

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Develop an
Electricity Integrated Resource Planning
Framework and to Coordinate and Refine Long-
Term Procurement Planning Requirements.

Rulemaking 16-02-007
(Filed February 19, 2016)

**2018 INTEGRATED RESOURCE PLAN OF
EDF INDUSTRIAL POWER SERVICES (CA), INC.**

(PUBLIC)

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August 1, 2018

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In accordance with Ordering Paragraph 14 of Decision 18-02-018, EDF Industrial Power Services (CA), LLC hereby submits this 2018 Integrated Resource Plan,¹ including the following documents attached hereto and incorporated herein by reference:

- Alternate LSE Plan (Type 1)
- Conforming Portfolio
- Alternative Portfolios
- CEC Form S-1: Capacity Resource Accounting Table
- CEC Form S-2: Energy Balance Accounting Table
- Power Source Disclosure Program 2017 Annual Report
- Officer Verification

Respectfully submitted,



Gregory S.G. Klatt
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Attorney for
EDF INDUSTRIAL POWER SERVICES (CA), LLC

August 1, 2018

¹ Spreadsheets and reports containing confidential information are not attached to this public version of EDF's 2018 Integrated Resource Plan.

(PUBLIC)

Alternative LSE Plan

EDF INDUSTRIAL POWER SERVICES (CA), LLC

2018 INTEGRATED RESOURCE PLAN

August 1, 2018

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1. Executive Summary

This 2018 Integrated Resource Plan (2018 IRP) of EDF Industrial Power Services (CA), LLC (“EDF”) consists of the following forms, reports and information:

- CEC Form S-1: Capacity Resource Accounting Table.¹
- CEC Form S-2: Energy Balance Accounting Table.
- EDF’s Power Source Disclosure Program 2017 Annual Report.
- A description of EDF’s treatment of disadvantaged communities.
- A description of how EDF’s planned future procurement is consistent with EDF’s individual Greenhouse Gas Benchmark.
- EDF’s Conformed Portfolio.
- EDF’s Preferred Portfolio, including identification and justification for deviations in assumptions from the Reference System Portfolio.
- A description of how EDF’s Preferred Portfolio is consistent with each relevant statutory and administrative requirement.
- An action plan for implementing EDF’s 2018 IRP.
- A discussion of lessons learned from this IRP and suggestions for improving the IRP process.

2. Study Design

EDF used the following process to develop its 2018 IRP:

1. EDF used its 2019 Resource Adequacy Year-Ahead Load Forecast (RA Load Forecast) as is “assigned load forecast,” which served as the basis for calculating:
 - EDF’s annual energy requirement inputs for the GHG Calculator²;
 - EDF’s annual capacity requirements as reported in CEC Form S-1³;

¹ Load serving entities (LSEs) use Form S-1 and Form S-2 to report electricity supply resource plan information to the California Energy Commission (CEC) as part of the CEC’s data collection for the biennial *Integrated Energy Policy Report*. However, EDF was not required to file an electricity supply resource plan for the 2017 IEPR, given that EDF’s peak load was less than 200 megawatts (MW) in both 2015 and 2016. EDF prepared the S-1 and S-2 forms that are being submitted as part of this 2018 IRP solely for that purpose. Accordingly, the electricity supply resource plan information reported in forms S-1 and S-2 is limited to the current IRP Planning Period (i.e., 2018-2030) and does not include historical information. Moreover, to minimize inconsistencies with the load data used for the GHG Calculator, the load data reported in forms S-1 and S-2 is derived from the same data set that was used for EDF’s 2019 Resource Adequacy Year-Ahead Load Forecast.

² The energy requirements in EDF’s 2019 RA Load Forecast include distribution losses, while the GHG Calculator adds transmission and distribution losses to inputted energy requirements. Therefore, to calculate the energy requirement inputs for the GHG Calculator, EDF deducted distribution losses from the energy requirements reported in its 2019 RA Load Forecast.

³ Whereas the peak loads reported in the RA Load Forecast are *monthly* peak loads by *service territory*, the instructions for CEC Form S-1 call for LSEs to forecast their *annual non-coincident system* peak loads.

- EDF's annual energy requirements as reported in CEC Form S-2⁴;
 - EDF's individual GHG Emissions Benchmark.
2. EDF used its assigned load forecast and the methodology set forth in Decision 18-02-018 to calculate its individual GHG Emissions Benchmark.⁵
 3. EDF produced a Conforming Portfolio based on:
 - EDF's assigned load forecast;
 - EDF's estimated Renewables Portfolio Standard (RPS) procurement obligations for 2018, 2022, 2026 and 2030;
 - EDF's estimated Energy Storage procurement obligations⁶;
 - Inputs and assumptions matching those used in developing the Reference System Portfolio.
 4. EDF used the Clean Net Short Methodology and the GHG Calculator to estimate the GHG emissions produced by its Conforming Portfolio.
 5. EDF produced an Alternative Portfolio using the same inputs and assumptions that it used to produce its Conforming Portfolio, with one exception: EDF assumed the load associated with Home Electric Vehicle Charging was zero in each of the forecast years.
 6. EDF used the Clean Net Short Methodology and the GHG Calculator to estimate the GHG emissions produced by its Alternative Portfolio.
 7. EDF used the resources and methodology referenced in staff's guidance to identify customers in disadvantaged communities.

3. Study Results

3.1. Preferred and Conforming Portfolios

For EDF's Conforming Portfolio, EDF projected its historical RPS procurement across the IRP Planning Horizon. The estimated GHG emissions associated with EDF's Conforming Portfolio total [REDACTED] MMtCO₂/yr., which exceeds EDF's GHG Benchmark by 18.2%. Because of the complexity of the GHG Calculator, it is difficult to determine the causes of that result with any precision. However, EDF believes it is mostly, perhaps entirely, due to the significant (25.7%) increase in EDF's

Thus, while the forecast 2019 annual system peak load reported in Form S-1, which serves as the forecast peak load reported in Form S-1 for each year of the 2018-2030 forecast period, was calculated using the same data set that was used to develop the monthly peak loads for each service territory reported in EDF's 2019 RA Load Forecast, the former is not the simple sum of the latter.

