Status Report on Short-Term Load Forecasting

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Topics to Discuss

- Brief description of RTD & RTC forecasts
- Summary of problems and solutions
- Q &A with market participants

Overview of RTC & RTD

- ## RTC – Real Time Commitment

  - ➤ Commits a generator to run and issues an advisory dispatch schedule.

  - ➤ Runs once every 15 minutes with a horizon of 2 ½ hours ahead

- ## RTD – Real Time Dispatch

  - ➤ Specifies generator base points for the next 5-minute interval

  - ➤ Specifies advisory dispatch levels 15, 30, 45 & 60 minutes ahead

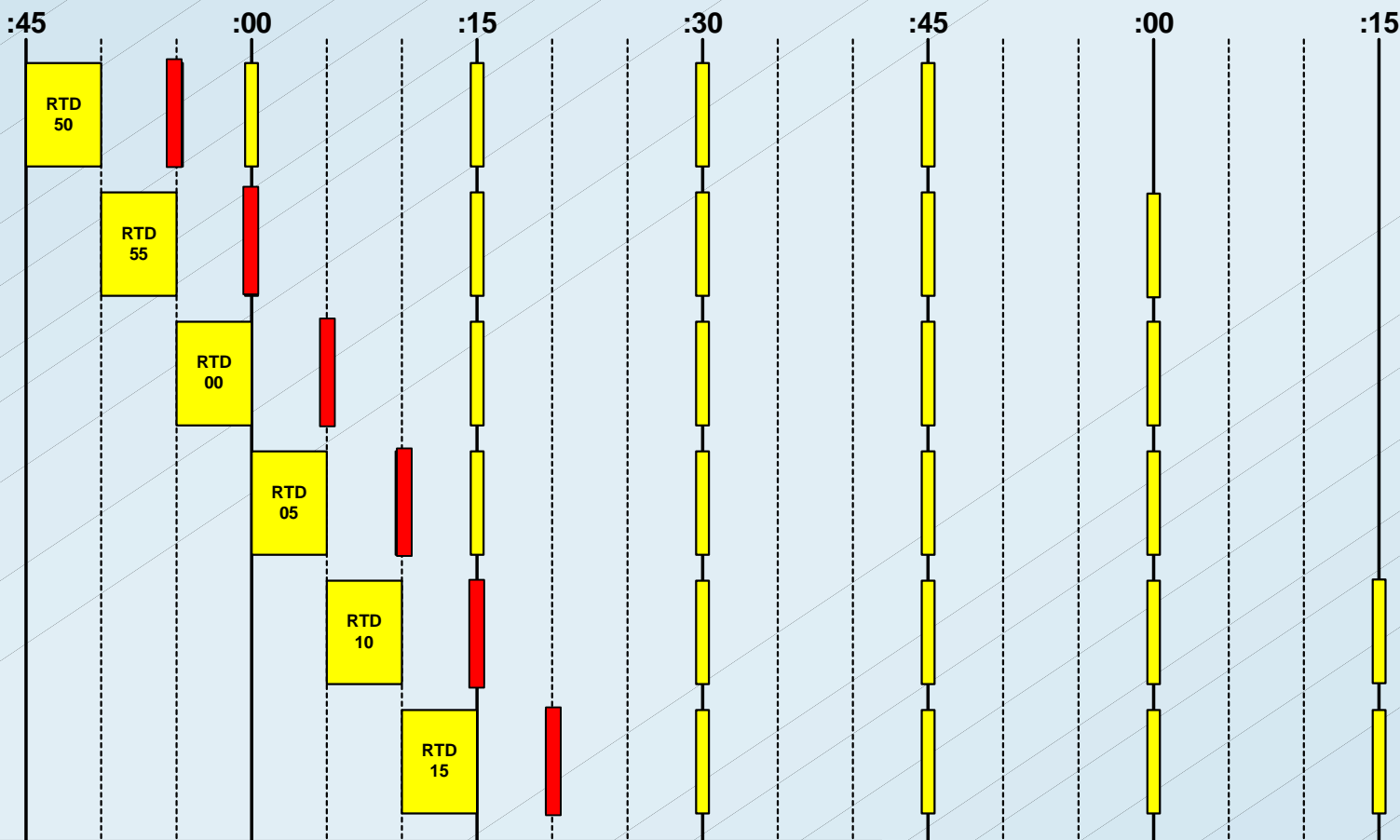 - ➤ Updated once every 5 minutes with a horizon of 1 hour ahead

