

# Wind and Solar Forecasting Trials: Do's and Don'ts, Part 1 Best practices

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# Overview

- ✓ Introduction to the IEA Task 36 Document Table of Contents
- ✓ Understanding end users' requirements and objectives
- ✓ Types of trials
  - ✓ Advantages/Disadvantages
- ✓ Most common Do's and Don'ts of Trials
- ✓ Best Practices of a Well Run Trial

The content of this presentation supports IEA Wind ExCo strategic objectives:  
“To reduce the cost of wind energy use, for both land-based and offshore wind” and “Increase the exchange of best practices.”

# IEA Task 36, WP 2, Task 2.1: Table of Contents

- **Purpose of document- to serve as a guidance and standard for private industry, academics and government in executing a renewable energy forecasting benchmark or trial.**
- Definitions
- Executive Summary of Procedures
  - Pre-trial and Benchmark Questions for End User
  - Resource Considerations
  - Checklist Questions for Efficient Execution
- Best Practices and Recommendations
  - Live Trial with Real-time Datafeed
  - Live Trial without Datafeed
  - Retrospective Trial
- Pitfalls and Reference Material



**IEA Task 36: Forecasting for Wind Energy**  
2016 - 2018

**Task Objective is to encourage improvements in:**

- 1) weather prediction
- 2) power conversion
- 3) use of forecasts

**Task Organisation is to encourage international collaboration between:**

- Research organisations and projects
- Forecast providers
- Policy Makers
- End-users and stakeholders

**Task Work is divided into 3 work packages:**

- WP1: Weather Prediction Improvements inclusive data assimilation
- WP2: Development of a benchmarking platform & best practice guidelines
- WP3: Communication of best practice in the use of wind power forecasts



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**This is an ongoing IEA Task. Draft document should be available by the end of 2017**

# Customers That May Request a Trial



OEM  
System  
Suppliers



Renewable  
Developers



Owners /  
Operators



Energy  
Utilities

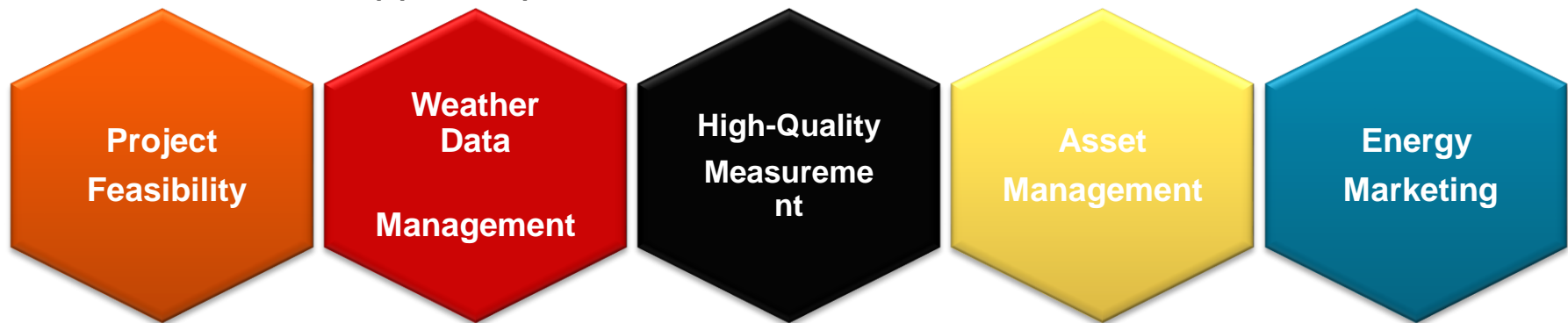


Energy  
Traders



# Understanding users' requirements - examples

- Day ahead market bidding
- Balance-of-day forecasts (mitigate bad pre-schedules, balance reserve estimates, bilateral trades)
- Checking a box (e.g., required by Power Purchase Agreement (PPA))
- Scheduling maintenance crews (1-7 days ahead)
- Keeping the owner/operator honest with PPA deliverables (e.g., datafeed uptime, tracking outages)
- Keeping the lights on (reliability) (e.g., grid operators, Balancing Authority)
- Test current supplier's performance



