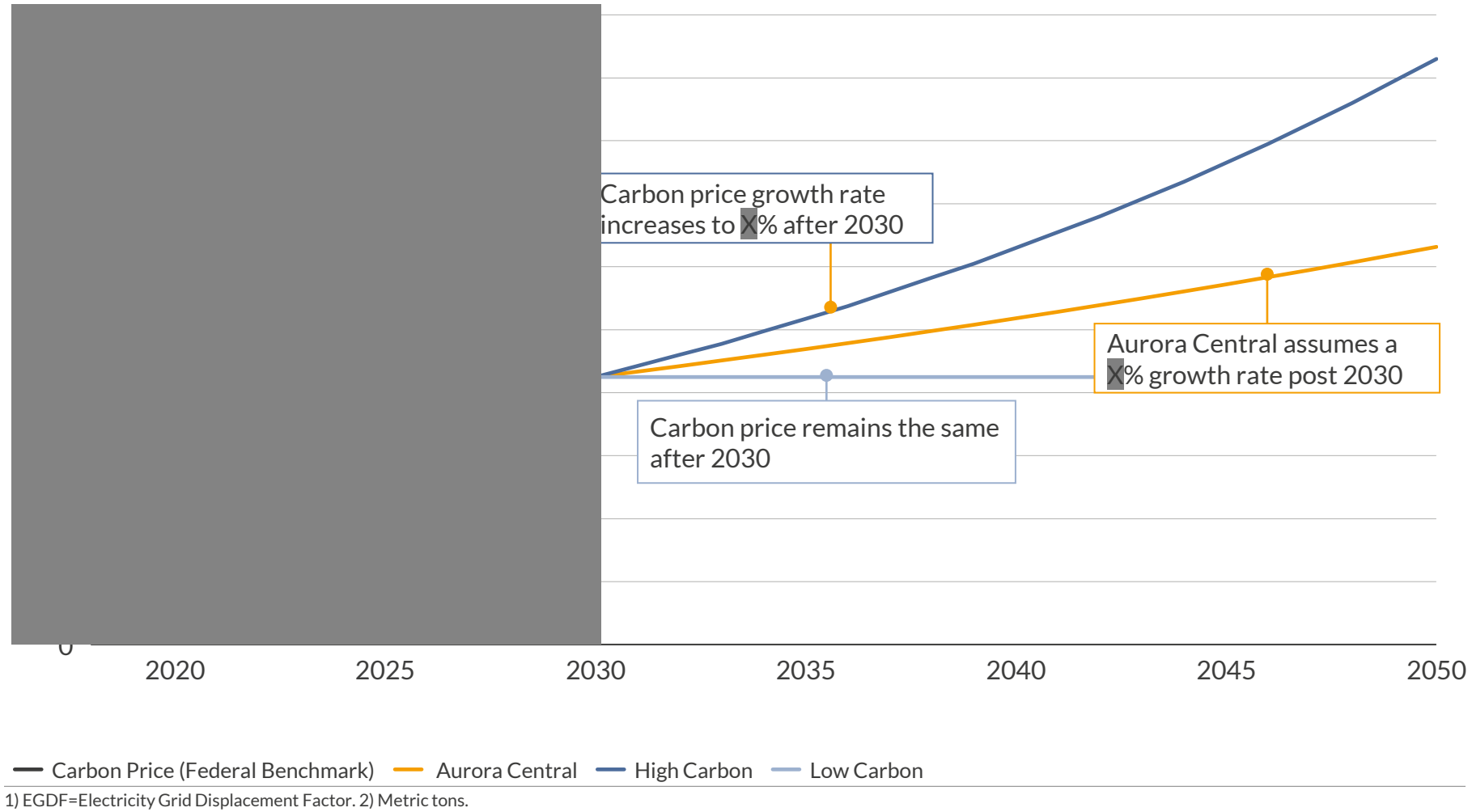
- The High Load scenario results in an additional XX GW of capacity, out of which XX% are renewables
- The Low Load scenario shows a XX GW decrease in capacity, with renewables accounting for XX% of the capacity difference

CCGT+CCS Solar Onshore wind Peaking Battery storage

Sources: Aurora Energy Research

Carbon price sensitivity: Carbon price is set to reach C$XXX/ton by 2030. Uncertainty remains on prices post 2030

Carbon Price
C$/ton[2] (nominal)



1) EGDF=Electricity Grid Displacement Factor. 2) Metric tons.

Sources: Aurora Energy Research, Government of Canada

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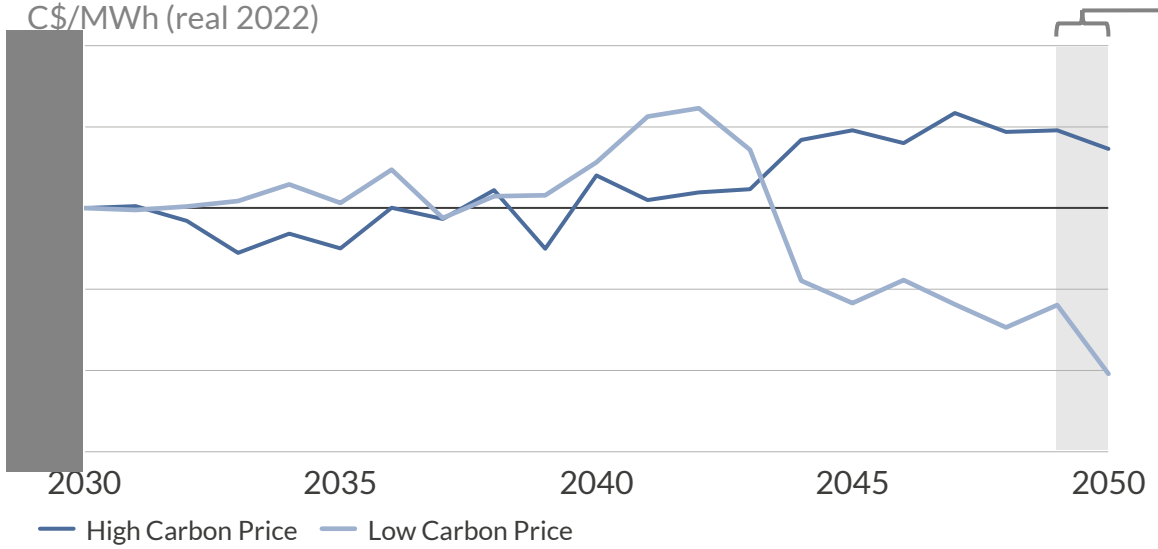
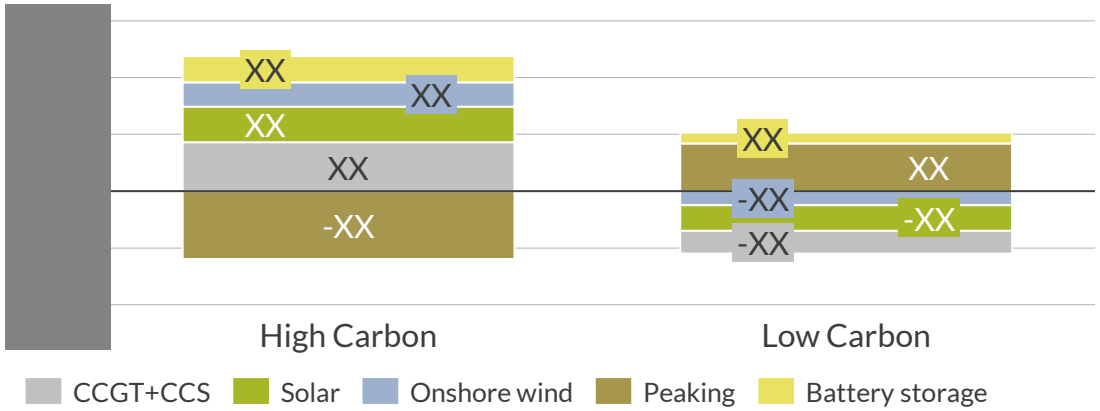
- The price of carbon in Alberta is set to reach C$XXX by 2030 in line with federal regulation
- Renewables can generate emission offsets at the rate specified by the EGDF[1] either at the time of commissioning or at a fixed schedule according to commissioning date