Real Time Commitment
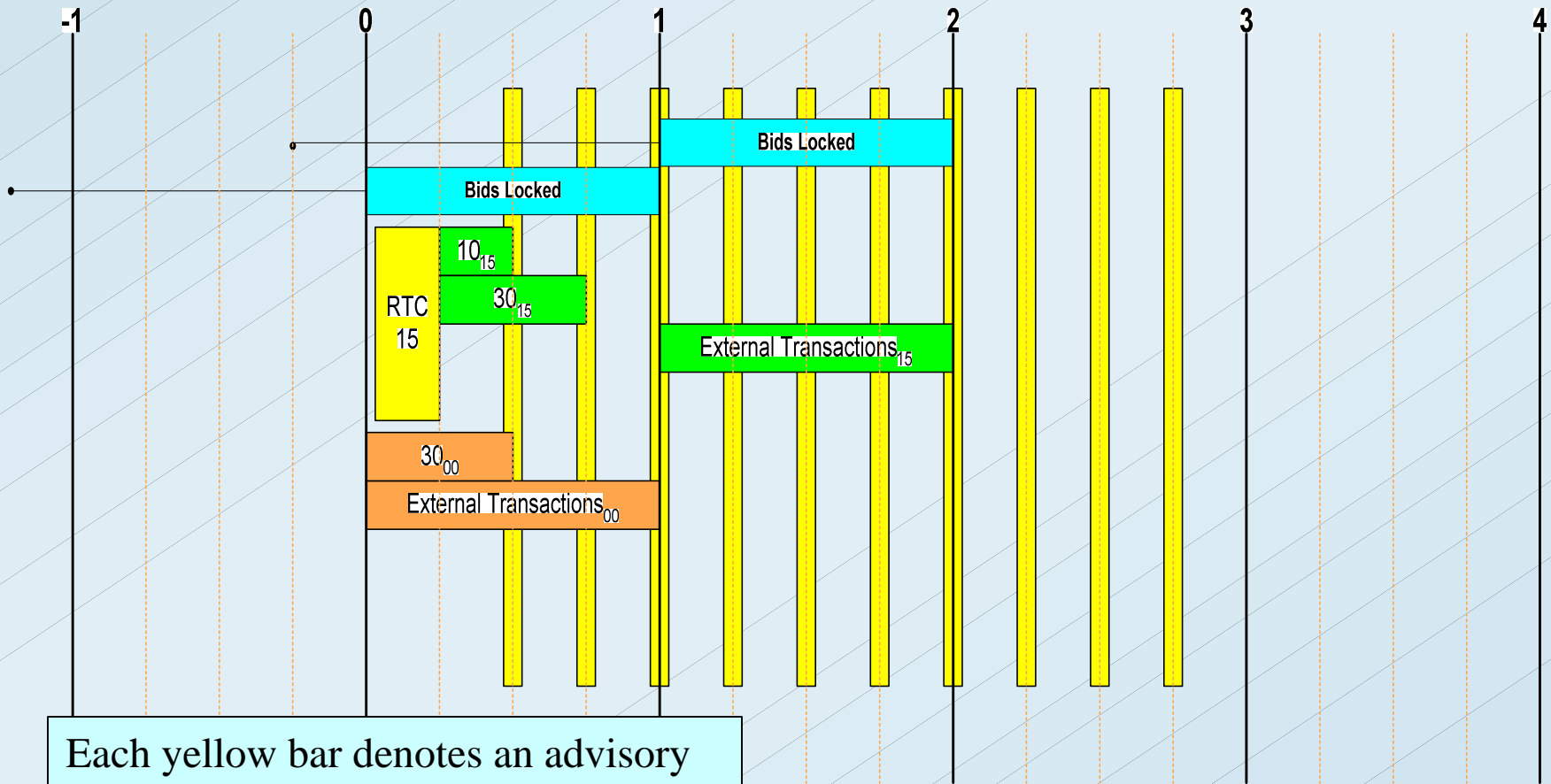
Each yellow bar denotes an advisory