

# PCWG\_share\_01\_main

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## Introduction

This document contains the results of the Power Curve Working Group's Share\_01 exercise, which ran from October to December 2015. The document and results are generated using the programming language R from the *PCWG\_share\_01\_main.rmd* file and can be run by participants themselves.

## How to use PCWG\_share\_01\_main.rmd

install R (<http://www.r-project.org>) and Rstudio (<http://www.rstudio.com>), and then create a directory with all of the code and files (see below). When you click the **Knit** button in RStudio a document will be generated that includes text and results from the code embedded in *PCWG\_share\_01\_main.rmd*.

## User Inputs

The *project.root* variable defines the location of the files required for this analysis. The *made.by* variable forms part of a label that will be added to the plots. *data.public* is a flag that indicates whether the results of the analysis are intended to be public, or not.

```
# Where can files be found?
project.root <- file.path('/Users/acrifton/Dropbox/work/A2e PRUF Working Folder',
                          'FY15 Activities/PCWG Share 01')

# Who ran this script
made.by = "A. Clifton, NREL"

# Will data be public or not?
data.public = TRUE

# Reanalyze existing data?
data.reanalyze = FALSE
```

## Directory structure

The following files should be placed in the *project.root* directory:

- PCWG\_share\_01\_main.Rmd
- /**analysis** directory containing results of the analysis
- /**code** directory containing functions required for the analysis
- /**data** directory containing all data files to be analyzed. This can include further sub directories. All .xls files contained in **data** and sub directories will be used in the analysis.

## Packages

This script requires the *ggplot2*, *grid*, *knitr*, and *XLConnect* packages to run. These are called from the script but you may need to install them directly. For details of how to install packages, see the RStudio help.

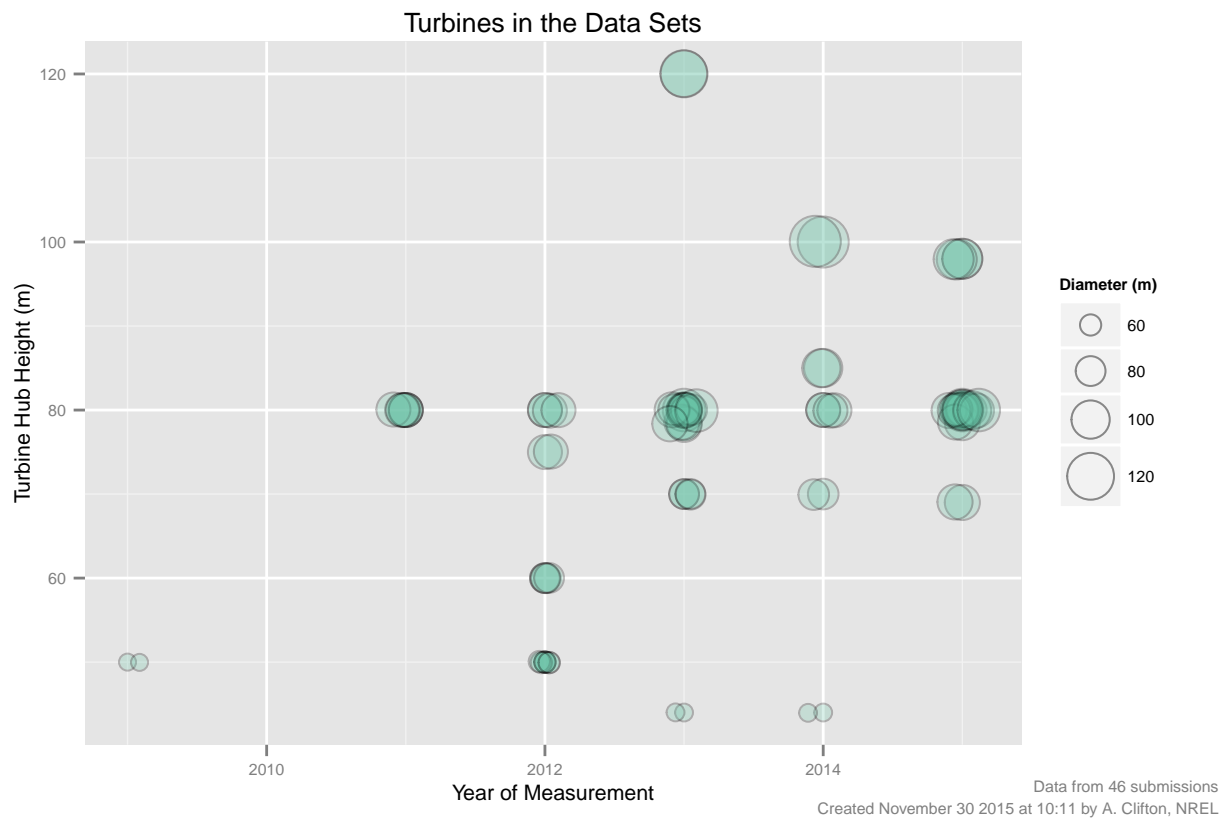
## Results from each data set

We now analyse the data from each data set. The plots are saved to their own directories in the *analysis* directory. If *data.public* is FALSE, plots will be created for every data file. If *data.public* is TRUE, only the final, aggregated data plots will be created.

