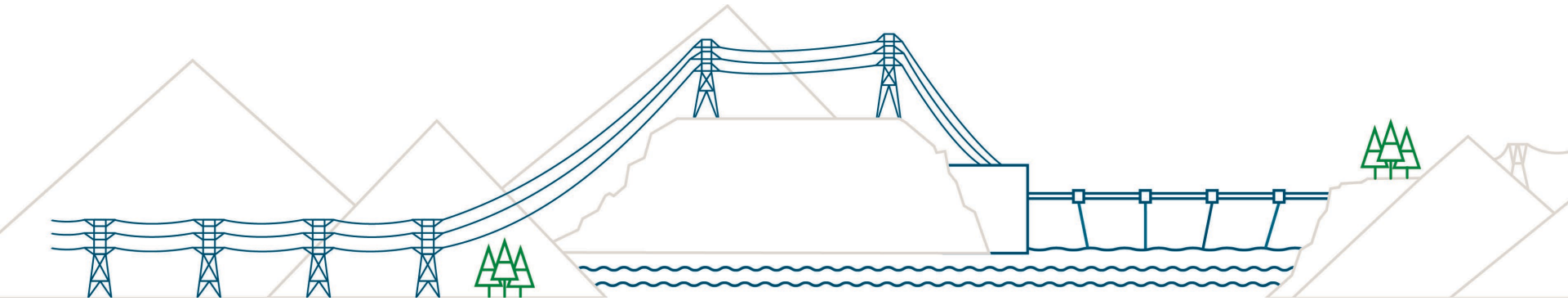
2021 Integrated Resource Plan (IRP)
Technical Advisory Committee (TAC)
Meeting #2a/b – Load Forecast



June 16/22, 2020

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Welcome & Introduction

Basil Stumborg, BC Hydro
Kathy Lee, BC Hydro

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Agenda review

Meeting purpose – chance for early feedback from TAC before first round of modelling starts

Welcome & introduction

Basil Stumborg, Kathy Lee

Meeting etiquette	About Webex	IRP timelines	Last meeting recap	Load forecast context

Load forecast

John Rich / Amanda Young

Load Forecast Background	COVID-19 Background	Mar/Apr 2020 Load Forecast Results	Dec 2020 Load Forecast Next Steps

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Virtual meeting etiquette

These principles should make our meetings more effective

- As with in-person meetings, continue to have members participate and alternates observe
- Keep the conversation respectful by focusing on ideas, not the person
- Stay curious about new ideas
- Share the air time – to ensure everyone gets heard

- To minimize distractions – keep yourself on mute
- We'll use the chat box to seek input and ask questions
- We'll not be recording these sessions, and ask for others not to record

Getting familiar with Cisco Webex

We'll be using a few basic tools, which you can find if you hover your mouse over the bottom of the screen

Mute/unmute your mic & turn your video on/off

View the participant list

Open the chat panel:

- to ask questions
- to provide feedback

Audio connection trouble?

See the alternative options here

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A quick update on IRP timelines

COVID-19 caused a delay to the IRP schedule

COVID Impacts:

- BCH's focus temporarily drawn to operational issues
- Capture increased uncertainty in load forecast
- Adjust consultation approach particularly with Indigenous Nations

We are regrouping and starting up again (virtually)

Recap of the last TAC meeting

We provided an overview last time

The first meeting on March 9th, we provided an overview of the IRP to the Technical Advisory Committee and discussed what was coming up.

Previous agenda topics:

- IRP overview (policy context, process and objectives)
- Decision framework (uncertainties reviewed a number of topics of interest)
- Electrification scenarios (high level)

More from last TAC meeting

What is BCH doing with your feedback

What we heard last meeting:

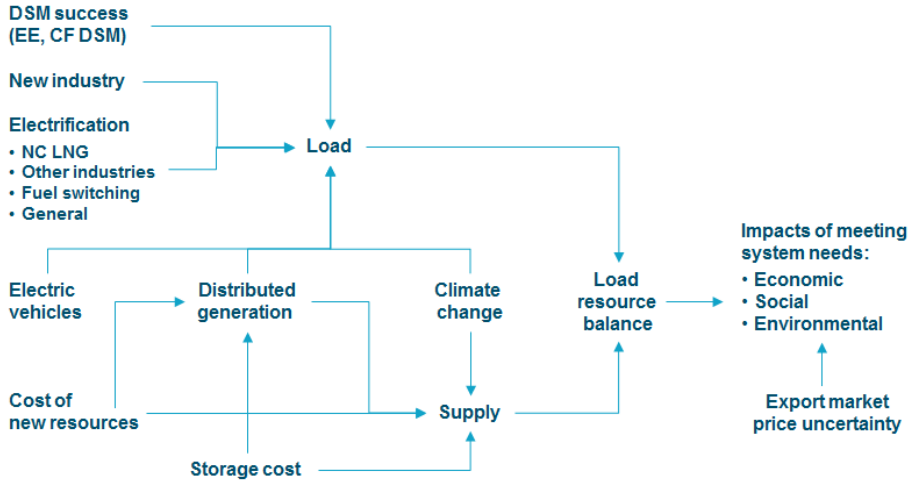
- More information about BC Hydro's electrification efforts
- Comparison of BC Hydro's electrification study with the Trottier study
- More information on low load growth in the short and longer term
- How BC Hydro will be addressing load uncertainty (e.g. scenarios)

We plan to address these topics in the July meetings

Why this topic, now

How does this contribute to comprehensive, timely engagement?

- In our last meeting, we discussed and prioritized a long list of TAC topics
  - We are still planning on working our way through those with TAC
  - We would like to present the new workplan in July
- Load forecast and DSM discussions moved up
  - Can allow some consideration before preliminary analysis starts over summer



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Capturing load forecast uncertainty

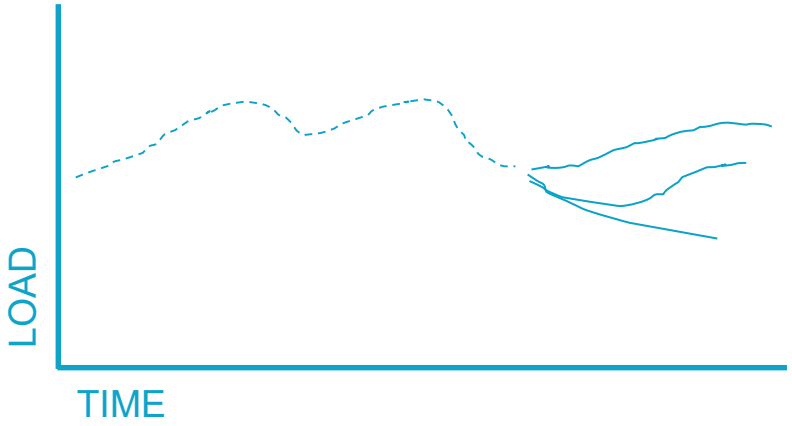
Use two vintages of forecasts to keep analysis moving

- BC Hydro will use a COVID-adjusted forecast for preliminary modelling
  - Modelling will be done over the summer and fall
  - Results will be tested in the fall for reasonableness
- COVID-adjusted load forecast partial results will be presented today
  - Focus on reference (mid) today
  - Will present approach to capturing range of uncertainty (low to high)
- Inputs to December 2020 Load Forecast are being finalized now
- In winter 2021, we will revisit preliminary IRP analysis to see if revisions are required

Other additions to load for the IRP

As distinct from the Load Forecast

- As presented in our last TAC meeting, other load additions not reflected in the load forecast:
  - Additional electrification
  - Additional LNG load, with related gas field developments
  - Additional load attraction
- We'll update these for you in future meetings
- We may also be able to
  - consider additional load sensitivities suggested by TAC



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Round table from TAC members

For today's topic of load forecasting

What would you like to have addressed today?

