Inputs and Assumptions for the 2022 Forecast Update (2022-2035)

Demand Analysis Working Group (DAWG)
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Today's Agenda

Topic	Time	Facilitator
Welcome and Introductions	1:00 to 1:10	Cary Garcia, CEC
Forecast Update Scope and Schedule	1:10 to 1:20	
New Inputs and Assumptions Forecast Framework	1:20 to 1:50	
Baseline Inputs and Assumptions		
– Economic and Demographic Updates	1:50 to 2:10	Cary Garcia, CEC
– Electricity Rates	2:10 to 2:30	Lynn Marshall, CEC
Break Time	2:30 to 2:40	
Transportation Assumptions	2:40 to 3:40	Aniss Bahreinian, CEC Maggie Deng, CEC
Additional Achievable Transportation Electrification Scenarios	3:40 to 4:40	Quentin Gee, CEC
Wrap-up Discussion and Comments	4:40 to 5:00	All Participants

2022 Schedule

Sep. 8	Inputs and Assumptions – DAWG
Mid Nov.	Draft Results – DAWG
Dec. 7	Final Results – IEPR Workshop
Jan. 2023	Forecast Adoption – Business Meeting

2022 Update Scope

- ✓ **Econometric based electricity forecast update only ➔ 2022-2035**
  - Using econometric models so no detailed end use model runs
  - Consumption, sales, hourly, 1-in-x peak, climate change, etc.
  - Updated transportation forecast
  - New gas forecast in 2023

- ✓ **More history, updated econ demo, electricity rates**
  - 2021 electricity sales and PV/storage capacity; 2022 normalized peak
  - May 2022 - Moody's and DOF
  - Revenue requirements / procurement costs

- ✓ **No updates to AAEE / AAFS**
  - Additional Achievable Energy Efficiency / Fuel Substitution
  - New estimates developed in 2023

- ✓ **New AATE scenario**
  - Additional Achievable Transportation Electrification

Inputs and Assumptions Framework

Old Inputs and Assumptions Framework

- Primarily intended to capture a range of economic uncertainty
- 3 economically driven baseline energy demand scenarios combined with several AAEE/AAFS scenarios
- Combination of baseline forecasts and AAEE/FS scenarios created the “managed” forecast set
- Resulting Scenarios: “Mid-Mid”, “Mid-Low”, “Low-High”, “High-Low”, etc.

Old Framework

Baseline Scenarios

Mid Energy Demand

- "Likely" or "expected" assumptions
- Moody's baseline / DOF HH and Population

High Energy Demand

- Higher econ/demo projections
- Higher impacts from climate change
- Higher energy rates
- Higher vehicle electrification
- Lower self-generation adoption

Low Energy Demand

- Lower econ/demo projections
- No additional climate change impacts
- Lower energy rates
- Lower vehicle electrification
- Higher self-generation adoption

+

AAEE / AAFS Scenarios

Efficiency + Fuel Substitution (Electrification)

- Scenario 1
- Scenario 2
- Scenario 3
- Scenario…

=

50+ Demand Forecast Files!

Issues with current approach

Many scenarios aren't informative or even used

- Some informed by unlikely long-term economic outcomes
- Only 2 scenarios are used for statewide planning
  - Mid-Mid and Mid-Low

Scenarios names aren't descriptive

- AAEE Scenario 3 + AAFS Scenario 3 = ???
- AAEE Scenario 2 + AAFS Scenario 4 = ???
- Mid-Mid, Mid-Low, High-Low, Low-High…

Proposed Changes to Framework

- ✓ **One set of baseline assumptions**
  - Moody's baseline for econ and DOF for demographics
  - Eliminate high and low assumptions for econ demo and prices
  - Much easier to manage and interpret

- ✓ **Naming based upon use case**
  - "Planning Forecast" (Mid-Mid)
  - "Local Reliability Scenario" (Mid-Low)

- ✓ **"One-pager" scenario assumptions cross-walk**
  - Easy to follow summary of scenario assumptions including baseline assumptions

- ✓ **Update Forecast Forms**
  - Consolidate planning area baseline consumption/sales results + AAEE / AAFS / AATE into a single machine-readable dataset
  - Update "demand modifier" spreadsheet to be a better summary of impacts at peak
  - LSE and BA tables will remain the same