Carbon price sensitivity: Carbon price changes post 2030 have small impacts on AURORA pool price as the grid moves towards decarbonization

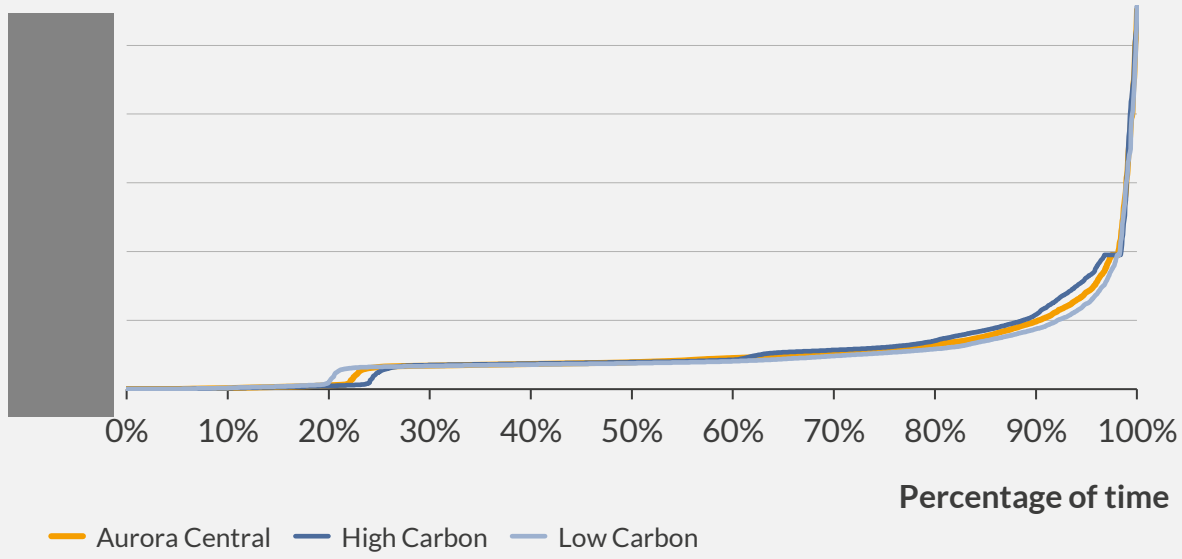
Pool price delta to Central
C$/MWh (real 2022)



Capacity delta to Central, 2050
GW



PDCs for Central, High, and Low Carbon Price Sensitivities, 2050
C$/MWh, real 2022

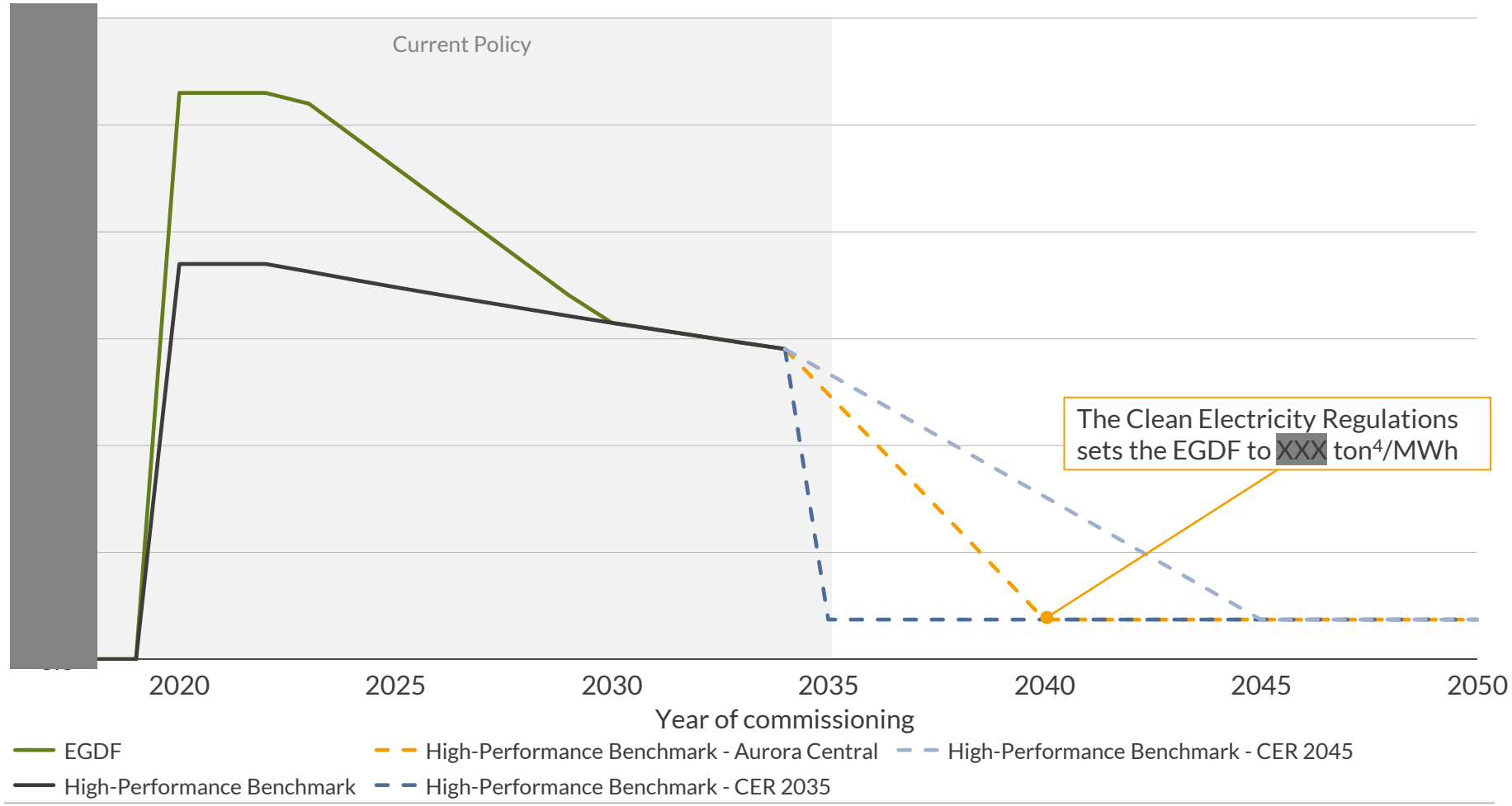


- The High Carbon price scenario results in an increase of XX GW of renewable capacity and XX GW of battery storage with a decrease of XX GW in peaking capacity compared with Aurora Central.
- On average, the High Carbon price scenario resulted in an increase of C$XX/MWh with respect to Aurora Central
- The Low Carbon price scenario shows an increase of XX GW in peaking capacity and a decrease of XXGW in renewable capacity

Sources: Aurora Energy Research

CER sensitivity: Aurora Central assumes a delay in the implementation of the CER in Alberta until 2040

EGDF[1], High-Performance Benchmark[2]
ton[4]/MWh



1) EGDF= Electricity Grid Displacement Factor. 2) High-Performance Benchmark according to TIER Regulation. 3) As established in Budget 2023. 4) Metric tons.