In one minute or less

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Load Forecast

John Rich / Amanda Young, BC Hydro

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Load Forecast

Today's session is organized into the following four sections

Load Forecast Background	COVID-19 Background	Mar/Apr 2020 Load Forecast Results	Dec 2020 Load Forecast Next Steps

Load Forecast Background

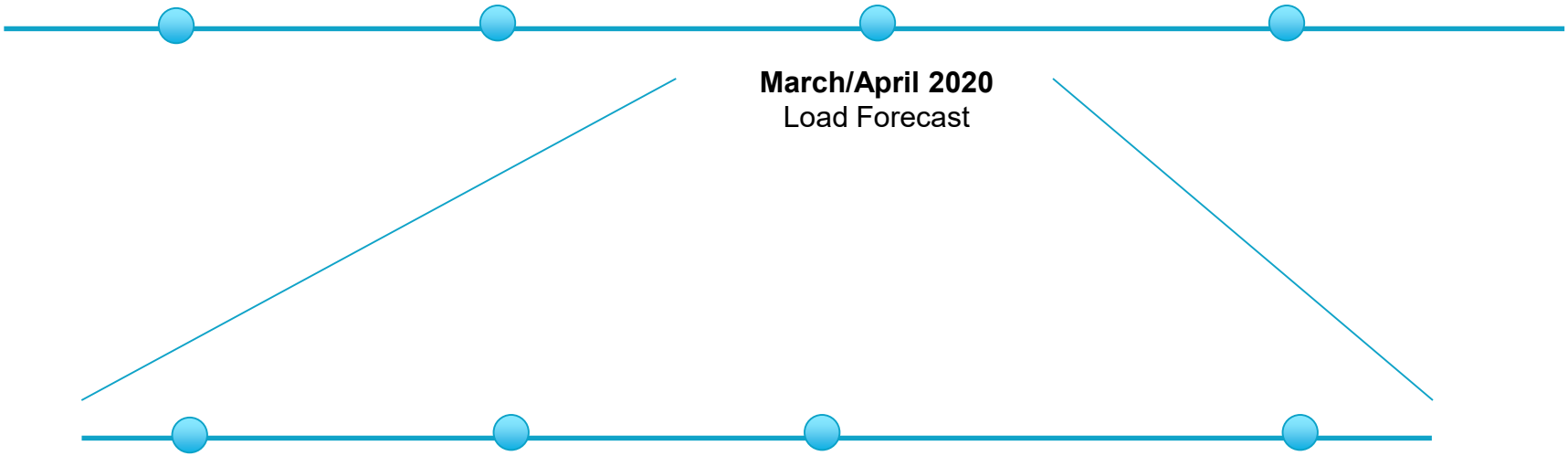
Load Forecast Timeline

Load Forecast vintages and their primary purpose

October 2018 Load Forecast	**June 2019** Load Forecast	**March/April 2020** Load Forecast	**December 2020** Load Forecast
5 yr energy	20 yr energy and peak	20 yr energy and peak	20 yr energy and peak
F20-21 RRA	For information only in F20-21 RRA	Start of IRP modelling	IRP Forecast
		For review today	**Currently in development**

Load Forecast Timeline

COVID-19 affected the March/April 2020 Forecast Release



December 2019

Major Input Assumptions Locked Down

March 17, 2020

March 2020 Low, March 2020 Reference, March 2020 High forecasts approved

April 2020

COVID-19 Cases Developed

June 2020

New low case to be developed to capture COVID-19 impacts

Currently in development

Forecast Methodology

Long term forecast methodology is the same as previous forecasts

- The March 2020 Load Forecast was developed using a similar methodology to the October 2018 and June 2019 Load Forecasts
  - see Appendix O of the F20-21 Revenue Requirements Application
  - Exception - high/low uncertainty bands

COVID-19 Background

COVID-19 Scenario Assumptions

Informed by two outcomes proposed by the BC Business Council, this work showed not so bad & moderately bad scenarios for BCH's Loads

	F21												F22												F23											
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
	20	20	20	20	20	20	20	20	20	21	21	21	21	21	21	21	21	21	21	21	21	22	22	22	22	22	22	22	22	22	22	22	22	23	23	23
A	Measures **		Slow Recovery										Long Term Projection																							
B	Measures**												Targeted Measures												Slower Recovery											
																									Long Term Projection											

Considerations	Scenario A	Scenario B
	"3 months and things return to normal"	**"18 months prolonged impacts using stark assumptions"**
BC Economy	Was already ebbing prior to the pandemic	Impacts beyond anything BC has experienced in 70 yrs
BC GDP	2020/F21 (7.3%) 2021/F22 2.0% 2022/F23 2.0%	2020/F21 (11.4%) 2021/F22 1.0% 2022/F23 .1.0%
Global Economy	Global recession is imminent or already underway	Deeper North American and global recessions
Results	F21 -6% F22 -3% F23-3% vs. March 2020 Ref.	F21 -12% F22 -13% F23 -9% vs. March 2020 Ref. (basis of April COVID-19 Reference case for F21-23)

Notes:
*Fiscal years denoted with an F, all other years are calendar
**Measures refers to government prescribed health measures

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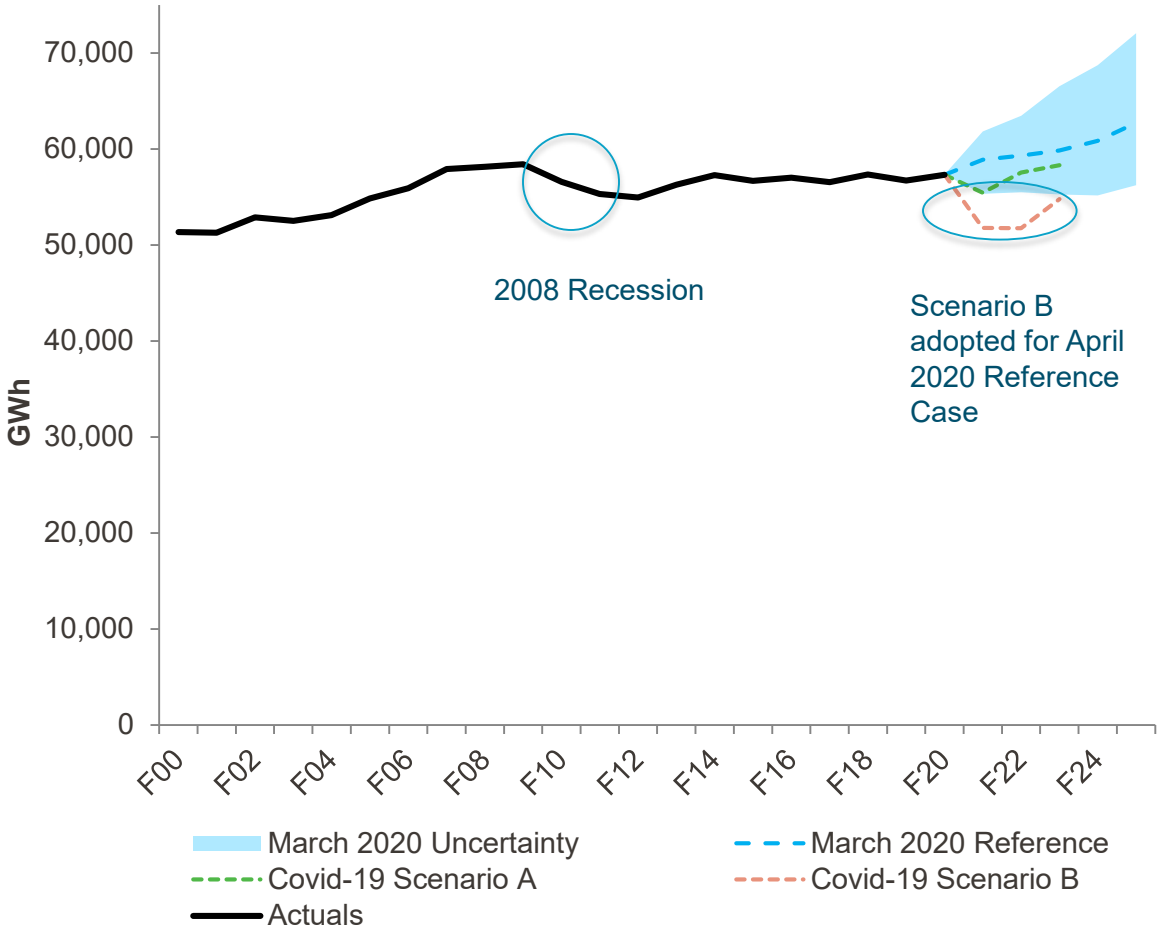
COVID-19 Scenario Results

Scenario A within March 2020 low uncertainty band. Scenario B lower.