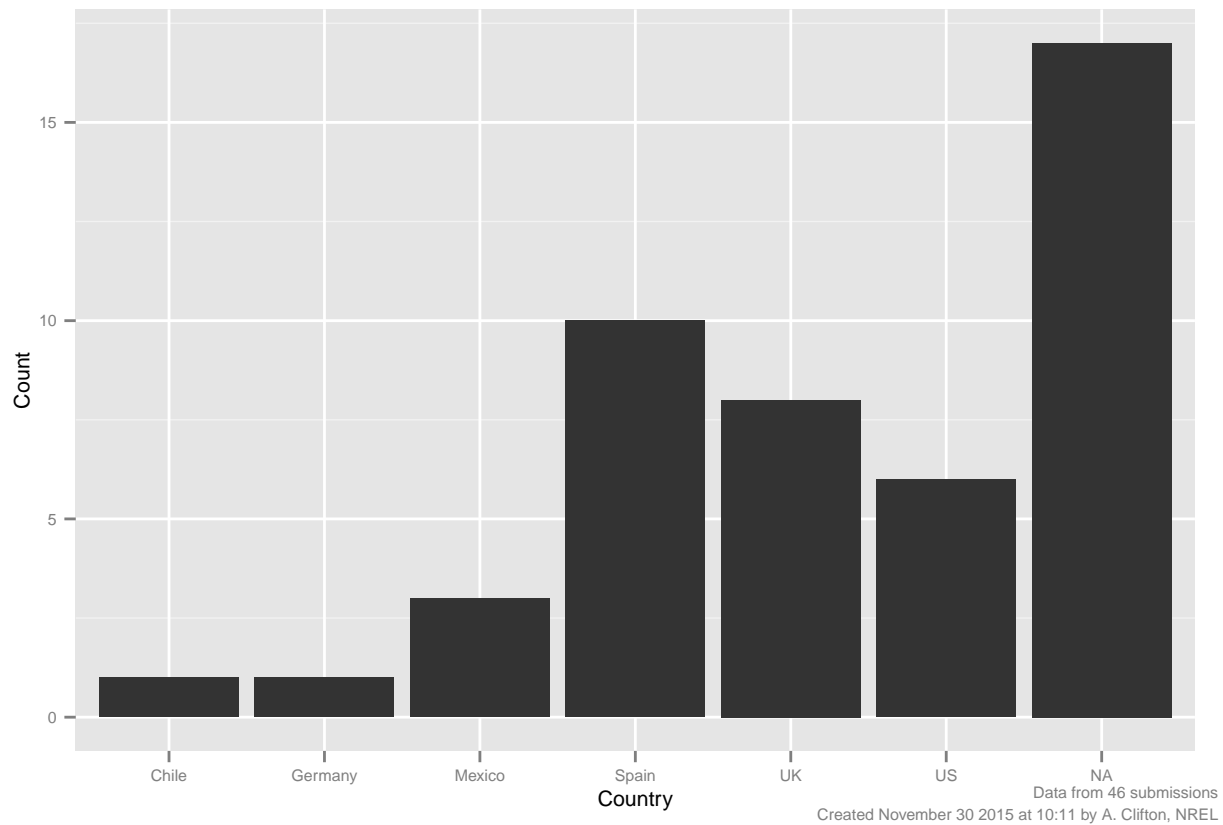
## Turbine Sizes, Characteristics, and Locations

In total, 46 data sets were submitted.

The 46 data sets include tests carried out in the period from 2009 to 2015. Turbine diameters range from 50 to 130 m, while hub heights range from 44 to 120 m.



