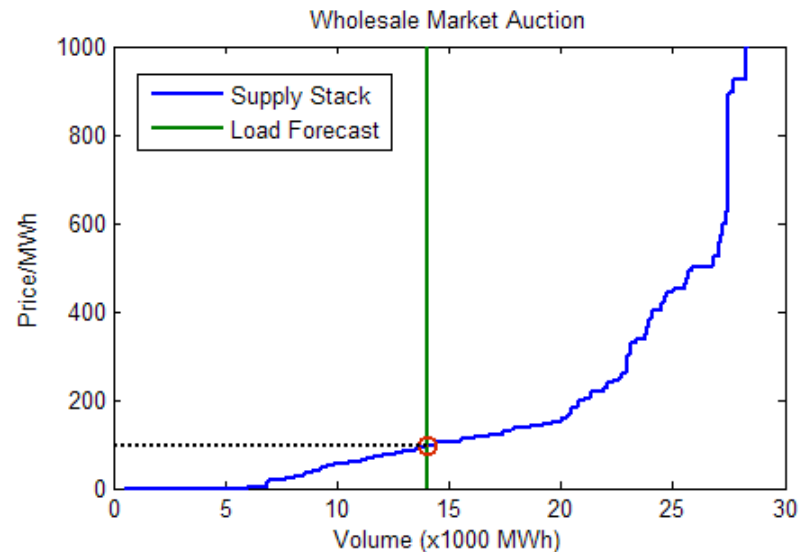# Electricity Load and Price Forecasting with MATLAB®

Ameya Deoras
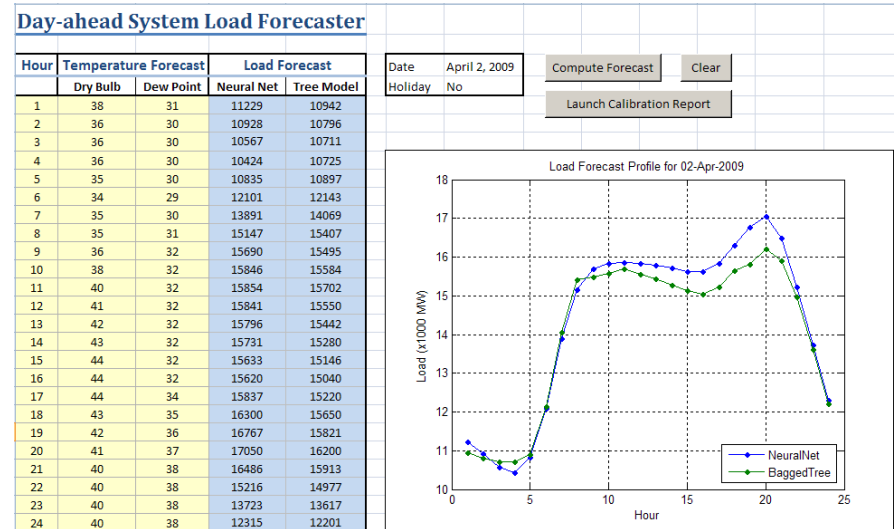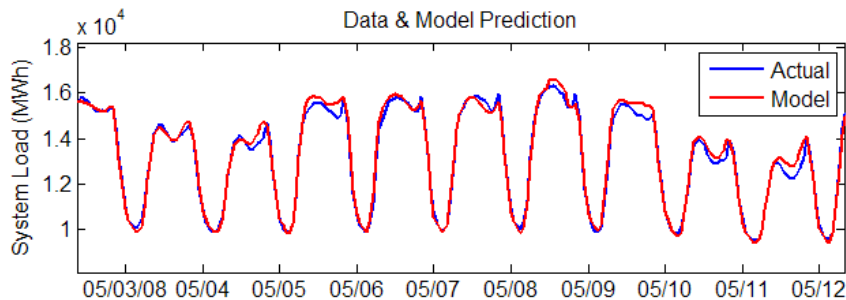
The Need for Accurate Load & Price Forecasts

- Utilities

- System Operators

- Generators

- Power Marketers

Case Study: Short-term Load Forecaster

- Goal:
  - Implement a tool for *easy* and *accurate* computation of day-ahead system load forecast

- Requirements:
  - Easy to use interface
  - Accurate predictive model

Challenges in Implementing a Load & Price Forecasting System

Traditional Approaches	Challenges
Off-the-shelf software	*Inability to customize*
Third-party consulting	*Lack of transparency*
In-house development with traditional languages	*Long development time*