Sources: Aurora Energy Research, Government of Canada

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- Under the proposed Clean Electricity Regulations, after 2035 generators would be required to reduce emissions to net-zero, thus dropping the value of the EGDF
- Under Aurora Central, a 5-year delay of CER results in a longer period of policy support for renewable generation and buildout
- CER 2045 scenario gives renewables the largest financial support comparing with other scenarios

CER sensitivity: Changes in the enforcement date of the CER result in revenue differences for RES due to TIER[1] credit generation

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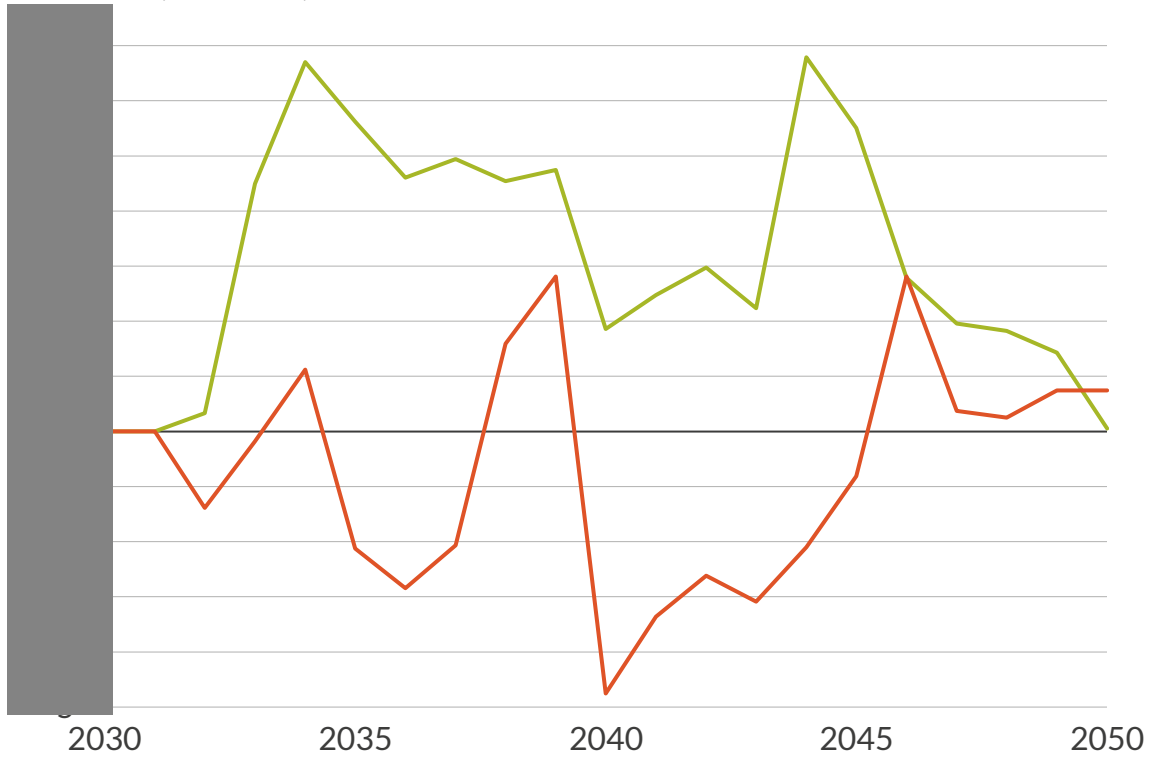
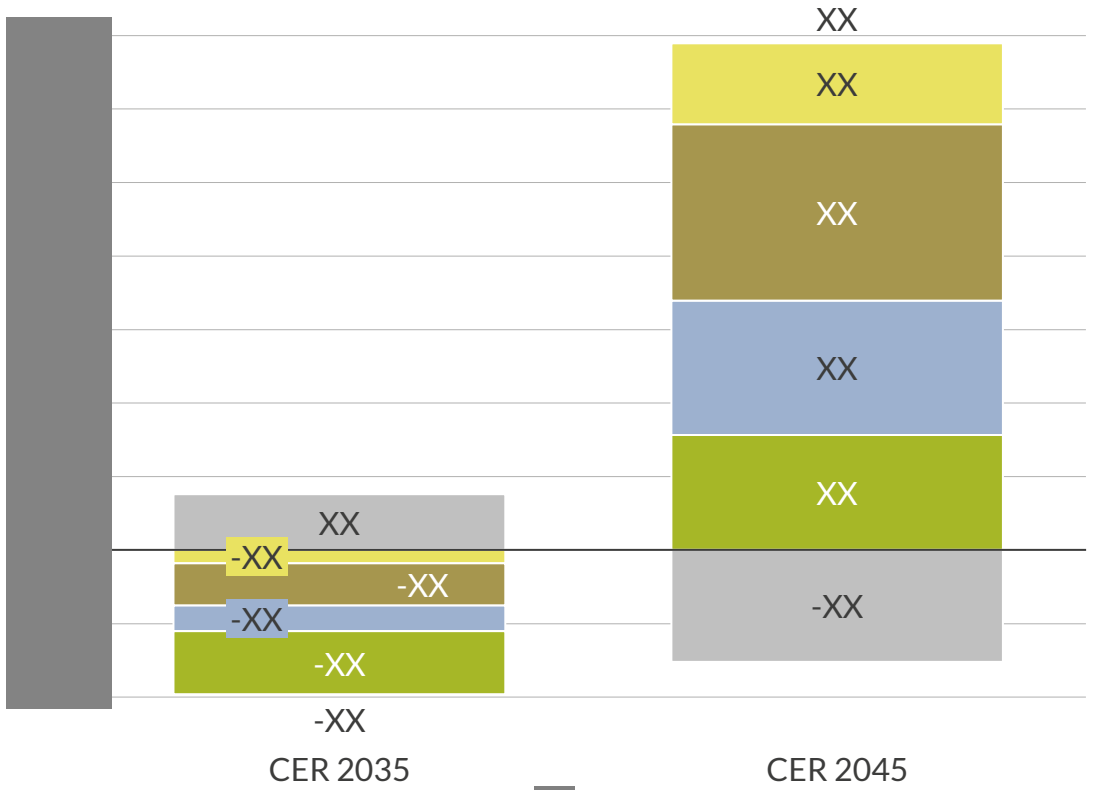
Pool price delta to Central
C$/MWh (real 2022)



- The implementation of CER in 2035 results in pool price increase of C$XX/MWh from 2030-2050, with most of the difference after 2035
- Due to the delay of CER, after 2035, with more RES buildout, the pool price decreases by an average of C$XX/MWh

CER 2035 CER 2045

Capacity delta to Central, 2050
GW



- The CER 2035 scenario shows a XXGW decrease of renewable capacity
- The delay of CER results in a XXGW increase of capacity, with renewables accounting for XX% of the capacity difference

CCGT+CCS Solar Onshore wind Peaking Battery storage

1) Technology Innovation and Emissions Reduction Regulation.