Change from March 2020 Reference Case		
Fiscal Year	COVID-19 **Scenario A** GWh [%]	COVID-19 **Scenario B** GWh [%]
F21	-3,422 [-6%]	-7,080 [-12%]
F22	-1,769 [-3%]	-7,560 [-13%]
F23	-1,534 [-3%]	-5,085 [-8%]

Peak to trough load comparison 2008 Recession vs. Scenarios A & B		
2008 Recession (F12-F09) GWh, %	COVID-19 **Scenario A** (F21-F20) GWh, %	COVID-19 **Scenario B** (F22-F20) GWh, %
-3,442 [-5%]	-1,887 [-4%]	-5,584 [-10%]

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COVID-19 Current Trends

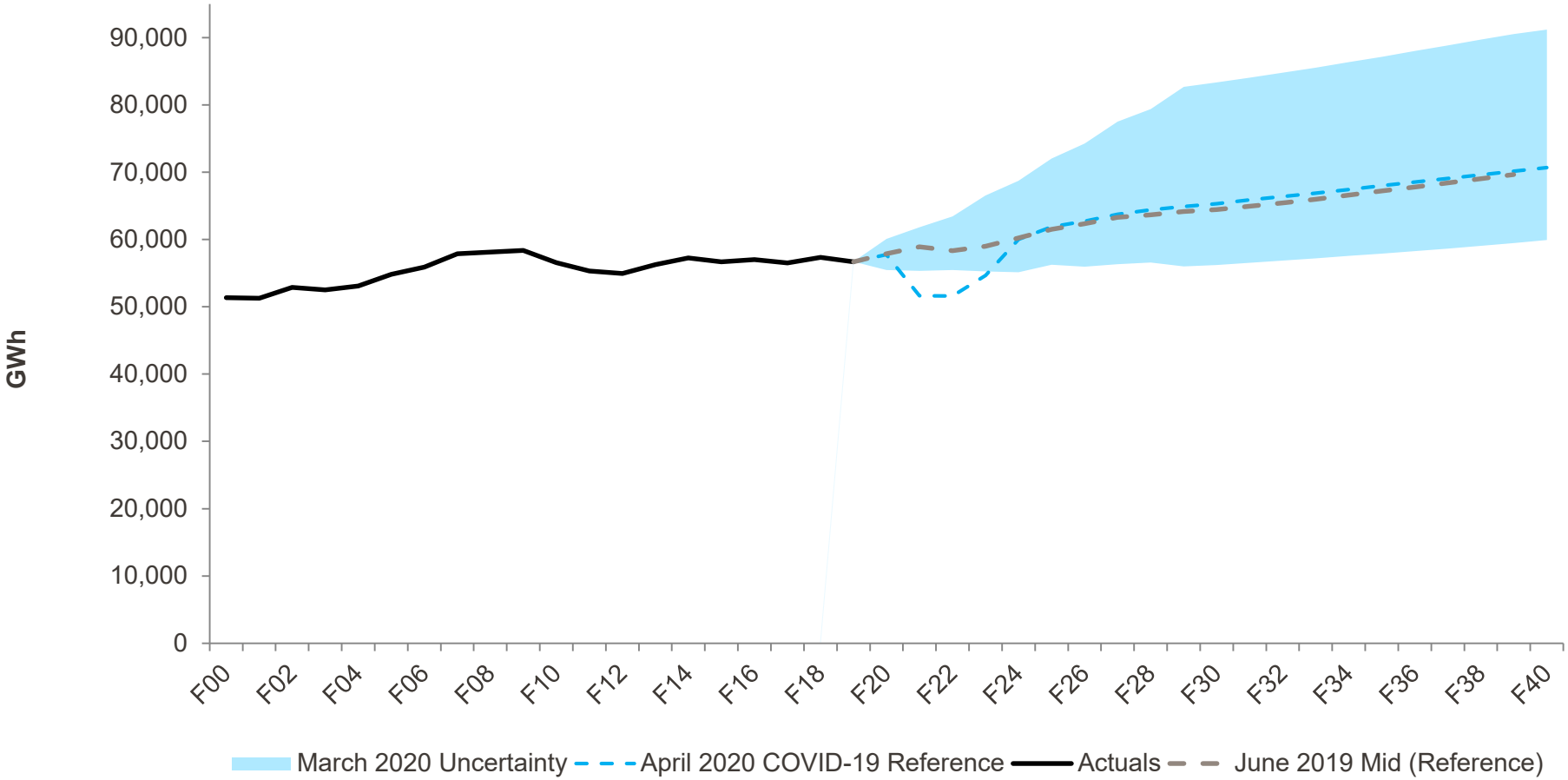
May 2020 actuals tracking well versus April 2020 reference case for distribution

(GWh)	May Prelim. Actual	June 2019	March 2020	April 2020	Actual vs. June 2019	Actual vs. March 2020	Actual vs. April 2020
Residential	1,264	1,217	1,226	1,266	12%	3%	0%
General Service	1,294	1,523	1,522	1,209	-14%	-15%	7%
Large Industrial	1,011	1,164	1,139	876	-13%	-11%	15%
Total Domestic	**3,568**	**3,904**	**3,886**	**3,350**	**-6%**	**-8%**	**7%**

March/April 2020 Load Forecast Results

Total Integrated System Energy

Lower consumption and higher uncertainty in the short term with moderate long term growth