Case Study: Short-term Load Forecaster

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- Requirements:
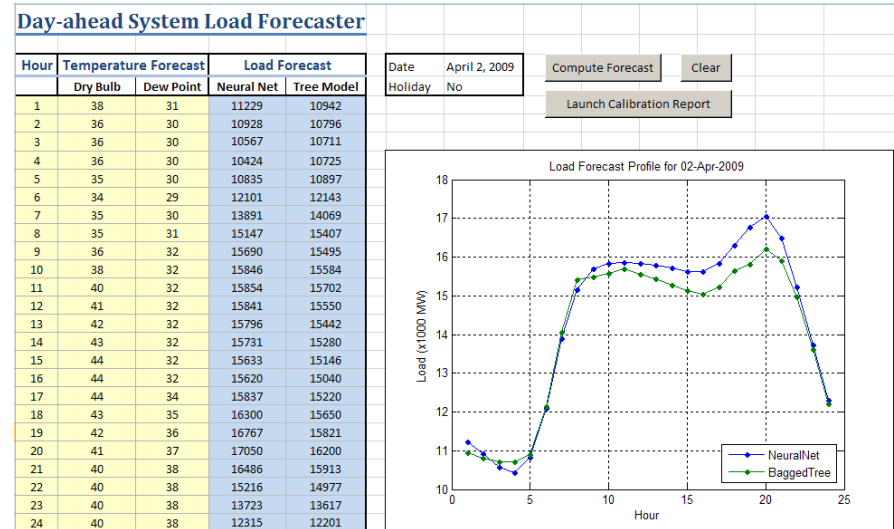