
INFORMATIKA
Demand Forecast Project
Microsoft

Demand Forecast Project

Forecasting of daily electricity consumption is key metric hence influence plan of production and later trading with electricity on open market.

Value prop: Investment in Informatika to implement predictive data analytics could increase the volume of energy sold to the open market leading to increased profits

Factors that significantly affect the demand curve (consumption) in day-ahead trading:

1. Hydro-meteorological forecast:
   - Temperature forecast (affects heating and air conditioning…etc.
   - Wind Forecast (affects heating)
   - Forecast of cloudiness, irradiation (affects lighting of objects)
2. Specific days
   - Holidays
   - Working day, Saturday, Sunday…etc.
3. Social events (sports, cultural), or population activity

How we got to the project

1. Step1: We learn and analyzed customer processes and get familiar with different departments who are involved in process like dispatchers, brokers, traders….etc. and got approval from IT and Security to use Azure.

2. Step2: We delivered workshop and built basic model one day ahead based on historical data used from last 10 years. Data which was used were “Dates with accomplished consumption“ and “Daily temperature“. Offer solution for everybody (operations, management, teams outside trading for transparency).

3. Step 3: Building PoC model for hourly consumption and used PowerBI for data visualization. We agreed to involve more ponders like: Sunrise, Sunset, number of Sunny hours, Min. Max. and Average temperature, Humidity, Cloudiness, Wind…etc. Also taking some other affects like changing clock time for Winter to Summer and “Inertial temperature” – we noticed there is delay in consumer behaviors in sudden change temperature it’s not followed in.

Customer’s verdict

- We need everything to prepared till 9AM, we start at 7AM and in past we used 1:45min to predict electricity consumption and just 15min to optimize whole production for a day.
- Now we just need 15min for prediction, so we have 1:45min to plan, optimize production and trading.

DEMAND FORECAST

PROJECT GOALS

AI

Build as most accurate as possible electricity demand forecasting model

EXPENSION

Extend forecasting period up to 14 days

USABILITY

Simplify data entry forms and report representation

MAKE REAL TIME DISPATCHING EASIER

DEMAND FORECAST

WHAT WE USED TO BUILD IT

HISTORICAL DAILY AND HOURLY WEATHER DATA (TEMPERATURE, HUMIDITY, RAINFALL WIND SPEED AND DIRECTION, ETC.)