⁴ The annual energy requirements reported in Form S-2 mirror the energy requirement inputs for the GHG Calculator.

⁵ EDF's individual GHG Emissions Benchmark is [REDACTED] MMtCO₂/yr.

⁶ As an electric service provider (ESP), EDF is required to procure energy storage equal to 1% of its 2020 peak load, with the procured energy storage to be in commercial operation by no later than 2024.

forecast 2030 energy requirements that is attributable to inputs and assumptions built into the GHG Calculator.

To test this hypothesis, EDF made one minor adjustment to the GHG calculator, which was to set the assumed “Electric Vehicle Load - Home Charging Only” load input to zero.⁷ This small adjustment and the resulting decrease in EDF’s load forecast reduced EDF’s estimated GHG emissions for 2030 to [REDACTED] MMtCO₂/yr. under this First Alternative Portfolio, thereby reducing the extent to which EDF’s attributed GHG emissions exceed the benchmark to 10.8%.

Importantly, EDF does not serve any residential load, thus making the zeroing out of Home EV Charging Load an eminently reasonable adjustment. Moreover, the total amount of DA load is capped by statute, thus making the attribution of any significant amount of incremental load to EDF questionable. Thus, its First Alternative Portfolio, while based on forecast energy requirements that are still artificially high, more closely approximates EDF’s planned portfolio and estimated GHG emissions than EDF’s Conforming Portfolio. Accordingly, EDF requests that its First Alternative Portfolio be certified as its Preferred Portfolio.⁸

3.2. Disadvantaged Communities Impacts

EDF estimates that 32.7% of its current customers are in disadvantaged communities (DACs).⁹ All such customers are either commercial or industrial customers. That is, EDF does not serve any residential customers in DACs. Therefore, the IRP descriptive requirements for DACs are inapplicable to EDF.

EDF has no DAC-specific activities or programs. However, EDF’s customers help fund utility activities and programs aimed at customers in DACs through public purpose program charges.

EDF has no planned procurement from generation resources located in DACs. Therefore, the IRP requirements related to estimating and minimization of local air pollution in DACs are inapplicable to EDF.

⁷ The inputs for same appear in the GHG Calculator Dashboard at Line 33.

⁸ EDF prepared a Second Alternative Portfolio with an additional adjustment: EDF increased the forecast renewables procurement for 2030 to match the sum of the required PCC1 REC procurement and allowed PCC 2 procurement associated with its unadjusted 2030 energy requirement forecast. This action reduced EDF’s estimated GHG emissions for 2030 to [REDACTED] MMtCO₂/yr., which is less than EDF’s benchmark. Assuming the PCC1 RECs would cost \$7.50 more than PCC2 RECs, EDF estimates the cost of this mitigation measure would be \$ [REDACTED]

⁹ Calculated as a percentage of the total number of meter accounts EDF currently serves.

3.3. Cost and Rate Analysis

Because the direct access market is both competitive and capped, EDF endeavors to secure and retain customers by procuring energy and capacity products, including statutorily mandated products (e.g., RA capacity and RPS products), at the lowest cost possible. EDF plans to continue this practice throughout the IRP forecast period.

3.4. Local Needs Analysis

EDF's local capacity procurement needs will likely vary over the IRP forecast period, as such needs are dependent on the make-up and location of EDF's customers, which will vary over time. Whatever those needs may be, however, EDF will use its best efforts to procure Local RA capacity in the locations and amounts required to meet EDF's assigned Local RA obligations.

4. Action Plan

EDF's 2018 IRP Plan closely reflects EDF's current procurement practices, which are to (a) procure RA and RPS products in the amounts required to satisfy EDF's regulatory obligations and (b) procure its energy requirements primarily from CAISO markets. It does not appear that any changes to those practices will be required to meet EDF's individual GHG Emissions Benchmark.

5. Lessons Learned

EDF's focus in this first IRP cycle has been simply to understand and satisfy the IRP requirements. Energy Division staff has been exceptionally helpful in that regard. Prior to the next IRP cycle, however, EDF recommends that the Energy Division hold a workshop with the aim of identifying IRP data and information requirements that, given the differences between EDFs and other classes of LSEs, can safely be simplified or eliminated for EDFs without detracting from the Commission's ability to meet statutory requirements.

6. Confidentiality

EDF is requesting confidentiality for portions of its 2018 IRP.

CONFORMING PORTFOLIO

Cell Color Scheme
 Yellow cells are inputs that can be changed by the user (only in the Dashboard and Custom Profiles tabs)
 Orange cells contain drop-down menus that show the user's original custom values
 Green cells are final outputs

Tab Color Scheme
 Light Orange tabs are where the user inputs values and views results
 Green tabs contain specific data from the 2027 EPR that the user should input into the "EPR Manager Retail Sales Forecast" cells on the Dashboard
 Yellow tabs are read-only tabs that contain inputs and calculations

RESULTS

RESULTS

Notes:
 Input values (if low cells) show here are p.e. resources. Users should replace all inputs with values specific to their system.
 Input and results are in units for the 2018-2022 and 2026 and 2030 modeling years. Any intermediate years should be interpolated outside of this tool.

