

Background

- Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) expressed interest in installing wind turbines at a site in Cambridge Bay, Nunavut. WEICan was contracted by Natural Resources Canada (NRCan) to analyze whether the wind resource has suitable potential for power generation at the chosen site.
- **September 2013** - WEICan installed a 34 m meteorological tower at Cambridge Bay, Nunavut 2013. WEICan monitored data until December 2018.
- **March 2020** - The tower was recommissioned. All sensors were replaced. Sensors were also added to assess solar generation potential. WEICan monitored data for another year.



Installed Sensors and Height

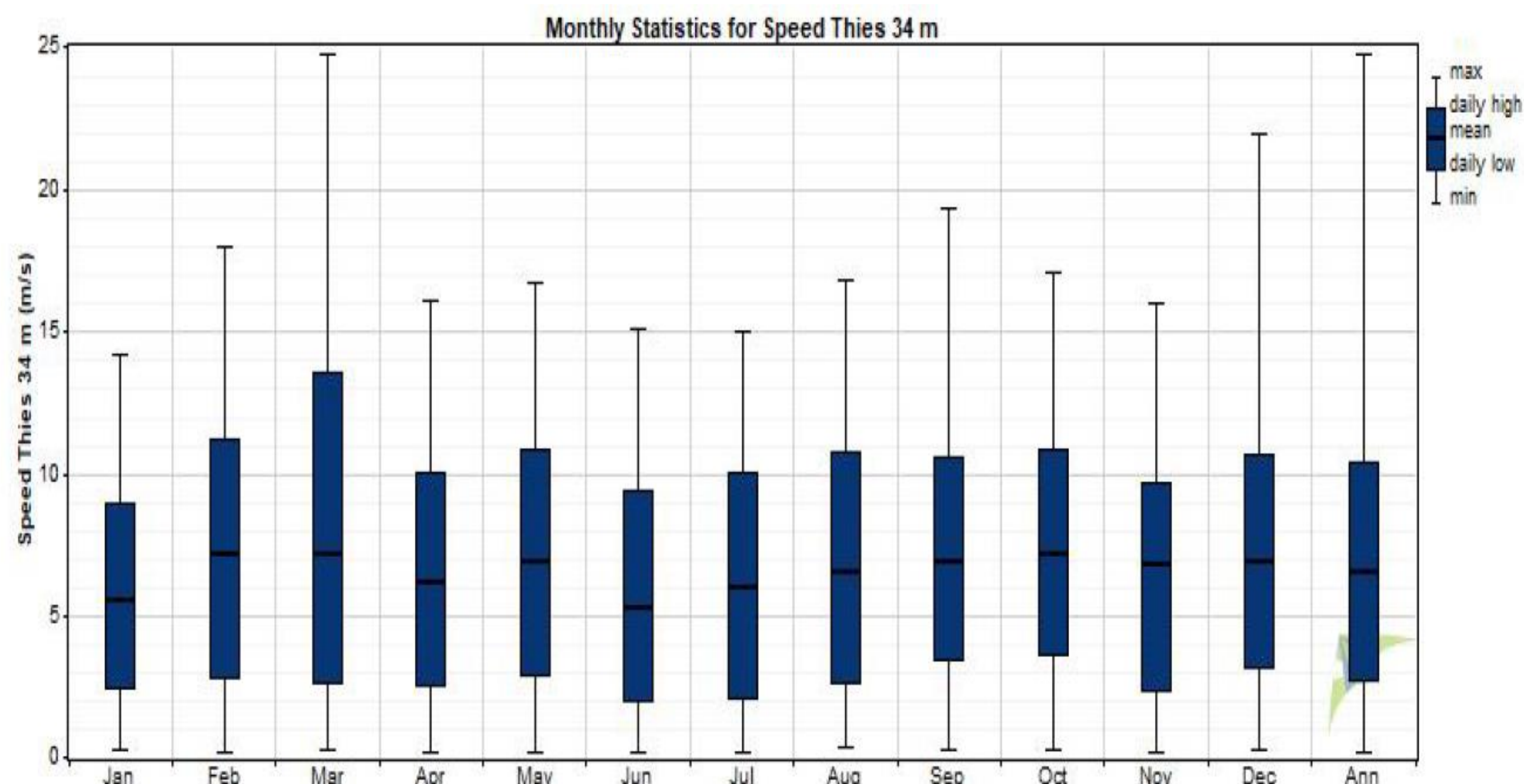
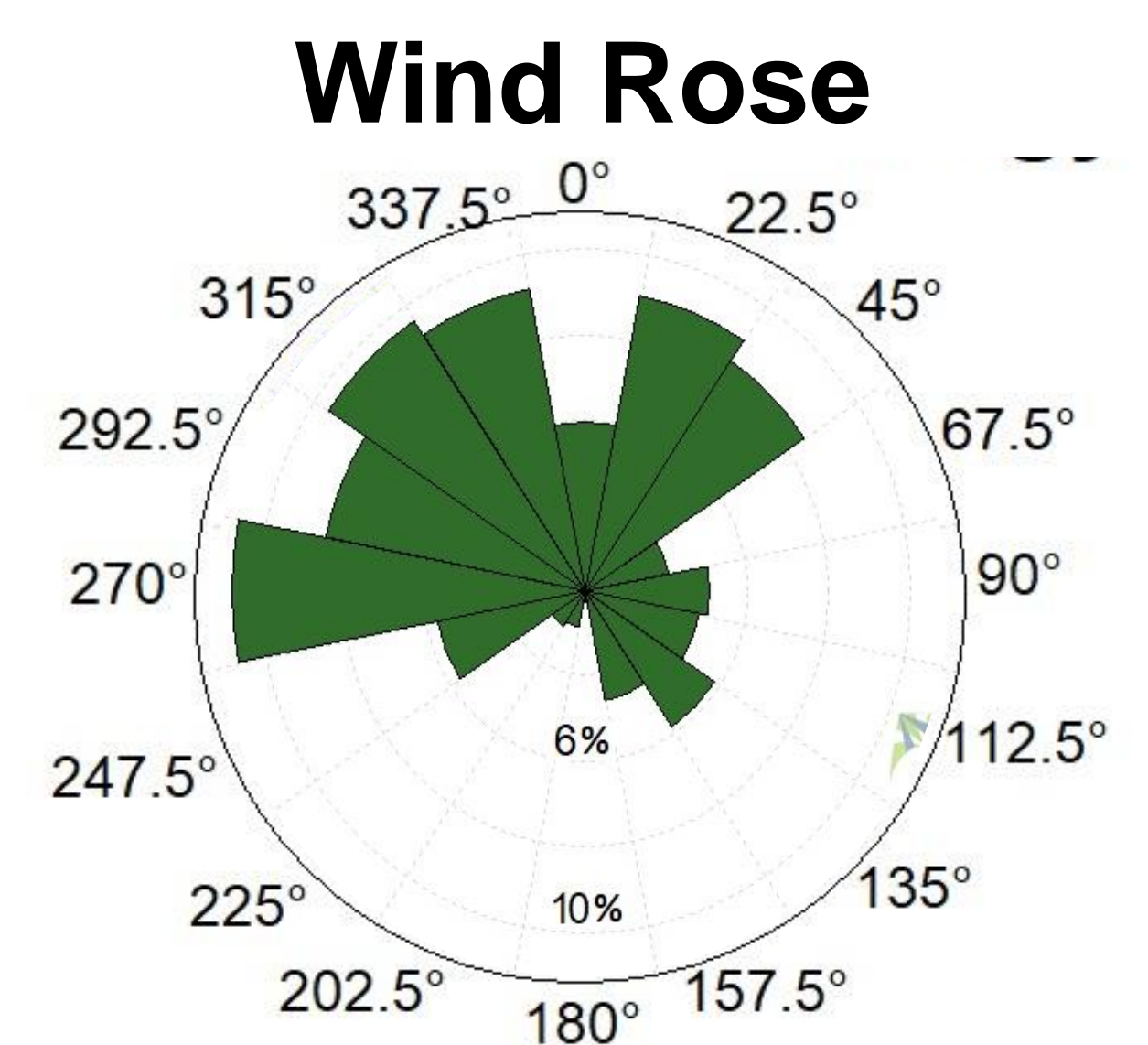
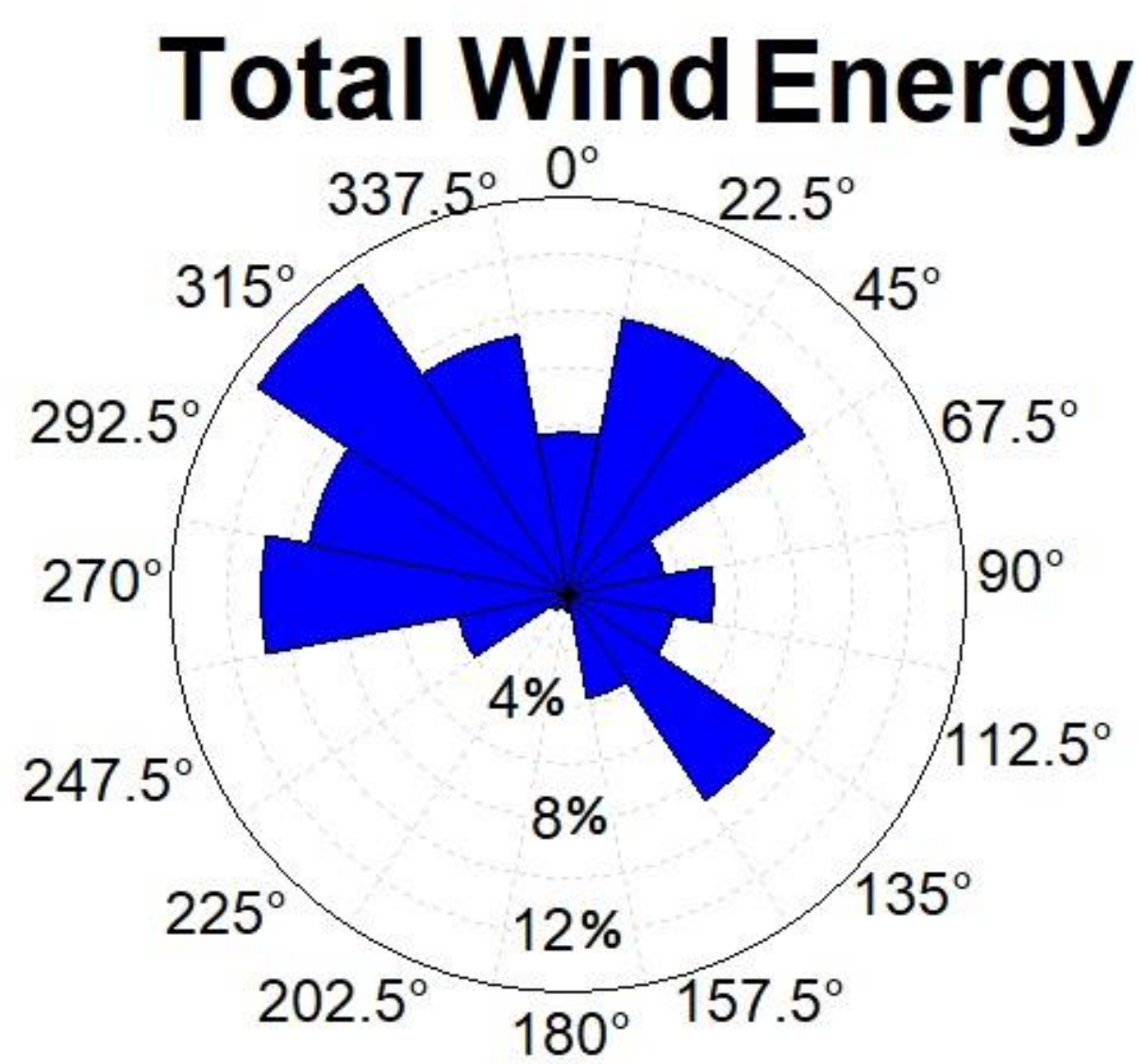
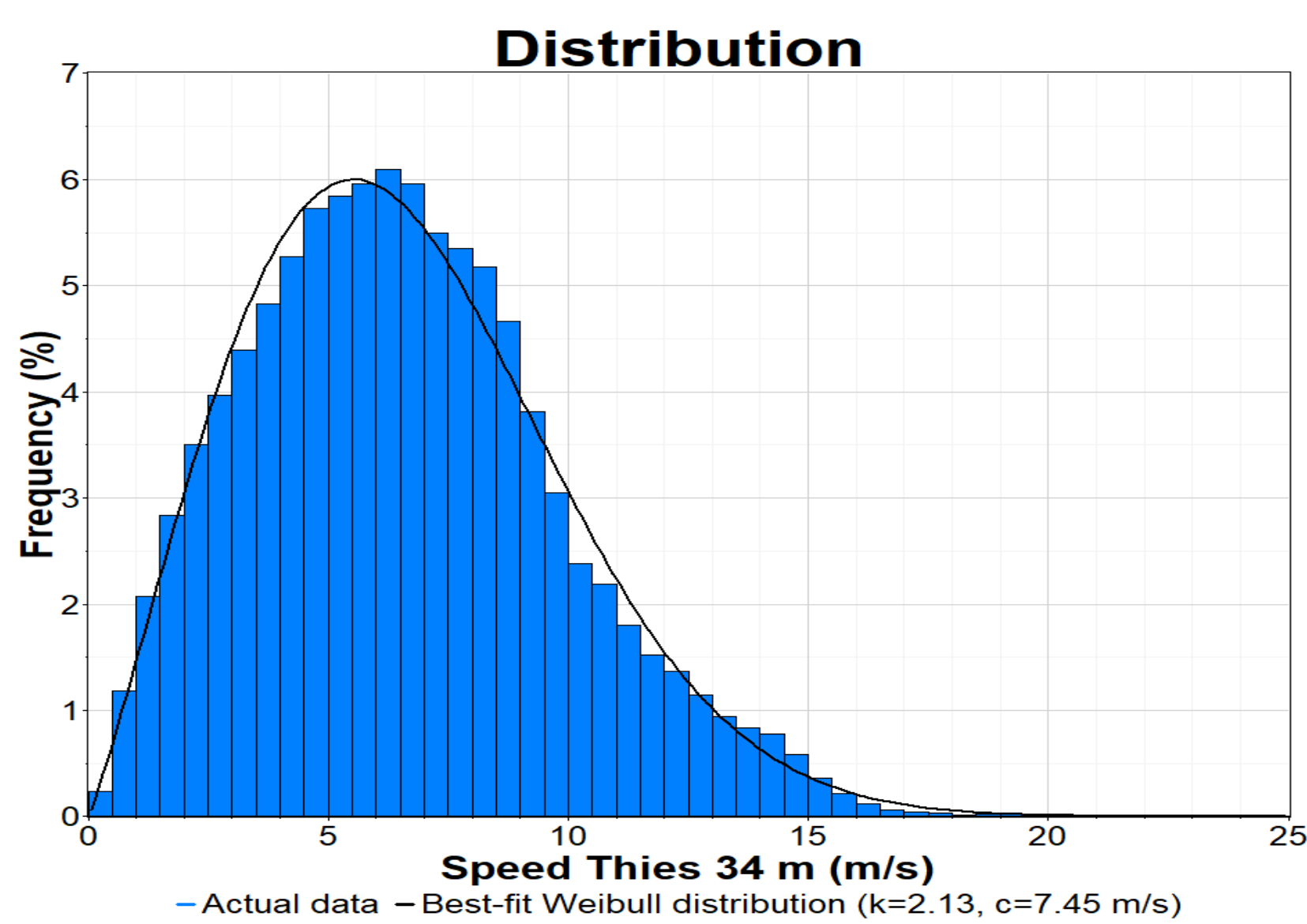
Thies First Class Anemometer	34 m
NRG ICEFREE3 Heated Anemometer	34 m
Thies First Class Anemometer	20 m
NRG ICEFREE3 Heated Anemometer	20 m
NRG 200M Vane	33 m
NRG 200M Vane	19 m
NRG T60 Temperature	4 m
Hukseflux LP02-05 Pyranometer	4 m
Hukseflux LP02-05 Pyranometer	4 m

Results and Conclusions

The wind resource assessment undertaken at the Cambridge Bay monitoring site was found to have an average 6.4 m/s wind speed at the 34 m height anemometer, with the highest average in the month of March.

The predominant wind direction was Northwest at the 33 m height wind vane. The highest proportion of energy in the wind also occurred in the Northwest direction. The surface roughness for the monitoring site was low, at 0.0283 m, and the turbulence intensity was also low, 0.07 at 15 m/s, or IEC Class C. The wind power density at 34 m was 331 W/m² which falls within Wind Power Class 3 or "fair".

Pyranometer data identified the average solar irradiance at approximately 293 W/m², with the highest peak observed in May, at 645 W/m². The total irradiance during the 12-month period was approximately 990.1 kWh/m².



Cambridge Bay Site Characteristics (March 3, 2020-March 9, 2021):

Average Temperature: -12.2 °C
 Average Wind Speed: 6.40 m/s
 Total Irradiance: 990.1 kWh/m²