APRIL 9, 2021

EBCE Technology and Analytics Update

Special Board Retreat

Taj Ait-Laoussine, VP Technology & Analytics

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Agenda

- Team Mission and Overview
- The EBCE Integrated Platform
- Enabling a Data-Driven Organization: Use Cases
- Ecosystem of Partners
- Customer Relationship Management (CRM) System
- CCDMS RFP
- Tentative Roadmap
- Collaboration with Other CCAs

Team Mission / Meet the Team

"Develop an in-house integrated data platform and analytical capabilities to conduct ongoing load research and analysis."

- Key Recommendation, EBCE Local Development Business Plan

Team Mission: the Technology and Analytics team manages data, processes and systems to ensure that EBCE decisions and operations are grounded in data and driven by analytical insights.

Diego Ponce de Leon Barido
Director of Analytics

Doug Allen
Modeler-in-Chief

Kevin Li
Data Scientist

Sanjay Subramanian
Data Engineer

Taj Ait-Laoussine
Vice President, Technology and Data Analytics

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The EBCE Integrated Data Platform

- EBCE built its data platform using the Google Cloud Platform (GCP) as a foundation
- The platform centralizes and processes all data relevant to EBCE Operations
- With GCP, EBCE staff have access to modern data science and big-data technologies
- The EBCE platform is unique among CCAs and has contributed to significant innovation

Google Cloud Platform

Why Use Cloud Technology?

Fast **Cost-Effective** **Highly Scalable** **Secure** **Modern**

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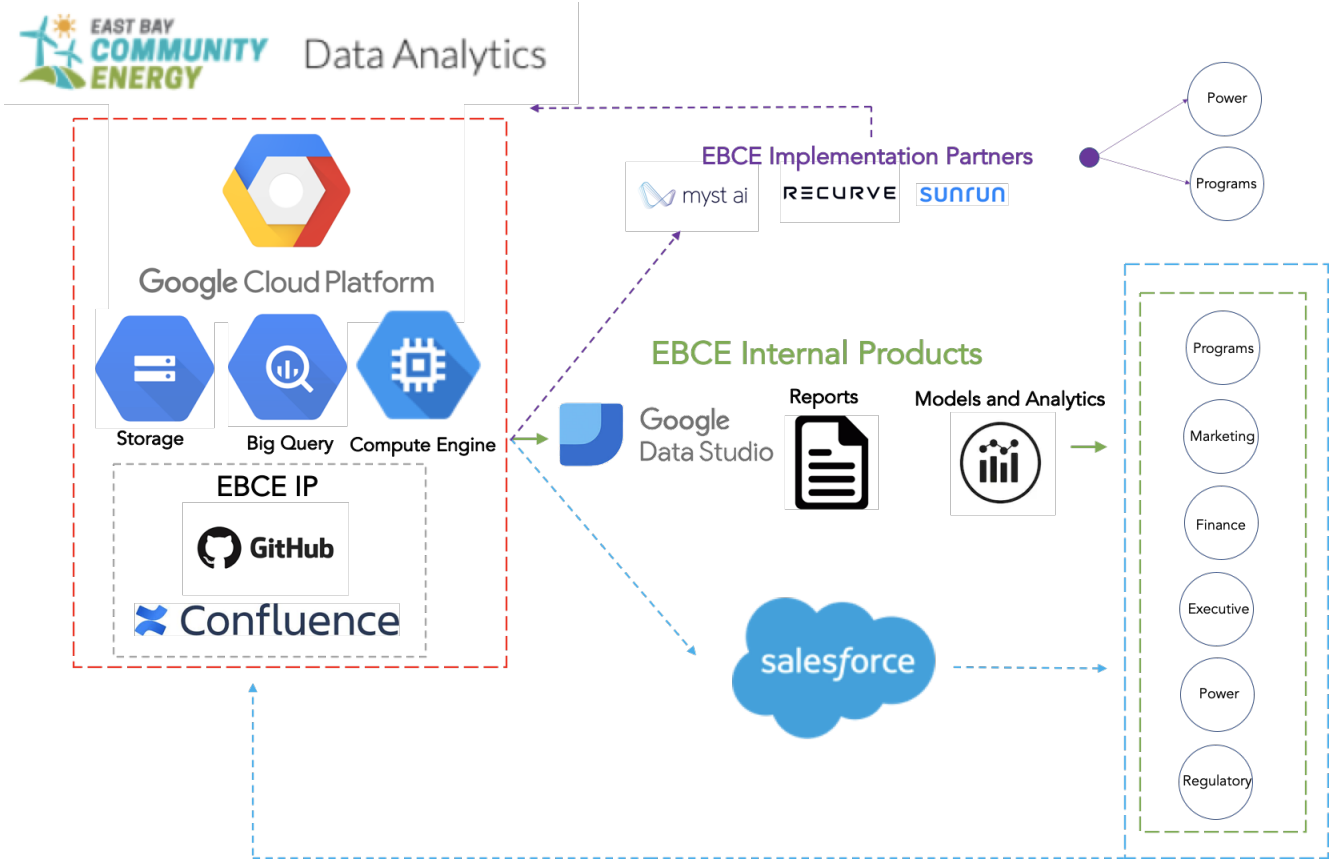
EBCE Manages a Complex Data Environment