# Types of Forecasting Trials:

## Retrospective Trial :

Answers the question: *“How would a forecast have performed at my project in the past?”*

## Live Trial:

Answers the question: *“How does the forecast perform under realistic conditions that could be expected?”*



# Retrospective Trial: Advantages/Disadvantages

- Advantages:
  - Less time upfront for both forecast provider and consumer.
  - Forecast can be made over a longer period with same level of effort as a shorter test period.
  - Results can be obtained quickly.
  - No Realtime datafeed setup!
- Disadvantages:
  - Can only evaluate the Day Ahead forecast this way. The intra-day (Hour Ahead) forecast can be done, but there's potential for cheating.
  - Forecast graphical tools are usually not available for forecast consumer to use in day-to-day processes.

# Live Trial: Advantages/Disadvantages

## ■ Advantages:

- Forecast user is allowed to evaluate both the intraday and day ahead forecast horizon performance
- Allows Forecaster to evaluate the ongoing forecast performance and make adjustments, where necessary.
- Better indicator of what to expect as far as operational flow

## ■ Disadvantages:

- Longer to see conclusion and results of the trial.
- Data setup – needs both historical data and real-time data exchange established. This is more effort upfront for both parties and can take a long time, especially the real-time data transfer.
- Oftentimes not long enough to really gauge performance in a statistically significant way



# Common Trial Do's and Don'ts

## Do

## Don't

Clearly define all trial parameters ahead of trial start date.

Engage/evaluate forecast providers on different standards.

Select a trial time period representative of all potential weather factors.

Select a trial time period during just non-windy months or cloudy summer months.

Supply all forecasters with the same information.

Give certain forecasters extra information/data.

Supply training data from the same place which validation will be performed.

Supply substation meter data for validation against turbine power.

Ensure communication is kept throughout the trial.

Wait until the end of the trial to mention something wasn't correct.

Keep trial results anonymized.

Send out any results with forecast providers names visible.

**Clear up-front communication is vital to ensure forecaster doesn't waste a lot of time and user gets the most accurate forecast under most realistic conditions**

# Sample Vaisala Trial Checklist

Wind Power Forecast Trial Checklist v 110 20150916		ANSWERS
<p><b>Author:</b> Jeff Lerner (JLER), <a href="mailto:Jeffrey.lerner@vaisala.com">Jeffrey.lerner@vaisala.com</a></p> <p><b>Purpose:</b> check off required information to complete inventory of what we know and do not know for each forecasting trial.</p>		
Name of trial company:		
Will this be a live trial?	RT Datafeed?	
	No RT data?	
Will this be a retrospective trial?	Make sure HA (intraday) forecast isn't needed	
<b>Metadata Checklist:</b>		
Trial Start Date:		
Trial End Date:		
Name(s) of sites as needed in datafile:		
Latitude and longitude coordinates of sites? Turbine as-built locations will suffice here.		
Nameplate capacity of each site:		
Will a web tool be needed (this is less common for trial)?		
Turbine make/model/rating:		
Number of turbines:		
Hub height of turbines?		
If forecasting wind speed and converting to power, is client providing a power curve?		
<b>Value of forecast questions:</b>		
Which variables will be forecasted and validated?		
Which variables will be forecasted and validated?		

# Elements of a well run trial

- Winning criteria communicated clearly up front
- Q&A period ahead of trial start date
- Detailed description of the metrics
- Clearly articulated start/end dates
- Covers a period of at least 3-6 months with varying levels of wind/solar capacity factors
- Result Sharing:
  - How and when results will be shared with forecasters
  - Interim metrics reporting- this allows the forecasters to make changes as needed for forecast improvement
  - Results of multi-participant trial anonymized
- Sufficient data provided to forecasters to reproduce results obtained by client.
- Clear and frequent communication throughout!

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