dispatch level to committed units.
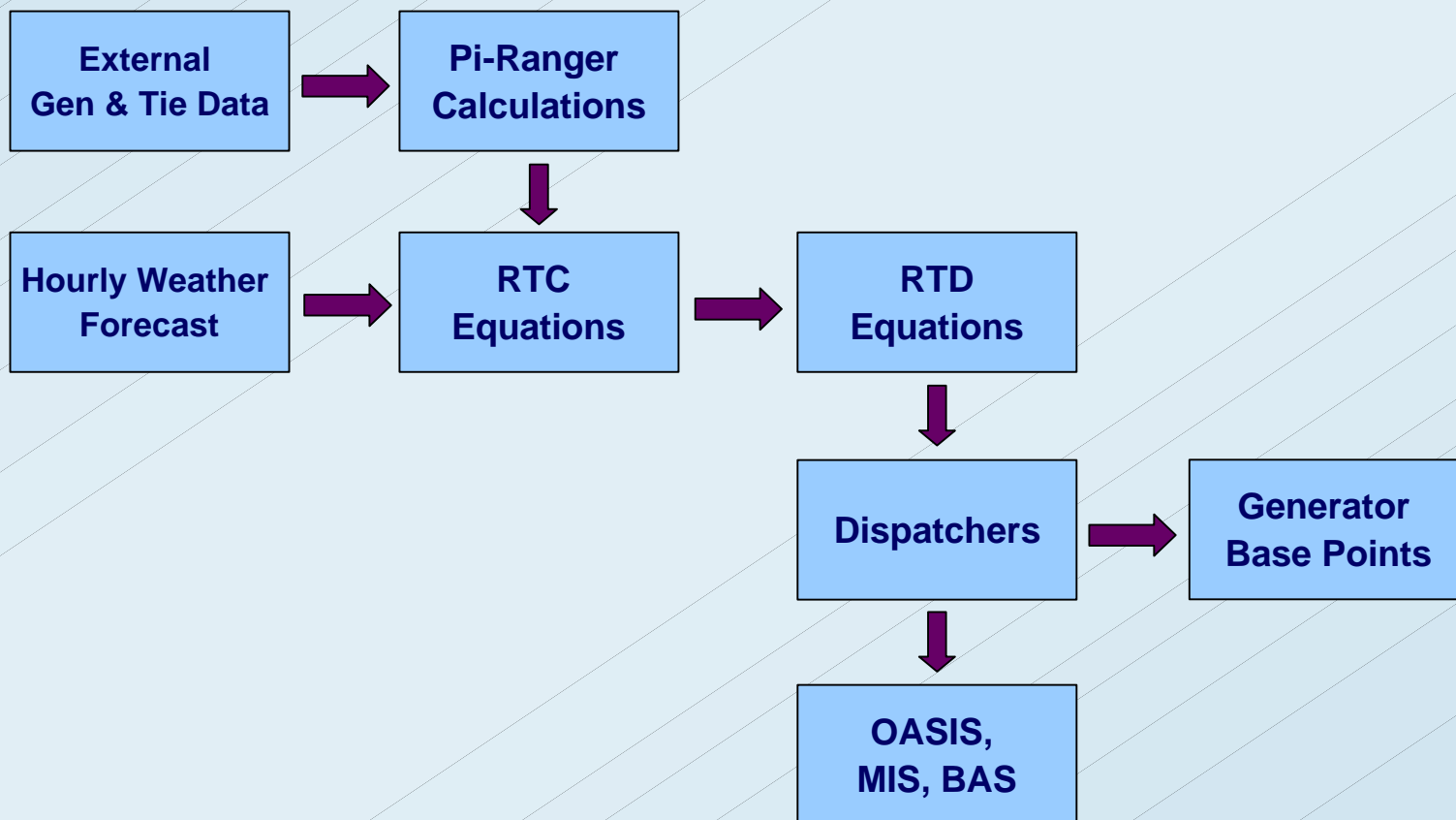
Real Time Dispatch