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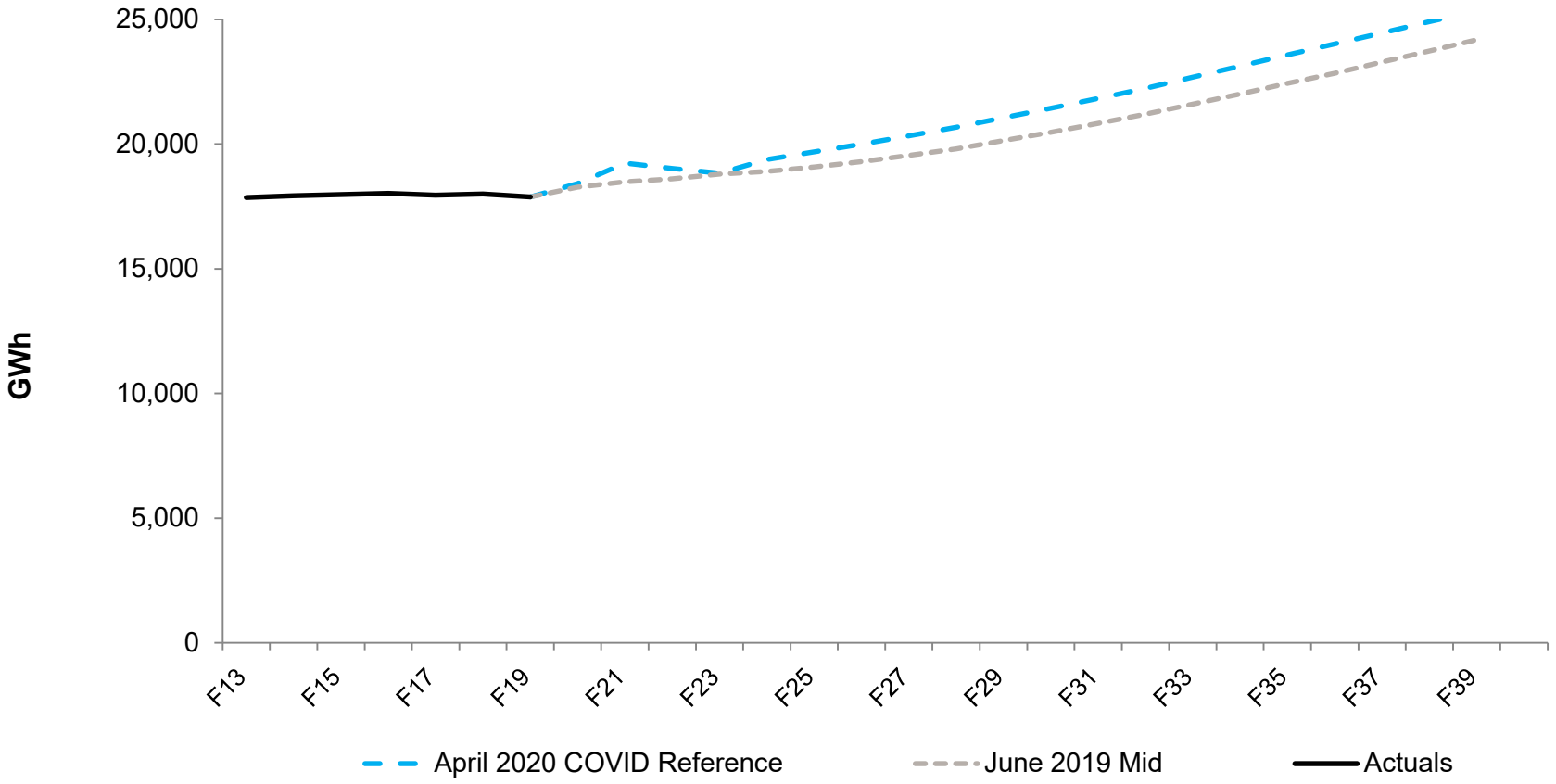
Residential Energy

Higher short-term load due to COVID-19 more time at home. Long term growth driven by account growth and electric vehicles.



after adjustments

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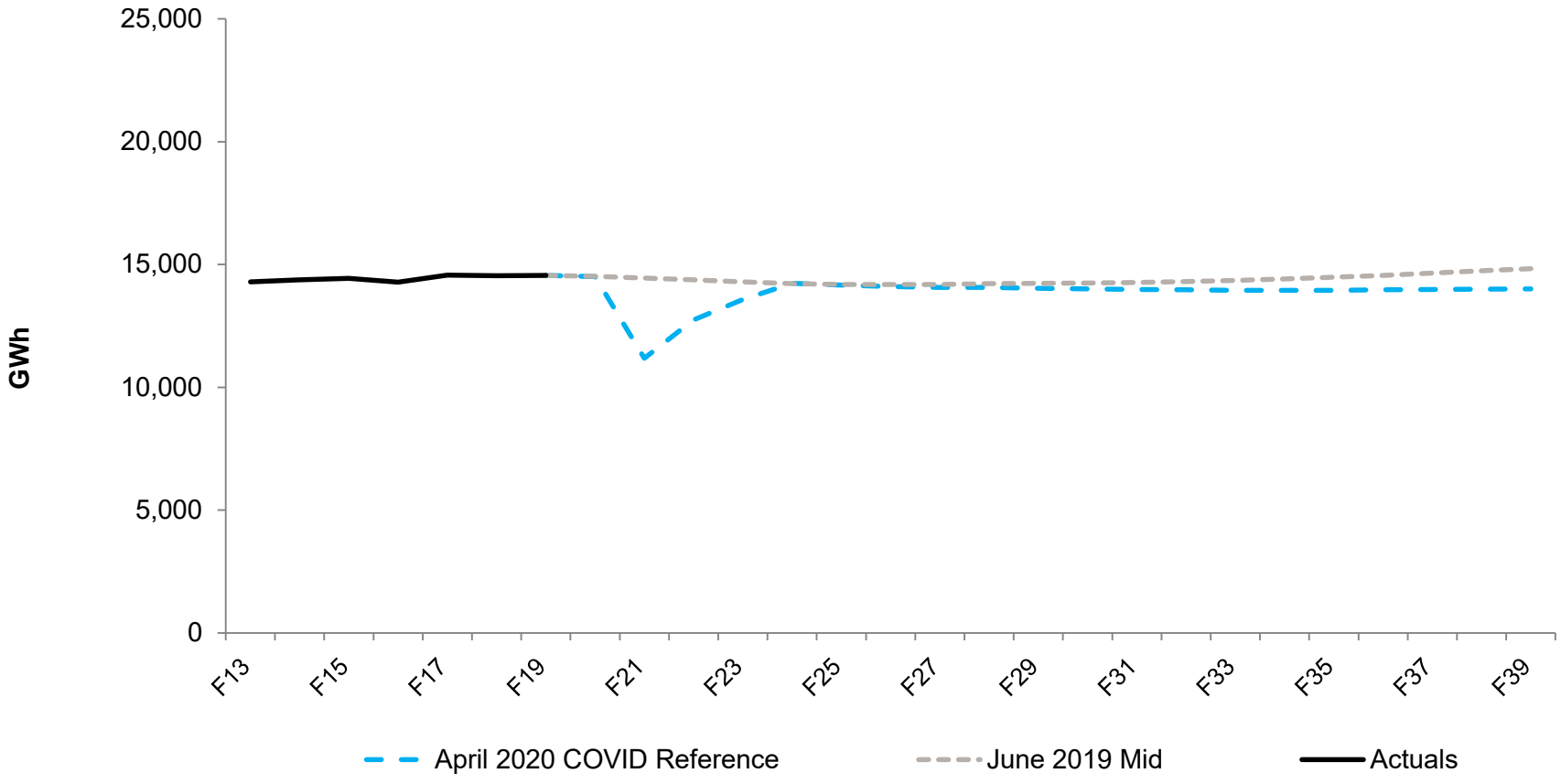
Commercial Energy

Short term decline due to COVID-19. Long term outlook is flat.



