

CanWEA 2007

AESO Wind Power Forecasting Pilot Project

Oct 2 2007

Quebec City

Reliable **Power**

Reliable **Markets**

Reliable **People**

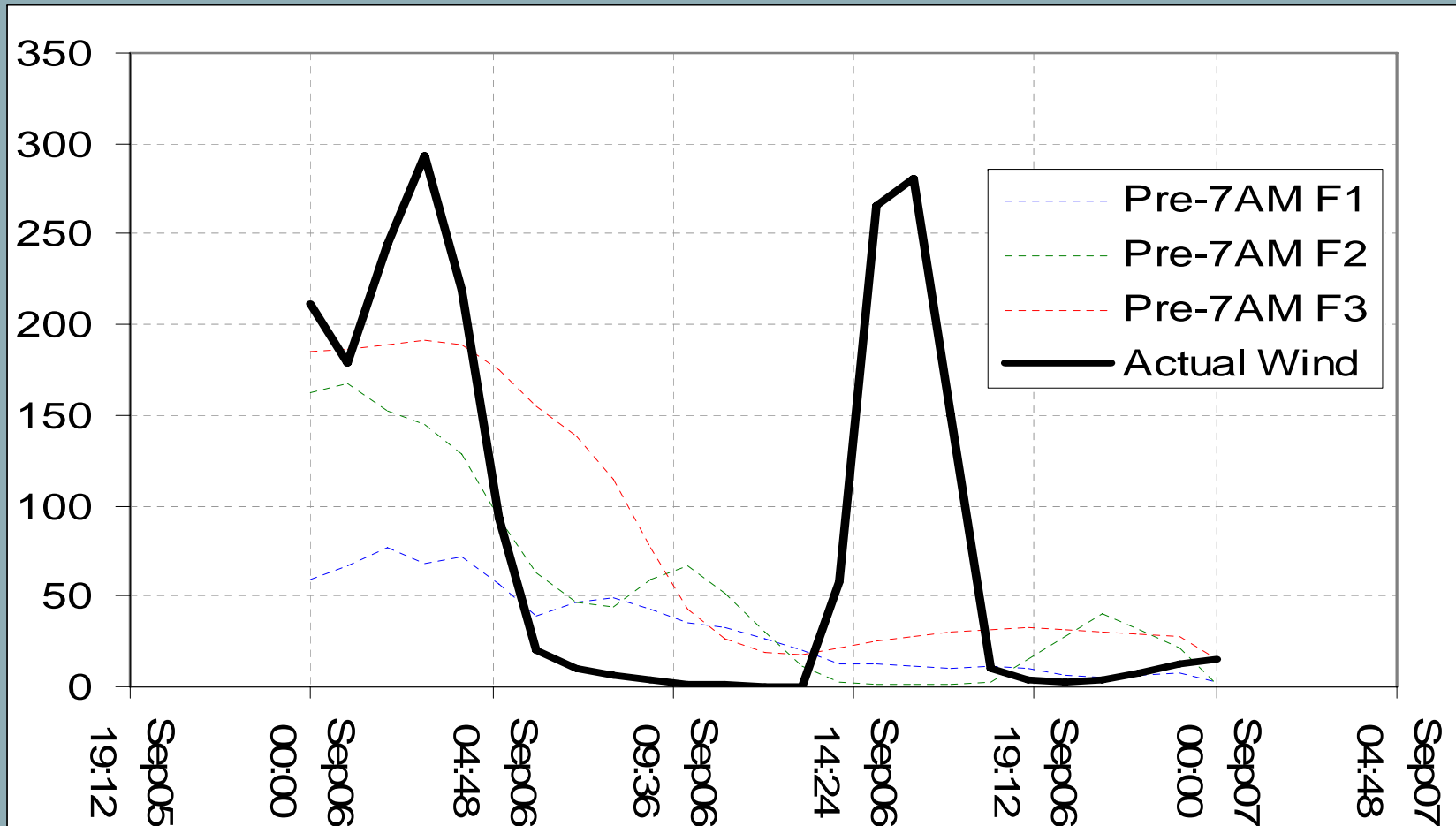


Darren McCrank

Operations and Reliability



Why a Pilot Project?