Integrated Data Sources

Energy Usage Information

- Hourly/ 15 Minute Usage
- Bills / Billing Determinants
- Monthly Electric Usage
- Gas Usage

Customer Information

- PG&E Customer Details
- Customer Enrollment
- Product Choices

- Tax Assessor Records
- Census Information
- CalEnviroScreen
- PG&E Arrears
- PG&E Disconnections
- PSPS Events
- DMV Records

Other Data Sources

- CAISO Price Data
- SC DA Schedules
- Load Forecasts
- Power Procurement Txs
- Google Sunroof
- Weather

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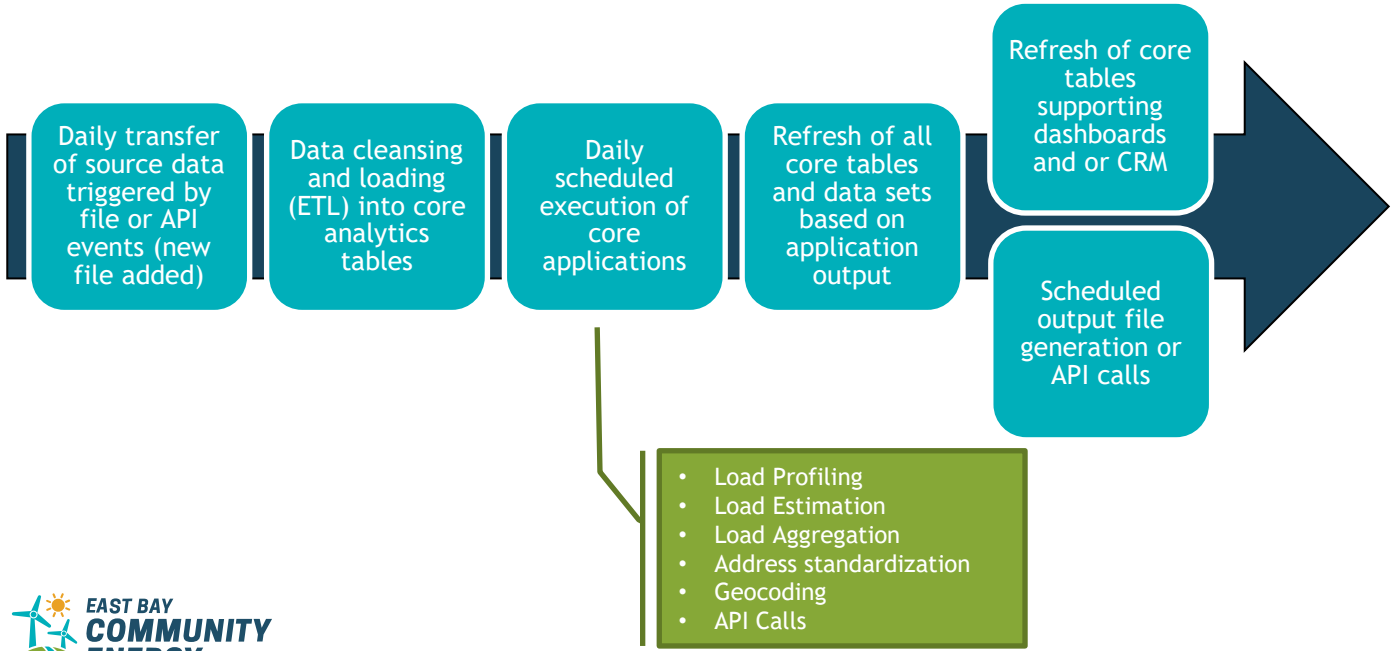
Automated Data Integration



