

Turlock Irrigation District

**California Energy Commission
2011 Integrated Energy Policy Report**

**Electricity Demand Forecast Forms
Form 4 and Form 5**

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4. DEMAND FORECAST METHODS

In order to forecast load, Turlock Irrigation District (TID) separates its customers into the following segments:

Residential (Rate Class DE)

DE ~ Domestic and Farm Service

This schedule applies to: (1) Domestic service use including lighting, heating, air conditioning, cooking and appliances where a single meter serves a single family dwelling; (2) apartments and multifamily dwelling units where each unit is individually metered by the District; (3) noncommercial or farm uses (except dairy milk barns, poultry houses, and similar type farm uses) with a total connected load of 20 kW or less, where such service is provided in conjunction with a residence on the same property; and (4) where a single meter serves noncommercial or farm uses (except dairy milk barns, poultry houses, and similar type farm uses) on the same property as the residence with a total connected load of 20 kW or less.

Commercial (Rate Classes CE, CT)

CE ~ Commercial Service Energy, Energy under 35 kW

This schedule applies to general power use with a demand of less than 35 kW for the following: (1) commercial and industrial customers for general power use and (2) other services where other Rate Schedules do not apply. This schedule is applicable on an annual basis only.

CT ~ Commercial Service Time of Use under 35 kW

This optional schedule applies to general power use with a demand of less than 35 kW for the following: (1) commercial and industrial customers for general power use and (2) other services where other Rate Schedules do not apply. This schedule is applicable on an annual basis only.

Industrial (Rate Classes ID, IT, HT, XT, BP)

ID ~ Small Industrial Service, Demand 35 to 499 kW

This schedule applies to: 1) commercial and industrial customers for general power use with a demand of 35 kW to 499 kW, and 2) other services where other Rate Schedules do not apply. This schedule is applicable on an annual basis only.

IT ~ Small Industrial Service, Time of Use, 35 to 499 kW

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This optional schedule is available to: 1) commercial and industrial customers for general power use with demand of 35 kW to 499 kW, and 2) other services where other Rate Schedules do not apply. This schedule is applicable on an annual basis only.

HT ~ Large Industrial, Demand Metered 500 to 2,999 kW, Time of Use

This schedule applies to: 1) commercial and industrial customers for general power use with a demand of 500 to 2,999 kW and over, and 2) services where other Rate Schedules do not apply. This schedule is applicable on an annual basis only.

XT ~ Very Large Industrial, Demand Metered, 3,000 to 6,999 kW, Time of Use

This schedule applies to: 1) commercial and industrial customers for general power use with a demand of 3,000 to 6,999 kW, and 2) services where other Rate Schedules do not apply. This schedule is applicable on an annual basis only.

BP ~ Bulk Power Industrial, Demand Metered, 7,000 kW and over, Time of Use

This schedule applies to: 1) commercial and industrial customers for general power use with a demand of 7,000 kW and over, and 2) services where other Rate Schedules do not apply. This schedule is applicable on an annual basis only.

Agricultural (Rate Classes FO, FX, FE, FC, FD, FT, PI, PT)

FO ~ Farm Service, Irrigation Pumping (This schedule is closed to new accounts)

This schedule applies to: 1) pumping of subsurface water for drainage or irrigation which is not eligible to be served with electricity sold to the District by the City and County of San Francisco pursuant to Section 9(l) of the Federal Raker Act; or 2) pumping from natural waterways or District facilities. This schedule is applicable on an annual basis only.

FX ~ Farm Service, Irrigation Pumping, Time of Use (This schedule is closed to new accounts)

This schedule applies to: 1) pumping of subsurface water for drainage or irrigation which is not eligible to be served with electricity sold to the District by the City and County of San Francisco pursuant to Section 9(l) of the Federal Raker Act; or 2) pumping from natural waterways or District facilities. This schedule is applicable on an annual basis only.

FE ~ Farm Service – Energy

This schedule applies to farm service where agricultural end-uses include growing crops, raising livestock, other related farm uses, or pumping water for agricultural and public utility purposes not eligible for Rate Schedule PI. This schedule is not applicable to agricultural processing operations or other uses that change the form of the product. This schedule is applicable on an annual basis only.