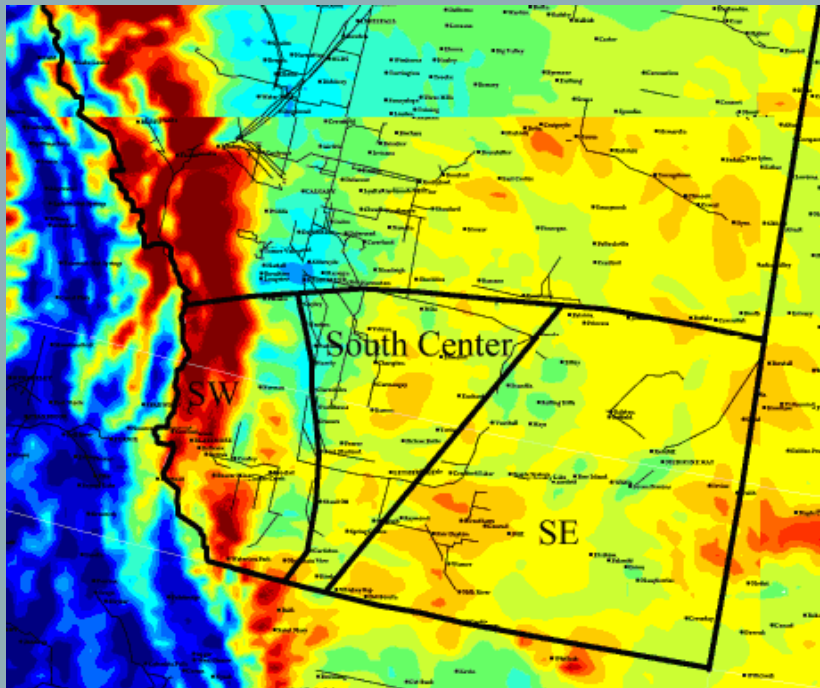


The purpose



- To evaluate different forecasting methods in order to find the most effective means to forecast wind power in Alberta.
- To leverage the experience of other jurisdictions globally
- To educate Alberta's power industry on wind power forecasting techniques and capabilities
- To recommend wind power forecasting requirements to be implemented in Alberta