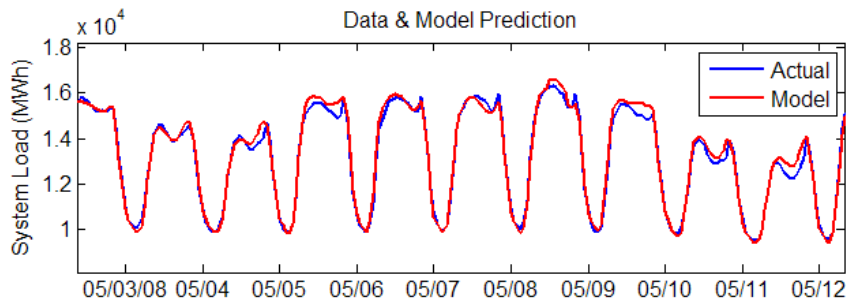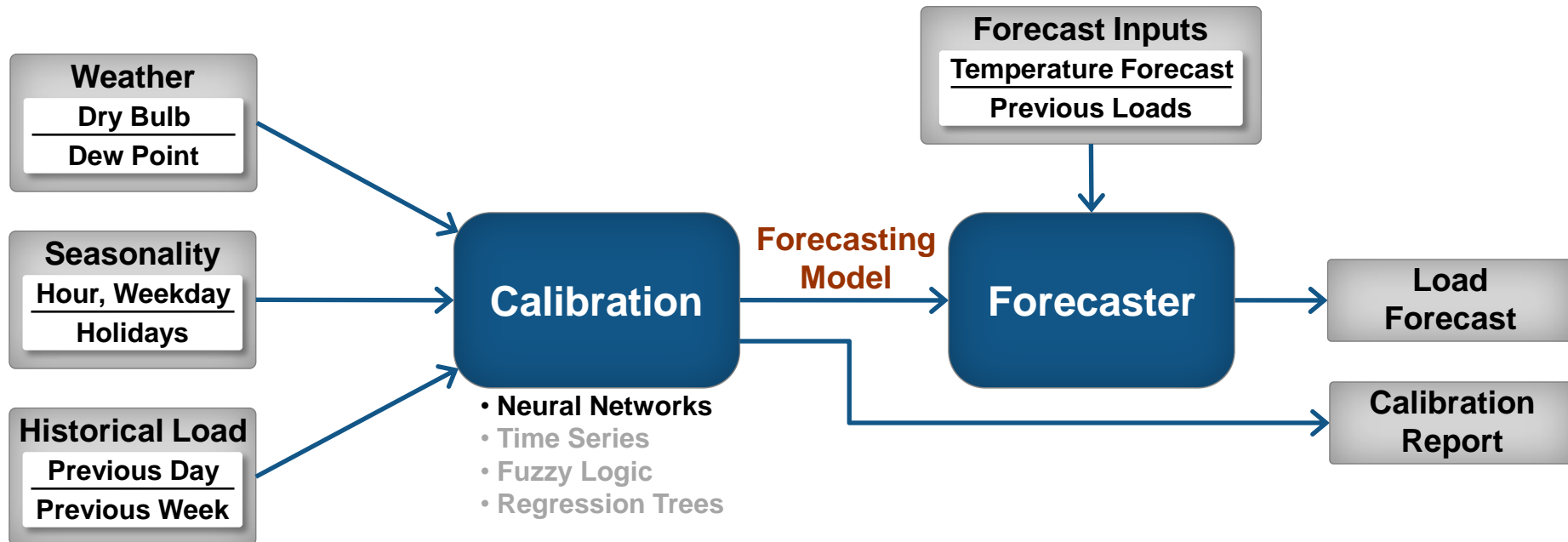 - Easy to use interface
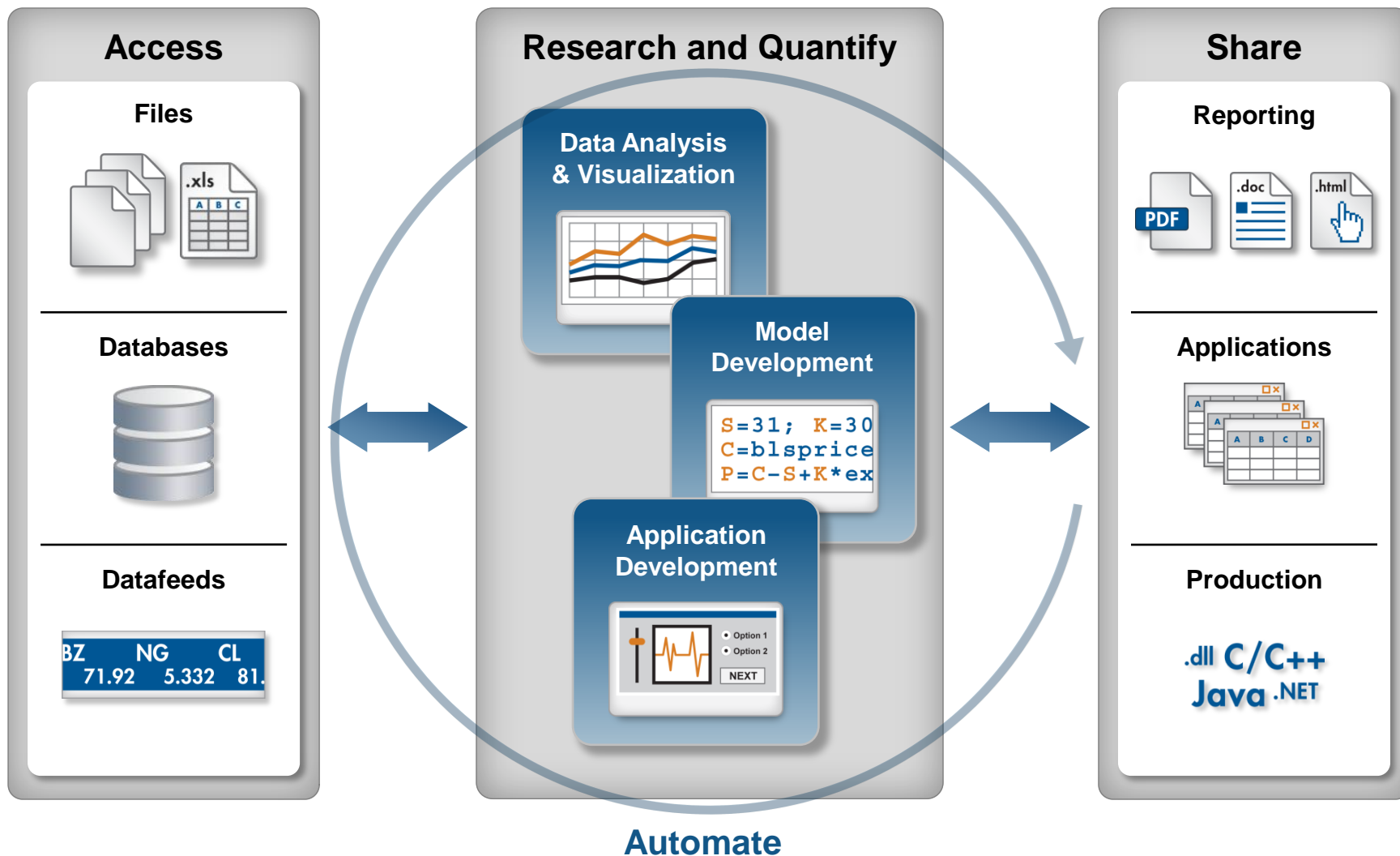 - Accurate predictive model