	2018	2022	2026	2030	Notes
Energy Balance					
Energy for Load (excluding BTM PV)	GW/h				
Owned or contracted non-dispatchable GHG-emitting resources	GW/h				
Large Hydro	GW/h				
Renewable Generation (including BTM PV)	GW/h				Includes oversupply
User-specified GHG-free Power	GW/h				Due to storage losses and subhourly reserves.
Storage Energy Imbalance	GW/h				
Clean Net Short					
Facilities	Unit				
Clean Net Short	MMtCO ₂ /yr	2022	2026	2030	2030 Notes
Owned or contracted non-dispatchable GHG-emitting resources	MMtCO ₂ /yr				Includes oversupply emissions credits
Emissions offset for NW hydroelectric imports	MMtCO ₂ /yr				Scaled to LSE load ratio share within CAISO
Total	MMtCO ₂ /yr				
Average emission intensity	TCO ₂ /MWh	0.2783	0.2232	0.2674	0.1662
Oversupply					
Oversupply	MMtCO ₂ /yr				Occurs when hourly supply exceeds hourly load
Capacity/Peak					
Owned or contracted non-dispatchable GHG-emitting resources	Unit				Start of hourly load profile - not a 1.0 peak
Large Hydro	MW				
Nuclear	MW				
Total BaseLoad Renewables	MW				
Total Variable Resources	MW				Includes BTM PV
Energy Storage	MW				
Maximum Clean Net Short	MW				

	2018	2022	2026	2030	Notes
Metric					
Owned or contracted non-dispatchable GHG-emitting resources	MMtCO ₂ /MMh	0.35	0.35	0.35	Perfect capacity - 100% CF, Cooperated on
Emission factor - Owned or contracted non-dispatchable GHG-emitting resources	%	6%	14%	22%	30% Values shown are from CH2M HILL PRC/ES&E User/Interfac
Demand Inputs					
Assigned Load Forecast for RFP (i.e. Managed Retail Sales Forecast)	GW/h				Includes effect of BTM PV, AEE, etc.
Default Demand Inputs (Based on sales-weighted share of total from EPR)					
Baseline net energy for load (no BTM PV, EV electrification energy efficiency)	Units				Grossed up for TBD losses, demand met by BTM PV, RFP excluded
Electric Vehicle Load - Home Charging	GW/h				
Other Electric Load - Home Work Charging	GW/h				
Building Electrification	GW/h				
Energy Efficiency	GW/h				
Custom Demand Inputs (OPTIONAL, overrides Assigned Load Forecast for RFP) Use Custom?					
Baseline net energy for load (no BTM PV, EV electrification energy efficiency)	Units				To overwrite set "Use Custom" to "Yes" and input forecast. Custom demand values should be grossed up for TBD losses.
Electric Vehicle Load - Home Charging Only	GW/h				User-specified load profiles should be input in the "Custom Profile" tab
Other Electric Load - Home Work Charging	GW/h				User-specified load profiles should be input in the "Custom Profile" tab
Building Electrification	GW/h				should be entered as negative values.
Energy Efficiency	GW/h				
Active Demand Inputs					
Baseline net energy for load (no BTM PV, EV electrification energy efficiency)	Units				
Electric Vehicle Load - Home Charging Only	GW/h				
Other Electric Load - Home Work Charging	GW/h				
Building Electrification	GW/h				
Energy Efficiency	GW/h				

	2018	2022	2026	2030	Notes
Capacity Inputs (MW)					
Battery Storage	Storage				Assumes 4 hr battery storage duration
Pumped Storage	Storage				Assumes at least 1.2 hr pumped storage duration
Large Hydro	Large Hydro				Perfect capacity - 100% CF
Nuclear	Nuclear				Assumes average dispatch based on RESOLVE
Wind	Wind				EL2020 wind locations in CAISO
Solar	Solar				EL2020 solar locations in CAISO
Contracted NW Wind	Wind				EL2020 wind located in NW and delivered to CAISO
Northern California Wind	Wind				EL2020 wind located in NW and delivered to CAISO
Southern California Wind	Wind				
Central Valley Wind	Wind				
Imperial Valley Wind	Wind				
Greater Imperial Wind	Wind				
Imperial Valley Wind	Wind				
Par. for Northwest Wind	Wind				
NW_Ext_TX_Wind	Wind				
Idaho Wind	Wind				
Utah Wind	Wind				
Western Wind	Wind				
Southern Nevada Northwest Arizona Wind	Wind				
Arizona Wind	Wind				
New Mexico Wind	Wind				
SW_Ext_TX_Wind	Wind				
CAISO Solar for CAISO	Solar				Derive from demand inputs, grossed up for TBD losses, DO NOT EDIT
SW_Solar_for_CAISO	Solar				EL2020 solar located in CAISO
IB_Solar_for_CAISO	Solar				EL2020 solar located in SW and delivered to CAISO
Northern California Solar	Solar				EL2020 solar located in ID and delivered to CAISO
Central Valley Solar	Solar				
Westlands Solar	Solar				
Greater Carrizo Solar	Solar				
Tehachapi Solar	Solar				
Kramer-Inyo Kern Solar	Solar				
Imperial Valley Solar	Solar				
Southern California Desert Solar	Solar				
Riverside, East Palm Springs Solar	Solar				
Greater Imperial Solar	Solar				
Baja California Solar	Solar				
Imperial Valley Solar	Solar				
Arizona Solar	Solar				
New Mexico Solar	Solar				
Geothermal	Geothermal				Perfect capacity - 100% CF
Biomass	Biomass				Perfect capacity - 100% CF
Small Hydro	Small Hydro				Perfect capacity - 100% CF

FIRST ALTERNATIVE PORTFOLIO

Cell Color Scheme
Yellow cells are inputs that can be changed by the user (only in the Dashboard and Custom Profiles tabs)
Orange cells contain drop-down menus that show the original custom values
Green cells are final outputs

Tab Color Scheme
Light Orange tabs are where the user inputs values and views results
Grey tabs contain E-Specific data from the 2027 EPR that the user should input into the "EPR Manager Retail Sales Forecast" cell on the Dashboard
Yellow tabs are read-only tabs that contain inputs and calculations

RESULTS

Inputs
Input values (if low cell) show here are pre-calculated. Users should replace **0** inputs with values specific to their system.
Inputs and results are in \$/MWh for the 2018 - 2022 and 2030 modeling years. Any intermediate years should be interpolated outside of this tool.

