Power Curve Working Group 5th Meeting
Validation Framework and Dataset 1 Overview

Peter Stuart
Senior Technical Manager

Wednesday 4th December 2013

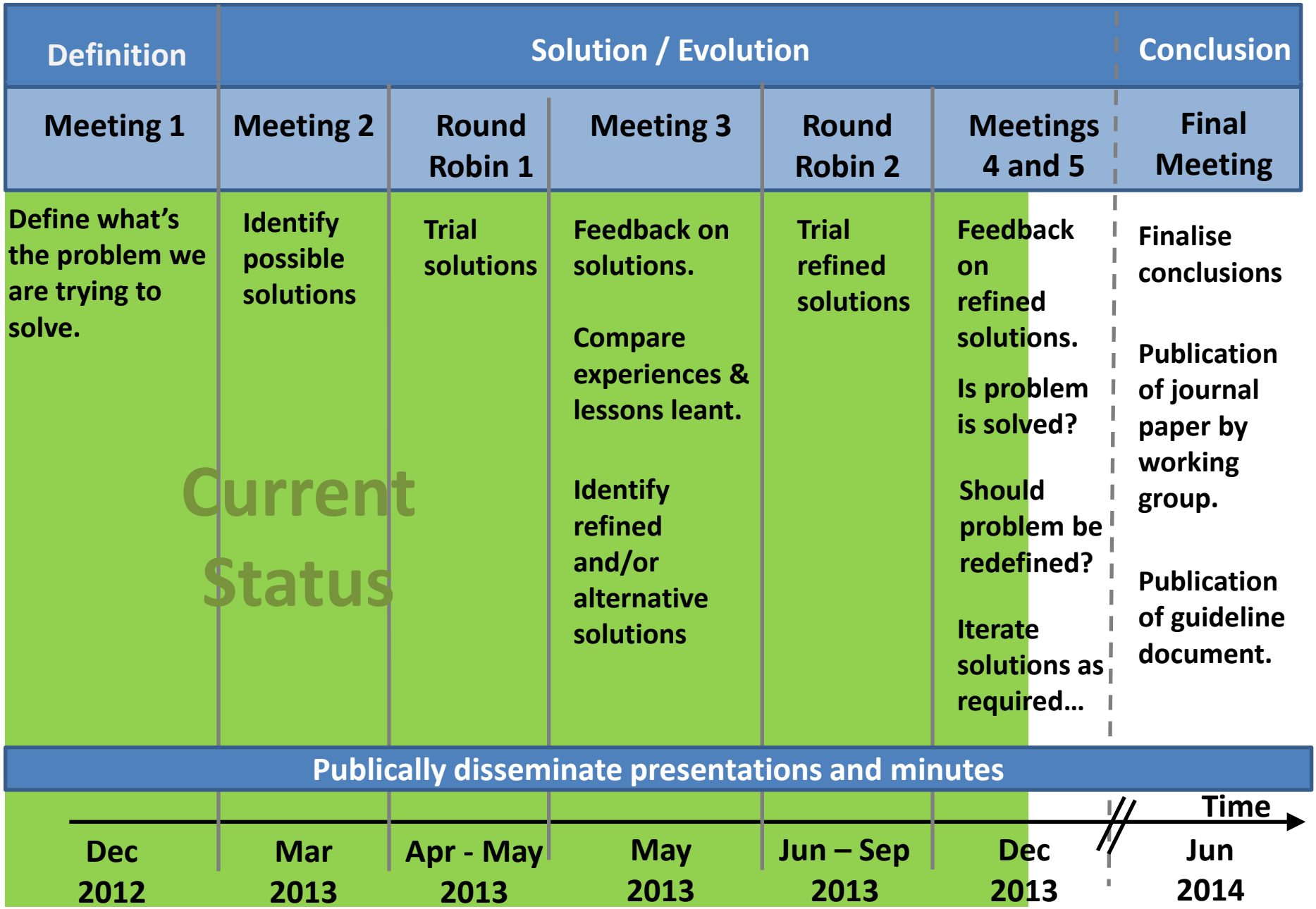
Agenda

PCWG Progress Overview

- The 1st meeting gave a clear statement of the **problem**.
- The 2nd meeting examined possible **solutions**.
- The 3rd meeting put some of those solutions into **practice**.
- The 4th meeting **consolidated** the learning by examining new datasets.
- The 5th meeting will focus on **validating** the candidate correction methods against real data.

There will be an in depth retrospective of the progress to date in the afternoon.

Power Curve Working Group Roadmap



Review of Actions from Last Meeting

- ✔ Final collation of Round Robin 2 Results (see minutes)
- ✔ Rotor Equivalent Wind Speed Consensus Analysis (Final)
- ✔ Turbulence Renormalisation Consensus Analysis (Draft)
- ✔ 1st Validation dataset published (based on dataset 1 from Round Robin)
- ✔ Draft Inner-Outer Range Proposal (circulated within group)

Agenda

Agenda Morning Part 1

10.00 – 10.05 “Welcome” Daniel Stevens (SSE)

Analysis of Validation Dataset 1

- 10.05 – 10.15 “Validation Framework and Dataset 1 Overview” Peter Stuart (RES)
- 10.15 – 10.30 “Dataset 1 Colour Map Analysis” Tomas Blodau (REPower)
- 10.30 – 10.45 “Rotor Equivalent Wind Speed: One Power Curve or Two?” Axel Albers (WindGuard)

Additional Validation Analysis

- 10.45 – 11.00 “GL DNV Validation Analysis” Richard Whiting (DNV GL)
- 11.00 – 11.15 “RES Validation Analysis” Alex Clerc (RES)
- 11.15 – 11.30 “EDF Validation Analysis” Jared Kassebaum (EDF)

Additional Open Datasets (11.30 – 12.00)

- Proposed SSE/Sgurr Dataset Dan Stevens (SEE) & Ralph Torr (Sgurr)
- Proposed RES Dataset
- Discussion: potential for other datasets?

