RFP # 5595

Technical Specifications
Load, Price, Weather, Wind Forecasting Services

EXHIBIT 3
# CITY OF DENTON

RFP FOR LOAD & PRICE FORECASTING SERVICES FOR THE CITY OF DENTON

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1. INTRODUCTION

This specification describes the requirements for Load, Price, Weather, & Wind Forecasting services to be purchased by The City of Denton for Denton Municipal Electric, (DME). The new system shall be installed in the existing DME Administration Building located at 1659 Spencer Road, Denton, Texas 76205. The installation and commissioning of the new system must be carefully coordinated with DME support staff.

1.1 About DME

Background for the City of Denton and DME can be found in the RFP – Main Document.

1.2 Scope

DME is seeking proven vendors that have commercially available forecasting services for DME and the ERCOT system. DME is not interested in a services that is either “in-development” or unproven.

Functionality for the services includes:

- Load Forecasting
- Price Forecasting
- Meteorological Weather Reporting & Forecasting
- ERCOT Regional/Site-Specific Wind Output Forecasting

1.3 Submissions and Evaluations

The minimum submission requirements are stated in the Main RFP document, Item 3, page 3.

The schedule of events and proposed dates are stated in the Main RFP document, Item 4, page 4.

The evaluation criteria are stated in the Main RFP document, Item 16, page 7, a-c.

The City will conduct an initial evaluation and contact a selected list of proposers for MANDATORY post-submittal presentation/demonstration and trial period of services which will be scheduled between the days of 08/04/2014 through 08/11/2014. Trial services do not need to include City of Denton specific load forecasts, but it is encouraged in order to provide the best insight of usability of the proposed service. The City may not be able to offer any additional dates. In order to be considered, proposers must be available upon the City’s request.
1.4 Prospective Proposers General Responsibilities

The prospective proposers shall assume responsibility for the design, fabrication and startup of the new system. The Vendor's obligations shall include, but not be limited to, the responsibilities in the following list, and those required performing the system functions described in the Specification:

a) Delivery of all Operating System software and application software
b) Integration of all Vendor-supplied hardware and software
c) Provide Training of DME personnel
d) User’s guides, electronic “help” services/assistance, and other documentation.
e) The vendor shall be responsible to provide support and warranty services for the duration of the services contract
f) Support services must include day-time support (Monday through Friday during normal business hours), help desk, problem resolution, and subscription for vendor software patches

1.5 DME General Responsibilities

DME shall supply the following items and services as part of the new service:

a) Windows based desktop computers
b) Meeting room facilities
c) Historical data required to provide City of Denton load forecasts (subject to executed NDA)

1.6 Project Timeline

The project timeline and schedule of events is stated in the Main RFP document, Item 4, page 4.
2. TECHNICAL REQUIREMENTS

This section describes the technical requirements and functionality to be supported by the load forecasting, price forecasting, meteorological weather reporting & forecasting, and wind output forecasting services.

The City requests that all vendors provide access to all services from password protected internet websites that will provide forecasts to City personnel with the capability to sustain multiple users at one time. In order to be considered for evaluation, vendors offering multiple services must give mutually-exclusive, individual pricing for each service (i.e. vendors must not stipulate that one service requires subscription to another service). However, the City does encourage vendors to give alternative pricing where subscription to multiple services can enable an overall discount.

It shall be noted that the proposal shall be judged by its conformance to the functional requirements of this section. Any exceptions, where the proposer cannot perform a requested task, must be listed and detailed by the proposer in Attachment B of the Main RFP.

I. Load Forecasting

1. Short term forecast horizon beginning on the current operating day plus 14 days (15 day forecast)
2. Mid-term forecast horizon beginning on the current operating day plus 364 days (1 year forecast)
3. Forecast regions must include:
   a. City of Denton
   b. ERCOT system-wide
   c. ERCOT regional Load Zones (LZ_HOUSTON, LZ_NORTH, LZ_SOUTH, LZ_WEST)
   d. ERCOT Weather Zones (WZ_COAST, WZ_EAST, WZ_FAR_WEST, WZ_NORTH, WZ_NORTH_CENTRAL, WZ_SOUTH_CENTRAL, WZ_SOUTHERN, WZ_WEST)
   e. Vendor must supply a list of stations/cities used in each forecast
4. Short term load forecasts must be by hour with updates occurring at, but not limited to, the following intervals:
   a. Every hour with previous hour’s actual weather
   b. With every major update of weather forecast service input
   c. When actual load data is uploaded by user
5. Mid-term load forecasts must be by hour (8760-hour forecast) with updates occurring, at a minimum, daily
6. Hourly weather data coinciding with load forecast (and actuals) must be provided
7. System must allow for automated upload/entry of actual load data by user
8. System must allow for automated export/download of historical and forecast data by user.

9. System must allow for interactive access (e.g. web application, Excel interface, etc.) by user to perform, at a minimum, the following tasks:
   a. Short term forecasts
      i. Edit weather inputs to perform customized load forecasts
      ii. Capability to view forecast and historical data in tabular and graphical forms
      iii. Similar day comparison allowing user to view days in history comparable to days in forecasts, where similarity criteria is user defined
      iv. Perform analysis of forecast accuracy
   b. Mid-term forecasts
      i. Edit weather and load based on scenarios for each month of the forecast horizon (e.g. Normal, Below Normal, Above Normal, High Load, Low Load, etc)
      ii. Allow for user to define time period of historical weather actuals to use in simulation (e.g. recent 10 year, 15 year, 30 year, etc)
      iii. Allow for user to specify hourly forecasted temperatures to use in simulation
      iv. If multiple statistical models for simulating weather are available, allow user to select between them

II. Price Forecasting

1. The City is also interested in hourly day-ahead and real-time market price forecasting for each of the tradable ERCOT Hubs and ERCOT Load Zones, as well as ancillary service price forecasting for the ERCOT system.