Metric	Unit	2018	2022	2026	2030	Notes
Owned or contracted non-dispatchable GHG-emitting resources	MWh	0	0	0	0	Perfect capacity - 100% CF, Cogeneration
Emission factor - Owned or contracted non-dispatchable GHG-emitting resources	CO2/MWh	0.35	0.35	0.35	0.35	For multiple resources, input weighted average
Fraction of EV owners that can charge at work	%	6%	14%	22%	30%	Values shown are from CHPC BP RESOLVE User Interface

Demand Inputs	Unit	2018	2022	2026	2030	Notes
Assigned Load Forecast for IRP (i.e. Managed Retail Sales Forecast)	GWh	0	0	0	0	Includes effect of BTM PV, AEE, etc.

Default Demand Inputs (Based on sales-weighted share of total from EPR)	Units	2018	2022	2026	2030	Notes
Baseline net energy for load (no BTM PV, EV electrification, energy efficiency)	GWh	0	0	0	0	Grossed up for TBD losses, demand met by BTM PV, CHP excluded
Electric Vehicle Load - Home Work Charging	GWh	0	0	0	0	Grossed up for TBD losses
Other Electrification	GWh	0	0	0	0	Grossed up for TBD losses
Building Electrification	GWh	0	0	0	0	Grossed up for TBD losses
Energy Efficiency	GWh	0	0	0	0	Grossed up for TBD losses

Custom Demand Inputs (OPTIONAL, overrides Assigned Load Forecast for IRP)	Use Custom?	2018	2022	2026	2030	Notes
Baseline net energy for load (no BTM PV, EV electrification, energy efficiency)	No	0	0	0	0	To overwrite set "Use Custom" to "Yes" and input forecast. Custom demand values should be grossed up for TBD losses.
Electric Vehicle Load - Home Charging Only	Yes	0	0	0	0	User-specified load profiles should be input in the "Custom Profiles" tab
Electric Vehicle Load - Home Work Charging	No	0	0	0	0	User-specified load profiles should be input in the "Custom Profiles" tab
Other Electrification	No	0	0	0	0	User-specified load profiles should be input in the "Custom Profiles" tab
Building Electrification	No	0	0	0	0	User-specified load profiles should be input in the "Custom Profiles" tab
Energy Efficiency	No	0	0	0	0	User-specified load profiles should be input in the "Custom Profiles" tab

Active Demand Inputs	Units	2018	2022	2026	2030	Notes
Baseline net energy for load (no BTM PV, EV electrification, energy efficiency)	IEPR	0	0	0	0	IEPR
Electric Vehicle Load - Home Charging Only	Custom	0	0	0	0	Custom
Electric Vehicle Load - Home Work Charging	IEPR	0	0	0	0	IEPR
Other Electrification	IEPR	0	0	0	0	IEPR
Building Electrification	IEPR	0	0	0	0	IEPR
Energy Efficiency	IEPR	0	0	0	0	IEPR

Capacity Inputs (MW)	Unit	2018	2022	2026	2030	Notes
Battery Storage	Storage	0	0	0	0	Assumes 4 hr battery storage duration
Pumped Storage	Storage	0	0	0	0	Assumes at least 12-hr pumped storage duration
Large Hydro	Large Hydro	0	0	0	0	Perfect capacity - 100% CF
Nuclear	Nuclear	0	0	0	0	Assumes average dispatch based on RESOLVE
Wind (All)	Wind	0	0	0	0	Perfect capacity - 100% CF
SW_Wind_for_CAISSO	Wind	0	0	0	0	SW Wind located in CAISO
NW_Wind_for_CAISSO	Wind	0	0	0	0	NW Wind located in CAISO
Central_Valley_North_Los_Banosa_Wind	Wind	0	0	0	0	Central Valley wind located in CAISO
Kramer_Inyofern_Wind	Wind	0	0	0	0	Kramer wind located in CAISO
Riverside_East_Palm_Springs_Wind	Wind	0	0	0	0	Riverside wind located in CAISO
Greater_Imperial_Wind	Wind	0	0	0	0	Greater Imperial wind located in CAISO
Baja_California_Wind	Wind	0	0	0	0	Baja California wind located in NW and delivered to CAISO
Par-fc_Northwest_Wind	Wind	0	0	0	0	Par-fc Northwest wind located in NW and delivered to CAISO
NW_Ext_Tx_Wind	Wind	0	0	0	0	NW Ext Tx Wind
Idaho_Wind	Wind	0	0	0	0	Idaho Wind
Utah_Wind	Wind	0	0	0	0	Utah Wind
Western Wind	Wind	0	0	0	0	Western Wind
Southern Nevada Northwest Arizona Wind	Wind	0	0	0	0	Southern Nevada Northwest Arizona Wind
Arizona_Wind	Wind	0	0	0	0	Arizona Wind
New_Mexico_Wind	Wind	0	0	0	0	New Mexico Wind
SW_Ext_Tx_Wind	Wind	0	0	0	0	SW Ext Tx Wind
CAISO_Solar_for_CAISSO	Solar	0	0	0	0	CAISO Solar for CAISO
SW_Solar_for_CAISSO	Solar	0	0	0	0	SW Solar for CAISO
NW_Solar_for_CAISSO	Solar	0	0	0	0	NW Solar for CAISO
Northern California Solar	Solar	0	0	0	0	Northern California Solar
Central_Valley_North_Los_Banosa_Solar	Solar	0	0	0	0	Central Valley North Los Banosa Solar
Westlands_Solar	Solar	0	0	0	0	Westlands Solar
Greater_Carrio_Solar	Solar	0	0	0	0	Greater Carrio Solar
Tehachapi_Solar	Solar	0	0	0	0	Tehachapi Solar
Kramer_Inyofern_Solar	Solar	0	0	0	0	Kramer Inyofern Solar
Golden State Solar	Solar	0	0	0	0	Golden State Solar
Southern California Desert Solar	Solar	0	0	0	0	Southern California Desert Solar
Riverside_East_Palm_Springs_Solar	Solar	0	0	0	0	Riverside East Palm Springs Solar
Greater_Imperial_Solar	Solar	0	0	0	0	Greater Imperial Solar
Baja_California_Solar	Solar	0	0	0	0	Baja California Solar
Par-fc_Northwest_Solar	Solar	0	0	0	0	Par-fc Northwest Solar
Arizona Solar	Solar	0	0	0	0	Arizona Solar
New_Mexico_Solar	Solar	0	0	0	0	New Mexico Solar
Geothermal	Geothermal	0	0	0	0	Perfect capacity - 100% CF
Biomass	Biomass	0	0	0	0	Perfect capacity - 100% CF
Small Hydro	Small Hydro	0	0	0	0	Perfect capacity - 100% CF