12.00 – 12.15 "Rotor Equivalent Wind Speed and Turbulence Renormalisation Implementation in OpenWind" Nick Robinson (AWS TruePower)

12.15 – 13.00 Morning Discussion Session (Moderated by Peter Stuart)

- Rotor Equivalent Wind Speed Consensus Analysis
- Addition of Veer to REWS Consensus Analysis
- Turbulence Renormalisation Consensus Analysis
- Possible public distribution of Consensus Analysis.
- Inner /Outer Range Statement Document Discussion

13.00 – 14.00 Lunch

Afternoon Agenda (Moderated by Andrew Tindal GLGH)

Afternoon Discussion Session Part 1: 14:00 – 15:30

- 14:00 – 14:15 “One year on, A review of Working Group progress to date” (Andrew Tindal DNV GL)
- Open Discussion
  - Discussion of issues raised in presentations
  - Round robin of views of Manufacturers present – verbal or brief slides

15.30 – 15.45 Tea/Coffee Break

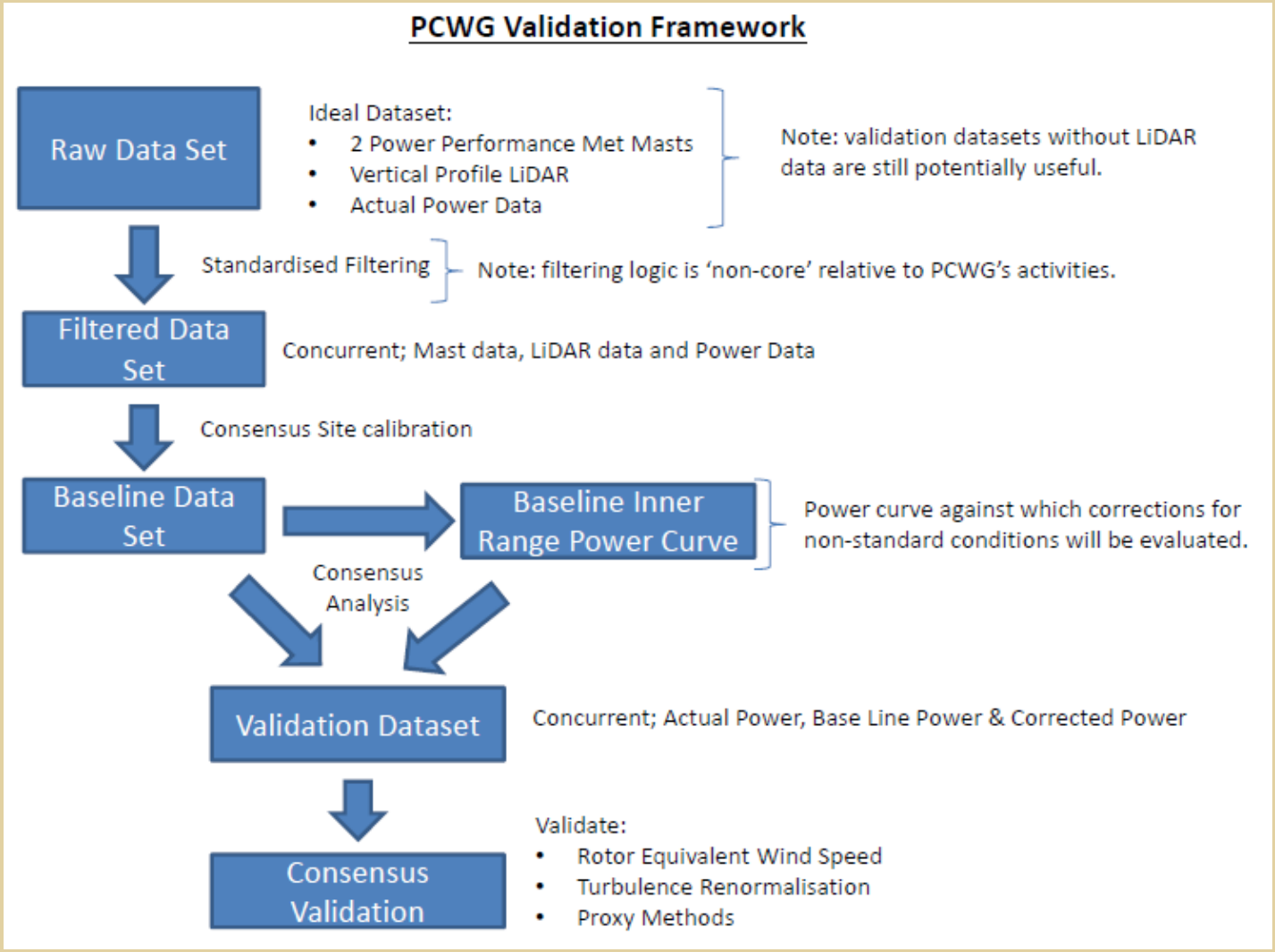
Afternoon Discussion Part 2: 15.45 – 17.30

Next steps for working group

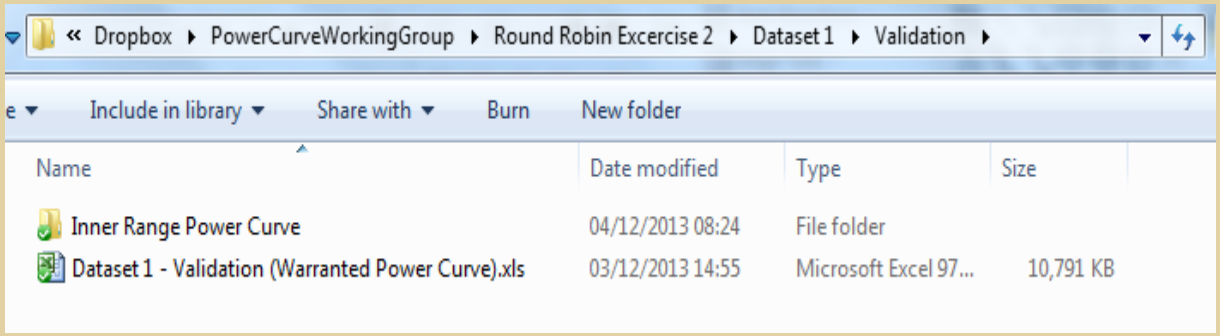
- Wrap Up, Conclusions (20 minutes)
- Continued Public Distribution of Minutes and Presentations (5 minutes)
- Venue for next meeting (5 minutes)