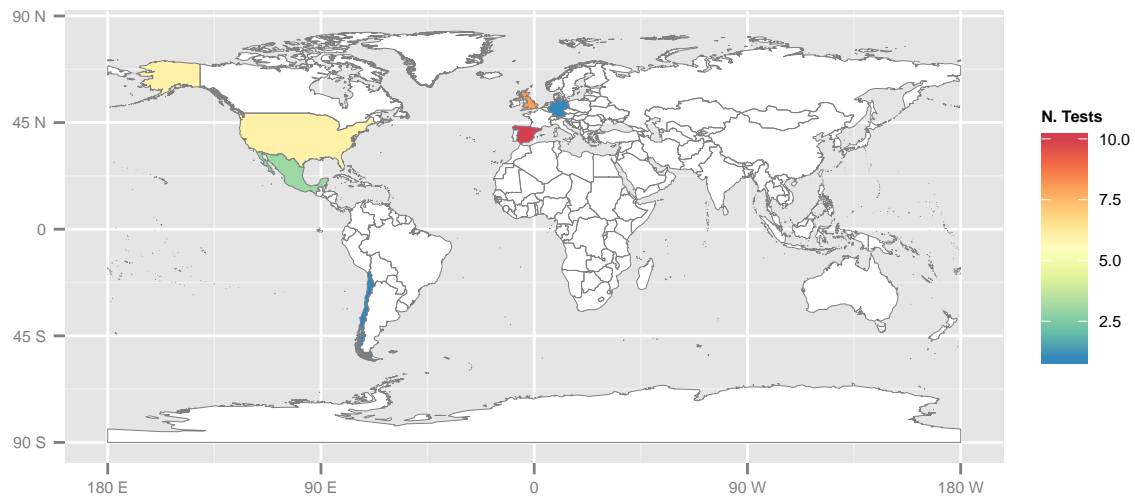
## Test Characteristics



```
## Loading required package: rgdal
## Loading required package: sp
## rgdal: version: 1.0-4, (SVN revision 548)
##   Geospatial Data Abstraction Library extensions to R successfully loaded
##   Loaded GDAL runtime: GDAL 1.11.2, released 2015/02/10
##   Path to GDAL shared files: /Library/Frameworks/R.framework/Versions/3.2/Resources/library/rgdal/gdal
##   Loaded PROJ.4 runtime: Rel. 4.9.1, 04 March 2015, [PJ_VERSION: 491]
##   Path to PROJ.4 shared files: /Library/Frameworks/R.framework/Versions/3.2/Resources/library/rgdal/proj
##   Linking to sp version: 1.1-1
## Loading required package: RColorBrewer

## OGR data source with driver: ESRI Shapefile
## Source: "/Users/acclifton/Dropbox/work/A2e PRUF Working Folder/FY15 Activities/PCWG Share 01/code/work/
## with 246 features
## It has 11 fields

## Regions defined for each Polygons
```

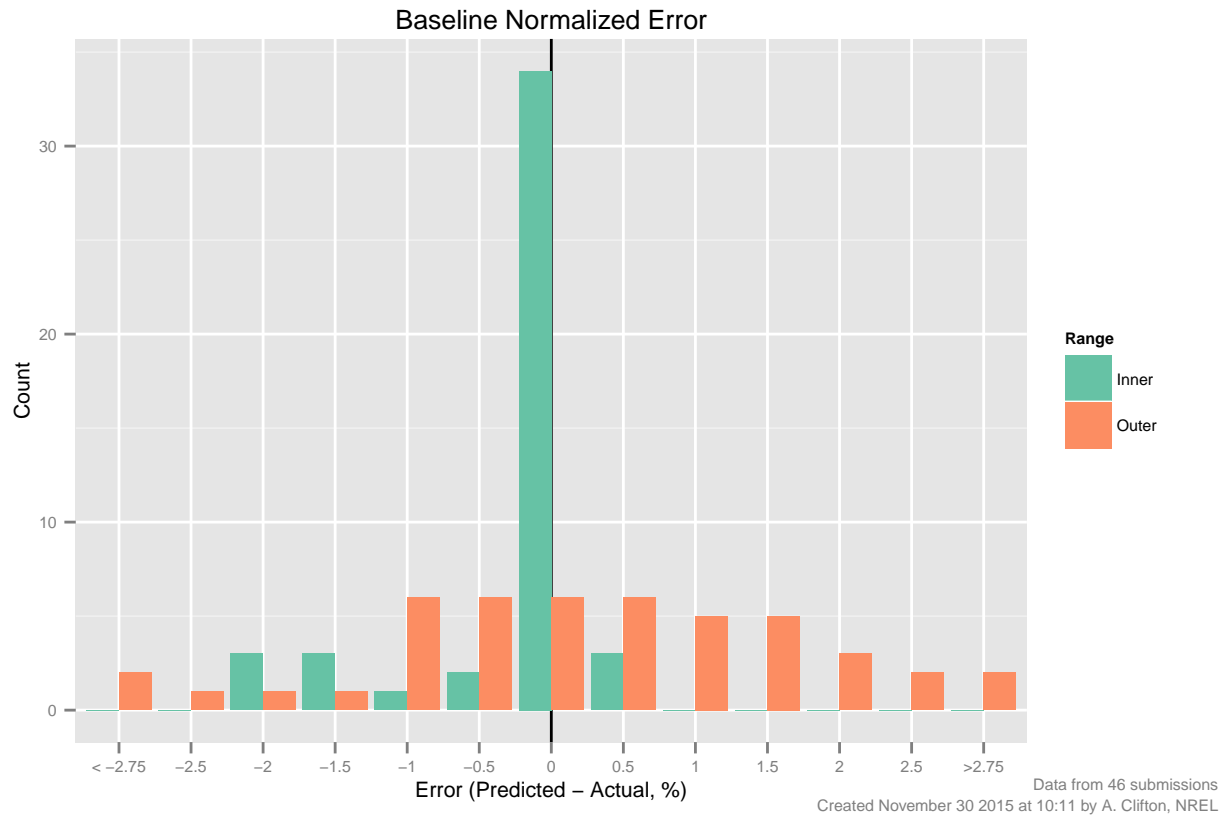


Data from 46 submissions  
Created November 30 2015 at 10:11 by A. Clifton, NREL

## Aggregated results

In this section, data from all of the individual submissions have been combined.