Energy Balance	Unit	2018	2022	2026	2030	Notes
Energy for Load (excluding BTM PV)	GWh	0	0	0	0	Includes over-supply
Owned or contracted non-dispatchable GHG-emitting resources	GWh	0	0	0	0	Due to storage losses and subhourly reserves
Large Hydro	GWh	0	0	0	0	
Nuclear	GWh	0	0	0	0	
Renewable Generation (including BTM PV)	GWh	0	0	0	0	
User-specified GHG-free Power	GWh	0	0	0	0	
Storage Energy Imbalance	GWh	0	0	0	0	
Clean Net Short	GWh	0	0	0	0	

Emission	Unit	2018	2022	2026	2030	Notes
GHG Emissions	MMTCO2/yr	0	0	0	0	Includes over-supply emissions credits
Total GHG Emissions	MMTCO2/yr	0	0	0	0	Scaled to LSE load ratio share, within CAISO
Total	MMTCO2/yr	0	0	0	0	
Average emission intensity	CO2/MWh	0.2776	0.2210	0.2035	0.1512	

Over-supply	Unit	2018	2022	2026	2030	Notes
Over-supply	MMTCO2/yr	0	0	0	0	Occurs when hourly supply exceeds hourly load

Capacity/Peak	Unit	2018	2022	2026	2030	Notes
Capacity	MW	0	0	0	0	Peak of hourly load profile - not a 1.0 peak
Large Hydro	MW	0	0	0	0	
Nuclear	MW	0	0	0	0	
Renewables	MW	0	0	0	0	
Storage	MW	0	0	0	0	
Maximum Clean Net Short	MW	0	0	0	0	

SECOND ALTERNATIVE PORTFOLIO

Cell Color Scheme
 Yellow cells are inputs that can be changed by the user (only in the Dashboard and Custom Profiles tabs)
 Orange cells contain drop-down menus that allow the user to select a custom value
 Green cells are final outputs

Tab Color Scheme
 Light Orange tabs are where the user inputs values and views results
 Grey tabs contains specific data from the 2027 ERP that the user should input into the "ERP Manager Retail Sales Forecast" cells on the Dashboard
 Yellow tabs are read-only tabs that contain inputs and calculations

RESULTS

Metric	Unit	2018	2022	2026	2030 Notes
Energy Balance	MWh	-	-	-	-
Owned or contracted non-dispatchable GHG-emitting resources	MMtCO ₂ /yr	0.35	0.35	0.35	-
Large Hydro	MWh	-	-	-	-
Renewable Generation (including BTM PV)	MWh	0.03	0.35	0.35	-
User-specified GHG-free Power	MMtCO ₂ /yr	-	-	-	-
Storage Energy Imbalance	MMtCO ₂ /yr	-	-	-	-
Clean Net Short	MMtCO ₂ /yr	-	-	-	-
Facilities					
Clean Net Short	MMtCO ₂ /yr	-	-	-	-
Owned or contracted non-dispatchable GHG-emitting resources	MMtCO ₂ /yr	-	-	-	-
Emissions offset for MW hydroelectric imports	MMtCO ₂ /yr	-	-	-	-
Total	MMtCO ₂ /yr	0.27%	0.22%	0.26%	0.14%
Capacity / Peak					
Average emission intensity	MMtCO ₂ /MWh	0.27%	0.22%	0.26%	0.14%
Capacity / Peak	MW	-	-	-	-
Owned or contracted non-dispatchable GHG-emitting resources	MW	-	-	-	-
Large Hydro	MW	-	-	-	-
Nuclear	MW	-	-	-	-
Total Baseload Renewables	MW	-	-	-	-
User-specified GHG-free Power	MW	-	-	-	-
Energy Storage	MW	-	-	-	-
Maximum Clean Net Short	MW	-	-	-	-

Inputs:
 Input values (in low cells) show here are p.e.e.e.e.e. Users should replace inputs with values specific to their system.
 Inputs and results are in for the 2018 - 2022 - 2026 - 2030 and 2030 modeling years. Any intermediate years should be interpolated outside of this tool.

INPUTS

Metric	Unit	2018	2022	2026	2030 Notes
Demand Inputs	MWh	-	-	-	-
Assigned Load Forecast for ERP (i.e. Managed Retail Sales Forecast)	MMtCO ₂ /yr	-	-	-	-
Default Demand Inputs (Based on sales-weighted share of total from ERP)					
Baseline net energy for load (no BTM PV, EV electrification, energy efficiency)	MWh	-	-	-	-
Electric Vehicle Load - Home Charging	MWh	-	-	-	-
Other Electric Load - Home Work Charging	MWh	-	-	-	-
Building Electrification	MWh	-	-	-	-
Energy Efficiency	MWh	-	-	-	-
Custom Demand Inputs (OPTIONAL, otherwise Assigned Load Forecast for ERP) Use Custom?	MWh	-	-	-	-
Baseline net energy for load (no BTM PV, EV electrification, energy efficiency)	MWh	-	-	-	-
Electric Vehicle Load - Home Charging Only	MWh	-	-	-	-
Other Electric Load - Home Work Charging	MWh	-	-	-	-
Building Electrification	MWh	-	-	-	-
Energy Efficiency	MWh	-	-	-	-
Active Demand Inputs	MWh	-	-	-	-
Baseline net energy for load (no BTM PV, EV electrification, energy efficiency)	MWh	-	-	-	-
Electric Vehicle Load - Home Charging Only	MWh	-	-	-	-
Other Electric Load - Home Work Charging	MWh	-	-	-	-
Building Electrification	MWh	-	-	-	-
Energy Efficiency	MWh	-	-	-	-