Validation Framework Overview

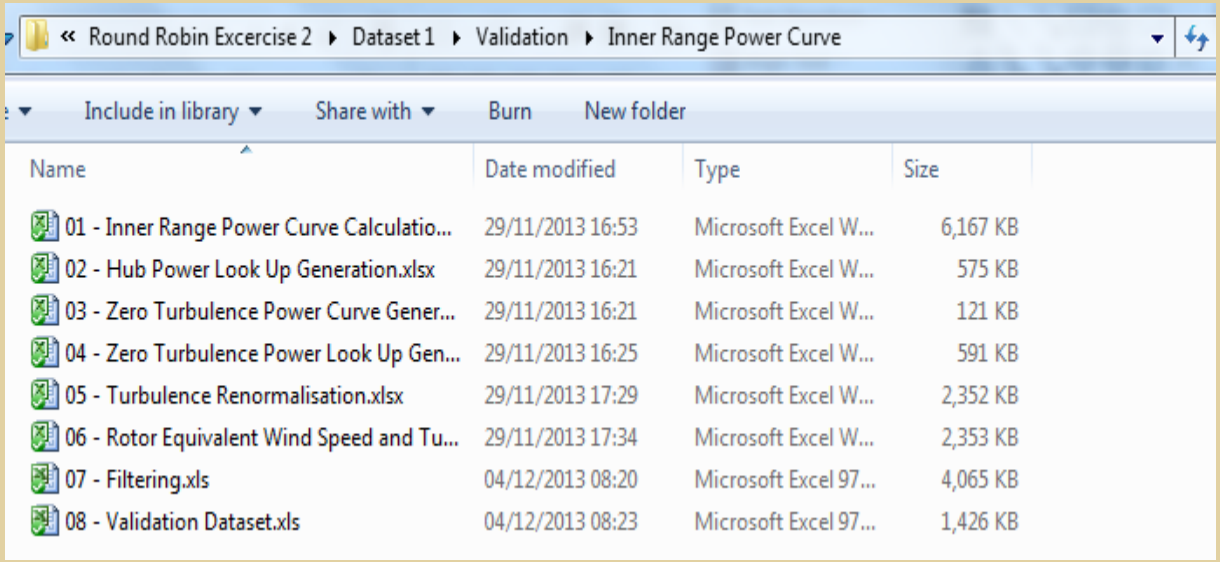
Validation Analysis Overview



Validation Dataset Flavours



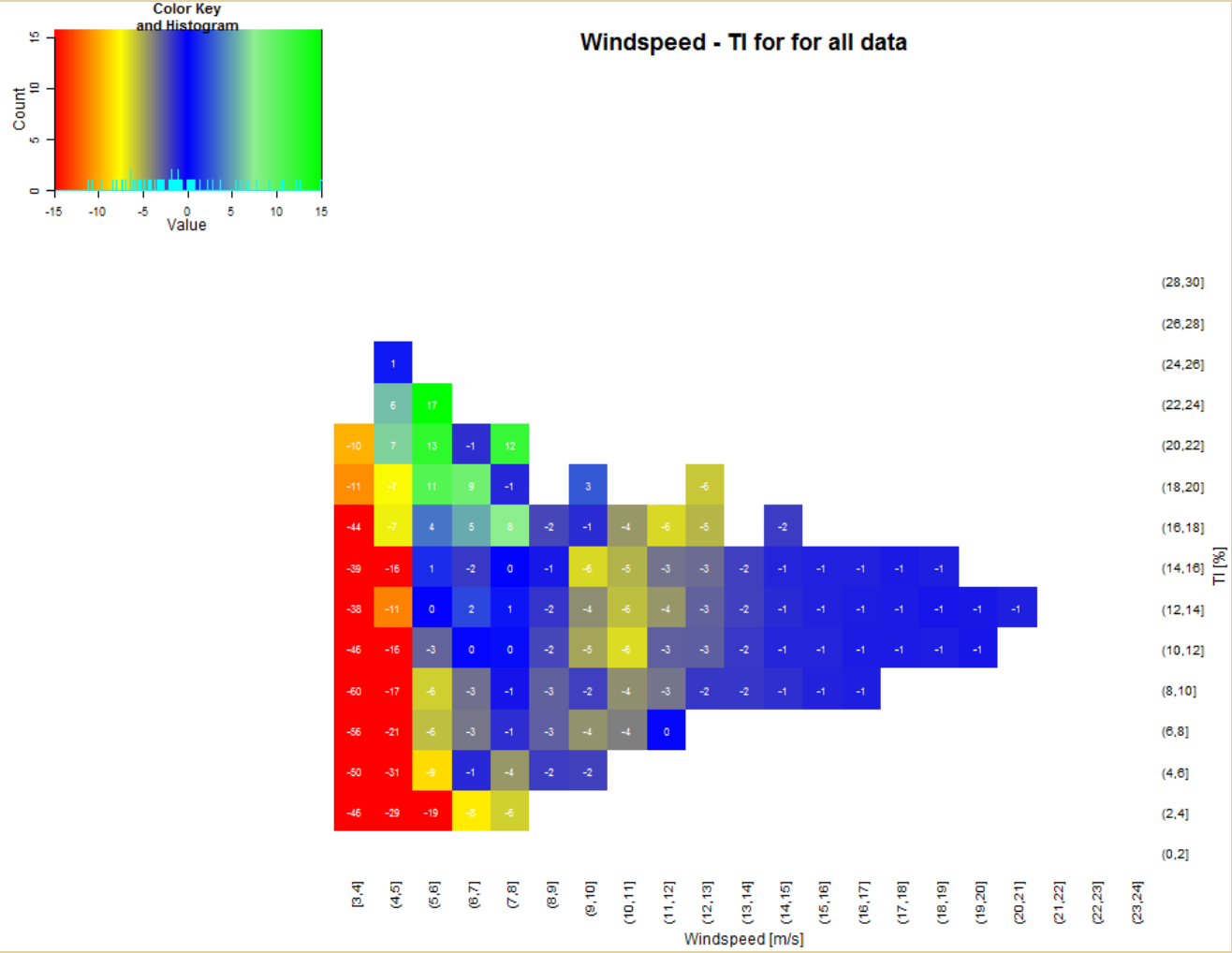
Warranted Power Curve Based – Consistent with Round Robin (Original)