Model Architecture

Step 1: Access Historical Data

Step 2: Select & Calibrate Model

Step 3: Run Model Live

Model Development Workflow

Access

Files

Databases

Datafeeds

BZ	NG	CL
71.92	5.332	81.

Research and Quantify

Data Analysis & Visualization

Model Development

```
S=31; K=30
C=blsprice
P=C-S+K*ex
```

Application Development

- Option 1
- Option 2

NEXT

Share

Reporting

PDF .doc .html

Applications

A B C D

Production

.dll C/C++
Java .NET

Automate

Modeling Tasks

Step 1: Access Historical Data

- Interactively import, visualize and explore data
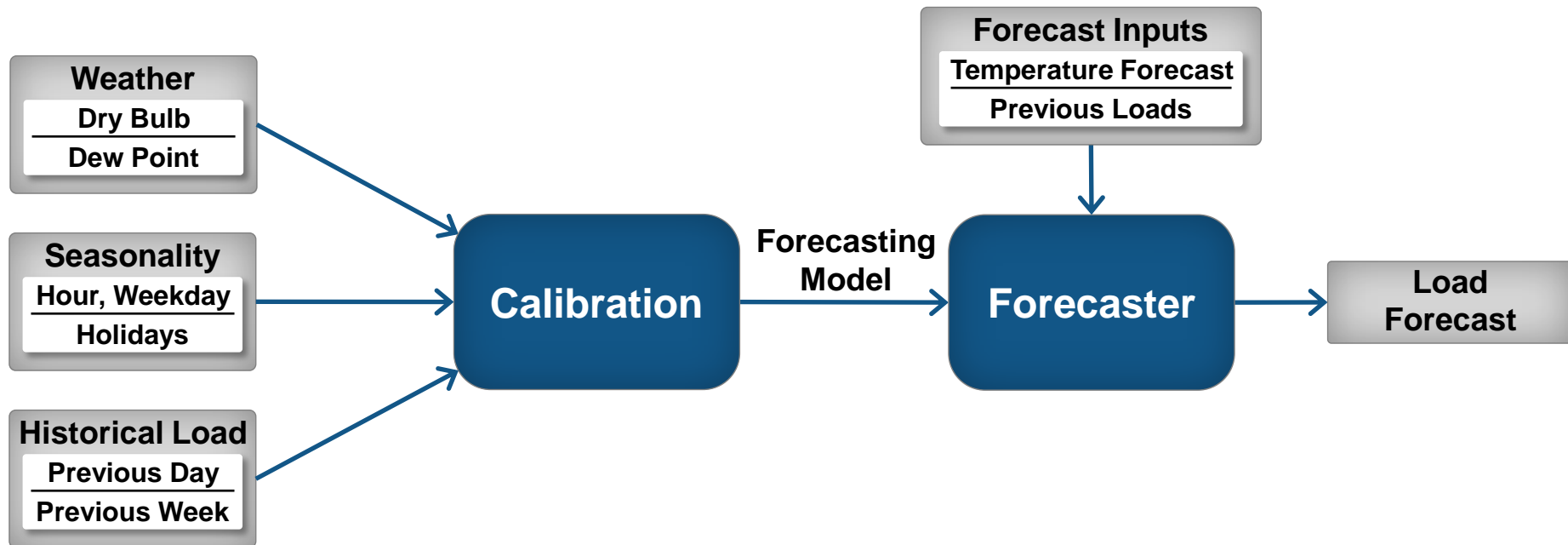- Auto-generate MATLAB code