2. Price forecasting should update when actual load, weather, and pricing data is made available to the system from the ERCOT Market Information System, and coincide with forecasts from the load forecasting system.

3. Interactive tools should be made available to compare forecasted prices to actual prices.

III. Meteorological Weather Reporting & Forecasting

A. Interactive Graphical Weather & Radar Display

   The interactive graphical satellite display functionality should include, at a minimum, the following:
   1. Time-lapse animation of satellite and radar imagery
   2. Scaling ability (zoom in/out, directional movement)
   3. Ability to toggle and display pertinent data in a layered format, including, but not limited to:
      a. Hourly observed temperature
b. Dew point  
c. Wind speed & direction  
d. Storm cells & direction  
e. National Weather Service Watches/Warnings  
f. National Hurricane Center Watches/Warnings  
g. Radar imagery  
h. Satellite imagery  

4. Continuous updates of live satellite and radar 

B. Daily & Hourly Weather Forecasts 

Daily and hourly forecasts shall be updated at least twice daily, once before 0700 Central Prevailing Time and once before 1430 Central Prevailing Time.

A Meteorologist/Forecaster period summary (e.g. 1-5 day, 6-10 day, 11-15 day) is expected at the first forecast update of each business day summarizing changes from the previous period forecast, along with a measure of certainty for the present forecast, and discussion of factors influencing the present forecast.

The hourly 15-day (current day + 14 days) weather forecast should include, at a minimum, the following for each hour:

1. Air temperature (Fahrenheit)  
2. Heat Index/Wind Chill influenced temperature (e.g. how it feels in the current conditions)  
3. Dew Point  
4. Cloud Cover Percentage  
5. Wind Speed  
6. Wind Direction  
7. Precipitation

The daily 15-day weather forecast should include, at a minimum, the following for each day:

1. Max/Min Temperature  
2. Heating/Cooling Degree Days (HDD/CDD)  
3. Probability of Precipitation (POP)

C. 30-Day/90-Day/Seasonal Weather Forecasts 

30-day & 90-day forecasts shall be updated, at a minimum, before the start of each new month, and should be accompanied with meteorologist discussion of changes from
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previous forecast, certainty of present forecast, and factors influencing the current forecast.

30-day forecasts should show expected deviation from the current 30-year normal for temperature and precipitation for the current month + 2 months (i.e. July forecast should be for July, August, and September).

90-day forecasts should show expected deviation from the current 30-year normal for temperature and precipitation for the current month’s 90-days, and the next month’s 90-days (i.e. the July forecast should be for Jul-Sep and Aug-Oct).

D. Tropical Storm Forecasts

Tropical storm forecasts should cover the Atlantic Basin, including the Gulf of Mexico. 1-3 day and 4-7 day graphical storm tracking and outlooks are expected, along with meteorologist commentary. Tropical precipitation and wind forecasts are also expected for this region.

E. Export Forecast Data

All daily and hourly forecast data should be able to be exported in *.csv format.

F. Export Historical Data

Users should be able to query and export historical daily and hourly data in *.csv format.

Daily data should be updated daily with the previous day’s data, and should have at least 50 years of data accessible by the user. Daily data should include:

1. Observed minimum/maximum/average temperatures
2. Observed precipitation
3. Observed HDD/CDD
4. Average minimum/maximum/average temperatures
5. Average HDD/CDD

Hourly data should be updated daily with the previous day’s data, and should have at least 20 years of data accessible by the user. Hourly data should include:

1. Observed temperature
2. Observed dew point
3. Observed wind chill
4. Observed heat index
5. Observed wind speed
6. Observed wind direction
7. Observed relative humidity
8. Observed cloud cover
9. Observed precipitation

IV. **ERCOT Regional/Site-Specific Wind Output Forecasts**

The City is also interested in wind output forecasts for the ERCOT North/West, ERCOT South/Houston, and ERCOT Aggregate regions, with granularity down to the wind farm level, if possible. Minimum requirements for this service are:

1. Forecasts updated at least 4 times a day (every 3 hours)
2. Forecast regions:
   a. ERCOT Total Wind
   b. ERCOT regional North & West Wind
   c. ERCOT regional South & Houston Wind
3. Forecast horizon:
   a. Current day forecast (24-hour)
   b. 2-day forecast (48-hour)
   c. 3-day forecast (72-hour)
   d. 3-5 day forecast
4. Capability to all export forecasts in *.csv format

3. **DME PROSPECTIVE PROPOSER PRESENTATION & TRIAL PERIOD**

The purpose of the prospective proposer presentation & trial period is two-fold:

1. The prospective proposer will be given about two hours to demonstrate the pertinent points of their service. This is generally known as the “sales presentation”.
2. The trial period allows staff “hands-on” time with the service in order to accurately evaluate the product for DME’s needs.