Introduction to Shear Correction Exercises of Round Robin 2

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Round Robin 2 Assumptions

- Three data sets; a mast, co-located lidar and a nearby turbine assumed to have the same wind conditions at each
- All datasets are fully processed, quality controlled and filtered
- Turbine, mast and LiDAR location all experience the same wind
- No long-term or seasonal adjustment required
- It is appropriate to use the power curve provided with either hub height wind speed of REWS
- The provided power curve is valid for site air density
- Power curve reference turbulence intensity is 10%
- No ‘non-power curve’ loss adjustments factors required

Exercise 2.0 - Baseline

- Task is to calculate Specific Energy Production (SEP) for the specific timestamps provided in each dataset at the turbine location based on hub height wind speed

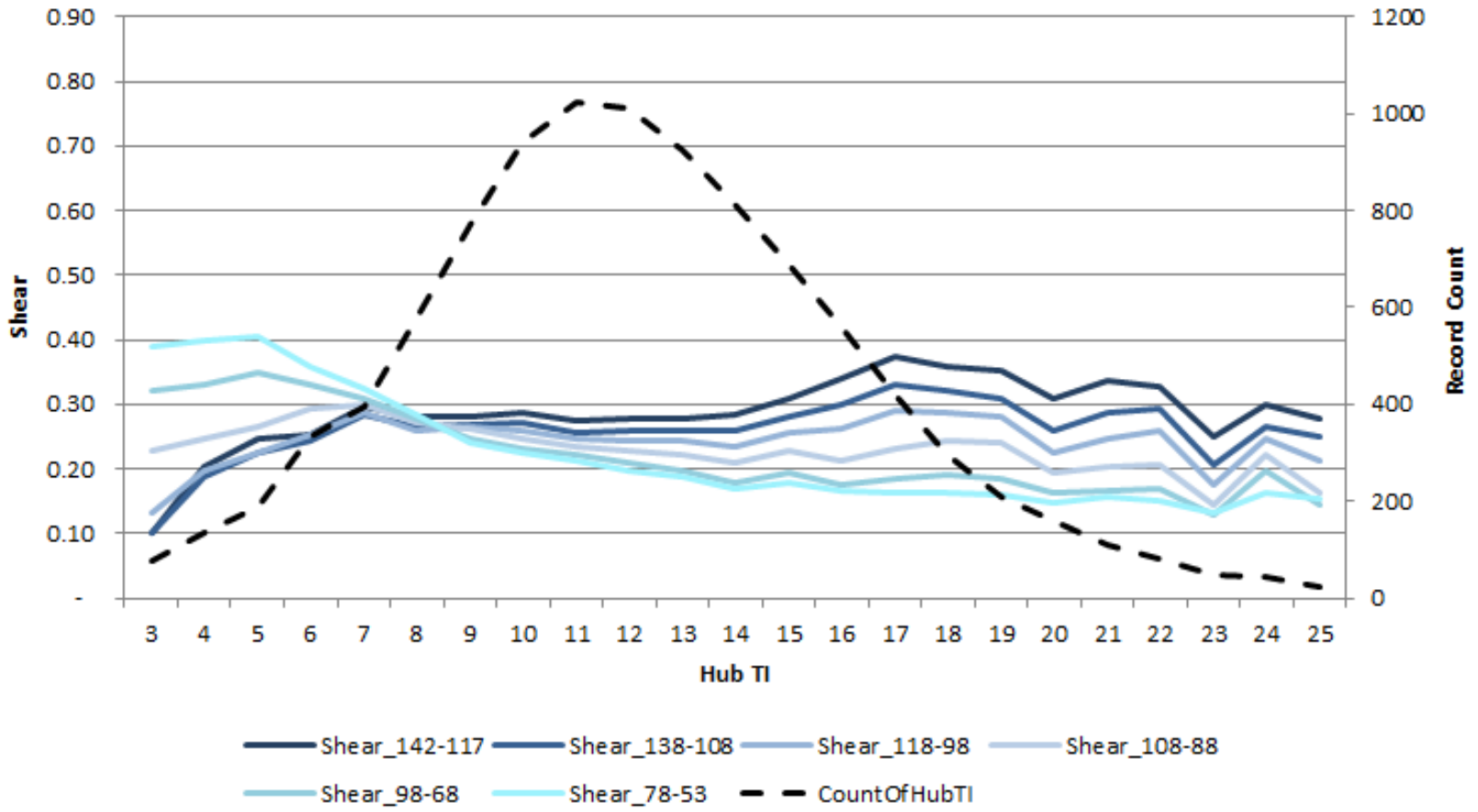
- Datasets:
  - Dataset 1 – Mast data at the hub height of 96 m
  - Dataset 2 – Mast data at 100 m, hub height assumed to be 96 m
  - Dataset 3 – Mast data at 71 m hub height of 96 m (Difference in shear methodology?)