FC ~ Farm Service – Connected Load

This schedule applies to farm service where agricultural end-uses include growing crops, raising livestock, other related farm uses, or pumping water for agricultural and public utility purposes not eligible for Rate Schedule PI. This schedule is not applicable to agricultural processing operations or other uses that change the form of the product. This schedule is applicable on an annual basis only.

FD ~ Farm Service – Demand

This schedule applies to farm service where agricultural end-uses include growing

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crops, raising livestock, other related farm uses, or pumping water for agricultural and public utility purpose not eligible for Rate Schedule PI. This schedule is not applicable to agricultural processing operations or other uses that change the form of the product. This schedule is applicable on an annual basis only.

FT ~ Farm Service – Time of Use

This schedule applies to farm service where agricultural end-uses include growing crops, raising livestock, other related farm uses, or pumping water for agricultural and public utility purposes not eligible for Rate Schedule PT. This schedule is not applicable to agricultural processing operations or other uses that change the form of the product. This schedule is applicable on an annual basis only.

PI ~ Restricted Irrigation Pumping

This schedule is applicable and restricted to pumping of ground water for drainage or irrigation for the purpose of Agricultural/Livestock Production within the irrigation service area boundary where such pumping is eligible to be served with electricity sold to the District by the City and County of San Francisco pursuant to Section 9(l) of the federal Raker Act. This schedule is applicable on an annual basis only.

PT ~ Restricted Irrigation Pumping, Time of Use

This schedule is applicable and restricted to pumping of ground water for drainage or irrigation for the purpose of Agricultural/Livestock Production within the irrigation service area boundary where such pumping is eligible to be served with electricity sold to the District by the City and County of San Francisco pursuant to Section 9(l) of the federal Raker Act. This schedule is applicable on an annual basis only.

Municipal (Rate Classes MC, MD)

MC ~ Municipal Uses, Connected Load, Under 35 of Demand

This schedule is applicable to municipal uses where the demand is less than 35 kW. This schedule is applicable on an annual basis only, unless a customer's demand is determined to equal or exceed 35 kW according to Demand Determination below.

MD ~ Municipal Uses, Demand Metered, 35kW and Over

This schedule is applicable to municipal uses where the demand is 35 kW and over. This schedule is applicable on an annual basis only.

Streetlights (Rate Classes LO, LC, LD)

LO ~ Lighting, Outdoor Area

This schedule is applicable to outdoor area lighting service for the illumination of areas where the District furnishes, installs, owns, operates and maintains the complete lighting installation.

LC ~ Street Lighting, Customer Owned

This schedule is applicable to lighting service for the illumination of public streets, alleys, highways and other publicly-dedicated outdoor places and is available to cities, counties, lighting districts or other public bodies where the District supplies electrical energy only, and the customer furnishes, installs, owns, operates and completely maintains lighting units including switching and all other

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associated equipment.

LD ~ Street Lighting, District Owned

This schedule is applicable to lighting service for the illumination of public streets, alleys, highways and other publicly-dedicated outdoor places where Schedule LC does not apply and is available to cities, counties, lighting districts or other public bodies where the District furnishes, installs, owns, operates and maintains the complete lighting installation.

Interdepartmental (Rate Classes NM, Interdepartmental)

NM ~ Flat Rate Service

Applicable to small, constant, non-metered incidental loads for utilities, state agencies, and applicable special districts where the customer owns and maintains the equipment. Such loads would include:

- Cathodic Protection Stations
- Motor Radial Gates
- Pressure Point Automatic Watering Systems
- Traffic Counters
- Flashing Beacons
- Sign Illumination

Interdepartmental ~ TID Electrical Usage

Following is a discussion of how the load forecast is derived for each of these segments.

The forecasts are based on linear and exponential regressions, with a few exceptions in segments where known facts indicate that future growth does not coincide with a regression calculation.