Ad Hoc Reports
Custom Reports
Custom Dashboards

Program / Marketing Support
Enrollment Lists
Target Lists
Mailing Lists

Salesforce
Data Model Refresh

Models
Revenue Model
PCIA Model

SQMD
Shadow SQMD Report

Forecasts
Short-Term Forecast (Myst)
Medium-Term Forecast
Long Term Forecasts

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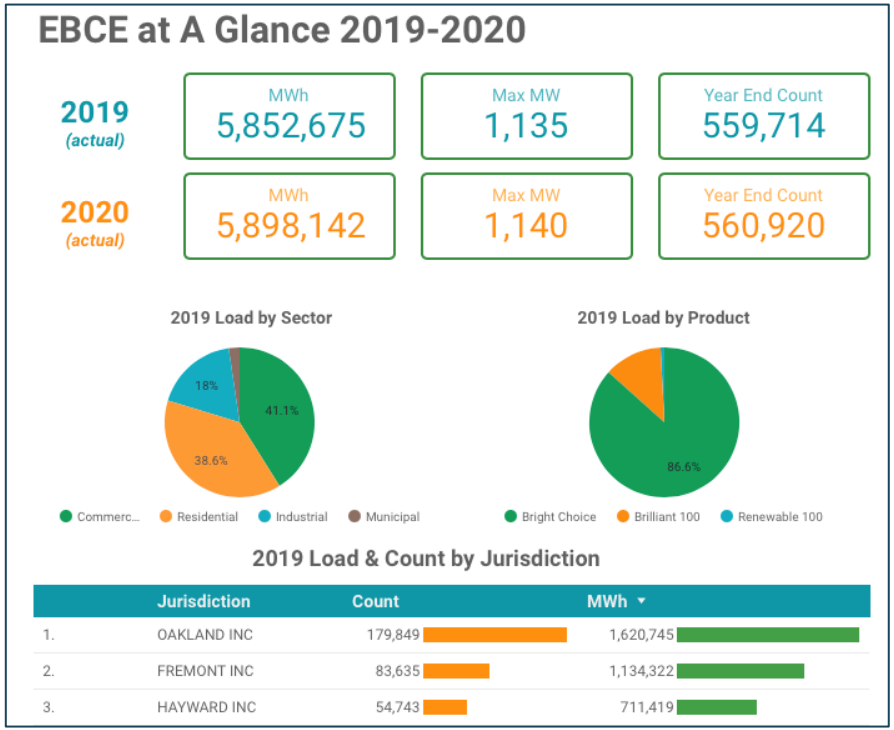
Self Service Dashboards and Reports



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Enabling a Data-Driven Organization

- **Team manages auxiliary systems to facilitate a data-driven organization:**
  - **Confluence**, an interactive wiki-like knowledge repository of all relevant information and documentation;
  - **Jira**, a ticketing system to request ad-hoc analysis or features (100s / year).
- **Recently, 6+ EBCE staff graduated from an internal SQL class to facilitate data querying.**
- **We also support additional self-help tools such as QGIS to let staff do their own analysis and modeling.**