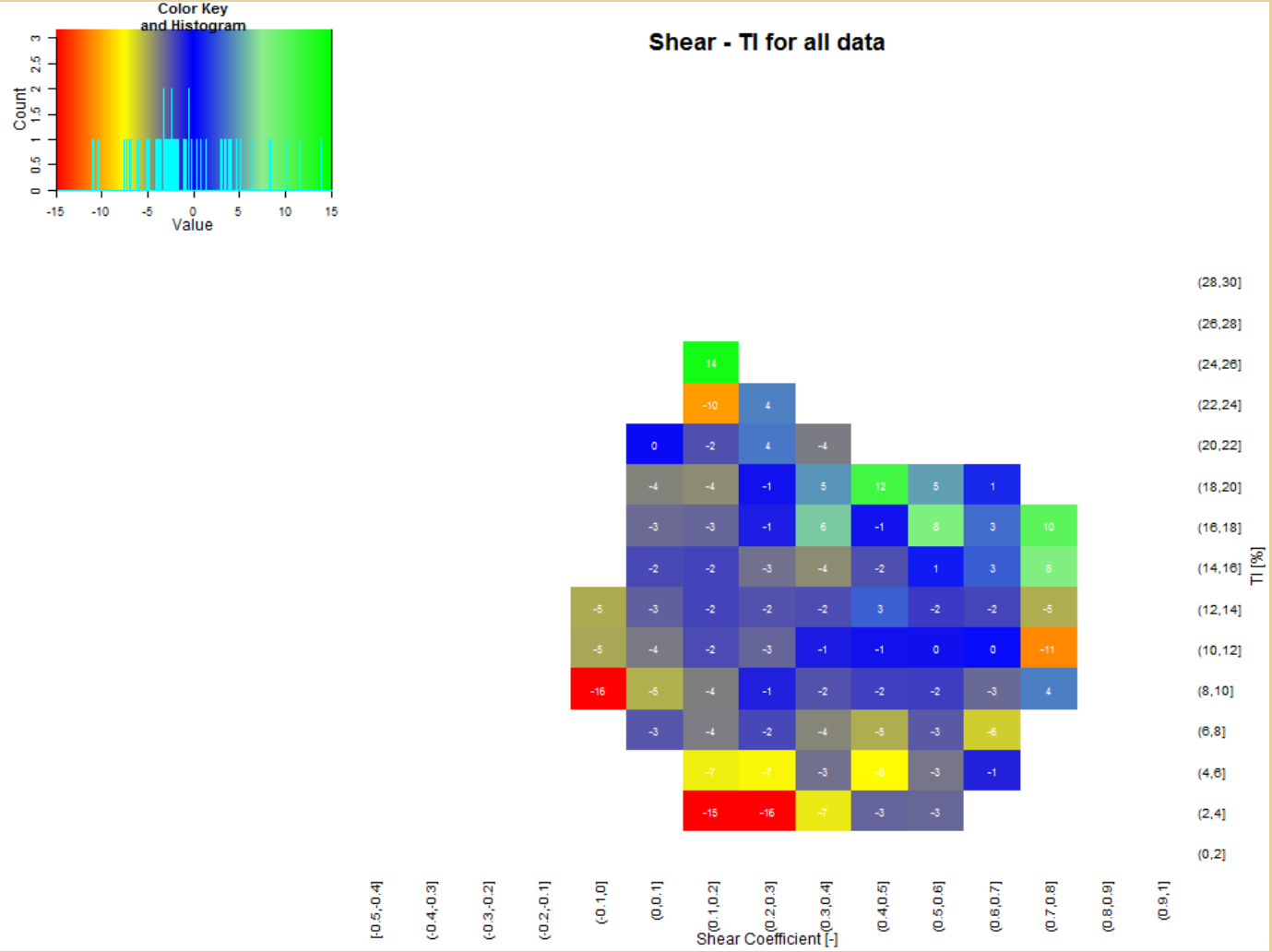
Inner Range Power Curve Based – Consistent with validation framework (just released)

Dataset 1 Colour-map Analysis (Relative to Warranted) Prepared by REPower

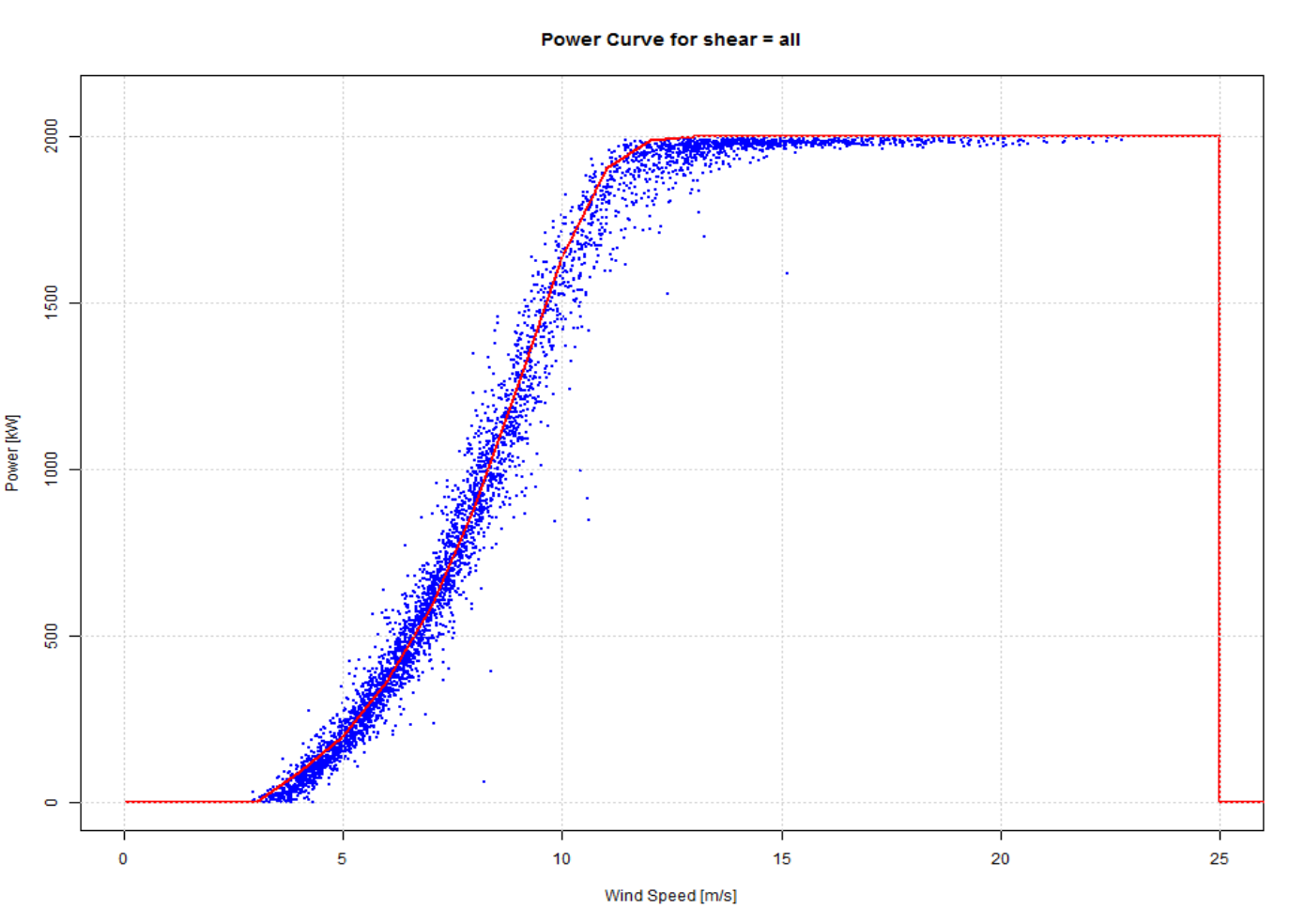
Wind speed vs. TI (All Data)