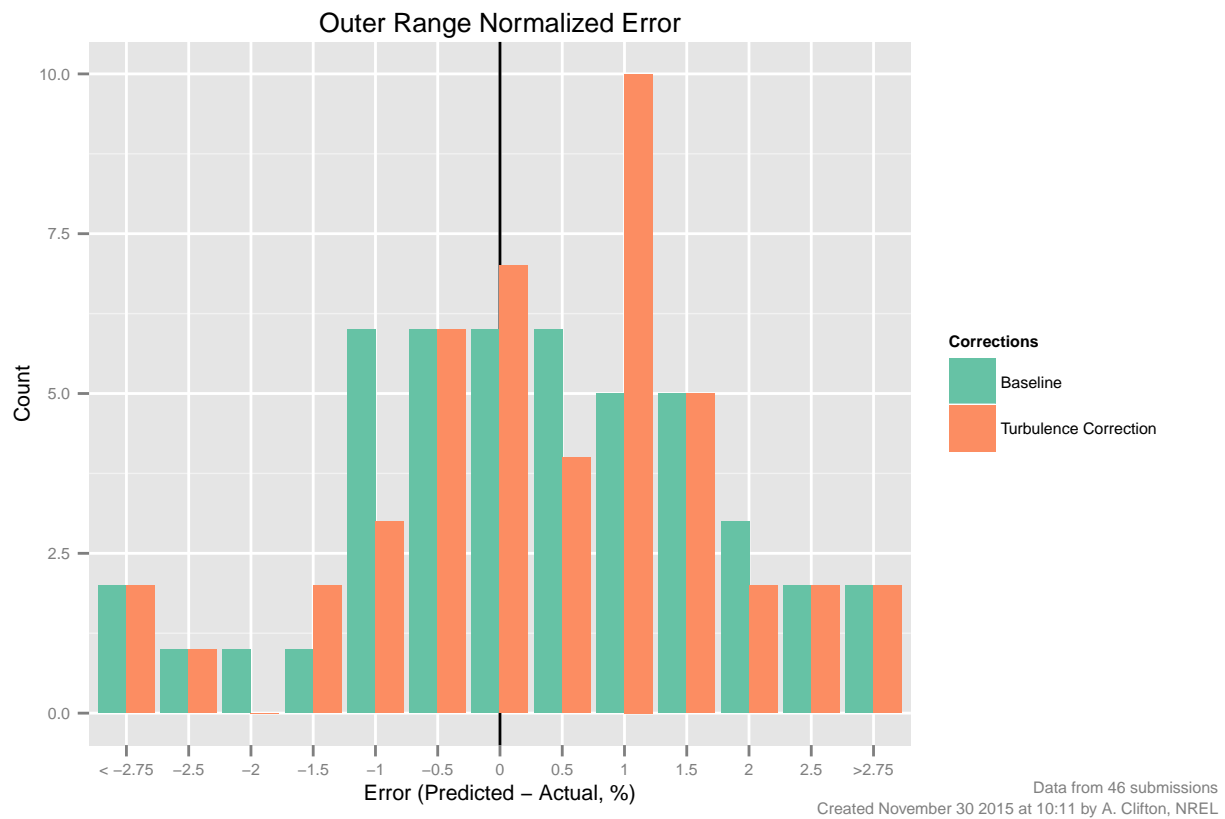
## Baseline Inner and Outer Range Error Histograms