Sources: Aurora Energy Research, Government of Canada

CER sensitivity: Changes in the enforcement date of the CER result in revenue differences for RES due to TIER credit generation

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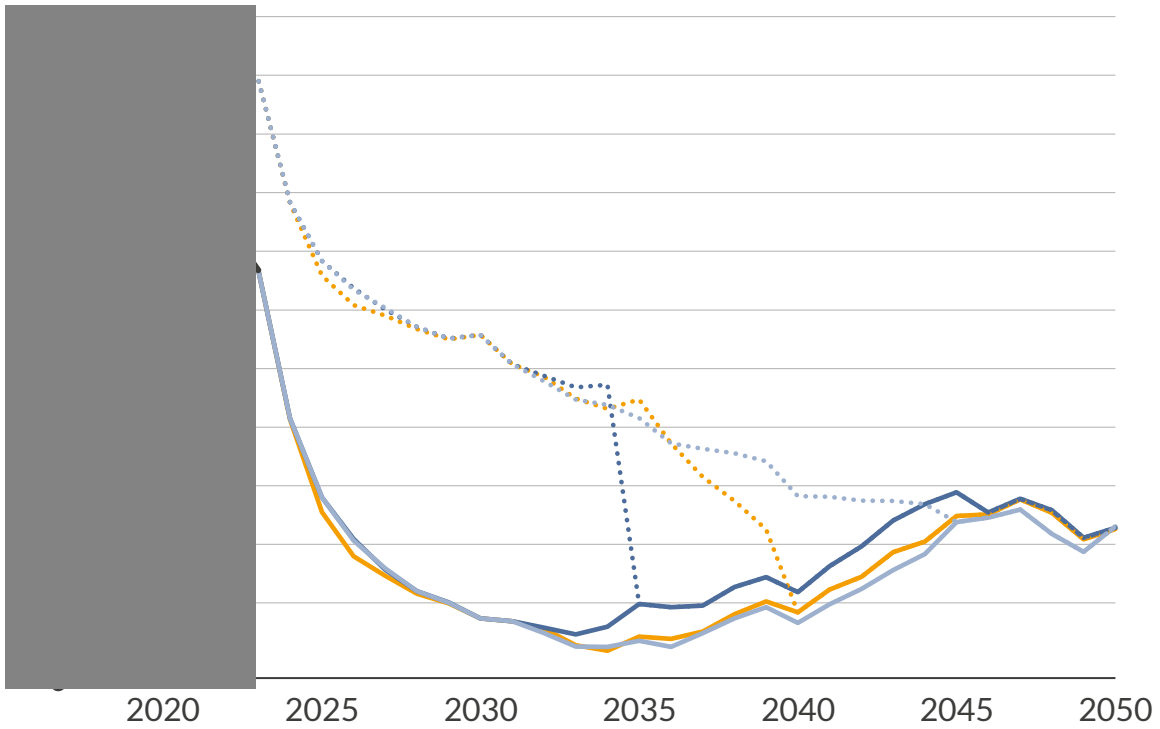
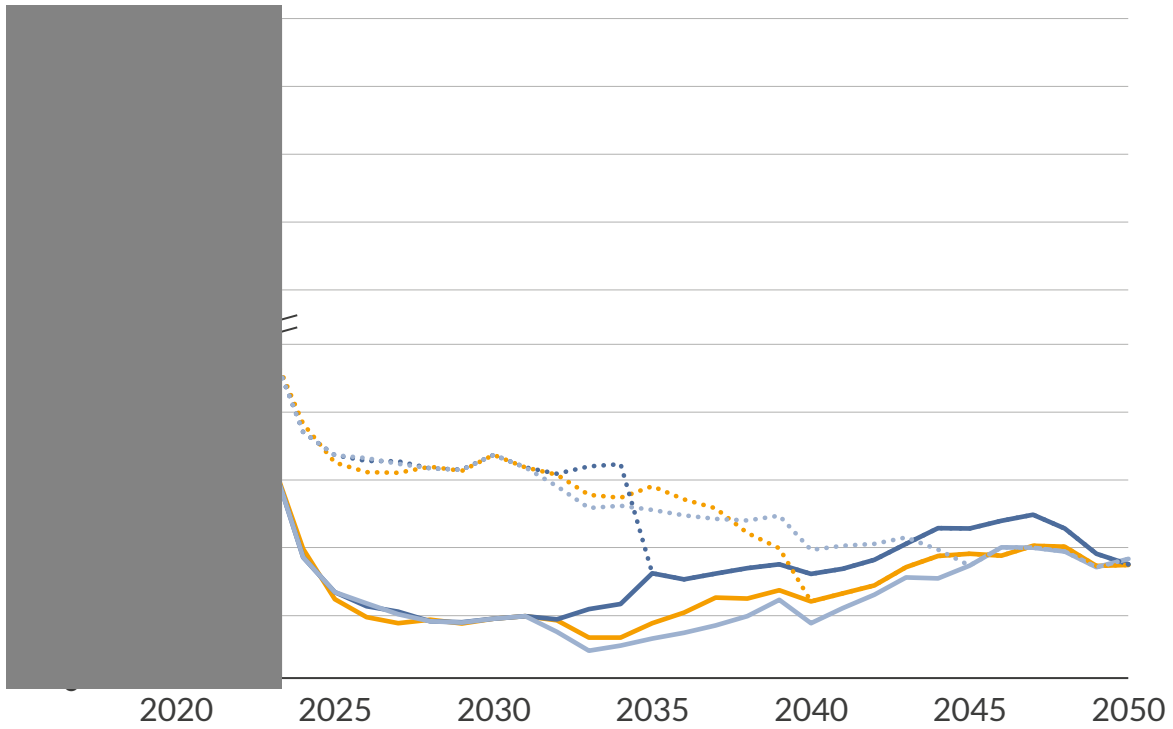
Wind GWA[2] Prices for Aurora Central, CER 2035 and CER 2045
C$/MWh (real 2022)



- With reduced financial support from TIER[1] credit and less capacity buildout, the wind GWA in CER 2035 scenario is higher than Aurora Central and CER 2045 scenario

Solar GWA Prices for Aurora Central, CER 2035 and CER 2045
C$/MWh (real 2022)



- Similarly, with the implementation of Clean Electricity Regulations starts from 2035, solar has a higher GWA with a short period of policy support and less capacity buildout

Historical | Aurora Central | CER 2035 | CER 2045 | Aurora Central + TIER Credits | CER 2035 + TIER Credits | CER 2045 + TIER Credits

1) Technology Innovation and Emissions Reduction Regulation. 2) GWA= Generation Weighted Average.

Sources: Aurora Energy Research

Agenda

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I. **Introduction to today's session**

II. **AIES Overview**

III. **Aurora's Central AIES outlook and key drivers**

1. Aurora's Central AIES outlook
2. Asset investment cases
3. Key input drivers and sensitivities

IV. **Alternative Scenarios**

V. **Next steps**

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Shawn.Bishop@Auroraer.com

We explore key market uncertainties through a range of market scenarios and sensitivities

Central	Considers current policies alongside a view for future policy intervention, and our internally consistent central view of technological change and commodity prices. Assumes continuation of TIER[1] policies, the successful implementation of the subsidies established in Budget 2023, and a delay of the Clean Electricity Regulations until 2040
Low	Represents a downside case, incorporating low underlying demand and low commodity prices. This envisages a world with slower overall GDP and population growth. Assumes stagnant demand from oil and gas production in the province
High	A long-term upside case for prices, this scenario considers higher commodity prices and demand. Higher global GDP increases demand for commodities, while demand grows at an accelerated pace due to higher rate of population and industrial demand growth, including oil-sands production
Clean Ambition	Explores a greater push for decarbonization in Alberta through a combination of federal and provincial policies. Federal policies include the successful implementation of the Clean Electricity Regulations post 2035, transmission upgrades increasing potential renewables deployment and further declines in costs for emissions abatement technologies
Conservative Policy	Explores a shift in Federal level policies where the Clean Electricity Regulations are not implemented, emission abatement technologies are not required for thermal assets. Assumes TIER Regulations continue as currently established and a freezing of the carbon price in 2027

1) Technology Innovation and Emissions Reduction Regulation.