Capacity Inputs (MW)	Unit	2018	2022	2026	2030 Notes
Storage	MWh	-	-	-	-
Pumped Storage	MWh	-	-	-	-
Large Hydro	MWh	-	-	-	-
Nuclear	MWh	-	-	-	-
WGS Wind - for CAISO	MWh	-	-	-	-
SW Wind - for CAISO	MWh	-	-	-	-
Contracted MW Wind	MWh	-	-	-	-
Northern California Wind	MWh	-	-	-	-
Solano Wind	MWh	-	-	-	-
Central Valley North_Los_Banios_Wind	MWh	-	-	-	-
Central Valley South_Wind	MWh	-	-	-	-
Yuba Wind	MWh	-	-	-	-
Kramer, Inyo Kern Wind	MWh	-	-	-	-
Southern California_Desert Wind	MWh	-	-	-	-
Riverside_East_Palm_Springs_Wind	MWh	-	-	-	-
Greater Imperial Wind	MWh	-	-	-	-
Central Valley_Baja California Wind	MWh	-	-	-	-
Par. for Northwest Wind	MWh	-	-	-	-
MW_Ex_Tx_Wind	MWh	-	-	-	-
Idaho_Wind	MWh	-	-	-	-
W. Wind	MWh	-	-	-	-
Southern Nevada Northwest Arizona Wind	MWh	-	-	-	-
Arizona_Wind	MWh	-	-	-	-
New Mexico_Wind	MWh	-	-	-	-
SW_Ex_Tx_Wind_PV	MWh	-	-	-	-
CAISO Solar for CAISO	MWh	-	-	-	-
SW_Solar_for_CAISO	MWh	-	-	-	-
IB_Solar_for_CAISO	MWh	-	-	-	-
Northern California Solar	MWh	-	-	-	-
Central Valley Solar	MWh	-	-	-	-
Central Valley_North_Los_Banios_Solar	MWh	-	-	-	-
Westlands Solar	MWh	-	-	-	-
Greater Carrizo Solar	MWh	-	-	-	-
Teahapai Solar	MWh	-	-	-	-
Kramer_Inyo Kern Solar	MWh	-	-	-	-
Central Valley_Baja California Solar	MWh	-	-	-	-
Southern California_Desert Solar	MWh	-	-	-	-
Riverside_East_Palm_Springs_Solar	MWh	-	-	-	-
Greater Imperial Solar	MWh	-	-	-	-
Baja California_Solar	MWh	-	-	-	-
Par. for Northwest Solar	MWh	-	-	-	-
Arizona Solar	MWh	-	-	-	-
New Mexico Solar	MWh	-	-	-	-
Geothermal	MWh	-	-	-	-
Biomas	MWh	-	-	-	-
Small Hydro	MWh	-	-	-	-

Capacity Inputs (MW):
 Assumes a 4-hr battery storage duration
 Assumes at least 12-hr pumped storage duration
 Assumes average dispatch based on RESOLVE
 Perfect capacity - 100% CF
 EX.B001 wind located in CAISO
 EX.B002 wind located in CAISO
 EX.B003 solar located in SW and del. to CAISO
 EX.B004 solar located in ID and delivered to CAISO

Capacity Inputs (MW):
 Perfect capacity - 100% CF
 Perfect capacity - 100% CF



EDF Industrial Power Services (CA), LLC

Yellow fills indicate confidentiality is being requested pursuant to Appendix A.
 2018 MW numbers are illustrative.

Where cell specifies more than one datum separate data with a semicolon.

Bold font cells sum automatically. Data input by User are in dark green font.

line	Capacity Resource Accounting Table (MW)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	PEAK LOAD CALCULATIONS	(↓ Prior Forecasts ↓)		(Forecast Supply ⇒)													
1	Forecast Total Peak-Hour 1-in-2 Demand																
2a	ESP Demand Existing Customer Contracts																
2b	ESP Demand New and Renewed Contracts																
2c	ESP Demand in PG&E service area																
2d	ESP Demand in SCE service area																
2e	ESP Demand in SDG&E service area																
3	Additional Achievable Energy Efficiency (-)																
4	Demand Response / Interruptible Programs (-)																
5	Adjusted Demand: End-Use Customers	0	0	0													
6	Coincidence Adjustment (-)																
7	Coincident Peak-Hour Demand	0	0	0													
8	Required Planning Reserve Margin	0	0	0													
9	Credit for Imports That Carry Reserves (-)																
10	Firm Sales Obligations																
11	Firm LSE Procurement Requirement	0	0	0													

line	Capacity Resource Accounting Table (MW)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	CAPACITY SUPPLY RESOURCES																
12a	Total Fossil Fuel Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12b	[state fuel then list each resource e.g. Fossil Unit 1]																
12c	[state fuel; then list each resource, e.g. Natural Gas; Fossil Unit 2]																
12d	[state fuel; then list each resource, e.g. Natural Gas; Fossil Unit N; list planned resources last]																
13a	Total Nuclear Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13b	[Nuclear Unit 1]																
13c	[Nuclear Unit 2]																
14a	Total Hydroelectric Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14b	Total Hydro Supply from Plants larger than 30 MW																
14c	Total Hydro Supply from Plants 30 MW or less																
15a	Total Utility-Controlled Renewable Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15b	[state fuel then list each resource e.g. Renewable Plant 1]																
15c	[state fuel; then list each resource, e.g. Geothermal Renewable Project 2]																
15d	[state fuel; then list each resource, Wind Renewable Project N; list planned resources last]																
17a	Total Qualifying Facility (QF) Contract Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17b	Biofuels																
17c	Geothermal																
17d	Small Hydro																
17e	Solar																
17f	Wind																
17g	Natural Gas																
17h	Other																
18a	Total Renewable Contract Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18b	Renewable DG Supply																
18c	[state fuel then Renewable Contract 1 (Supplier Name)]																
18d	[Small Hydro; then Renewable Contract 2 (Supplier Name)]																
18e	[Solar then Renewable Contract N list planned resources																
19a	Total Other Bilateral Contract Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19b	Non-Renewable DG Supply																
19c	Solar (RA Contract)																
19d	QF Natural Gas (RA Contract)																
19e	Other (Forecast RA Contracts)																
19f	[System Other Bilateral Contract N (Supplier Name)]																
19n	Planned Resources list each on lines inserted below this line.																
20	Short-Term and Spot Market Purchases (and Sales)																