New Framework for 2022

New Name →	"Baseline Forecast"	"Planning Forecast"	"Local Reliability Scenario"
Current Name →	Mid Baseline Forecast	Mid-Mid	Mid-Low
Use Case →	▪ Baseline ▪ Reference forecast	▪ Resource Adequacy ▪ CPUC IRP ▪ CAISO Flex ▪ CAISO Econ	▪ CAISO TPP ▪ CAISO Local ▪ CPUC DPP
Econ Demo / Price Scenarios	Baseline (Mid)		
AAEE Scenario	—	Mid (Scenario 3)	Low (Scenario 2)
AAFS …	—	Mid (Scenario 3)	High (Scenario 4)
AATE …	—	Mid (Scenario 3)	***Mid (Scenario 3)***

- Mid = “expected scenario”, following the reasonably expected to occur philosophy
- ATE forecast adopted in May 2022 will replaced by an AATE demand modifier scenario
- For now – we assume Local Reliability will use same “Mid” AATE assumption

Questions/Comments/Discussion

- Comments on new framework…
- Other ideas for naming convention?
- Forecast forms that combine baseline forecast with AA scenarios vs. gathering many forms??
- Any other thoughts or questions??

Sales History

Sales History (GWh)

	PG&E	SCE	SDG&E	LADWP	SMUD	STATE
2012	94,981	96,117	20,004	23,601	10,519	259,907
2013	95,442	95,803	19,814	22,645	10,481	258,704
2014	94,984	97,880	20,072	23,455	10,586	261,562
2015	94,149	96,490	19,767	23,336	10,524	258,602
2016	92,359	94,567	19,135	23,482	10,485	254,638
2017	91,196	93,822	18,727	22,679	10,930	252,410
2018	89,567	93,483	18,537	22,078	10,297	248,727
2019	87,653	91,838	17,682	21,530	10,238	243,394
2020	87,454	93,001	17,445	20,935	10,443	244,094
2021	88,034	85,676	17,560	20,891	10,479	237,465
2018-2019	**-2.1%**	**-1.8%**	**-4.6%**	**-2.5%**	**-0.6%**	**-2.1%**
2019-2020	**-0.2%**	**1.3%**	**-1.3%**	**-2.8%**	**2.0%**	**0.3%**
2020-2021	**0.7%**	**-7.9%**	**0.7%**	**-0.2%**	**0.3%**	**-2.7%**

* PG&E and SCE planning area includes POUs, CCAs and DA; SDG&E planning area includes CCAs and DA

2020-2021 Sales by Sector

	PG&E	SCE	SDG&E	LADWP	SMUD	STATE
Residential	-2.0%	-11.8%	-3.4%	-14.2%	-2.7%	-6.9%
Commercial	0.8%	-4.6%	3.4%	9.9%	1.6%	0.1%
Industrial/Mining	3.0%	-10.8%	10%	4.8%	2.9%	-2.9%
Ag + Water Pumping	7.3%	2.8%	9.0%	32.9%	27.4%	6.0%
Streetlighting	3.9%	16.4%	-5.7%	3.3%	3.0%	5.7%

* PG&E and SCE planning area includes POUs, CCAs and DA; SDG&E planning area includes CCAs and DA

Statewide Summary

- Residential rebound from 2020 but sales are still higher than 2019 on average
- Commercial sales still about 8% lower compared to 2019
- Ag and water pumping sales increased by 36% from 2019 to 2021
  - PG&E is the largest ag sector – increased by 46%
- Continued declines in industrial/mining sector sales, -9% over the last decade
- Streetlighting sales have grown for the second time in the past decade, but has declined by 17% over the same period