Yellow bars – Denote publishing of advisory dispatch levels

Red bars – Denote publishing of generator base points

Real Time Dispatch Flow Chart

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┌──────────────┐      ┌──────────────┐
│   External   │ ───▶ │  Pi-Ranger   │
│ Gen & Tie Data│      │ Calculations │
└──────────────┘      └──────┬───────┘
                             │
                             ▼
┌──────────────┐      ┌──────────────┐      ┌──────────────┐
│Hourly Weather│ ───▶ │     RTC      │ ───▶ │     RTD      │
│   Forecast   │      │  Equations   │      │  Equations   │
└──────────────┘      └──────────────┘      └──────┬───────┘
                                                   │
                                                   ▼
                                            ┌──────────────┐      ┌──────────────┐
                                            │ Dispatchers  │ ───▶ │  Generator   │
                                            │              │      │ Base Points  │
                                            └──────┬───────┘      └──────────────┘
                                                   │
                                                   ▼
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                                            │    OASIS,    │
                                            │   MIS, BAS   │
                                            └──────────────┘
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The RTS Forecasting Models

- Structural models for RTC use:
  - Hourly weather forecasts: temperature, humidity, cloud cover, wind speed
  - Calendar information: day, month, year, holidays, length of day, daylight savings time
  - Load & weather data from 3 previous days
  - Forecast horizon: up to 10 days ahead
- Lagged load models for RTD use:
  - Prior 30 minutes of load - tell where we've been
  - *Includes next 30 minutes of RTC - tells where we're going*
  - Calendar information similar to RTC, but no weather
  - Forecast horizon: up to 3 hours, 1st hour is best

Relative Merits of RTC & RTD

- RTD models have higher accuracy & faster response to load changes than RTC in the first 60 minutes
- RTC has greater accuracy beyond that
- Optimal strategy is to employ both in sequence
  - Use RTD for the first hour
  - Make gradual transition to RTC in the second hour
  - Use RTC thereafter
- Initial SMD-2 design did something different….
  - Interleaved RTC and RTD in every quarter hour
  - Constantly recalibrate RTD & RTC to actual data
  - Consequence: successive forecasts not always consistent

RTS Problems & Solutions

Problem	Solution	Status
1-minute integrated averages produced spikes in RTD	Change to 5-minute integrated average load	Tested & deployed
Daily RTC transition sometimes causes a spike	Prorate change over several hours; not 1 interval	Tested & deployed
Zonal load inputs have spikes and step changes	Introduce a zonal load filter and screen data from gens and ties	Tested; deploy in early 2006
Interleaving of RTC and RTD produces forecast spikes	Do not interleave; make a gradual transition from RTD to RTC	Currently in test
RTD equations are erratic from one interval to the next	Use smoothed RTD parameters	Currently in test

Methodology for RTD Improvements

- Develop increased understanding of program logic
  - RTD & RTC equations & behavior are well-understood; their interaction is continuously being studied.
  - Flowcharts, code review, simulators
  - Archive new data tables with intermediate computations
  - Continued review of actual results provides insight
- Communicate ideas & results as rapidly as possible
  - Market Operations, Forecasting, Market Monitoring, IT
- Test modifications one step at a time
  - Base deployment decisions on statistical analysis

Your Turn at Bat……..

- ✓ Comments
- ✓ Questions
- ✓ Suggestions