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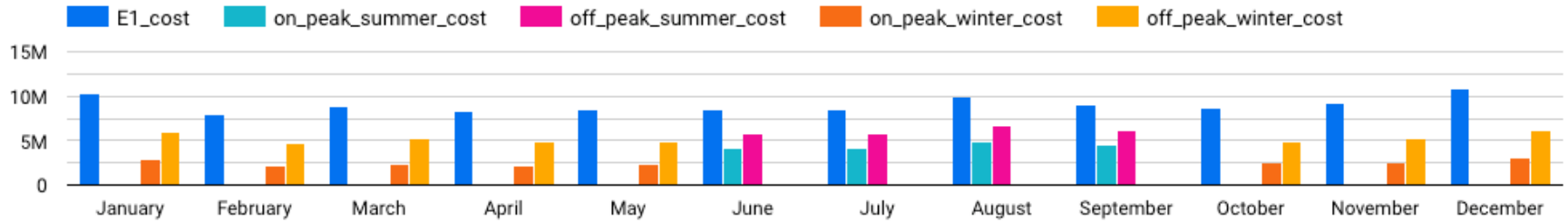
Use Case: Identifying TOU Transition Outcomes

Context:

- Residential customers will soon start defaulting to a new TOU Rate.
- Knowing which customers are winners and which are losers helps EBCE understand the impact of the transition on revenues, and how to market to those customers.
- So, who are the winners, and who are the losers?

Analysis:

- Identify eligible customers and use a year of hourly usage data for all customers.
- Calculate billing charges under two scenarios: normal rate, TOU rate.
- Calculate the cost difference between two scenarios and identify TOU winners and TOU losers.
- Calculate Bill Protection Amount @ Risk.



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Use Case: Enriching Resilient Home Leads

Context:

- Customers can submit a form on the EBCE website to see if they qualify for the Resilient Home Program.
- Leads need to be qualified and prioritized based on customer profiles and characteristics.
- Implementation partner needs usage and customer details to further qualify customers

Process:

- Forms collected on web site are sent to EBCE Analytics team for enrichment
- Leads are automatically enriched with data from EBCE integrated platform
- Enriched leads are seamlessly passed on to implementation partner via GCP.

Key Data Elements Added to Leads

Care / Fera / Medical Baseline | Fire Hazard Zone | PSPS Event Count | Google Sunroof Potential

Parcel Age | Disadvantaged Community Flag | Low Income Flag

Hourly Electricity Usage

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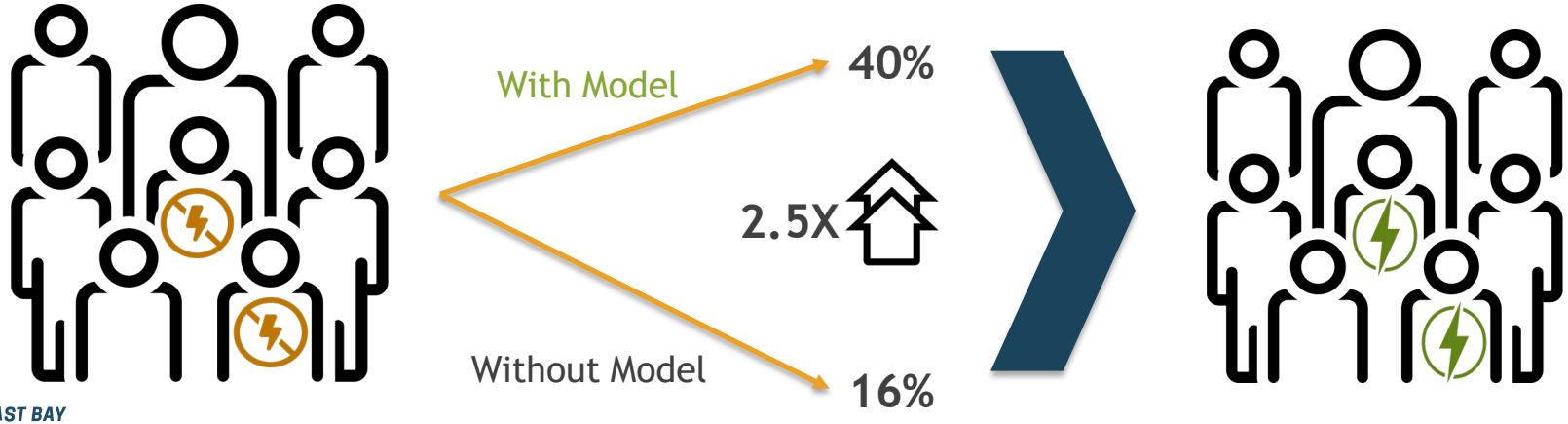
Use Case: Preventing Customer Disconnections