Exercise 2.1 – Shear Correction

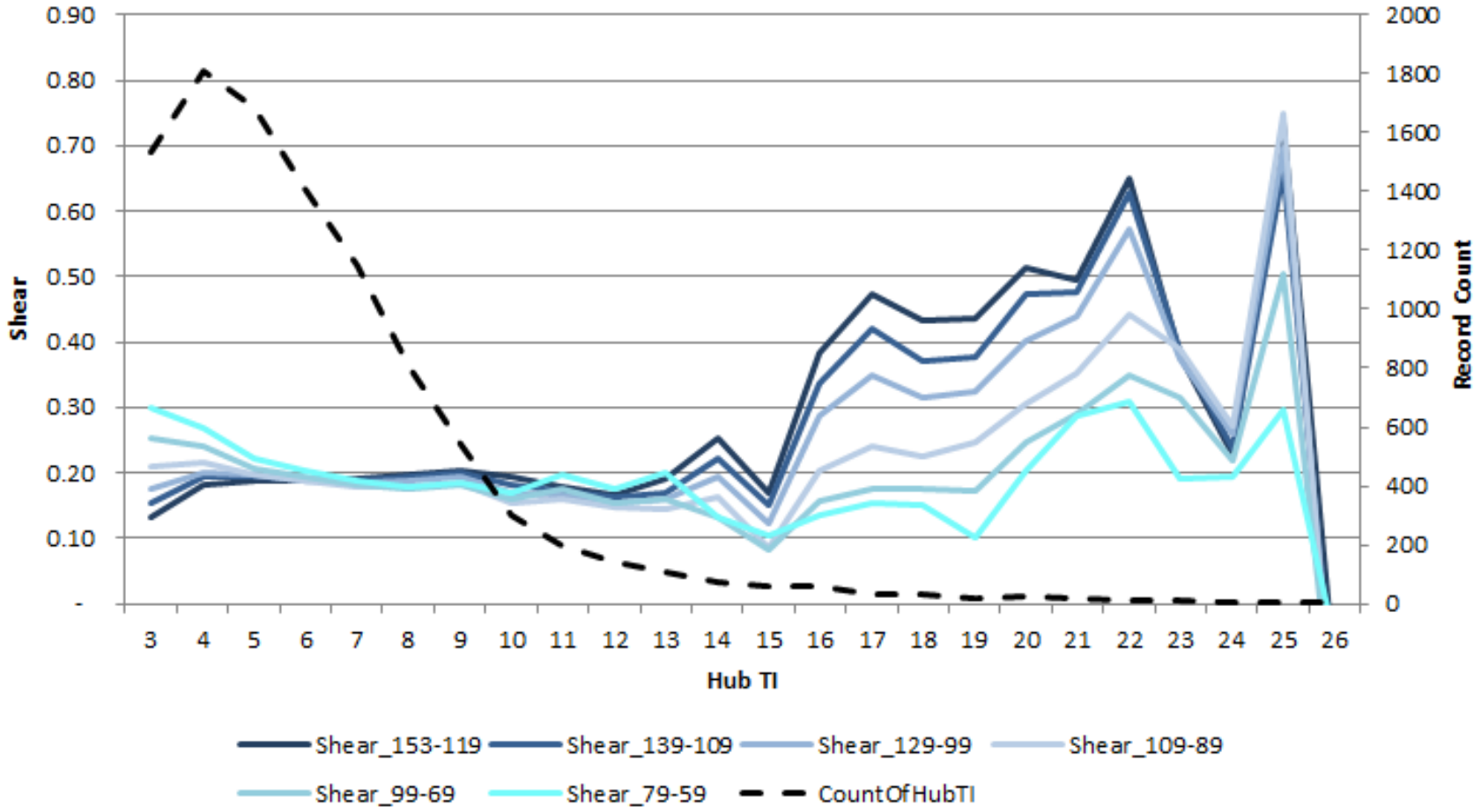
- Task is to calculate Specific Energy Production (SEP) for the timestamps provided in each dataset based on Rotor Equivalent Wind Speed (REWS)
- The REWS should be derived by combining the cup anemometer and lidar measurements whereby the hub height wind speed from the cup anemometer is multiplied by the ratio of REWS to hub wind speed from the lidar
- Datasets:
  - Dataset 1 – Mast data at the hub height of 96 m (lidar data measurement at 97.5 m)
  - Dataset 2 – Mast data at 100 m, hub height assumed to be 96 m (lidar data measurement at 99 m)
  - Dataset 3 – Mast data at 71 m hub height of 96 m (lidar data measurement at 100 m)