line	CAPACITY BALANCE SUMMARY	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
21	Total: Existing and Planned Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Firm LSE Procurement Requirement	0	0	0													
23	Net Surplus (or Need)	0	0	0													
24	Generic Renewable Supply																
25	Generic Non-Renewable Resources																
26	Specified Planning Reserve Margin				15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%

line	Historic LSE Peak Load:	MW Year 2015	MW Year 2016
27	Annual Peak Load / Actual Metered Deliveries		
28	Date of Peak Load for Annual Peak Deliveries	/15	/16
29	Hour Ending (HE) for Annual Peak Deliveries		
30	Interruptible Load called on during that hour (+)		
31	Self-Generation and DG Adjustments		
32	Adjustments for Major Outages		
33	Adjusted Annual Peak Load	0.0	0.0

Lines	Notes
x	
x	



EDF Industrial Power Services (CA), LLC

Yellow fills indicate confidentiality is being requested pursuant to Appendix A.
 2018 GWh numbers are illustrative.

Where cell specifies more than one datum separate data with a semicolon.

Bold font cells sum automatically. Data input by User are in dark green font.

line	Energy Balance Table (GWh)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	ENERGY DEMAND CALCULATIONS	(↓ Actual Supply ↓)		(Forecast Supply ⇒)													
1	Forecast Total Energy Demand / Consumption																
2a	ESP Demand Existing Customer Contracts																
2b	ESP Demand New and Renewed Contracts																
2c	ESP Demand in PG&E service area																
2d	ESP Demand in SCE service area																
2e	ESP Demand in SDG&E service area																
3	Additional Achievable Energy Efficiency (-)																
4	Demand Response/ Interruptible Programs (-)																
5	Adjusted Demand: End-Use Customers																
6	Coincidence Adjustment [does not apply to S-2 form]																
7	Coincident Peak-Hour Demand [does not apply to S-2]																
8	Required Planning Reserve [does not apply to S-2]																
9	Credit for Imports That Carry Reserves [does not apply]																
10	Firm Sales Obligations																
11	Firm LSE Procurement Requirement	0	0	0													
	ENERGY SUPPLY RESOURCES																
12a	Total Fossil Fuel Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12b	[state fuel then list each resource e.g. Fossil Unit 1]																
12c	[state fuel then list each resource e.g. Natural Gas Fossil																
12d	[state fuel; then list each resource, e.g. Natural Gas; Fossil Unit N; list planned resources last]																
13a	Total Nuclear Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13b	[Nuclear Unit 1]																
13c	[Nuclear Unit 2]																
14a	Total Hydroelectric Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14b	Total Hydro Supply from Plants larger than 30 MW																
14c	Total Hydro Supply from Plants 30 MW or less																
line	Energy Balance Table (GWh)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
15a	Total Utility-Controlled Renewable Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15b	[state fuel then list each resource e.g. Renewable Plant 1]																
15c	[state fuel; then list each resource, e.g. Geothermal Renewable Project 2]																
15d	[state fuel; then list each resource, Wind Renewable Project N; list planned resources last]																
17a	Total Qualifying Facility (QF) Contract Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17b	Biofuels																
17c	Geothermal																
17d	Small Hydro																
17e	Solar																
17f	Wind																
17g	Natural Gas																
17h	Other																
18a	Total Renewable Contract Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18b	Renewable DG Supply																
18c	[state fuel; then Renewable Contract 1 (Supplier Name)]																
18d	[Small Hydro; then Renewable Contract 2 (Supplier Name)]																
18e	[Solar then Renewable Contract N list planned resources																
19a	Total Other Bilateral Contract Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19b	Non-Renewable DG Supply																
19c	[state fuel if known; then name Other Bilateral Contract 1 (Supplier Name)]																
19d	[state fuel then list each resource e.g. Natural Gas Other																
19e	[Portfolio Other Bilateral Contract 3 (Supplier Name)]																
19f	[System Other Bilateral Contract N (Supplier Name)]																
19g	Planned Resources list each on lines inserted below this line.																
20	Short Term and Spot Market Purchases (and Sales)																
	ENERGY BALANCE SUMMARY																
21	Total: Existing and Planned Resources	0	0	0													
22	Firm LSE Procurement Requirement	0	0	0													
23	Net Surplus (or Need)																
24	Generic Renewable Supply																
25	Generic Non-Renewable Supply																

line	Notes
x	
x	



**ANNUAL REPORT TO THE CALIFORNIA ENERGY COMMISSION:
 Power Source Disclosure Program
 Schedule 1 and 2, applicable to: Load Serving Entities
 For the Year Ending December 31, 2017**

Load serving entities are required to use the posted template and are not allowed to make edits to this format.
 Please fill out the company name and contact information.

GENERAL INSTRUCTIONS

COMPANY NAME	
	EDF Industrial Power Services (CA), LLC
PRODUCT NAME (If Multiple Products Offered)	
CONTACT INFORMATION	
Name	Byron Pollard
Title	Vice President
Mailing Address	4700 W Sam Houston Parkway North Suite 250
City, State, Zip	Houston, Texas 77041
Phone	(281) 653-1641
E-mail	Byron.Pollard@EDFEnergyServices.com
Website for PCL Posting	http://www.edfenergyservices.com/

Please fill out the schedules that apply to your company's filing requirements. Provide the annual report and attestation together in PDF format and the annual report in an excel file by email to PSDprogram@energy.ca.gov. Remember to fill in the company name above, submit separate reports and attestations for each additional product if multiple electric service products are offered. Report procurements in MWh (not kWh).