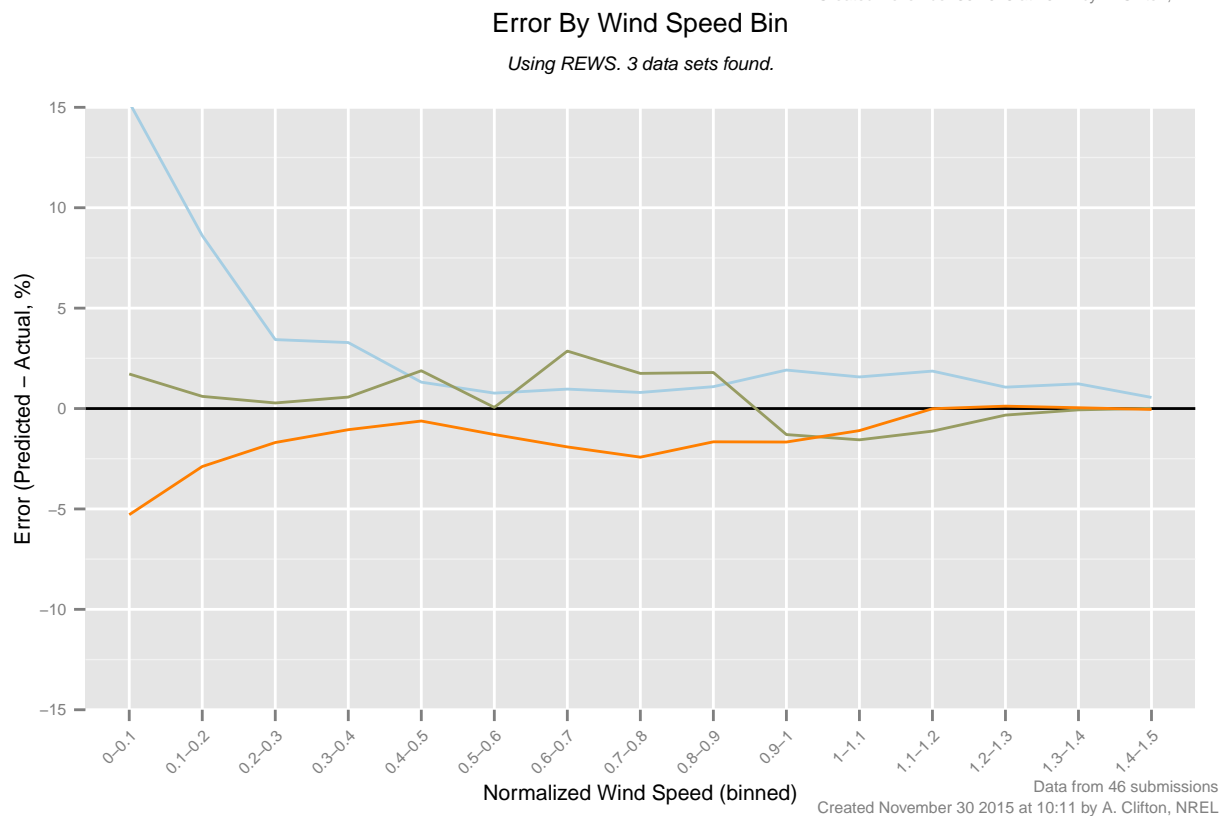
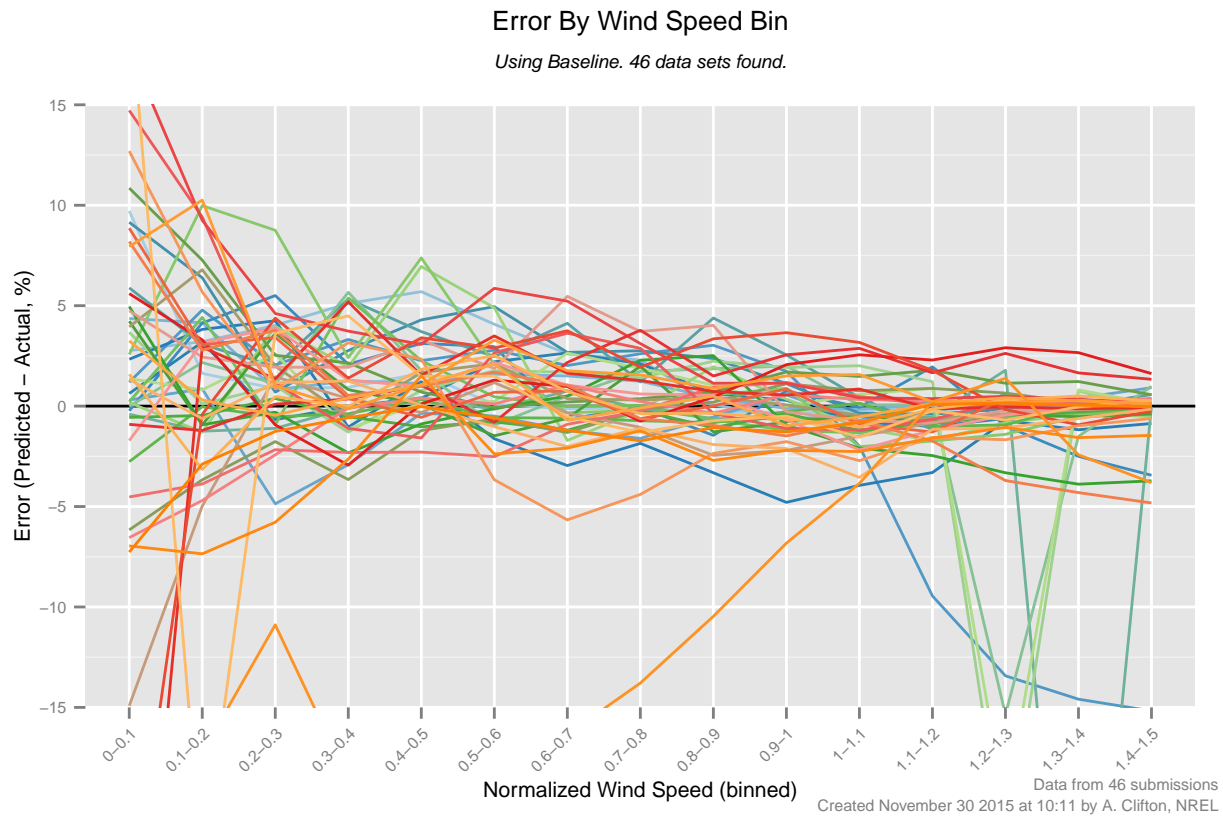
## Comparison of inner and outer range errors