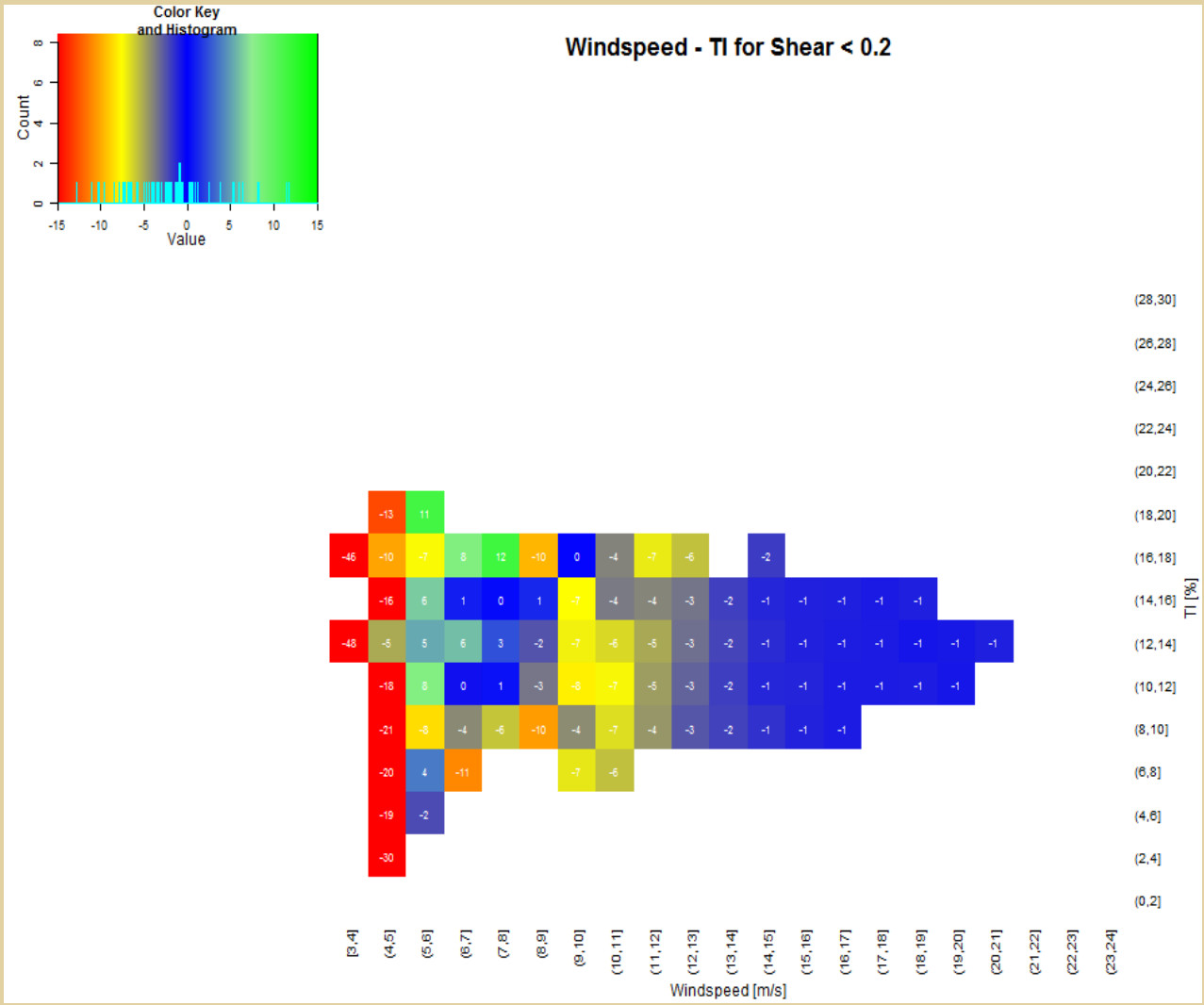
Shear vs. TI (All Data)