Shear across the rotor – Dataset 1

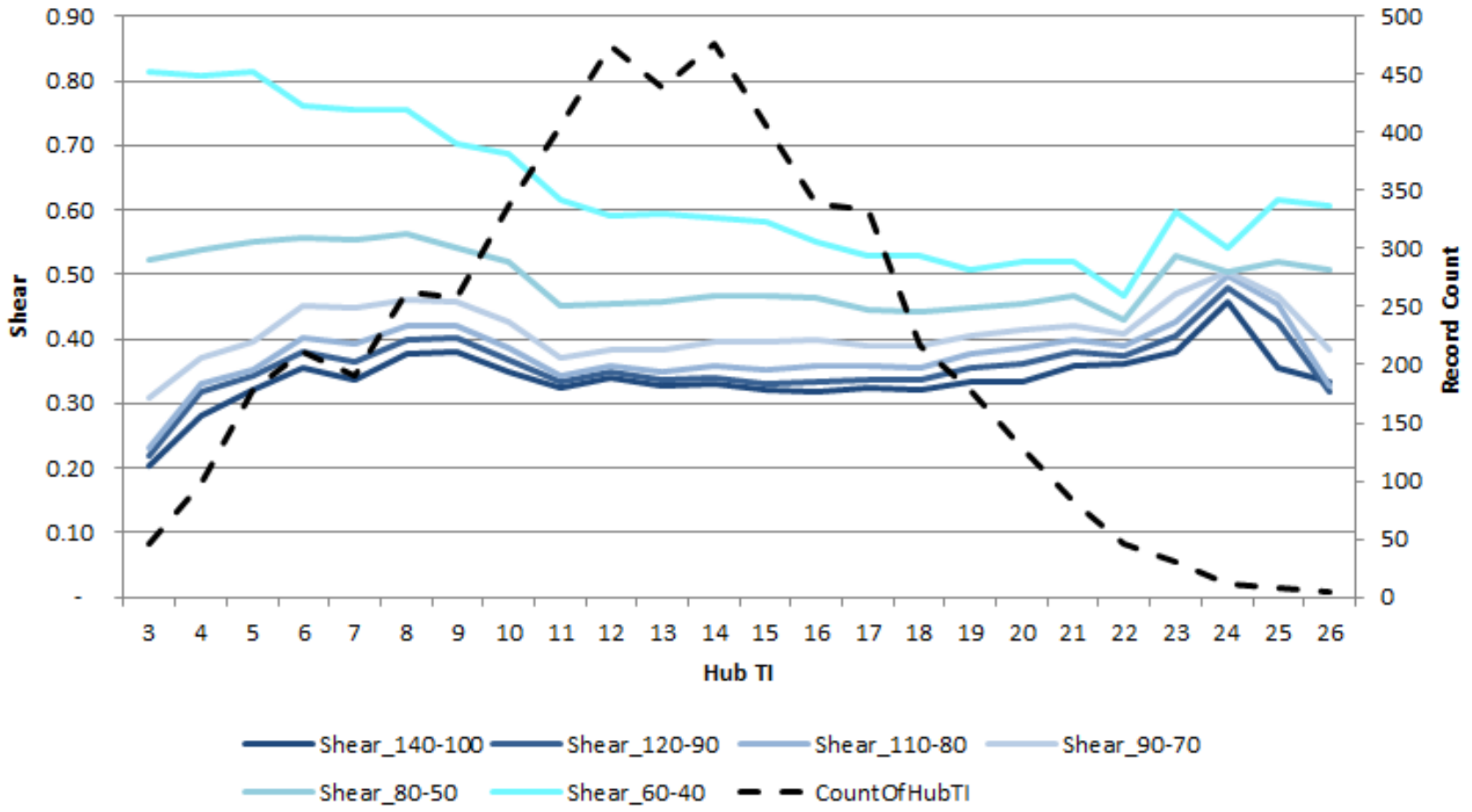
- Shear increases with height AGL for most of the data