Context:

- EBCE seeks to proactively help customers that are at risk of frequent disconnections.
- EBCE want to pre-emptively reach out to such customers and focus its resources where most needed, to prevent disconnections.
- So how can EBCE predict customers at risk of disconnection?

Analysis:

- Develop a machine-learning model specific to at-risk census tracts.
- Data used: interval kWh, monthly arrearages, monthly gas data, DMV/KBB car values.
- EBCE data infrastructure provides platform to ingest data, perform computations, and export candidates into program campaigns.



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Analysis allows EBCE to focus resources on customers most likely to be affected.

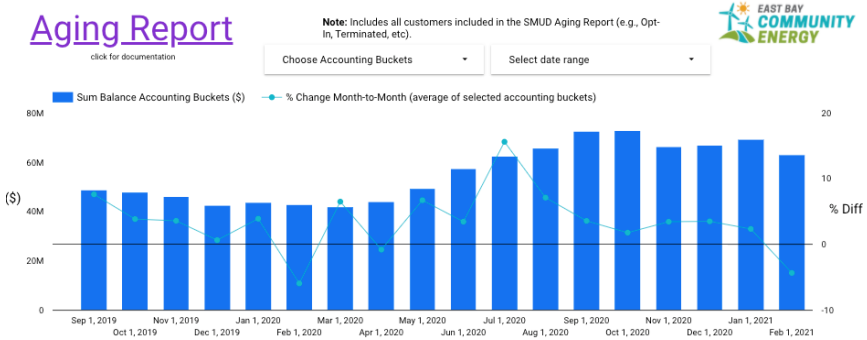
Use Case: Using Data to Respond Effectively

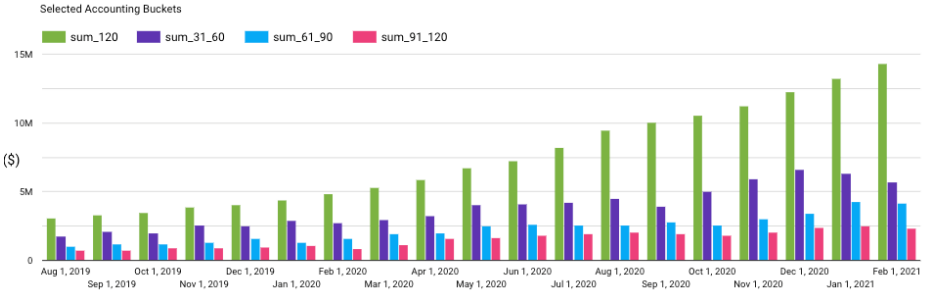
Context:

- COVID and difficult social circumstances led to a significant increase in customers with arrears in our service territory.
- Data from PG&E and partners was difficult to use, interpret and act upon.
- Analysis was required to better understand EBCE's overall arrears picture.

Analysis:

- Clean, monitor, analyze and visualize arrears data to be used by the Finance and Programs Teams.
- Data feeds flow into GCP and Salesforce for organizational decision making.
- Data allows for data-driven design of programs to help with arrears and debt management.