Residential (Rate Class DE)

Customers

Linear and exponential regressions are calculated using the variables Population, Personal Income, Income Per Capita, and Historical Number of Customers. Linear and exponential regressions are also calculated using the log of the variables. The R squared values of the regressions performed are compared and the results with the highest R squared value are chosen. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

Energy

The average use per customer during the previous 3 years is calculated and is multiplied by the forecasted annual number of Residential customers to forecast Residential energy use. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

Commercial (Rate Class CE, CT)

Customers

Linear and exponential regressions are calculated using the variables Total Employment, and Historical Total Number of Customers. Linear and

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exponential regressions are also calculated using the log of the variables. The R squared values of the regressions performed are compared and the results with the highest R squared value are chosen. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

Energy

Linear and exponential regressions are calculated using the variables Natural Gas Price, Commercial Electricity Price, Number of Customers and Historical Annual Energy Use. Linear and exponential regressions are also calculated using the log of the variables. The R squared values of the regressions performed are compared and the results with the highest R squared value are chosen. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

Industrial (Rate Class ID, IT, HT, XT, BP)

Customers

Linear and exponential regressions are calculated using the variables Total Employment, and Historical Total Number of Customers. Linear and exponential regressions are also calculated using the log of the variables. The R squared values of the regressions performed are compared and the results with the highest R squared value are chosen. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

Energy

Linear and exponential regressions are calculated using the variables Natural Gas Price, Industrial Electricity Price, Number of Customers, and Historical Annual Energy Use. Linear and exponential regressions are also calculated using the log of the variables. The R squared values of the regressions performed are compared and the results with the highest R squared value are chosen. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

Agricultural (Ag Pumping-Rate Classes FO-FX)

Customers

These rate schedules are closed to new accounts. The previous historical count is carried forward for the term of the forecast.

Energy

These rate schedules are closed to new accounts. The average energy use per customer of the previous three years is averaged and carried forward for the term of the load forecast.

Agricultural (Ag Other-Rate Classes FE, FC, FD, FT)

Customers

Linear and exponential regressions are calculated using the variables Total Population and Historical Total Number of Customers. Linear and exponential regressions are also calculated using the log of the variables.

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The R squared values of the regressions performed are compared and the results with the highest R squared value are chosen. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

Energy

Linear and exponential regressions are calculated using the variables Ag Services Employment, Ag Services Income, Number of Customers and the Historical Annual Energy Use. Linear and exponential regressions are also calculated using the log of the variables. The R squared values of the regressions performed are compared and the results with the highest R squared value are chosen. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

Restricted Pumping (Rate Classes PI, PT)

Customers

TID does not anticipate a significant change in the number of customers in this rate class. The previous historical count is carried forward for the term of the forecast.

Energy

The average energy use per customer previous three years is averaged and carried forward for the term of the forecast.

Municipal (Rate Classes MC, MD)

Customers

Linear and exponential regressions are calculated using the variables Total Population and the Historical Total Number of Customers. Linear and exponential regressions are also calculated using the log of the variables. The R squared values of the regressions performed are compared and the results with the highest R squared value are chosen. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

Energy

Linear and exponential regressions are calculated using the variables Personal Income, Number of Customers, and the Historical Annual Energy Use. Linear and exponential regressions are also calculated using the log of the variables. The R squared values of the regressions performed are compared and the results with the highest R squared value are chosen. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

Streetlights (Rate Classes LO, LC, LD)

Customers

Linear and exponential regressions are calculated using the variables Total Population and Historical Total Number of Customers. Linear and exponential regressions are also calculated using the log of the variables.

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The R squared values of the regressions performed are compared and the results with the highest R squared value are chosen. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

Energy

Linear and exponential regressions are calculated using the variables, Number of Customers and the Historical Annual Energy Use. Linear and exponential regressions are also calculated using the log of the variables. The R squared values of the regressions performed are compared and the results with the highest R squared value are chosen. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

Interdepartmental (Rate Classes NM, Interdepartmental)

Customers

TID does not anticipate a significant change in the number of customers in this rate class. The average historical count of the last several years is carried forward for the term of the load forecast.

Energy

The average energy use per customer of the prior years is averaged and carried forward for the term of the load forecast.

On December 7, 2003, TID began serving an additional 222-square-mile area of western Stanislaus County that was previously served by the Pacific Gas & Electric Co. This acquisition is referred to as the “Westside”.