after adjustments

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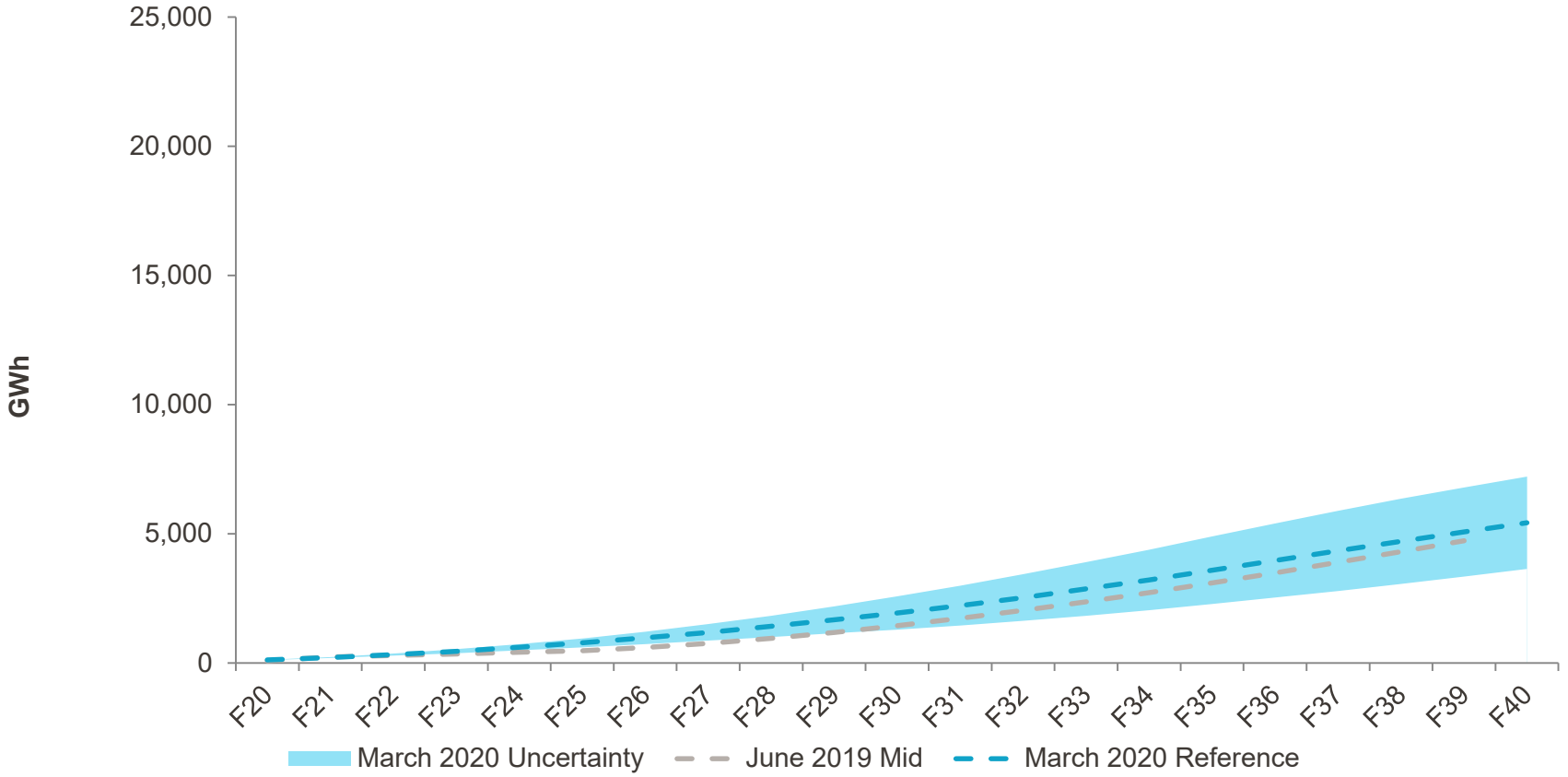
Electric Vehicles

Strong electric vehicle sales in 2019 resulted in higher reference forecast than June 2019. COVID impacts not incorporated.



before adjustments

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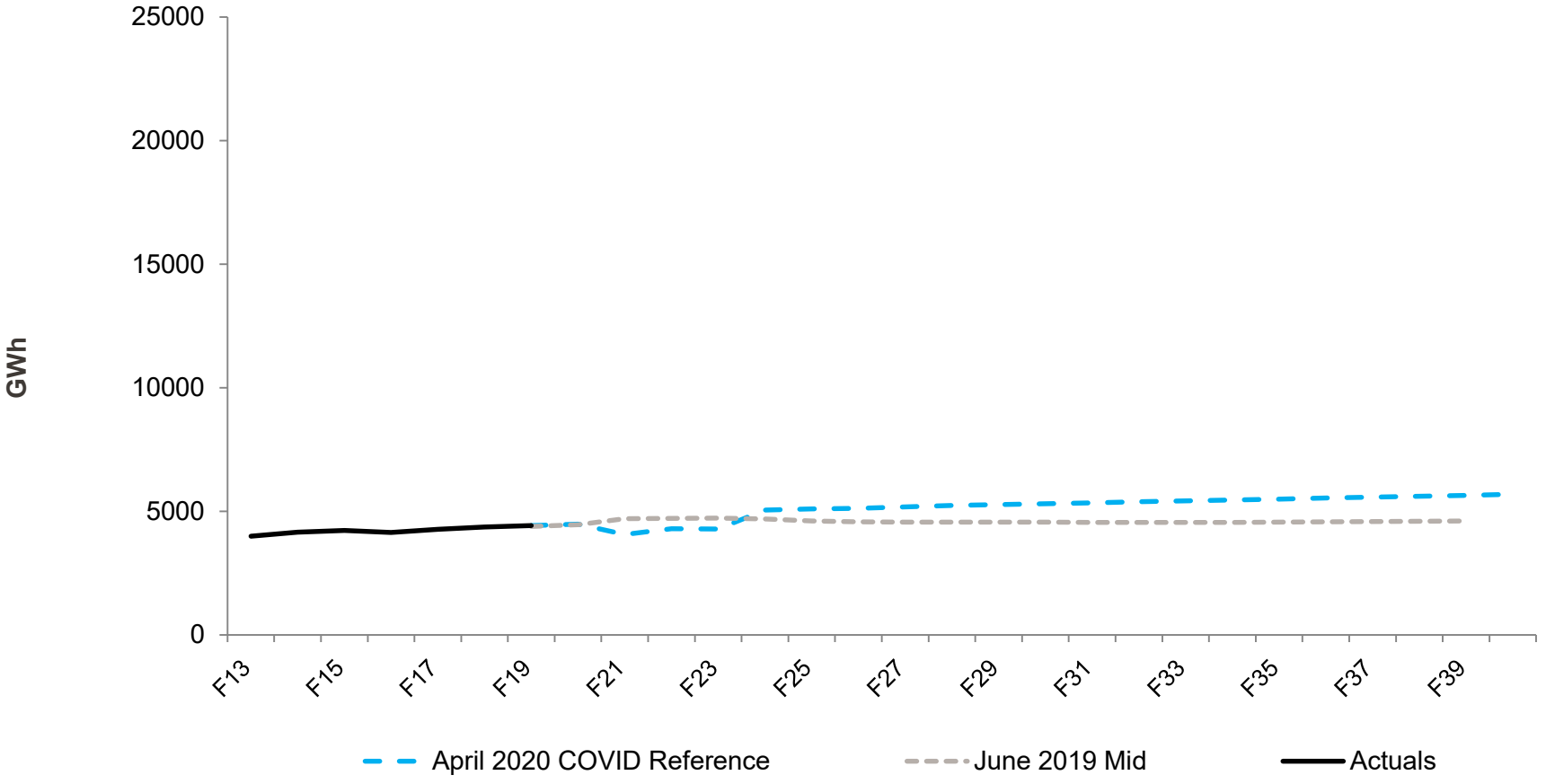
Light Industrial Energy

Short term decline due to COVID-19. Long term projection driven by updated calibration period and strong pre-COVID GDP forecasts.