Use Case: Calculating Revenue "Headroom"

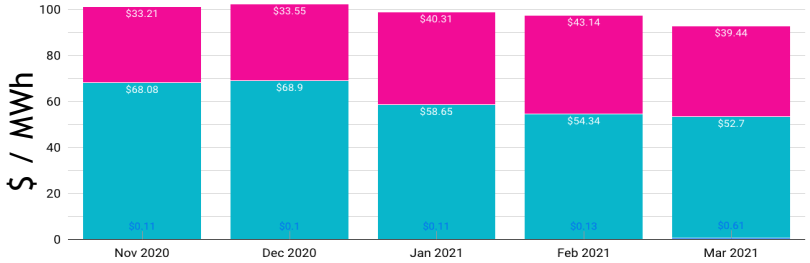
Context:

- As a CCA whose rates are tied to PG&E's, the amount we can spend on energy ("headroom") is determined by the interplay between PG&E rates, PCIA rates, and the composition of our load
- Year-to-year changes in PCIA can be significant, but can also be obscured by stable PG&E generation rates

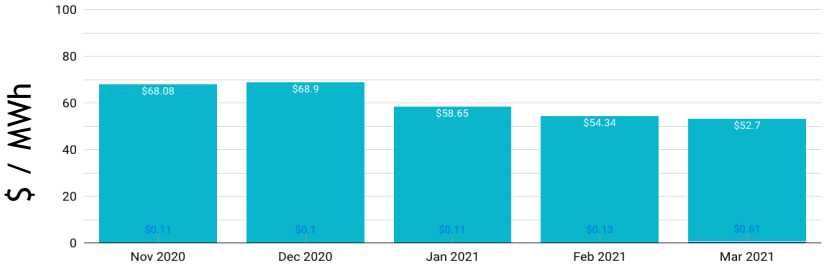
Analysis:

- Use hourly forecast usage data for all customers
- Calculate EBCE rates (PG&E + discount / premium)
- Net out PCIA payments to PG&E
- Can also calculate headroom by rate class, city, etc., to help target load reductions to specific customer segments

In January 2021, average rates paid by customers (including PCIA) dropped by 3.4%...



... but average rates received by EBCE (*net of PCIA*) dropped by 14.8%.



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GCP Computational power allows us to do this analysis meter-by-meter, and to repeat it in near-real-time under different scenarios.

Expanding the Ecosystem: Data Partners

Myst is an EBCE partner that generates highly accurate short term load forecasts for EBCE via seamless data exchanges through GCP.