HISTORICAL HOURLY CONSUMPTION DATA

LIST OF PUBLIC HOLIDAYS AND DAYS WITH DIFFERENT CONSUMPTION PATTERN

BUILDING THE AI MODEL

DISPATCHERS ENTER CONSUMPTION DATA MANUALY

PRELIMINARY RESULTS – DURING THE DAY

FINAL RESULTS – IN THE BEGINNING OF A NEW DAY

DISPATCHER CAN ADD EVENTS THAT SIGNIFCANLY AFFECT CONSUMPTION

WEATHER DATA COMES FROM A SINGLE METEOSTATION IN BELGRADE

THAT ENSURES THAT HISTORICAL DATA RELEVANT TO THE DATA USED FOR FORECAST

DAILY USAGE PROCESS

Project Objectives & Scope

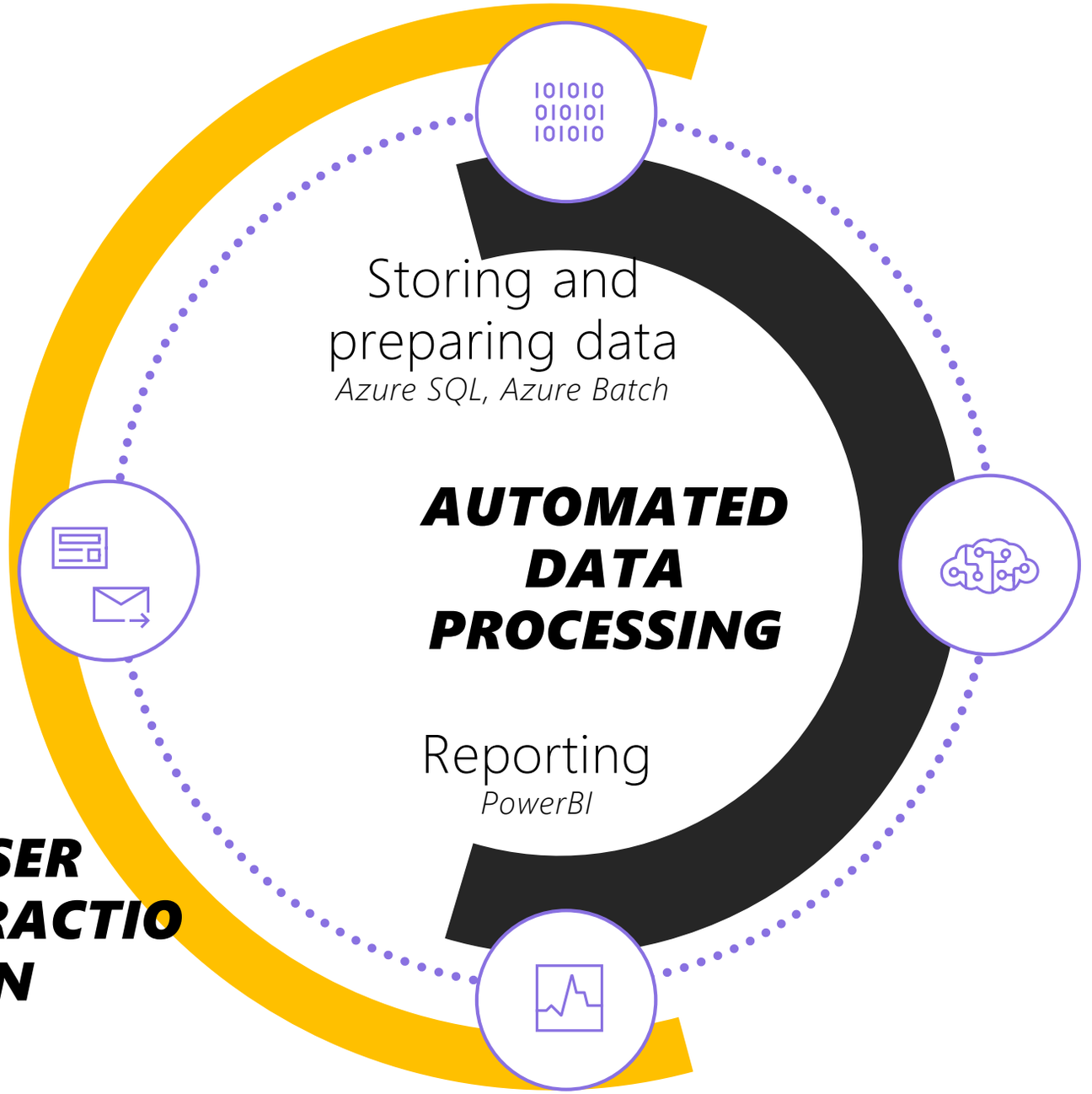
Project Objectives

- Build as most accurate as possible electricity demand forecasting model
- Extend forecasting period up to 14 days
- Simplify data entry forms and report representation

Project Scope

- Build forecasting model based on the customer meteo data
- Analyze spikes not forecasted by the POC model
- Propose additional factors influencing the forecasting model
- Try to increase model accuracy with additional factors (in the case if relevant data exists)

SOLUTION COMPONENTS



Business process

1. Daily data entry
   - Dispatcher enters consumption data every hour
   - Weather data automatically loads from a meteorologist email
   - If weather forecast needs to be corrected it can be done manually

2. Prediction forecasting
   - Runs automatically every hour
   - Initiated by dispatcher on the consumption entry form

3. Reporting
   - Daily report (weather parameters, consumption, prediction)
   - Compare report (Consumption and Prediction for today, yesterday, week ago, year ago)
   - Search by weather (select all dates with for today's weather + 3 degree)
   - Predictions by date (How predictions change after new data entry)

Project Approach

Envision and Plan

Summary
Validate the business goal and delivery plan

Key activities
- Project Kickoff
- Environment Assessment
- Interface Definition
- Use Case Development

Deliverables
- Project Plan
- Vision Scope
- Use Case

Asks
- NDA
- Provide detailed internal forecast and actuals data, including historical data related to the selected business scenario
- Active involvement

Build

Summary
Get all needed data and develop the solution

Key activities
- Develop data entry application
- Create or update database
- Create or update data factory
- Asses existing forecasting model
- Develop report forms

Deliverables
- The solution code base
- A designed and loaded data model, with appropriate visualizations relevant to the use case

Asks
- Provide Informatika access to needed customer data and development, test, and production systems
- Active involvement

Stabilize & Deploy

Summary
Implement the solution in the customer environment

Key activities
- Implement the solution in the Customer subscription
- Test the solution together with the customer project team
- Get customer project team feedback

Deliverables
- Working demonstration of scenario forecasting

Asks
- Active involvement

Demo

Summary
Verify that solution works in the customer environment and processes

Key activities
- Test the solution in the production processes and environment
- Collect user's feedback
- Develop roadmap for the future improvements

Deliverables
- Findings and recommendations, visualizations, and roadmap

Asks
- Active involvement

Close-out

Summary
Close Project

Key activities
- Close-out Presentation