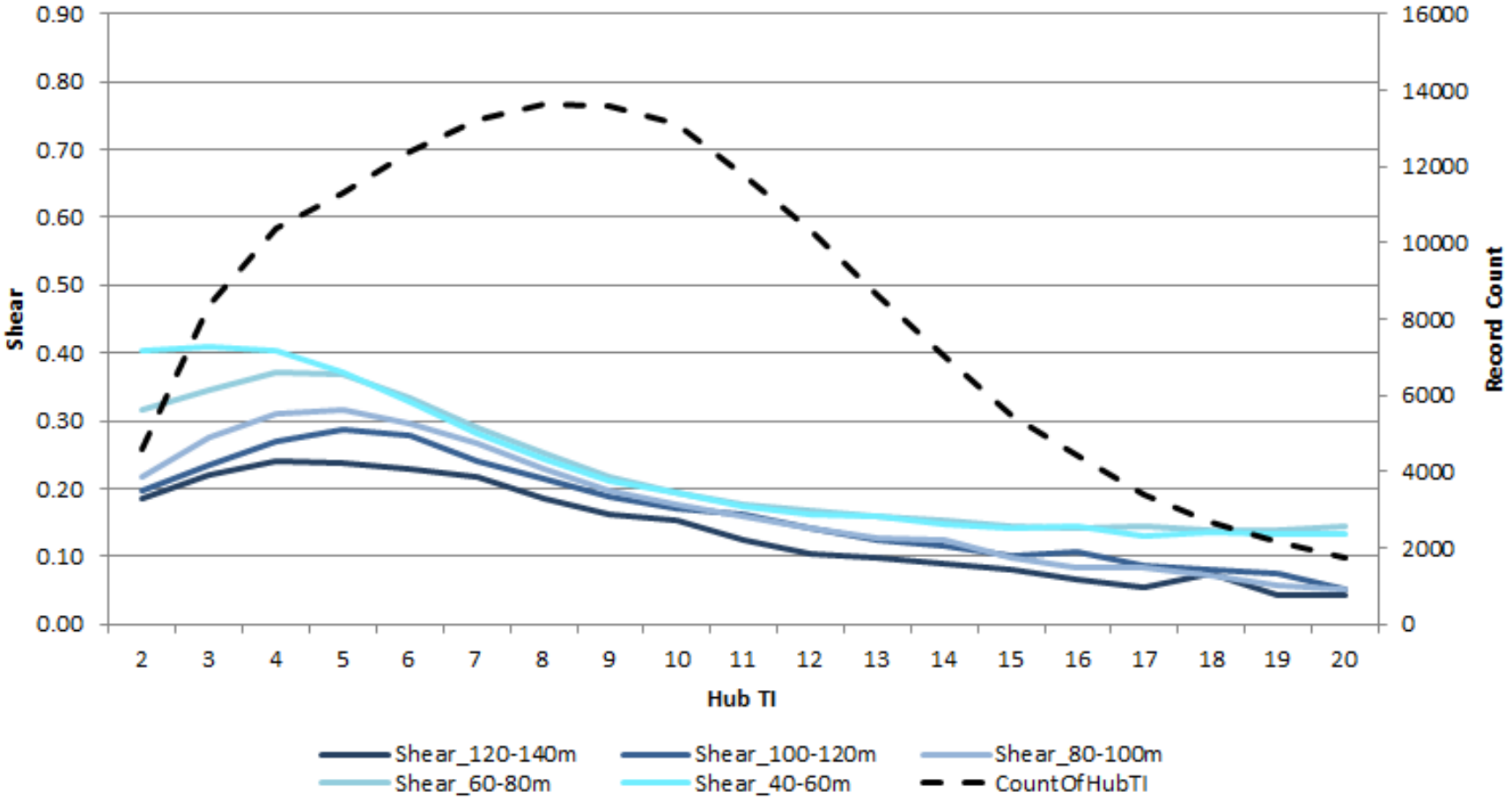
Shear across the rotor – Dataset 2



Shear across the rotor – Dataset 3



Shear across the rotor – Central US site



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