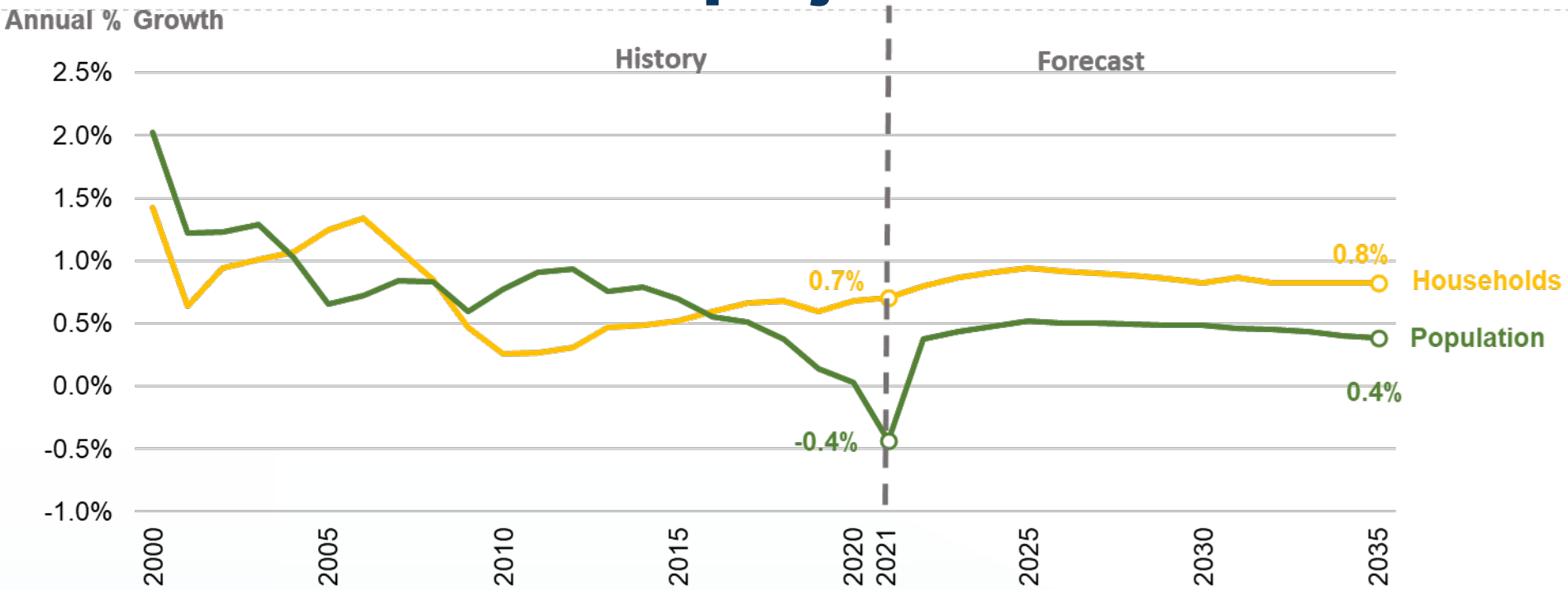
Econ Demo

Econ Demo Summary

Don’t expect dramatic changes in baseline electricity demand

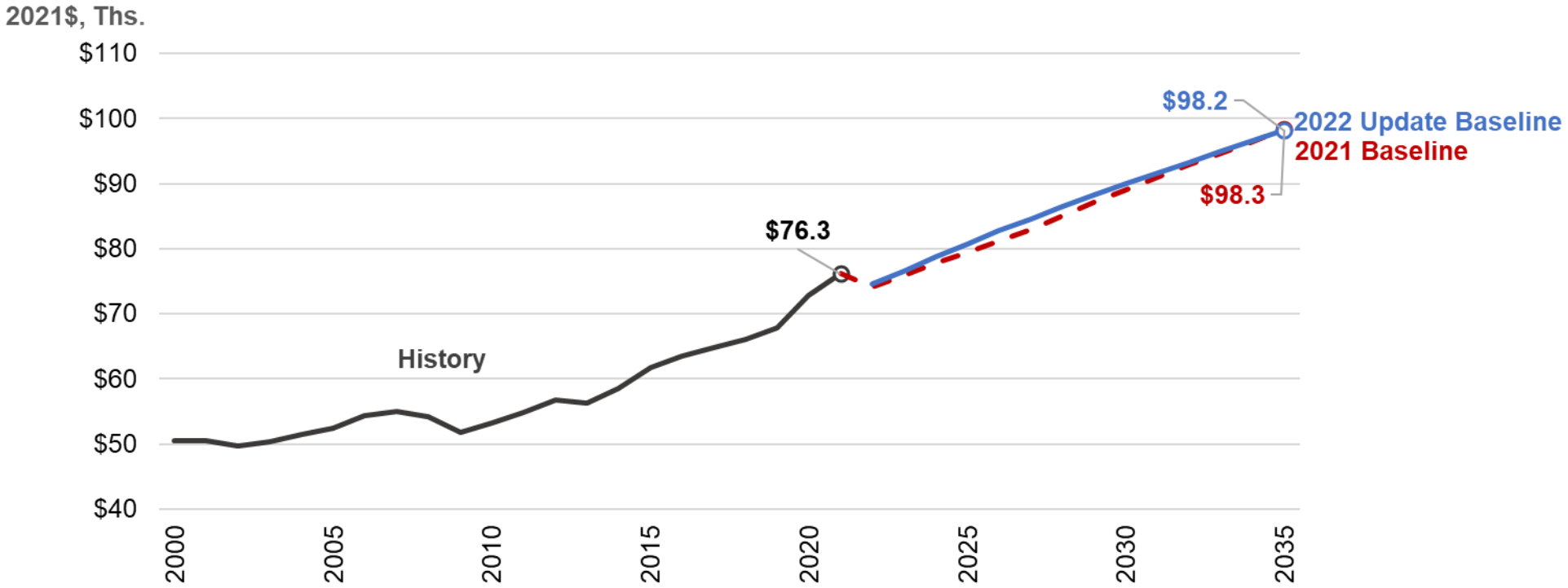
- Moody’s baseline economic projections are similar for main drivers
  - GDP, income and manufacturing output
- DOF projections for households and population are similar too