EBCE Wholesale Performance Report

Page 1 - Hourly Load & Prices

Apr 1, 2020 - Jul 31, 2020

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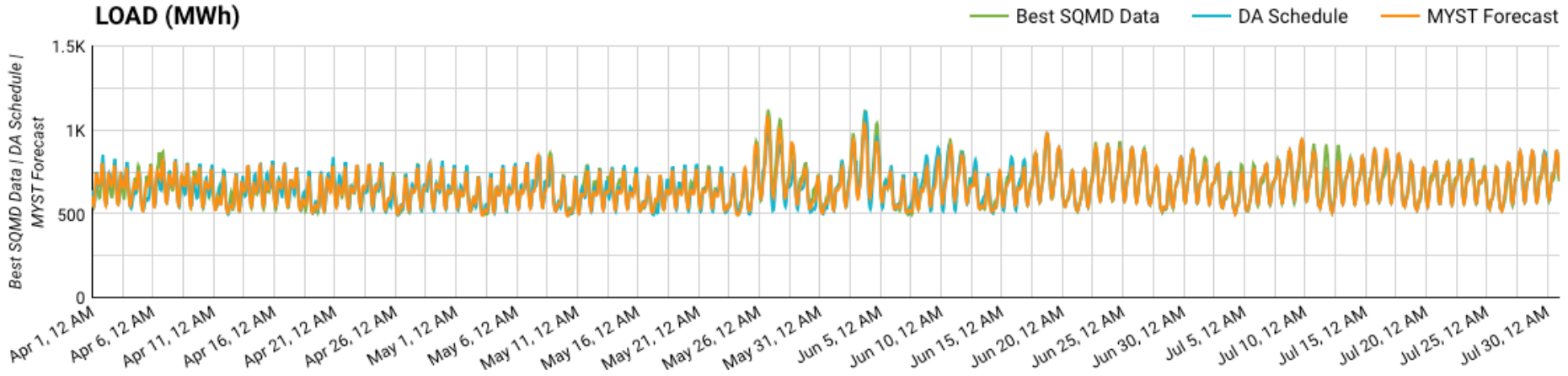
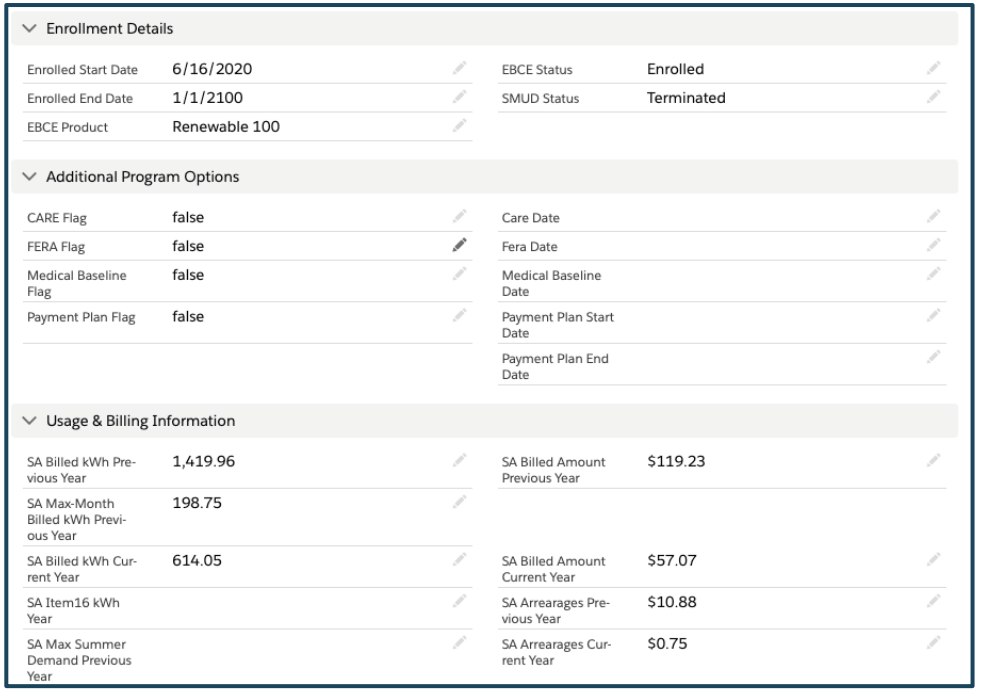
Total WS MWh	Max WS MW
1,936,237	1,120

Performance of Actual DA Schedule	Performance of Myst Schedule	Performance of Theoretical Internal EBCE Schedule
MAPE DA	MAPE Myst	MAPE FCAST
4.17%	2.59%	6.64%



Pushing the CRM Envelope

- EBCE has directly licensed its own Customer Relationship Management (CRM) system from Salesforce.
- The CRM is built on the EBCE Platform, centralizes all customer information in one place, and supports targeting, communication and enrollment of customer for marketing and local development;
- The EBCE CRM is the foundation to bringing future functions “in-house”, particularly the call center.