plot baseline inner range versus other inner range NME, color by method

## The Effect of The Turbulence Correction on the Outer Range Error

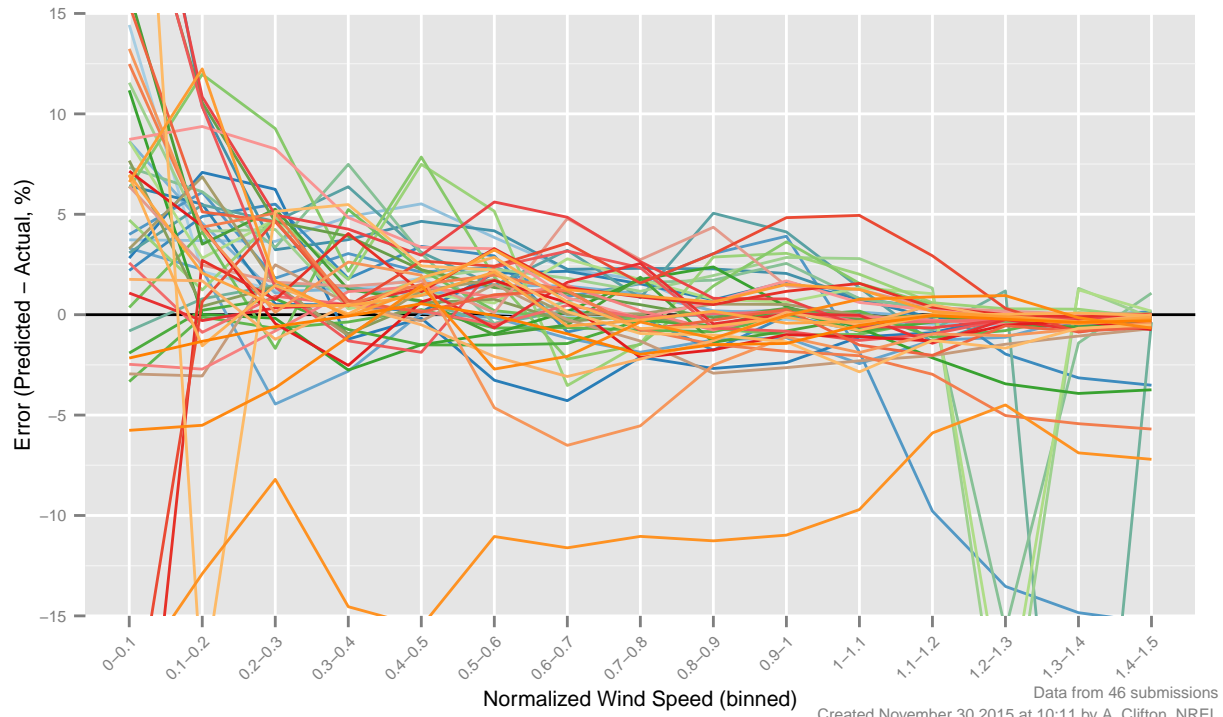


## Errors versus wind speed for all submissions



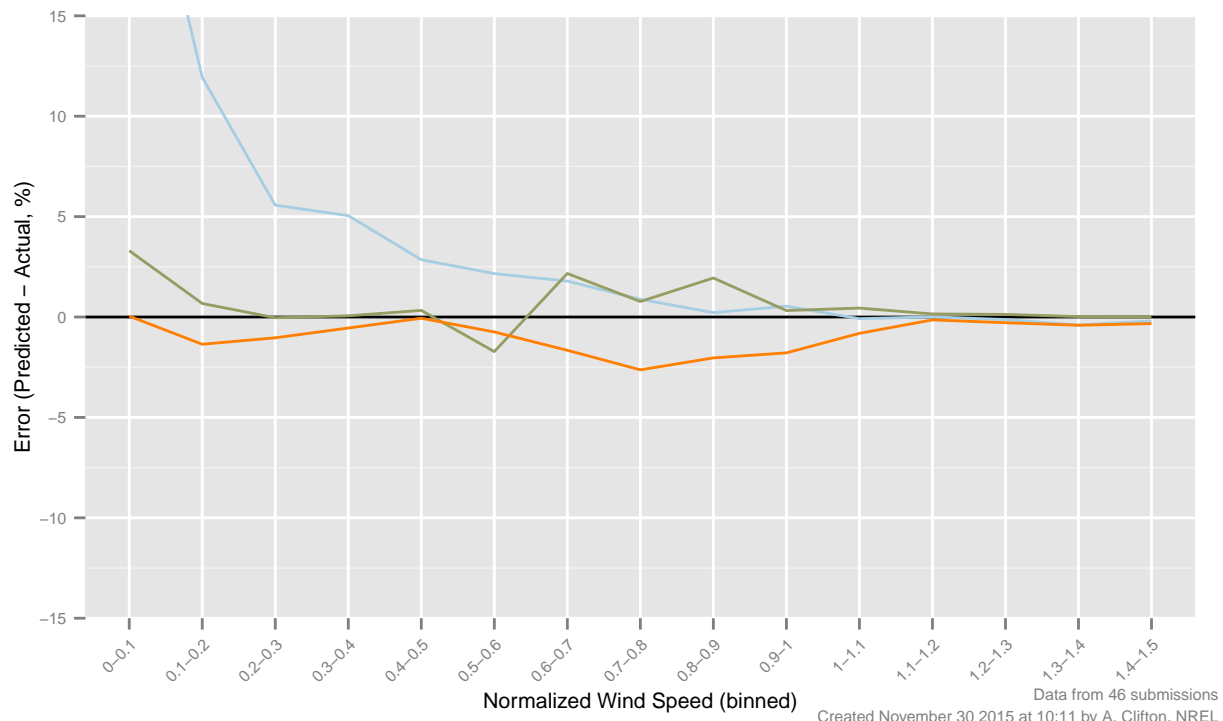
## Error By Wind Speed Bin

Using Turbulence Correction. 46 data sets found.