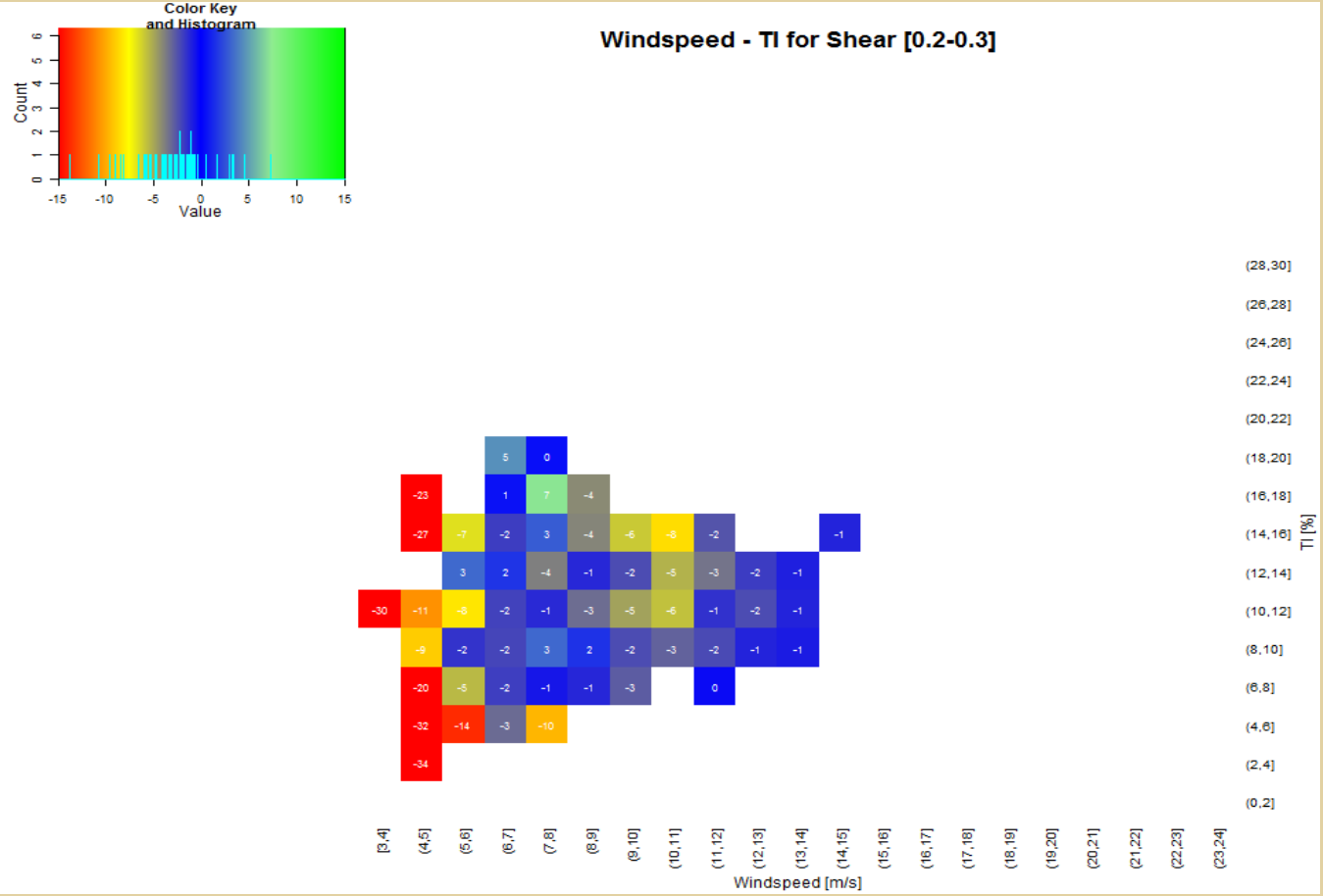
Power Curve for All Shear



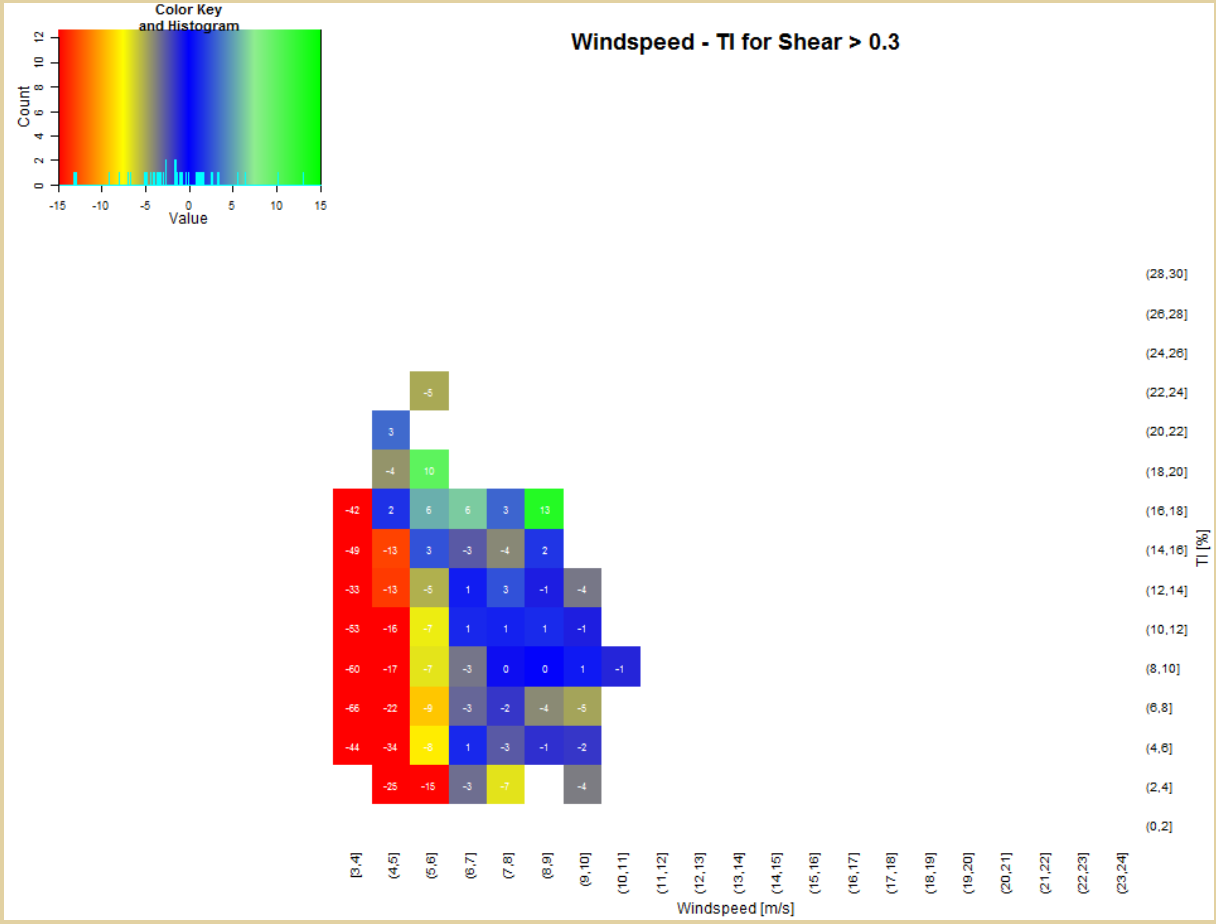
Wind Speed vs. TI (Shear < 0.2)