Westside historical data are insufficient for meaningful regression analysis. Therefore, an annual growth rate for each Westside class (Residential, Commercial, Industrial, Agricultural, Municipal, Streetlights and Flat Rate) is developed using the best available empirical and historical information.

The two forecasts are combined to produce one forecast for the entire TID service territory.

[Estimates of Direct Access, Community Choice Aggregation, and Other Departed Load](#)

Direct Access, Community Choice Aggregation, and Departed Load are not applicable in the TID service area. Hence, the TID load forecast does not include any direct access, community choice aggregation or other departed load.

[Local Private Supply Estimates](#)

The TID load forecast does not include any Local Private Supply Estimates.

[Weather Adjustment Procedures](#)

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The TID load forecast does not include weather adjustment. To develop our 1 in 5 and 1 in 10 cases TID uses a linear regression analysis based on 60 years of historical temperature data taken from the weather station reading at our control center location, Broadway Yard, Turlock.

Forecast Calibration Procedures

The TID load forecast does not include a forecast calibration procedure.

Energy and Peak Loss Estimates

Years 2000 to 2010 in Forms 1.2, 1.3 and 1.4 are actual meter data, and the rest are based on the most recent load forecast adjusted for estimated line losses. The losses are assumed to be 4.6% and are derived from the difference between the energy delivered to Westley Substation and energy received at the retail level. The loss assumptions do not vary by customer class or year.

Economic and Demographic Projections

The Personal Income, Population, and Employment historic/projected demographic data in Form 2.1 are sourced from the report produced by the consulting firm Woods & Poole. Their data is derived from the Bureau of Labor Statistics, the Census Bureau, and the National Income and Product Accounts. The Woods & Poole data used is specific to Stanislaus County. Years 2000 to 2010 Residential, Commercial, and Industrial Electricity pricing is based on actual revenues received and actual retail energy sales. Projections for electricity pricing take the previous year electricity price multiplied by the inflation rate. The results are evaluated in context of the historical data and, if necessary, a smoothing factor is applied.

5. DEMAND – SIDE PROGRAM METHODOLOGY

Efficiency Program Costs and Impacts

The majority of non-residential peak and energy impacts for custom rebates are calculated by an external energy engineering firm. Information given by the customer, industry knowledge along with pre and post measurement and verification work is used to assign the peak and energy savings. The life years assigned to each of the categories is based on the CPUC Energy Efficiency Policy Model.

Residential Rebates

- Whole House Fan ~ KEMA Report
- Room AC ~ KEMA Report
- Clothes Washer ~ KEMA Report
- Shade Screen ~ KEMA Report
- Refrigerator ~ KEMA Report

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Shade Tree ~ KEMA Report
New Construction Rebate – RLW Analytics
Refrigerator Recycling – KEMA Report
CFL Rebate – KEMA Report
Solar Attic Fan – KEMA Report
Radiant Barrier – KEMA Report
HVAC Replacement – E3 Model

[Discuss and document the different funding sources used and how funds are allocated to programs.](#)

Turlock Irrigation District allocates funds to Energy Efficiency Programs from the Public Benefit Fund and if additional funding is needed, it would come from the procurement budget. Funds are allocated in two ways: first, we allocate monies based on the previous year's expenditures; second, we evaluate existing programs to determine if they continue to be of benefit and we review prospective new programs. When warranted, TID adds the new program. TID has always fully funded all energy efficiency programs and has never turned away a customer due to funding limitations.

Our budget is reviewed during our regular budget process. Once the retail revenue is ascertained, we prepare the Public Benefit Budget. The budget total equals 2.85% of our budgeted retail revenue plus any funds left over from the previous year or less any funds spent ahead of schedule in the previous year.

[Demand Response Program Costs and Impacts](#)

TID currently does not have a formal DSM program.

[Renewable and Distributed Generation Program Costs and Impacts](#)

TID offers all of its customers a rebate for the installation of solar photovoltaic systems. This program will continue to evolve and change to meet the guidelines for California's solar electric incentive programs pursuant to Senate Bill 1 as provided by CEC.