The design



Funded by
AESO

Alberta Energy Research Institute
Alberta Department Of Energy

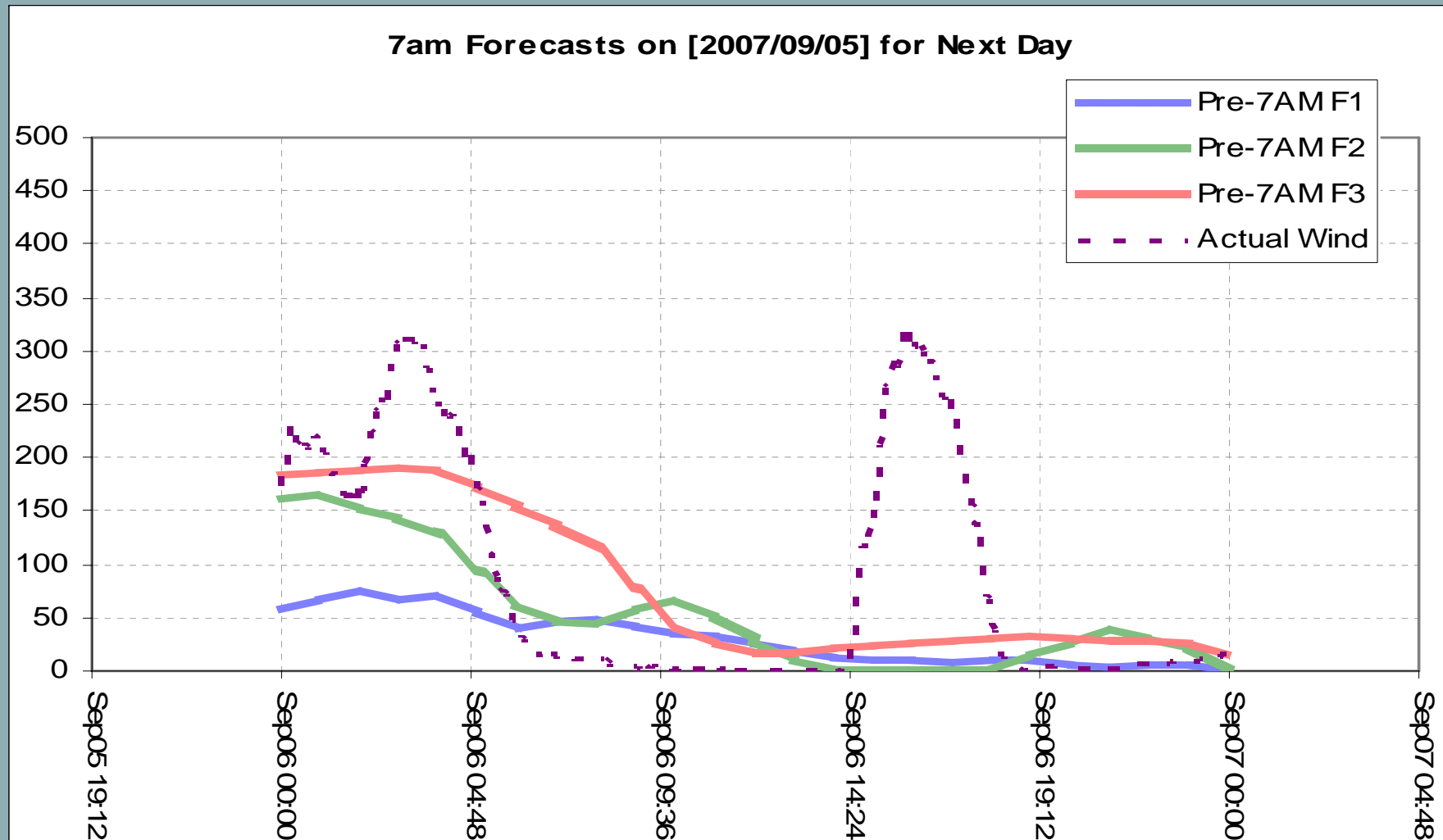
- Trial three very different forecasting methods over a one year period:
 - AWS Truewind (US)
 - WEProg (Denmark)
 - energy and meteo (Germany)
- 4 different geographic terrains / wind regimes in Alberta
- T-1 to T-48 hrs refreshed hourly
- 7 existing and 5 future facilities to represent geographic diversity and future expansion
- Data Collection by Phoenix Eng. (Calgary) – 1 met tower/site
- Independent analytical analysis from ORTECH (Canada)

The Schedule

- Feb 2007 - April 2007
 - Data Collection, model training (using historical information)
- April, 2007
 - Forecast Delivery Begins
- Quarterly Reports
 - Sept 07, Nov 07, Feb 08
- Final Report
 - Draft End May 08
 - Final End Jul 08