Sources: Aurora Energy Research

Summary of scenarios inputs and assumptions

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		Aurora Central	Low	High	Clean Ambition	Conservative Policy
Demand + Commodity	Underlying demand	+XX TWh between 2023 and 2050 driven by population and industrial growth	+XX TWh between 2023 and 2050 driven by population and industrial growth	+XX TWh between 2023 and 2050 driven by population and industrial growth. The province meets Canada's zero-emission vehicles target.		+XX TWh between 2023 and 2050 driven by population and industrial growth
	Gas price[3]	Prices increase to $XXX/MMBtu in 2050	Prices are $XXX/MMBtu in 2050	Prices are $XXX/MMBtu in 2050	Prices increase to $XXX/MMBtu in 2050	
Technology	Renewables	Wind and solar capital expenditures fall by XX% and by XX% by 2050				
	CCGT + CCS	New thermal buildout after 2035 must be abated except for peakers			New thermal buildout after 2035 must be abated except for peakers	There is no requirement for abated thermal generation
Policy	Clean Electricity Regulations	The implementation of the Clean Energy Regulation in Alberta is delayed to 2040[1,2]			The implementation of the CER in Alberta starts from 2035	The CER are not implemented
	TIER[4] Regulation	EGDF[5] goes from XX ton[6]/MWh in 2023 to XX in 2030. Afterwards, the HPB is reduced by X% annually until 2040			EGDF goes from XX ton[6]/MWh in 2023 to XX in 2030 Afterwards, the HPB is reduced by X% annually until 2035	EGDF goes from XX ton[6]/MWh in 2023 to XX in 2030. Afterwards, the HPB is reduced by X% annually
	Renewables incentives	ITC for renewables and batteries are XX% and fully phased out in 2035. XX% ITC for CCUS from 2024-2030, XX% from 2031-2040			ITC for renewables and batteries are XX% and fully phased out in 2040. XX% ITC for CCUS from 2024-2035, XX% from 2036-2045	ITC for renewables and batteries are XX% between 2024-2027. XX% ITC for CCUS from 2024-2027
	Carbon price	C$XXX/ton[6] by 2030, X% annual increase after 2030	C$XXX/ton[6] by 2030 and remains the same	C$XXX/ton[6] by 2030, X% annual increase after 2030	C$XXX/ton[6] by 2030, XXX% annual increase after 2030	C$XXX/ton[6] by 2027 and remains the same
	Transmission upgrades	Enough transmission to accommodate new supply				

1) The CER draft published in August 2023 sets the start date for the Emission Performance Standard to 2035. 2) The EPS replaces Alberta's High-Performance Benchmark in 2035 3) Prices are in 2022 USD. 4) Technology Innovation and Emissions Reduction Regulation. 5) EGDF=Electricity Grid Displacement Factor. 6) Metric tons.

Sources: Aurora Energy Research

Pool prices in the scenarios range between C$XX/MWh and C$XXX/MWh in 2050 with the highest prices in the High Scenario

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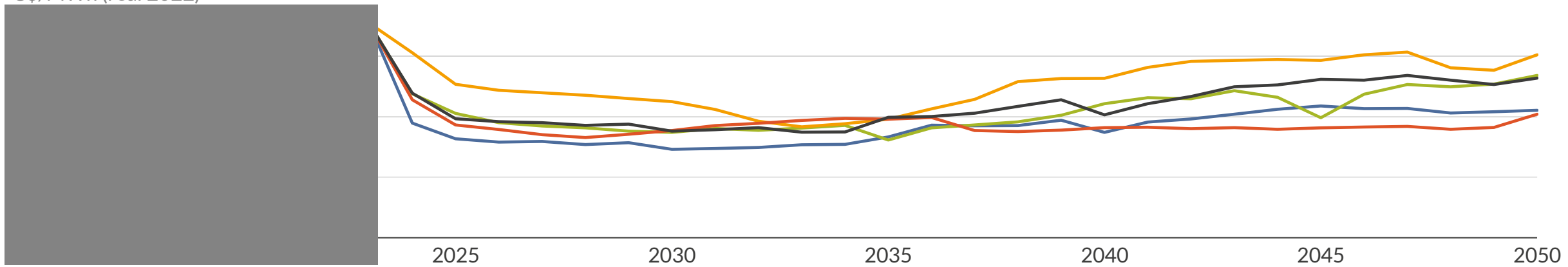
Pool price
C$/MWh (real 2022)



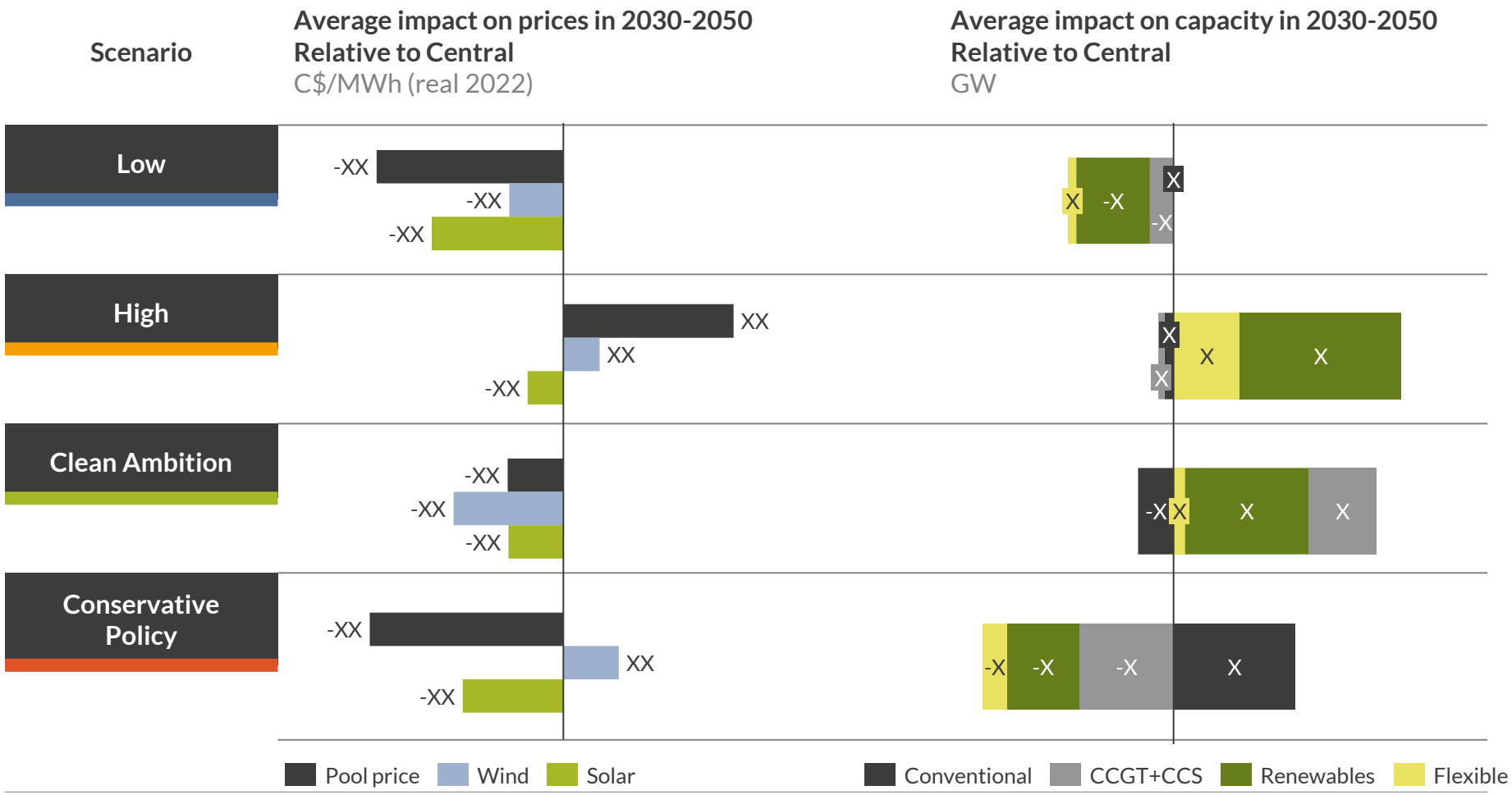
Scenario	Brief description	Typical use case
Aurora Central	Aurora's Central view of the market, current legislated and budget-funded policies	Equity financing, strategy analysis
Low	Low demand and commodity prices	Debt financing/sizing, strategy analysis
High	High demand and commodity prices	Equity financing, strategy analysis
Clean Ambition	Carbon pricing and other policies are enacted resulting in faster decarbonization of power sector and the wider AIES area economy	Test impact of more ambitious federal and state decarbonization policies
Conservative Policy	Conservative government that undermines support for renewables and relax the constraint for unabated plants	Test impact of more conservative federal with slow technology development