## Error By Wind Speed Bin

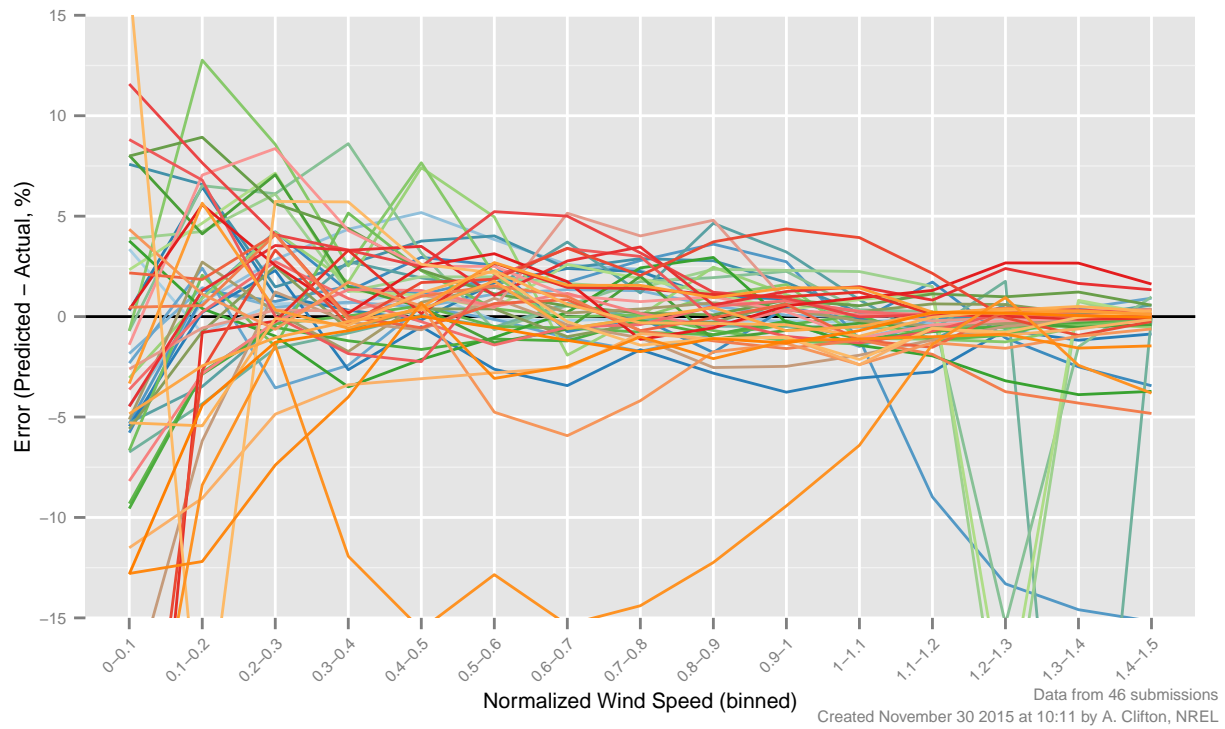
Using REWS & Turbulence Correction. 3 data sets found.