before adjustments

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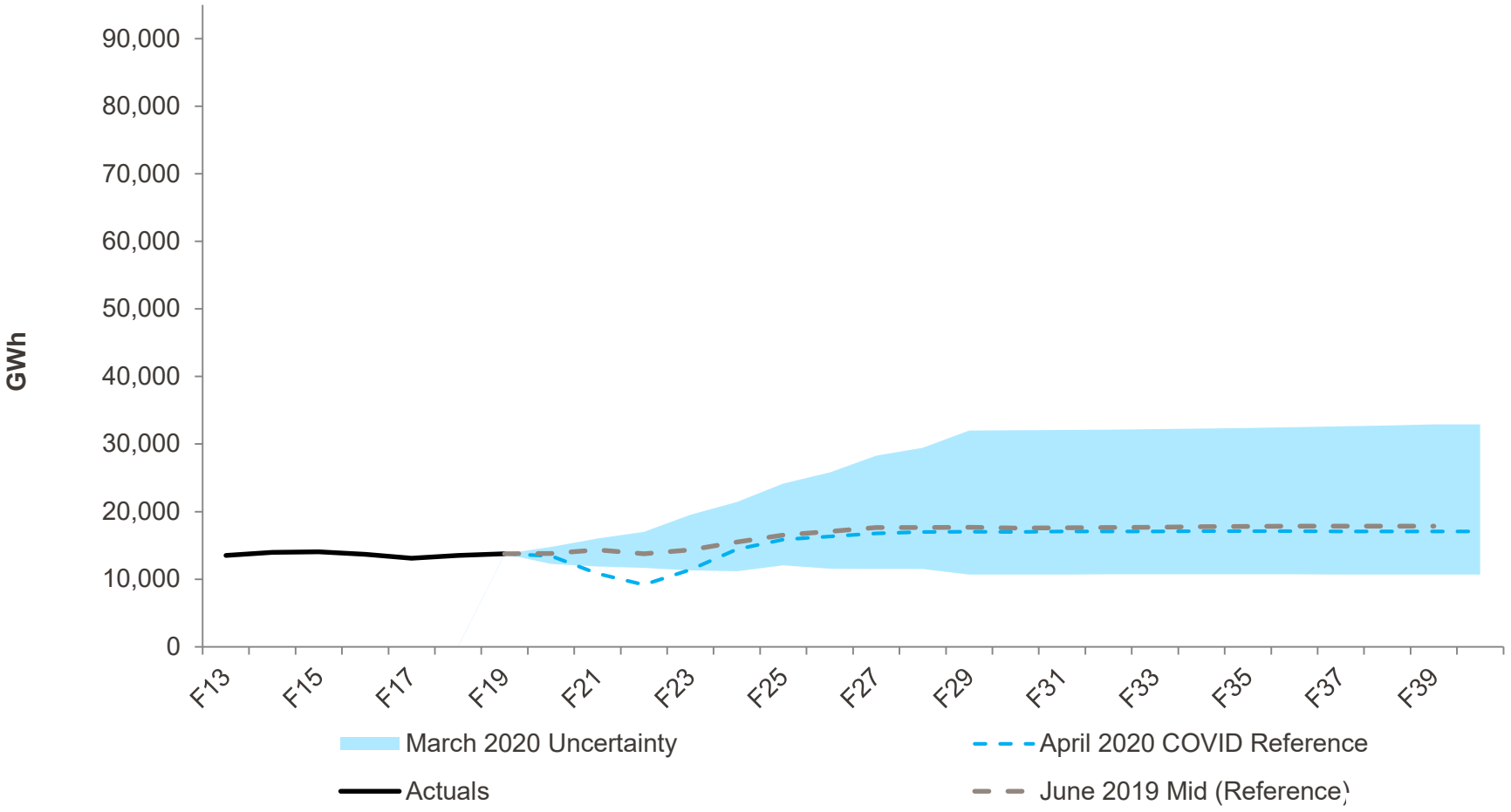
Transmission Forecast

Large industrial sector uncertainty drives system energy uncertainty



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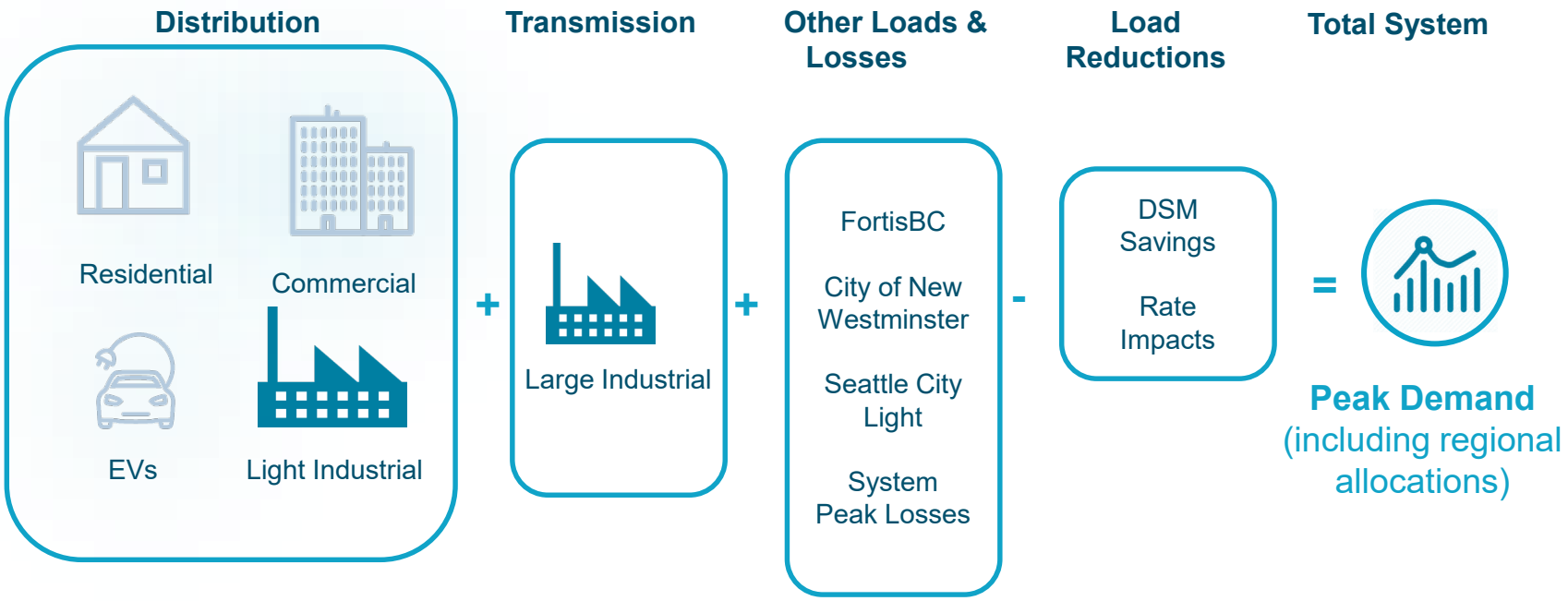
System Peak Forecast Methodology