Historical — Low — Clean Ambition — High — Conservative Policy — Aurora Central

Sources: Aurora Energy Research

High scenario has the greatest impact on power prices and the largest capacity delta across all scenarios

The High scenario incentivizes the most renewable and battery storage deployment, followed by Clean Ambition. Low and High trade off some growth in renewables for thermal capacity



1) Technology Innovation and Emissions Reduction Regulation.

Sources: Aurora Energy Research

- High scenario produces the largest renewables buildout across all scenarios – XX GW more than Clean Ambition in 2050 due to the high gas price and high demand and longer incentives from the TIER1 Regulation
- Pool prices in the Conservative Policy scenario are on average C$XXX/MWh lower than Central, followed by Low scenario, as low commodities prices and low demand enable cheap thermal generation across the horizon

Conservative Policy Scenario: The Clean Electricity Regulations are not enacted, and the price of carbon stays constant at C$XXX/ton after 2027

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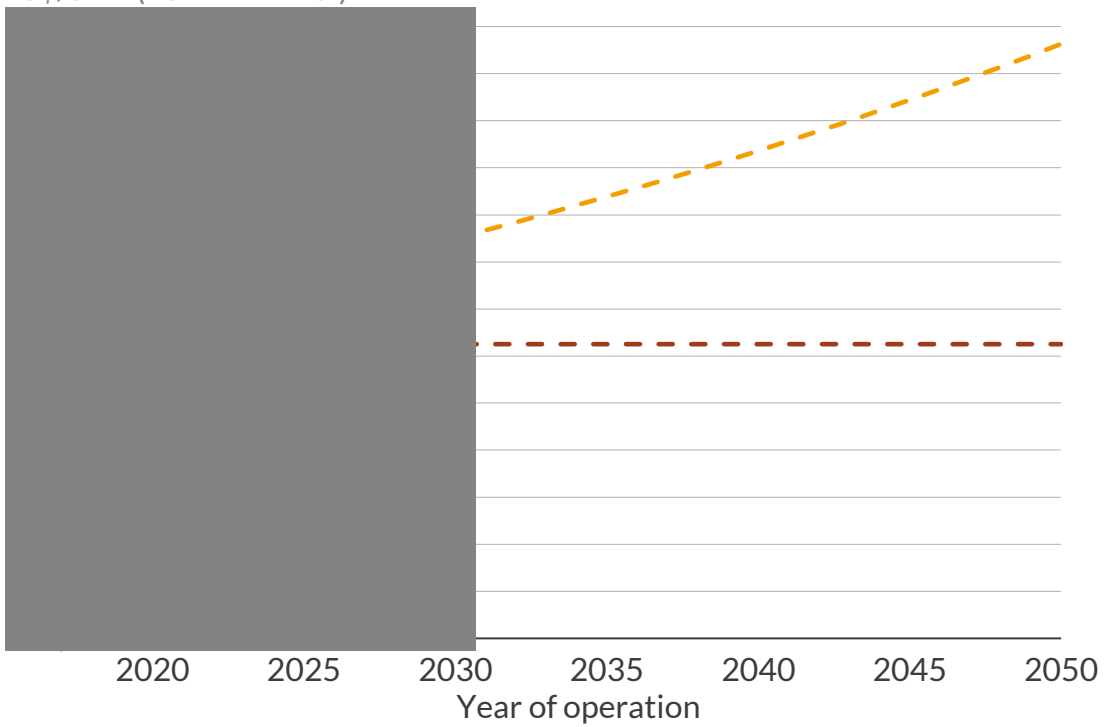
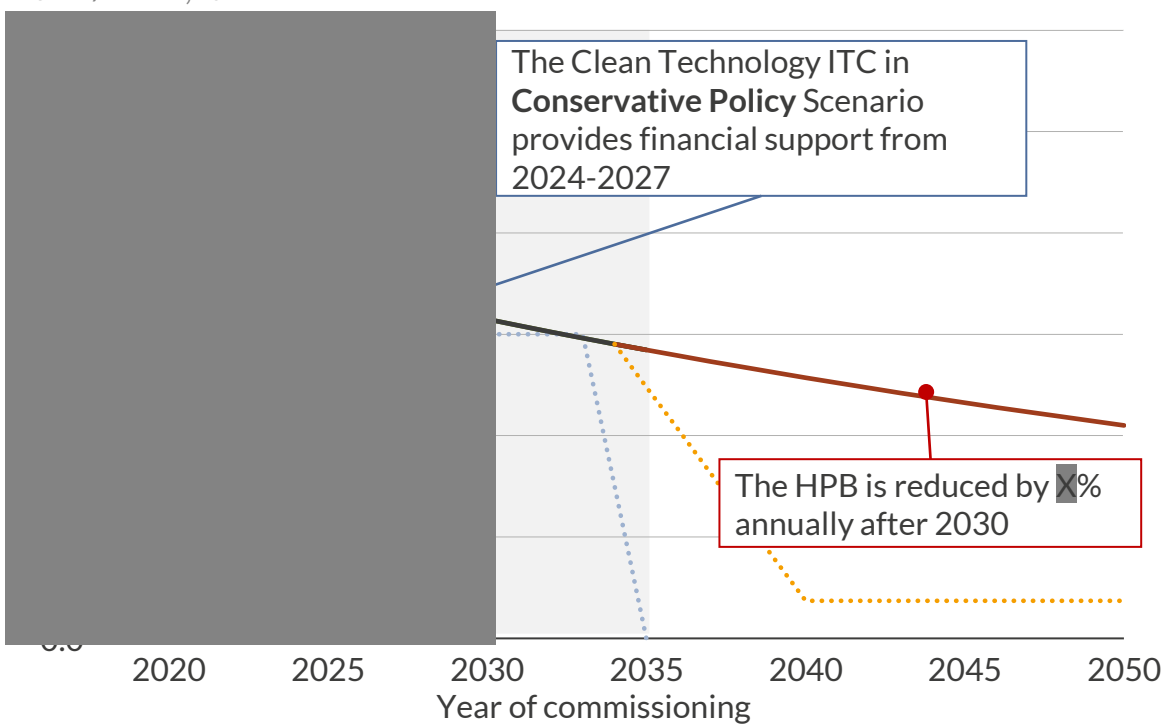
Carbon Price
C$/ton[3] (2022 nominal)



- The Conservative Policy scenario explores a change in direction at the federal level on carbon pricing and a net-zero emissions grid
- The price of carbon in the Conservative Policy scenario reaches C$XXX/ton[3] in 2027 and is kept nominally constant afterwards

Federal Benchmark — Conservative Policy — Aurora Central

EGDF, ITC
ton[3]/MWh, %



- As the Clean Electricity Regulations are not enacted, the EGDF[1] and High-Performance Benchmark under TIER[2] regulation follow their currently approved schedule. ITC for renewables and batteries are set to zero in 2027.