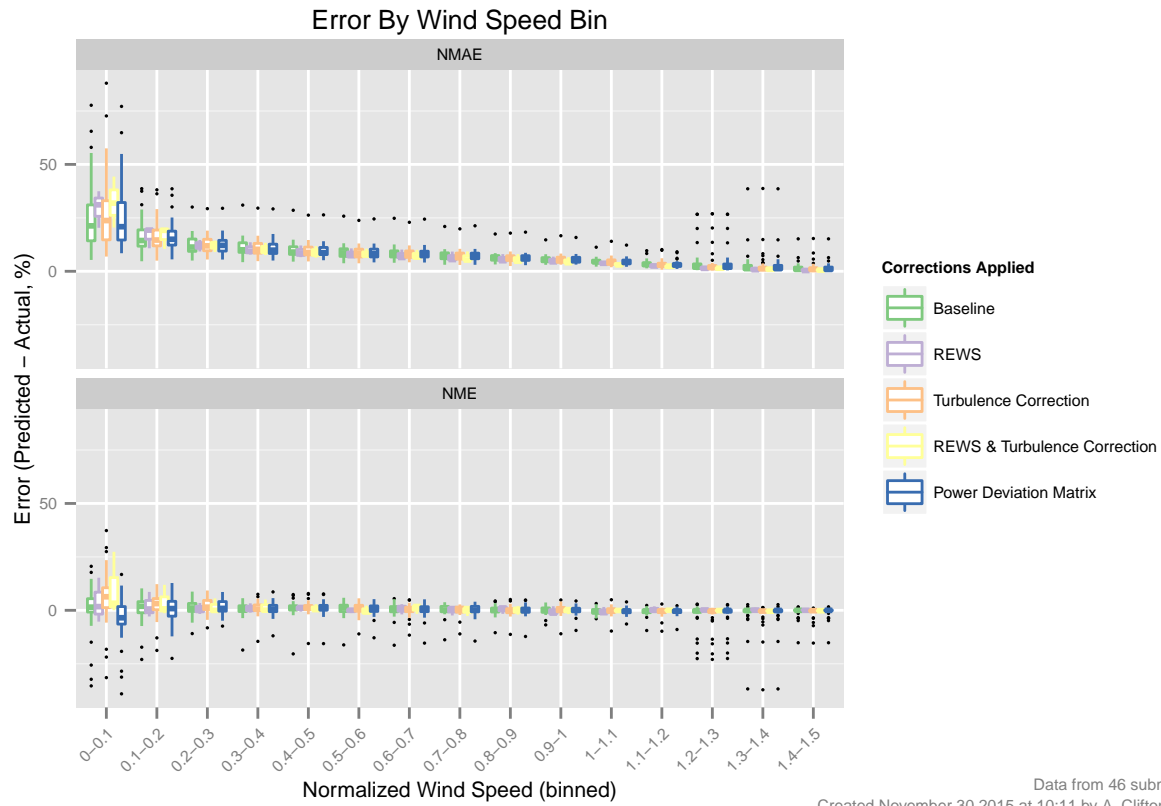


## Error By Wind Speed Bin

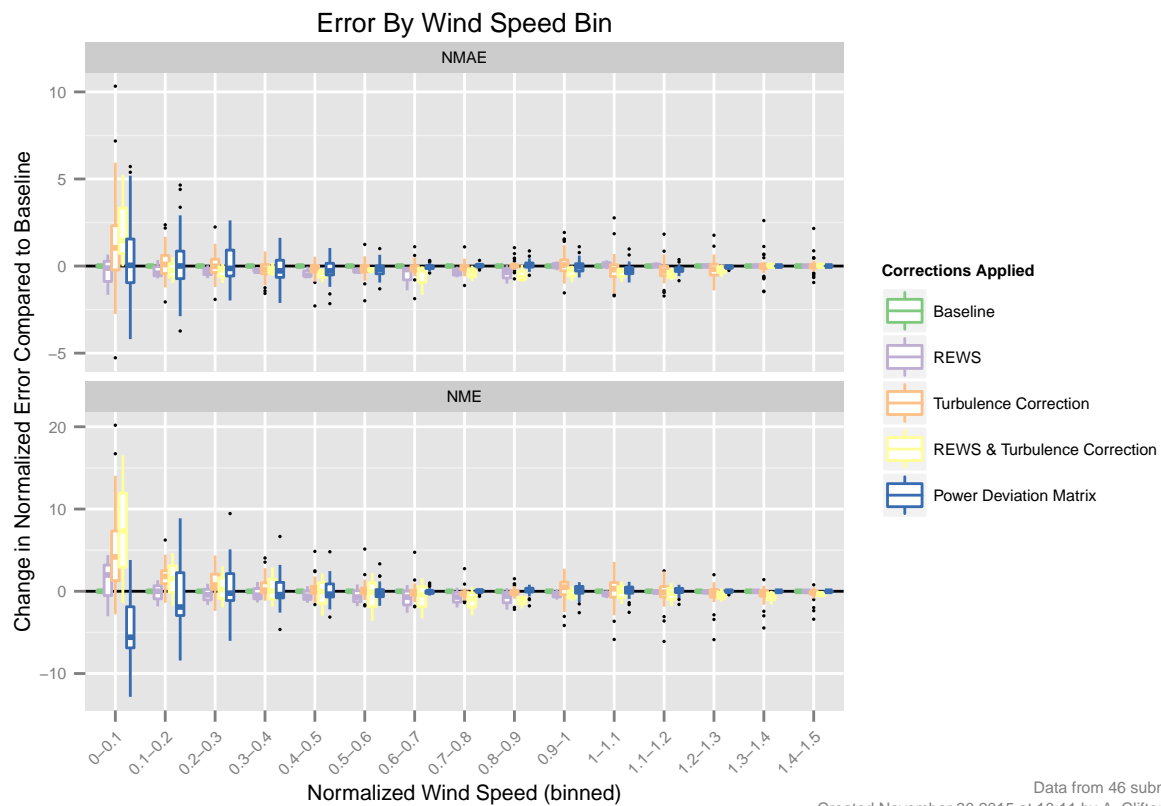
Using Power Deviation Matrix. 46 data sets found.



## Errors Binned by Wind Speed



## Change in errors binned by Wind Speed



## Errors Binned by Wind Speed and $T_i$

The plot