Peak demand is the max usage on coldest day and drives planning decisions



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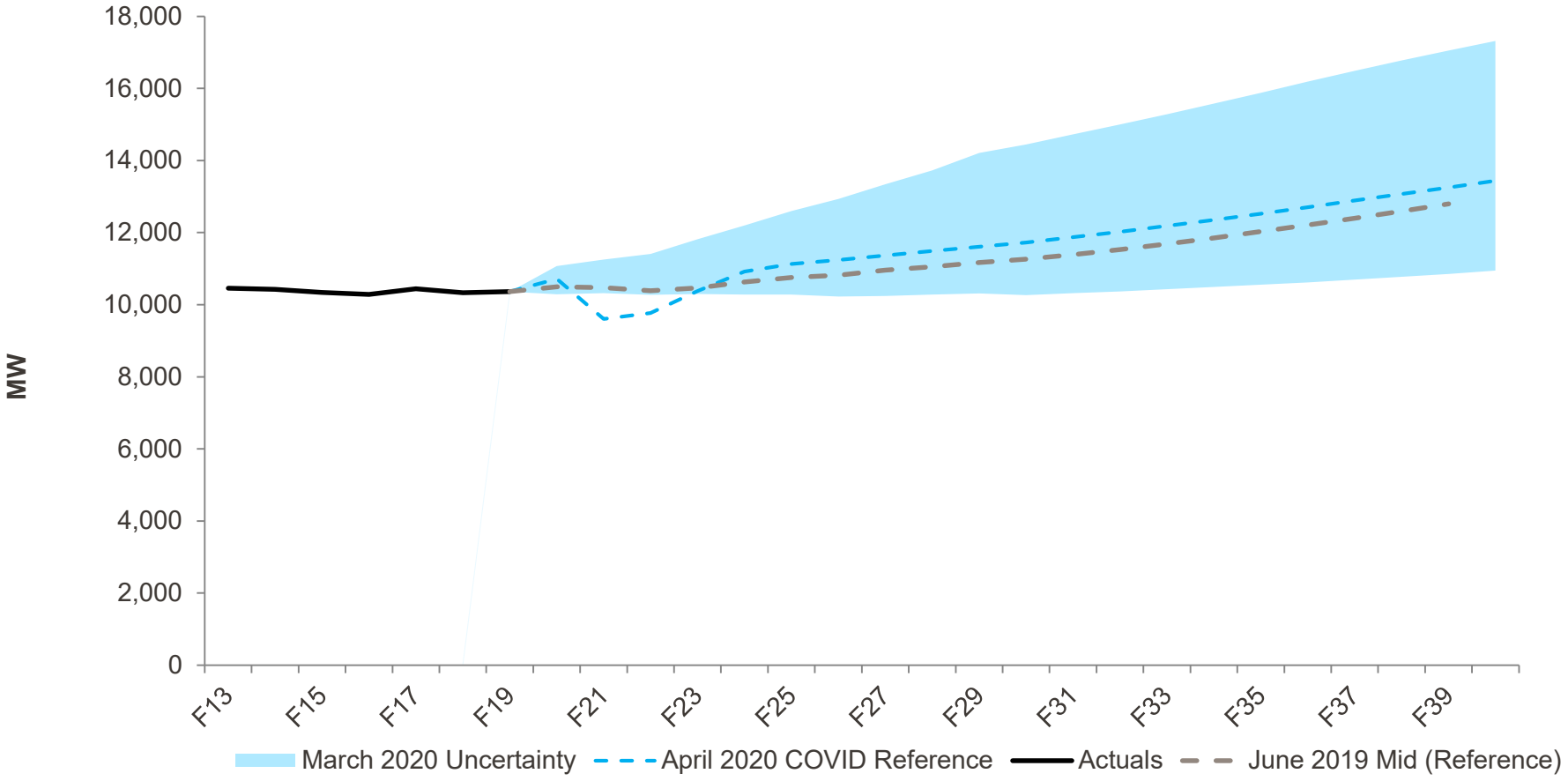
Total Integrated System Peak (coincident)

Moderate growth with high degree of uncertainty



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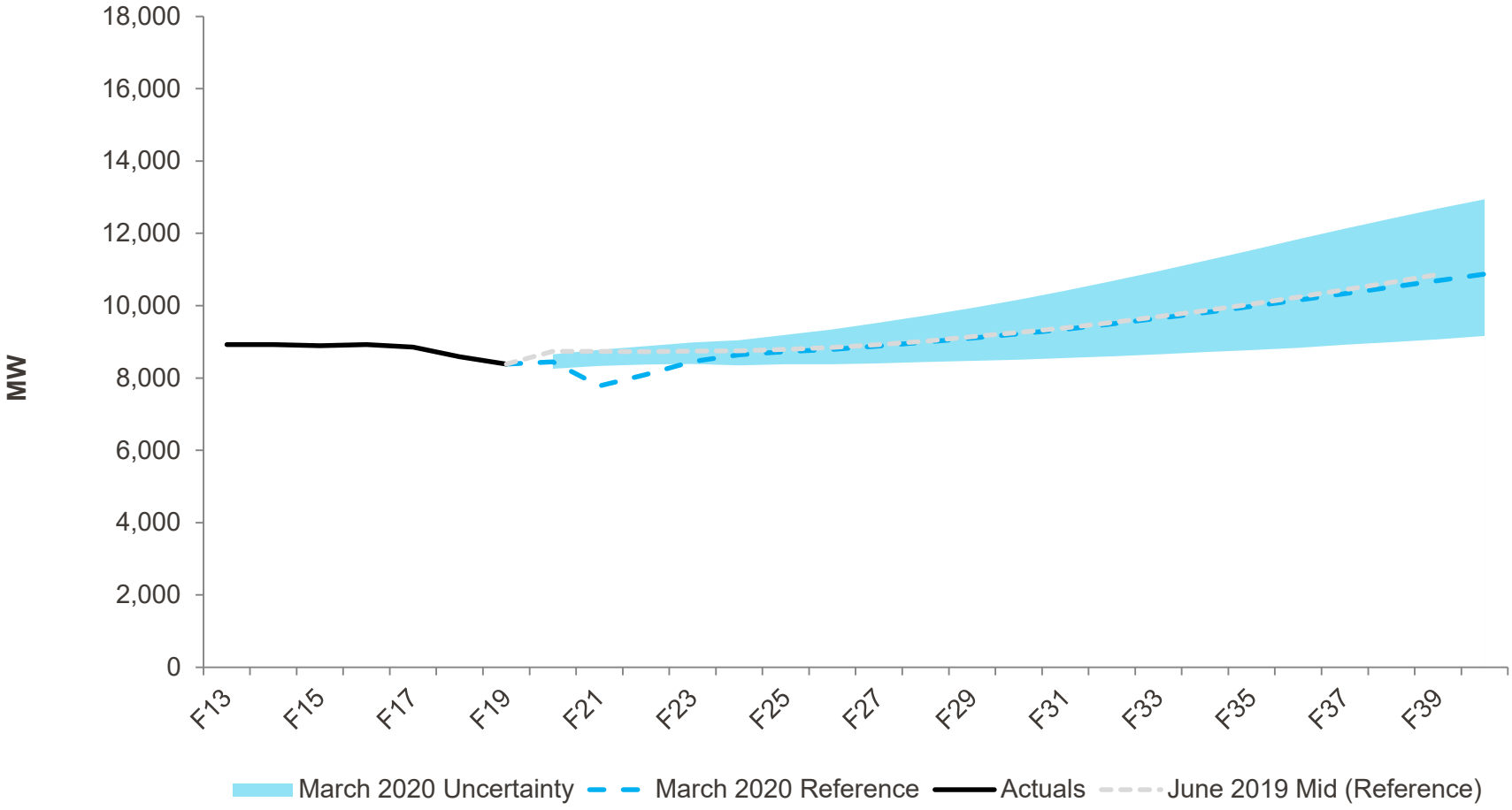
Total Distribution Peak (non-coincident)