Enrollment Details

Enrolled Start Date	6/16/2020	EBCE Status	Enrolled
Enrolled End Date	1/1/2100	SMUD Status	Terminated
EBCE Product	Renewable 100		

Additional Program Options

CARE Flag	false	Care Date	
FERA Flag	false	Fera Date	
Medical Baseline Flag	false	Medical Baseline Date	
Payment Plan Flag	false	Payment Plan Start Date	
		Payment Plan End Date	

Usage & Billing Information

SA Billed kWh Previous Year	1,419.96	SA Billed Amount Previous Year	$119.23
SA Max-Month Billed kWh Previous Year	198.75		
SA Billed kWh Current Year	614.05	SA Billed Amount Current Year	$57.07
SA Item16 kWh Year		SA Arrearages Previous Year	$10.88
SA Max Summer Demand Previous Year		SA Arrearages Current Year	$0.75

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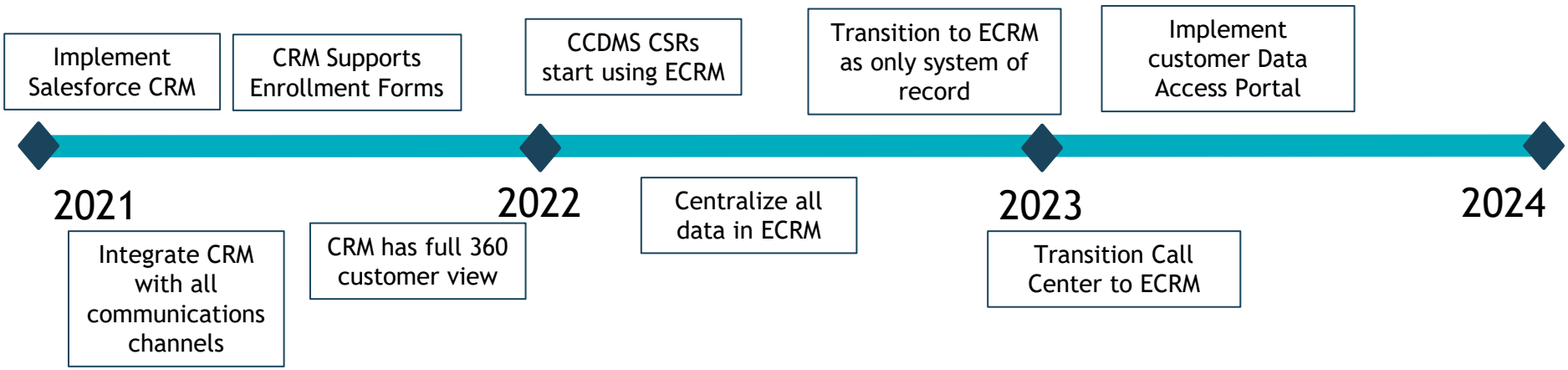
Call Center and Data Management Services RFP

- The Analytics team works closely with the EBCE Call Center and Data Management Services Provider (currently SMUD).
- EBCE has issued and RFP to renew these services, due 4/9/2021.
- RFP seeks pricing and options for call center integration into the service territory.
- RFP also calls for tighter integration with EBCE CRM and the EBCE Roadmap.
- RFP was reviewed in detail during the Executive Committee Meeting 3/26/2021.

Tentative Road Map – CRM Activities



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Collaboration with Other CCAs

- Over the last few years, more and more CCAs have embarked on the development of their own internal integrated platform.
- EBCE has provided thought leadership in this arena, and has offered to help other CCAs develop a platform like that at EBCE.
- EBCE continues to explore ways to partner with other CCAs as it presents the following advantages:
  - Potential economies of scale
  - Unified front when dealing with PG&E
  - Shared Intellectual Property through Open Source
- Progress! Most other CCAs are adopting the GCP Platform as the basis for their own internal systems.

APPENDIX

EBCE Modeling Layer

Sits on top of the Data Warehouse

- Direct pulls from latest data ensures currency of results
- But also means that any assumptions / errors made anywhere in the data warehouse flow through (and sometimes accumulate) in modeling efforts

Primarily self-contained “apps”

- Shared functions are kept separate in a central “tools” package
- Models are self-contained analyses
- Focus on flexibility in development phase pays off later when new questions arise

Integration with GCP / GCS allows for automatic updates

- Ability to archive input files / parameters for documentation purposes
- Increased visibility of results helps to catch errors