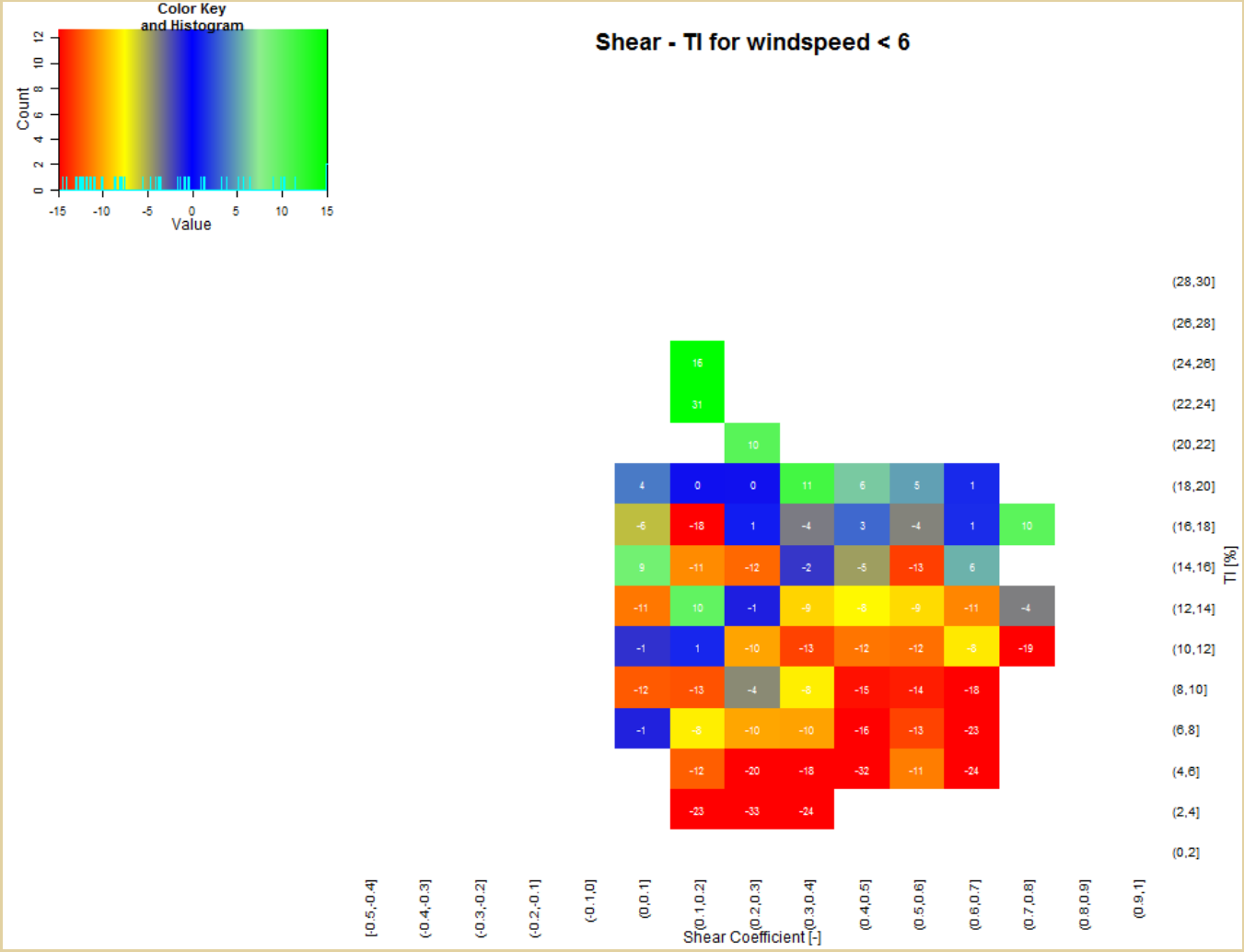
Wind Speed vs. TI (0.2 < Shear < 0.3)