EGDF — High-Performance Benchmark
Clean Technology ITC - Conservative Policy — HPB - Conservative Policy
Clean Technology ITC - Aurora Central — HPB - Aurora Central

1) EGDF= Electricity Grid Displacement Factor. 2) Technology Innovation and Emissions Reduction Regulation. 3) Metric tons

Sources: Aurora Energy Research, Government of Canada

Conservative Policy Scenario: Less stringent carbon policies result in thermal generation being unabated and less renewable capacity

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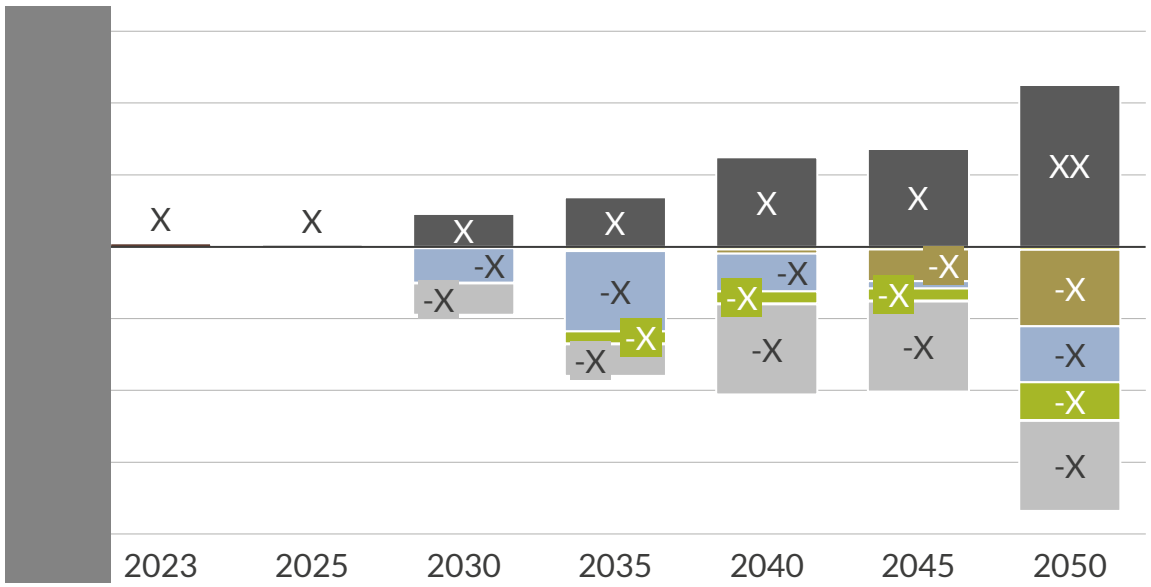
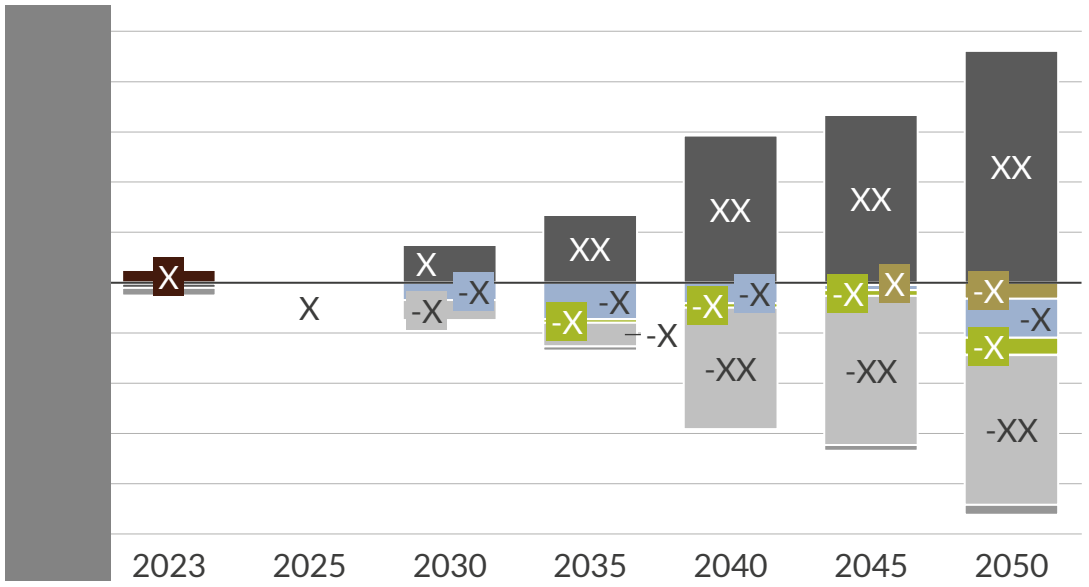
Delta in installed capacity to Central

GW



Delta in electricity production to Central

TWh



- A less stringent carbon policy results in an additional XX GW of unabated CCGT plants in the Conservative Policy Scenario
- As less incentives exist for renewables, the Conservative Policy Scenario shows a decrease of XX GW in installed capacity of renewables compared to Central

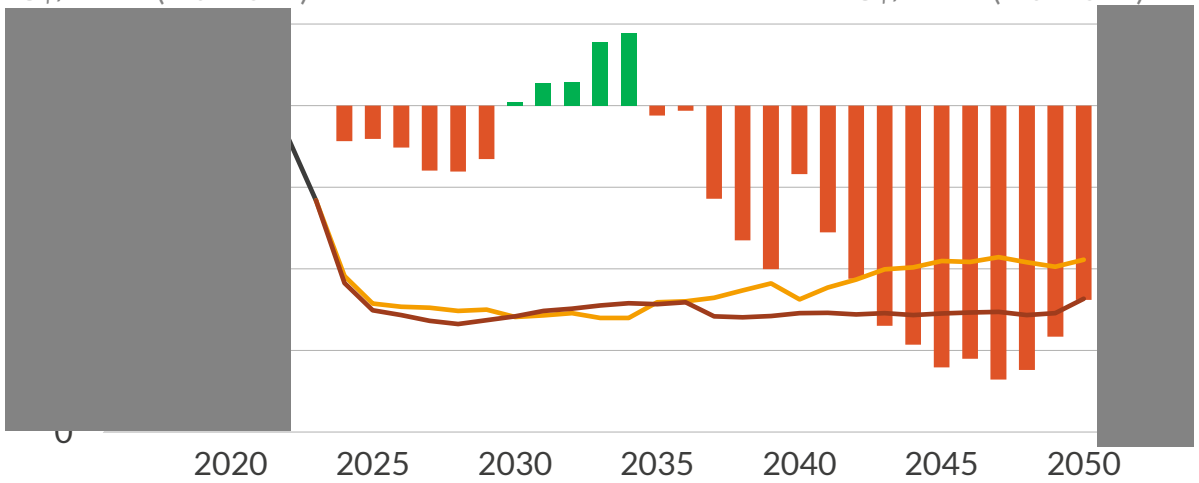
- With smaller renewable capacity, the need for peaking capacity is also reduced in the Conservative Policy Scenario, resulting in XX GW less peaking compared with Central
- Overall, most of the displaced generation with respect to Central, comes from abated CCGT, which is replaced by its unabated counterpart