Step 2: Select & Calibrate Model

- Leverage numerous built-in functions
- Focus on modeling not programming
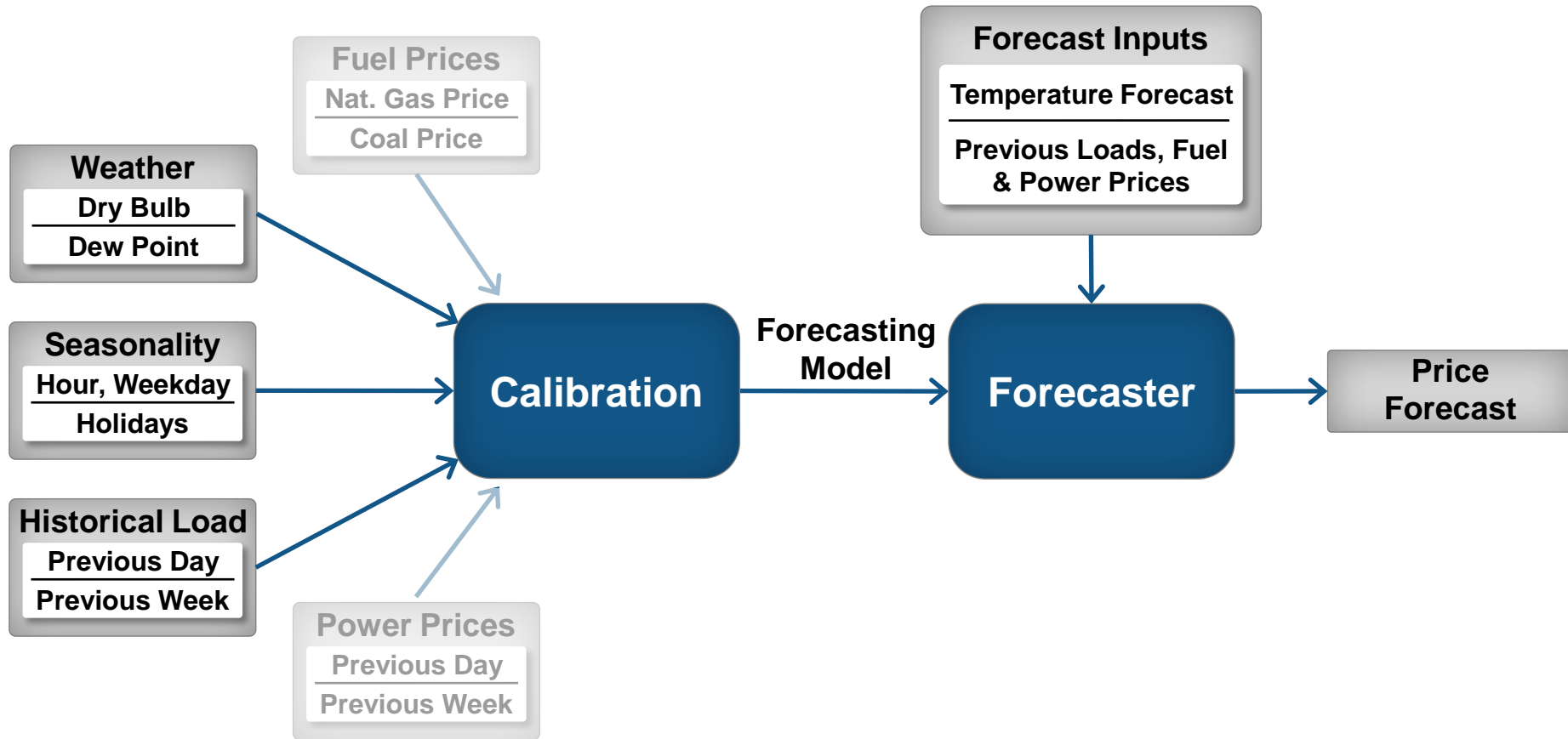- Capture as-you-go and automate the process

Step 3: Run Model Live

- Royalty-free deployment
- Point-and-click workflow

Forecasting Electricity Loads
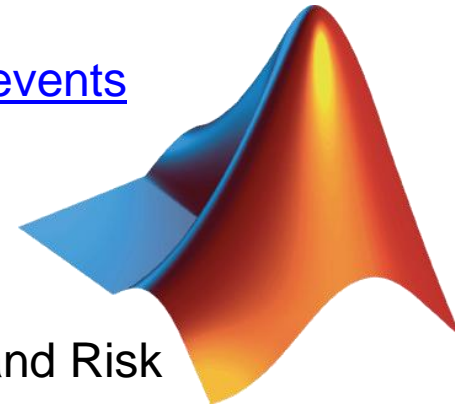
Forecasting Electricity Prices

MATLAB Solutions

Traditional Approaches	Challenges
Off-the-shelf software	Inability to customize
Third-party consulting	Lack of transparency
In-house development with traditional languages	Long development time

MATLAB Solutions

Challenges	Solutions
Inability to customize	**Flexible modeling** ▪ Complete development environment ▪ Libraries of customizable functions
Lack of transparency	**White-box modeling** ▪ Viewable-source functions ▪ Interactive debugging
Long development time	**Quick prototyping** ▪ Focus on modeling not programming ▪ Point-and-click deployment

Additional Resources

- Upcoming webinars:

  – **Sept 14**: Analyze, Model and Simulate Energy Risk with MATLAB – a SAP Integration at RWE

  – **Sept 15**: Investigating Reactive Power Management of Mixed-Technology Wind Farms Using Modeling and Simulation

  – and other recorded webinars, at http://mathworks.com/events

- User stories:

  – Horizon Wind Energy Develops Revenue Forecasting and Risk Analysis Tools for Wind Farms

  – GAS NATURAL FENOSA Predicts Energy Supply and Demand Using MathWorks Tools

  – and others, at http://mathworks.com/energy-production

Questions?