Widest contributing uncertainty is transmission (large industrial) sector



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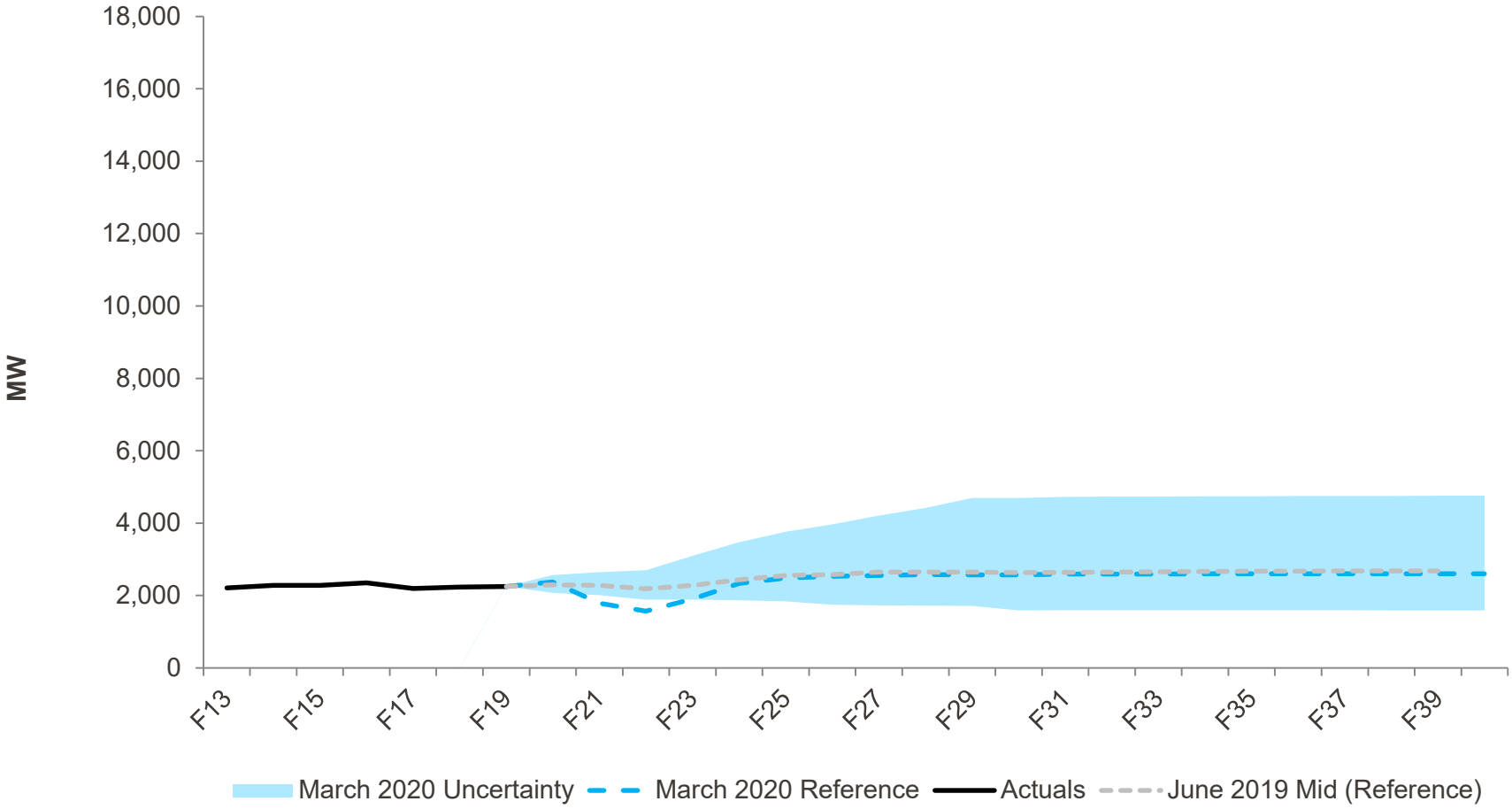
Total Transmission Peak (non-coincident)

Widest contributing uncertainty is transmission (large industrial) sector



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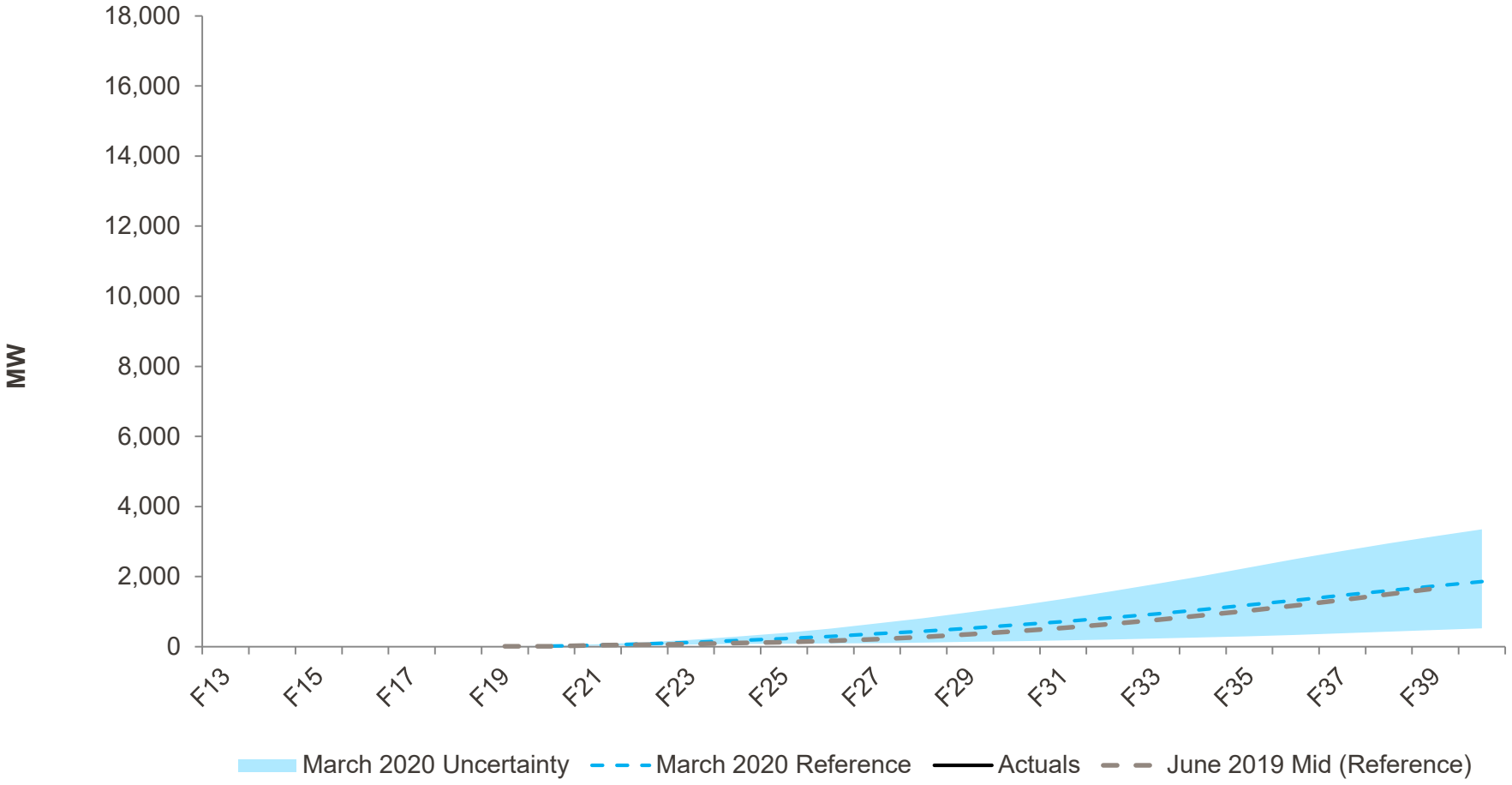
Electric Vehicle Peak Forecast

Peak uncertainty is reflective of charging behavior uncertainty



after adjustments

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EV Peak Forecast Uncertainty

We selected from peak scenarios to reflect various charging behavior options

High Energy
- **unconstrained**
- 25% compliance
- 50% compliance
- 75% compliance

Reference Energy
- unconstrained
- **25% compliance**
- 50% compliance
- 75% compliance

Low Energy
- unconstrained
- 25% compliance
- 50% compliance
- **75% compliance**

Note: Additional load reductions for "Time of Use" charging incentives will be considered as a "supply scenario" in the IRP

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Risks and Uncertainties – PRE COVID-19

Uncertainty exists in the 20 year timeframe

- Natural Gas / LNG*
- Residential / EVs*
- Mining
- Commercial
- Forestry
- Cryptocurrency and Cannabis Loads
- DSM / Load Forecast Integration
- Heavy Duty EVs – will be captured within LRP scenarios

*greatest potential impact from CleanBC / electrification initiatives

Risks and Uncertainties – COVID-19

Significant uncertainty on effectiveness of health and economic measures

- Black Swan Event – this is uncharted territory for everyone
- Magnitude and duration of pandemic and economic impact
  - Wide range of views, no consensus
  - GDP projections revised several times since early March
  - Too date, few economic forecasts go beyond calendar 2020
- Many jurisdictions still in early stages and severity of measures is relatively moderate (particularly in Canada and Western US)
- Impact of fiscal challenges and economic measures (governments, businesses, individuals)
  - BC Hydro relief program (large industrial); related bad debt risk
- Precarious state of our standard of living (will public policy priorities change in a post-COVID19 world?)

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December 2020 Load Forecast Next Steps

Discussion Notes

What should we be considering as we develop the next forecast?

- Low
- Reference
- High