Forecasts delivered day ahead

Delivered 7am Sept 5 for Sept 6

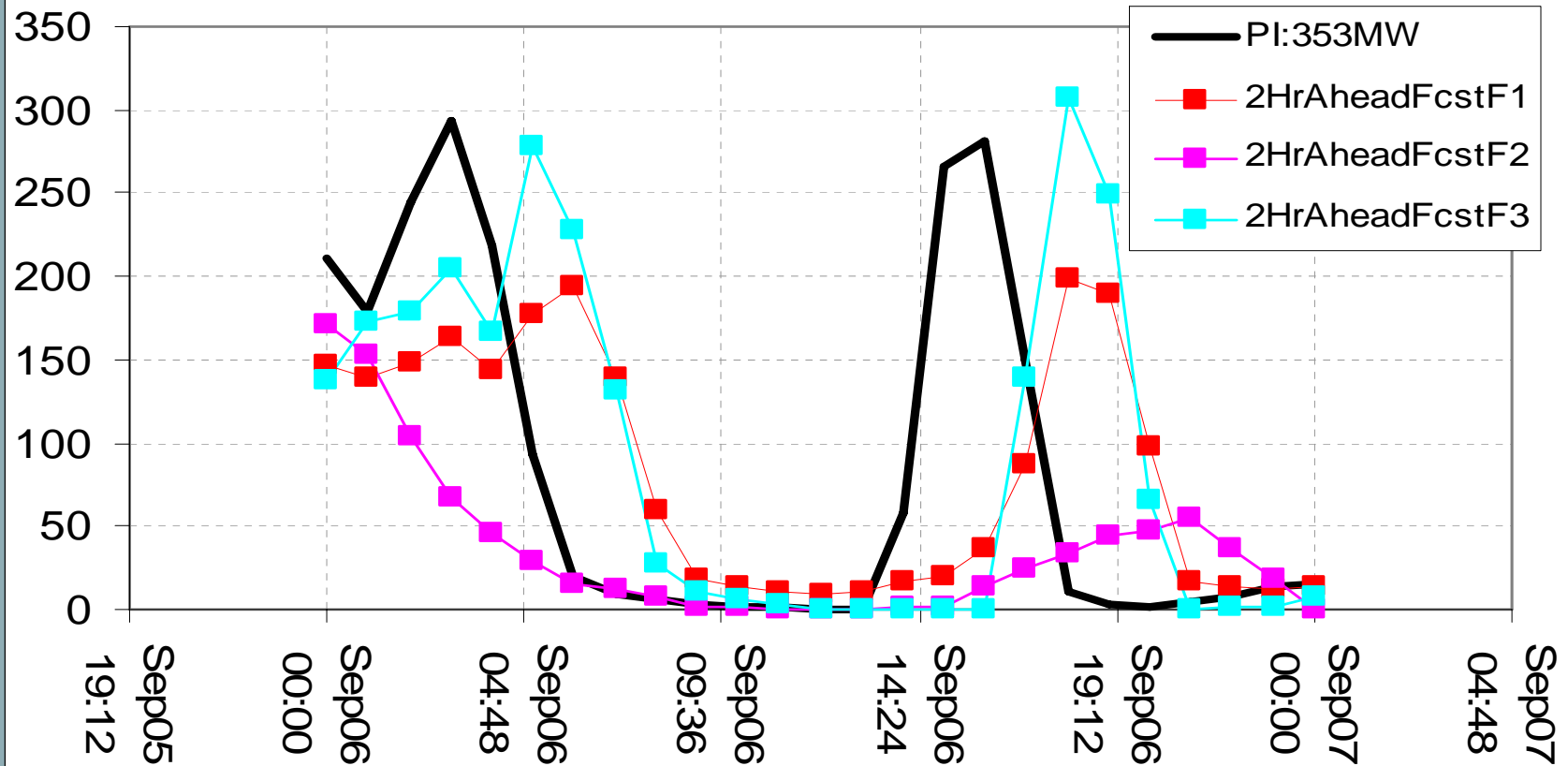


2 Hour ahead Forecasts Sept 6

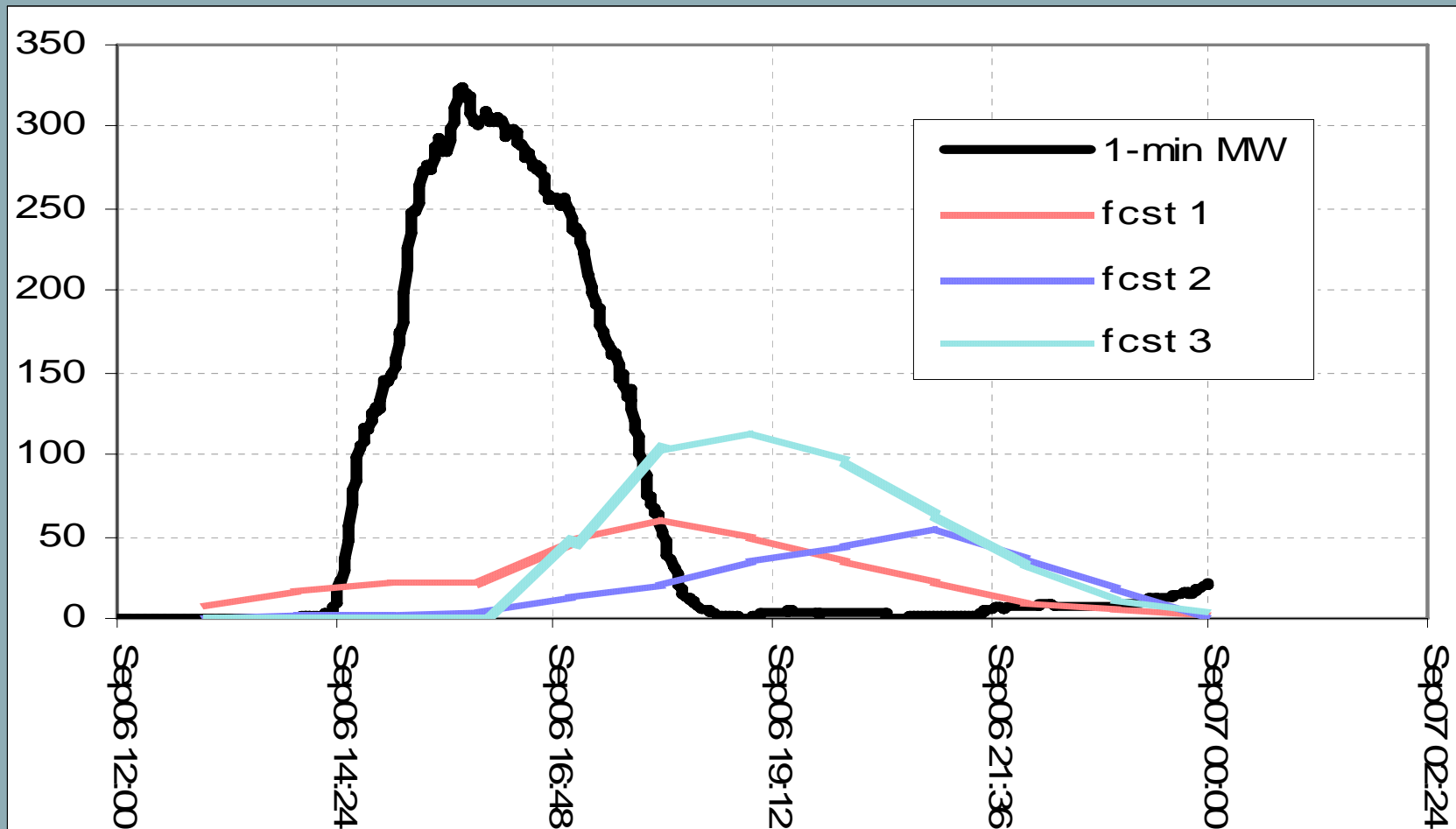
The forecasts are refreshed hourly



Actual vs Forecast of hourly average wind power output [2007/09/06 - 2007/09/07]



The forecasts delivered at noon on Sept 6



Forecaster comments to Sept 6



- WEPROG Comments:
 - Our short term forecast has not been optimised towards extreme events
 - Increasing the spatial resolution results in a better prediction of extreme events, but may also result in false alarms
 - A doubling in spatial resolution is 8 times more computation

Forecaster Comments to Sept 6



- AWS Truewind Comments:
 - Met towers at the northern sites could have provided about a 2-hr to 3-hr lead time
 - 6am NWP model showed the signature of this event, but due to delivery delays the event was not seen in AWS forecasts
 - Interestingly, none of model runs initialized with data from prior to 6 AM MDT Sept 6 had virtually no indication of this event.

Forecaster Comments to Sept 6



- energy & meteo systems Comments:
 - The delivered forecast is a combination of three independent forecasts calculated by emsys
 - One of the forecasts caught the event, but due to the bad performance of the other two forecasts, the event was not captured well when combined
 - One model seems to perform better during these type of weather situations (in this case a cold front)
 - However, in general this model is not the best forecast of the three
 - If the similar weather situations can be predicted, the right model can be given a higher weight factor

Lessons Learned to date

- Phoenix
 - Automated, real time data collection requires full time monitoring, trouble shooting data sources and data provision
- Forecasters
 - Still training there models, but have found the Alberta terrain to be challenging
 - Turbine availability is important information
- AESO
 - MAE or RMSE statistics over a period of time may not provide value on to operate a power system
 - Need to find a way to evaluate and quantify forecast error on events like September 6

The next steps

- Finalize and publish first quarter results and forecaster comments
- Continue AESO internal analysis and trailing
- Once the project is completed, forecasting will feed into AESO business practices of AS procurement, real-time operations and market information

Questions



- Darren McCrank, darren.mccrank@aeso.ca, 403-539-2623
- John Kehler, john.kehler@aeso.ca, 403-539-2622
- Ming Hu, ming.hu@aeso.ca, 403-539-2503