NOTE: Information submitted in this report is not automatically held confidential. If your company wishes the information submitted to be considered confidential an authorized representative must submit an application for confidential designation (CEC-13), which can be found on the California Energy Commissions's website at http://www.energy.ca.gov/commission/chief_counsel/documents/CEC13.pdf

If you have questions, contact PSD staff at PSDprogram@energy.ca.gov or (916) 653-6222.



ANNUAL REPORT TO THE CALIFORNIA ENERGY COMMISSION: Power Source Disclosure Program
For the Year Ending December 31, 2017
SCHEDULE 1: POWER PROCUREMENTS AND RETAIL SALES
Applicable to: Load Serving Entities

INSTRUCTIONS: Enter information about power procurements supporting all electricity products for which your company is filing the Annual Report. If you need additional rows, add them from the INSERT menu. Please list all purchases (Specified and Unspecified purchases) as line items under the Facility Name heading. If a procurement was for unbundled RECs include the term "REC Only" in parentheses after the facility name in the Facility Name column, and categorize the power as the fuel type of the generating facility from which the unbundled REC was derived. If procured power was from a transaction that expressly transferred energy only and not the RECs associated with that energy, identify the power as "Unspecified Power" in the Fuel Type column.

ALL PROCUREMENTS (Specified and Unspecified)												
Facility Name	Unit No.	Fuel Type	Location (State or Province)	RPS ID	WREGIS GU ID	EIA ID	FERC QF ID	Gross MWh Procured	MWh Resold or Self-Consumed	Net MWh Procured		
CAISO Markets	N/A	Unspecified	N/A	N/A	N/A							
AV Solar Ranch 1, LLC - Antelope Solar Ranch - Block 7	N/A	Solar	CA	60790	W3474							
AV Solar Ranch 1, LLC - AVSR1 - Antelope Solar Ranch - Block 1 & 2	N/A	Solar	CA	60790	W4141							
AV Solar Ranch 1, LLC - AVSR1 - Antelope Solar Ranch - Block 3	N/A	Solar	CA	60790	W2803							
AV Solar Ranch 1, LLC - AVSR1 - Antelope Solar Ranch - Block 4	N/A	Solar	CA	60790	W3274							
AV Solar Ranch 1, LLC - AVSR1 - Antelope Solar Ranch - Block 5	N/A	Solar	CA	60790	W3275							
AV Solar Ranch 1, LLC - AVSR1 - Antelope Solar Ranch - Block 6	N/A	Solar	CA	60790	W3280							
Geysers Power Plant - Calistoga Power Plant	N/A	Geothermal	CA	60117	W486							
Geysers Power Plant - Calpine Geothermal Unit 18	N/A	Geothermal	CA	60008	W125							
Geysers Power Plant - Calpine Geothermal Unit 20	N/A	Geothermal	CA	60009	W126							
Cassia Gulch Wind Park - Cassia Gulch Wind Park LLC (REC Only)	N/A	Wind	ID	60942	W823							
Cassia Wind Farm - Cassia Wind Farm LLC (REC Only)	N/A	Wind	ID	60943	W822							
Geysers Power Plant - Sonoma/Calpine Geysers	N/A	Geothermal	CA	60010	W127							
Spanish Fork Wind Park - Spanish Fork Wind (REC Only)	N/A	Wind	UT	63434	W1021							

Total Net Purchases

Total Retail Sales



**ANNUAL REPORT TO THE CALIFORNIA ENERGY COMMISSION:
Power Source Disclosure Program
For the Year Ending December 31, 2017
SCHEDULE 2: ANNUAL POWER CONTENT LABEL CALCULATION
Applicable to: Load Serving Entities**

INSTRUCTIONS: Total specific purchases (by fuel type) and enter these numbers in the first column. Null power purchases should be included with Unspecified Power. REC only purchases should be included as part of the fuel type they represent. Total retail sales information from Schedule 1 will autopopulate on this schedule. Any difference between total net purchases and total retail sales will be applied pro-rata to each non-renewable fuel type. Each fuel type total will then be divided by retail sales to calculate fuel mix percentages.

	Net Purchases (MWh)	Percent of Total Retail Sales (MWh)
Specific Purchases		
Renewable		30%
Biomass & Biowaste		0%
Geothermal		17%
Eligible hydroelectric		0%
Solar		9%
Wind		4%
Coal		0%
Large Hydroelectric		0%
Natural Gas		0%
Nuclear		0%
Other		0%
Total Specific Purchases		30%
Unspecified Power (MWh)		70%
Total		100%
Total Retail Sales (MWh)		

COMMENTS:



**ANNUAL REPORT TO THE CALIFORNIA ENERGY COMMISSION:
Power Source Disclosure Program
For the Year Ending December 31, 2017
ATTESTATION FORM
Applicable to: All participants in the Power Source Disclosure Program**

I, Gregory Klatt, Attorney-at-Law, declare under penalty of perjury, that the statements contained in Schedules 1 and 2 are true and correct and that I, as an authorized agent of EDF Industrial Power Services (CA), LLC, have authority to submit this report on the company's behalf. I further declare that the megawatt-hours claimed as specific purchases as shown in these Schedules were, to the best of my knowledge, sold once and only once to retail consumers.

Signed:

A handwritten signature in black ink, appearing to read "Gregory Klatt", written over a light blue horizontal line.

Dated: June 1, 2018

Executed at: Arcadia, CA

VERIFICATION

I, Gerald Nemec, am an officer of EDF Industrial Power Services (CA), LLC, and I am authorized to make this verification on its behalf. I have read the foregoing 2018 Integrated Resource Plan, including all attachments thereto, and affirm the contents thereof are true of my own knowledge, except as to matters which are therein stated on information and belief, and as to those matters I believe them to be true. I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 1, 2018, at Houston, Texas.



Gerald Nemec
General Counsel