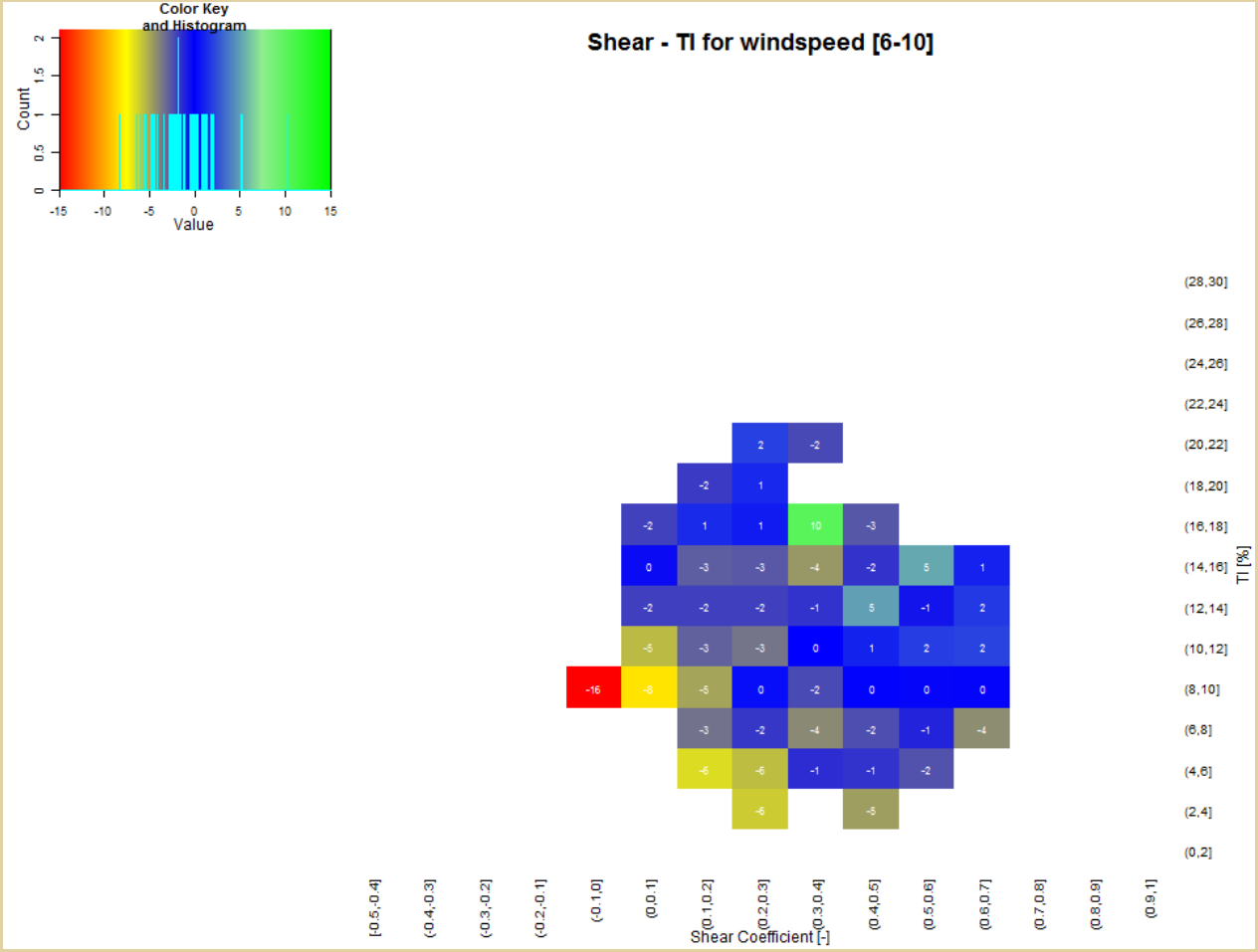
Wind Speed vs. TI for Shear > 0.3



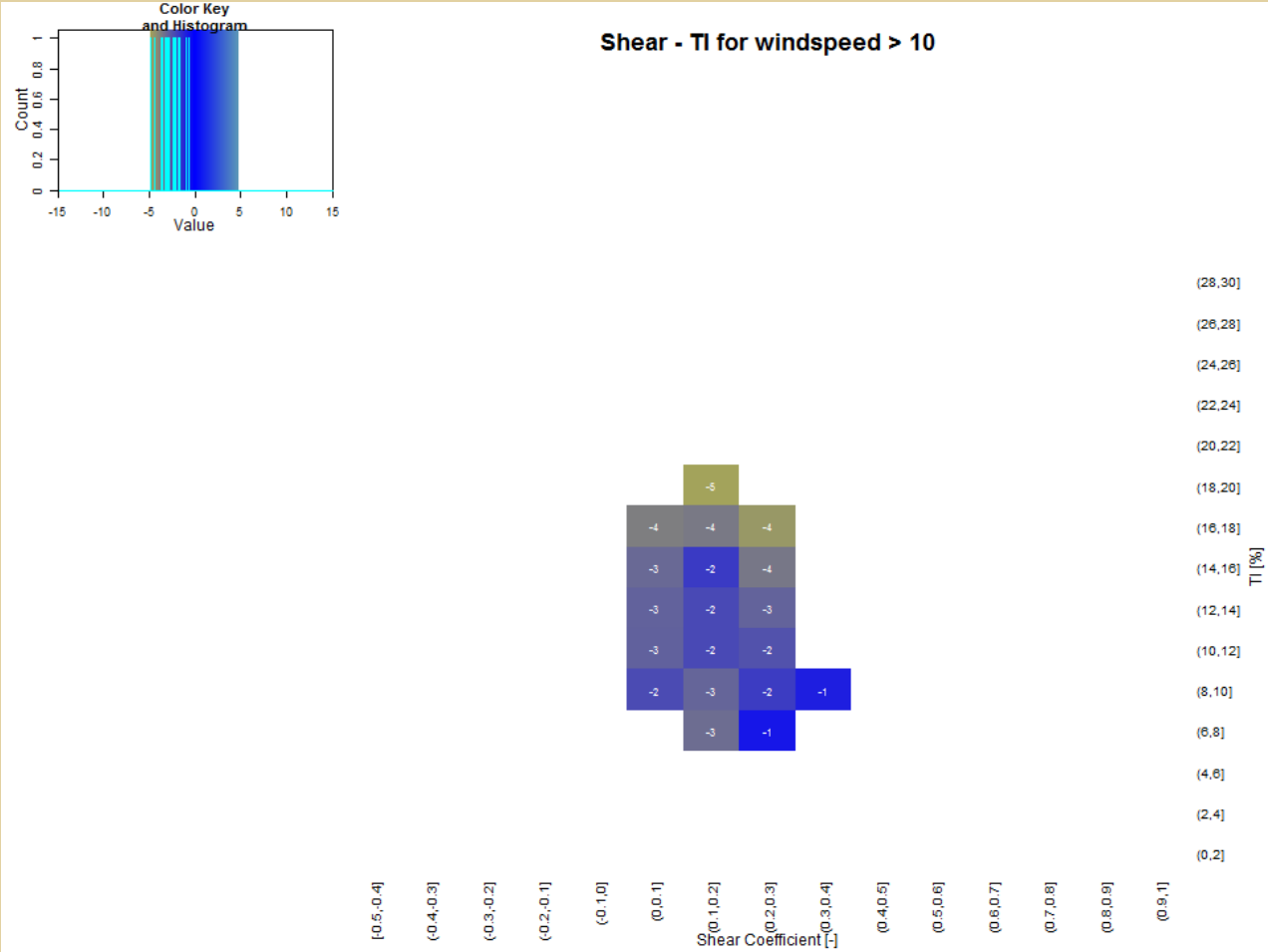
Shear vs. TI for Wind Speed < 6



Shear vs. TI for 6 < Wind Speed < 10



Shear vs. TI for Wind Speed > 10



power for good