Updated DOF household and population projections are similar to 2021 projections



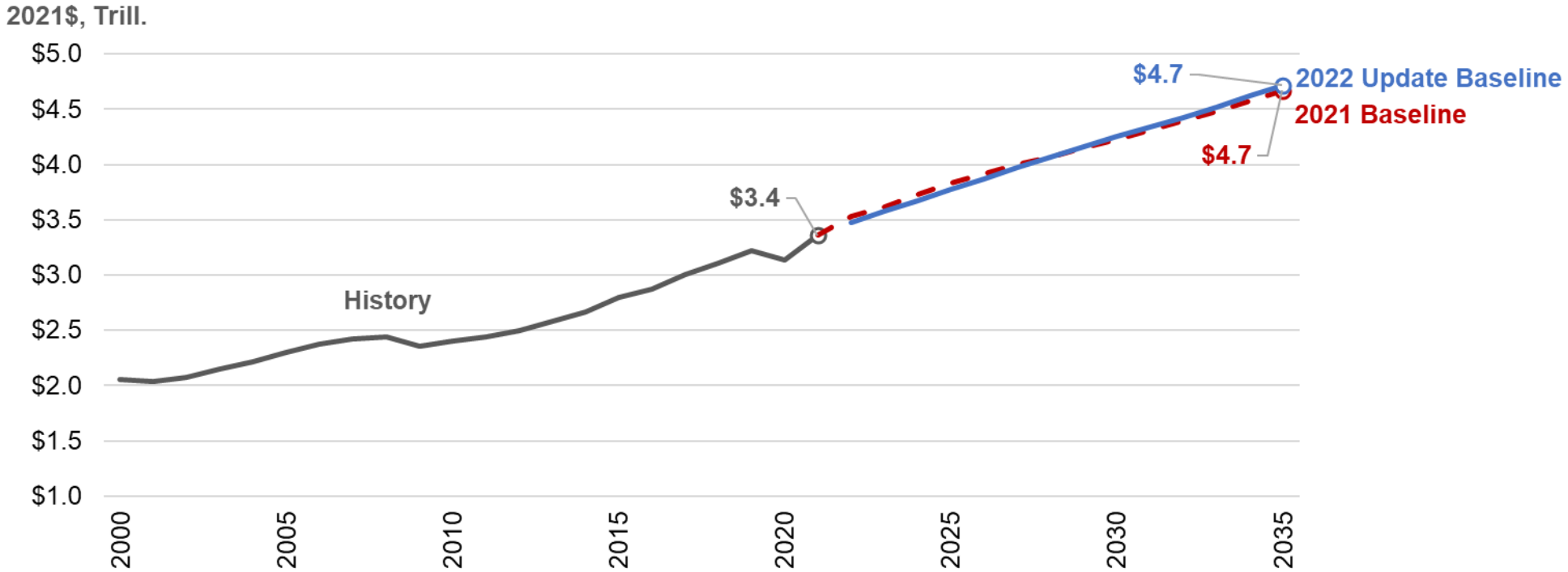
- Statewide population for CEDU 2022 continues to grow 0.5 % annually from 2022 to 2035
- 2022 total population estimate is 39.5 million and is projected to reach roughly 42 million by 2035
- Statewide household growth is expected to grow at 0.9 % annually from 2022 to 2035, slightly above previous household projections from DOF
- 15 million households by 2035 from 13.4 million in 2022