Coal | Cogeneration | Gas CCGT | CCGT+CCS | Other thermal | Solar | Other RES | Hydro | Wind | Pumped storage | Peaking | Battery storage

Sources: Aurora Energy Research

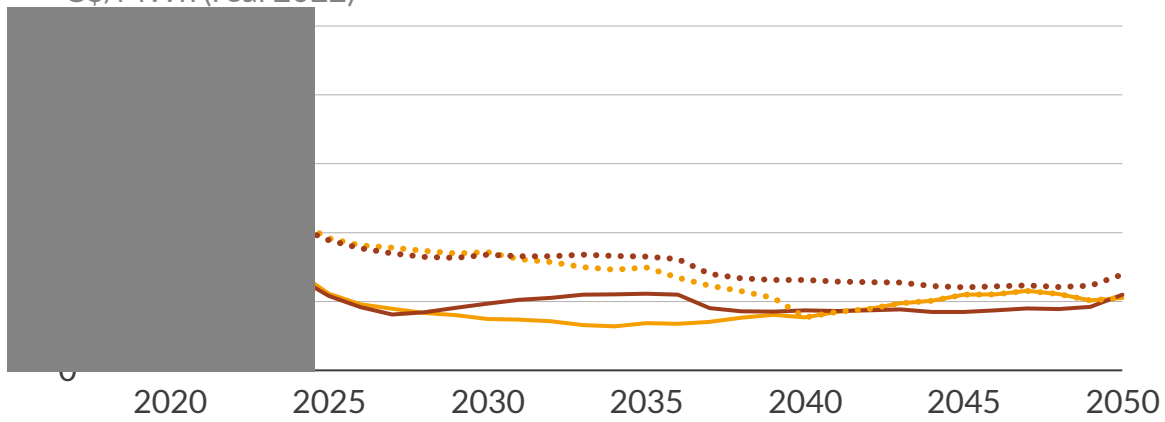
Conservative Policy Scenario: Prices show an average discount of C$20/MWh from 2035-2050 with respect to Central

Pool price
C$/MWh (real 2022)

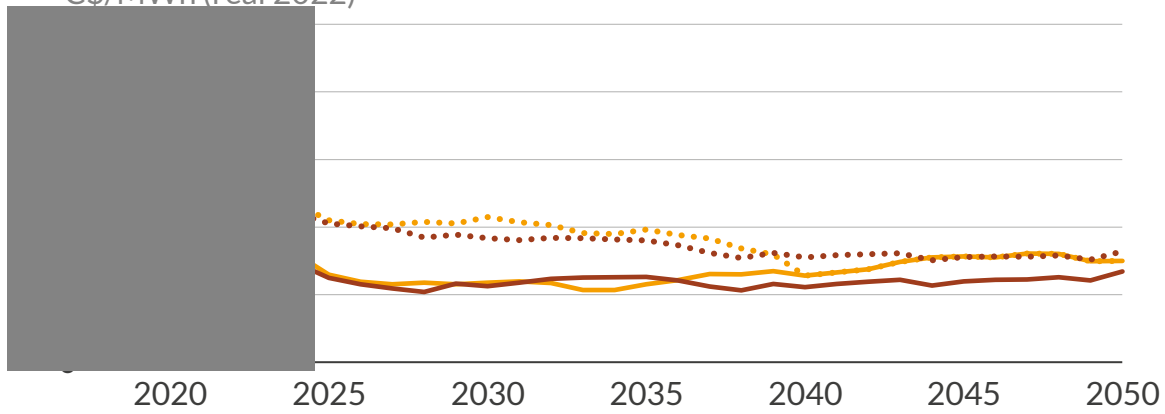


Pool price delta
C$/MWh (real 2022)

Wind GWA[2] Prices for Aurora Central and Conservative Policy
C$/MWh (real 2022)



Solar GWA Prices for Aurora Central and Conservative Policy
C$/MWh (real 2022)



- From 2024-2035, average pool price does not show significant differences with respect to Central. After 2035, the Conservative Policy Scenario shows an average discount of C$XX/MWh
- For wind, less built capacity also increases the GWA by C$XX/MWh from 2024-2040. Additional TIER[1] credits revenue is also captured post 2030
- After 2035, solar GWAs show an average decrease of C$XXX/MWh with respect to Central, mainly following the lower trend of pool price

Historical — Aurora Central — Conservative Policy — Delta (Scenario - Central)

Historical — Conservative Policy — Conservative Policy + TIER Credits
Aurora Central — Central + TIER Credits

1) Technology Innovation and Emissions Reduction Regulation. 2) GWA= Generation Weighted Average.

Sources: Aurora Energy Research

Key takeaways from Aurora's long-term forecast for AIES

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1. Pool prices decrease to C$81/MWh by 2040, followed by a steady increase reaching C$105/MWh by 2050
2. Renewable capacity increases to 23 GW in 2050, driven primarily by Investment Tax Credits, TIER[1] credits revenue and increasing pool price. By 2050, renewables account for 45% of the total generation
3. By 2050, CCGT+CCS represents 15% of the capacity and 26% of the total electricity generation
4. Under Aurora Central, pool price driven by renewable capacity buildout and requirements of CO_2 abatement. However, pool price is also largely sensitive to gas prices and the enforcement date of the Clean Electricity Regulations
5. Shifting policy towards less restrictive emissions standards results in lower pool prices, with an average discount of C$20/MWh from 2035-2050

1) Technology Innovation and Emissions Reduction Regulation.

Sources: Aurora Energy Research

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Future sessions will explore a diverse set of topics for AIES

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Group meeting 1
Long-term AIES outlook and alternative scenarios

- Long term-outlook of pool price, capacity mix and energy mix
- Impacts of Clean Electricity Regulations on price and new capacity
- Alternative scenarios capturing diverse economic and policy outcomes

Group meeting 2
Renewables investment cases

- Deep dive into the project economics of wind and solar
- Endogenous modelling of renewables and conventional capacity decisions while reflecting grid constraints
- Sensitivity and uncertainty assessment of costs and revenue streams for each technology

Group meeting 3
Battery economics & future revenue streams

- Modelling of battery dispatch under conditions of uncertainty and accounting for cycling constraints
- Battery business cases in the wholesale and ancillary markets
- Analysis of hybrid co-location models with solar and wind

Group meeting 4
Transmission Loss Factors and grid bottlenecks

- Analysis of impacts on grid expansion and renewables deployment scenarios on capture prices
- Detailed calibration of the drivers of pricing

Future subscriber meetings

- Subscriber interest will drive future topic selection
- This may include deep dives into:
  - Market design reform
  - Transmission tariff restructuring
  - Carbon Capture and Sequestration for AIES
  - Impact of a hydrogen economy in AIES

▲ Online platform access

▲ Access to historical data explorer

September 28, 2023	February, 2024	April, 2024	July, 2024	Quarterly

Bilateral follow ups and engagement throughout

Quarterly power market forecasts updates:

▲ ▲ ▲ ▲ ▲

Sources: Aurora Energy Research

Thank you to all the participants for attending today's session

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- We look forward to continuing the conversation via bilateral sessions
- For all comments and questions, you can reach Oliver Kerr at **oliver.kerr@auroraer.com**, Martin Anderson at **martin.anderson@auroraer.com**, and Dante Orta at **dante.orta@auroraer.com**
- **The next AIES workshop will take place on February 7th, 2024,** and will focus on renewables investment cases

Source: Aurora Energy Research


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