Per Capita Income is essentially the same



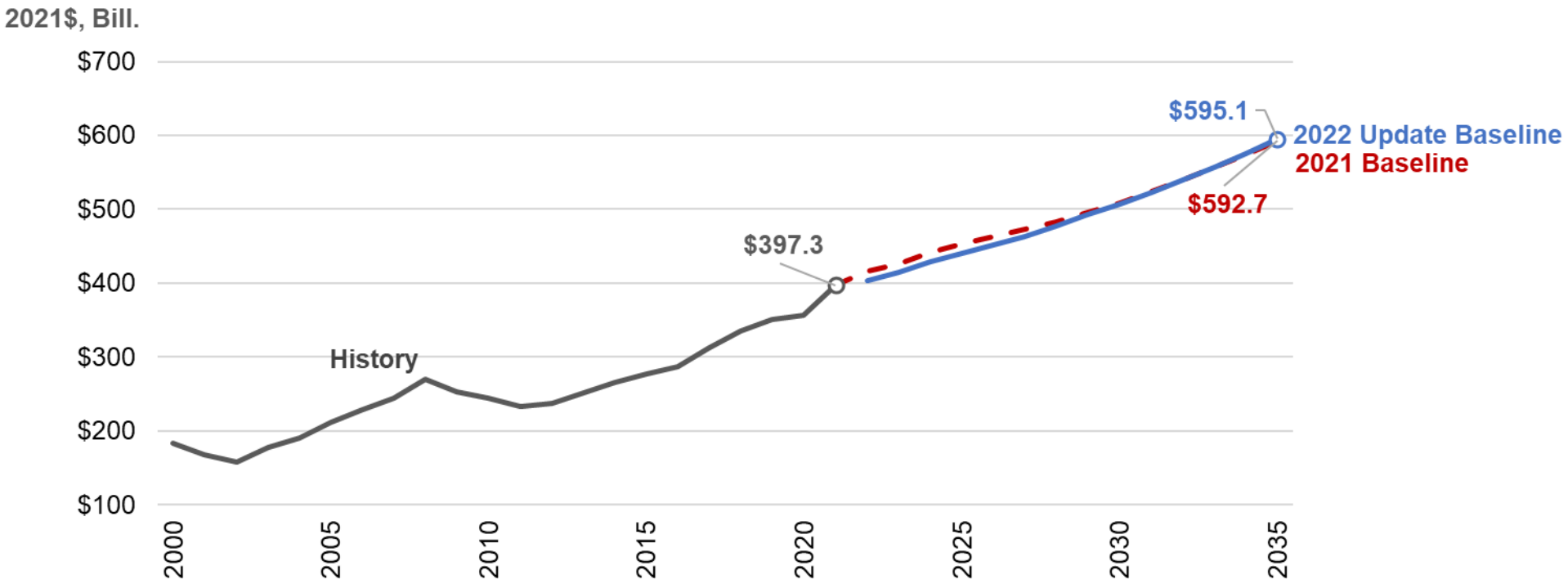
- Statewide per capita income is expected to grow at an average annual growth rate of 2.1% from 2022 to 2035.
- Statewide per capita income is expected to increase by 32 percent, reaching $98.2 thousand by 2035

The same for Gross State Product…



- GSP grows at an average annual growth rate of 2.4% from 2022 to 2035.
- GSP is expected to increase by 3%, reaching $4.7 trillion by 2035.

And manufacturing output too



- Gross manufacturing output grows at an average annual growth rate of 3% from 2022 to 2035.
- Gross manufacturing output is expected to increase by 40%, reaching $595 billion by 2035.

Questions/Comments/Discussion