Translating Research into Operational Services

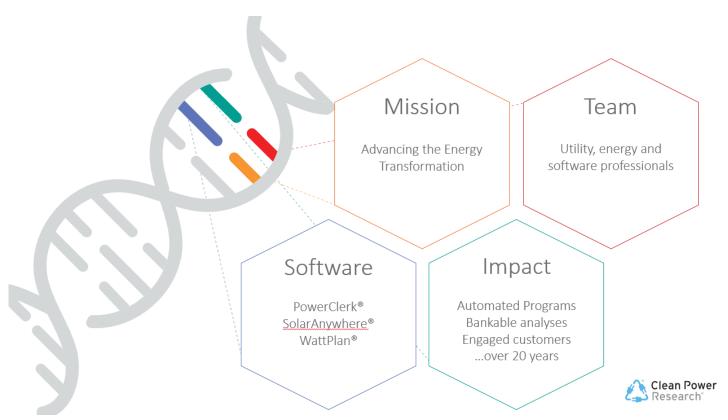Patrick Keelin, Lead Product Manger

27 Aug. 2020, Kirkland, WA

What motivates your research?

- Fame and fortune?

- Many of us strive to make an impact in the energy transformation

- For research to make an impact, adoption is critical!

- This presentation will outline key requirements for operational solar forecasting that are not always associated with research studies

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A brief introduction to Clean Power Reseach

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Mission

Advancing the Energy Transformation

Team

Utility, energy and software professionals

Software

PowerClerk®
SolarAnywhere®
WattPlan®

Impact

Automated Programs
Bankable analyses
Engaged customers
…over 20 years

Clean Power Research®

What is SolarAnywhere®

- On demand web service

- Bankable solar data and intelligence

- Forecast, real-time and historical

- Fleet modeling and system validation

- Partnership with Dr. Perez and atmospheric sciences team at SUNY Albany

Requirements for *operational* solar forecasting

- Timeliness

- Data security

- Data integration

- Data availability

- Data quality

- No revisions

Requirements for *operational* solar forecasting

- Timeliness

- Data security

- Data integration

- Team and infrastructure to deliver high availability, secure web service

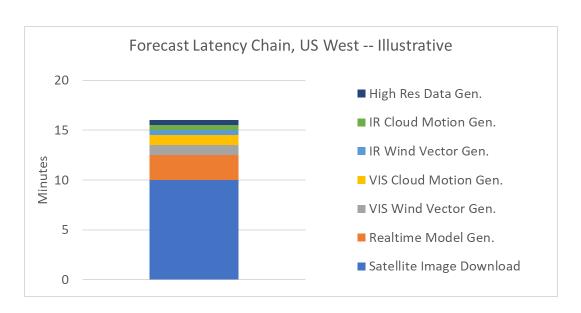# Requirements for *operational* solar forecasting

- Timeliness

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- Data integration

- **Data availability**

- Data quality

- No revisions

- Reanalysis data, e.g. aerosols – weeks to months delay for best sources

- Solar plant data may or may not be available

- Satellite data – lag from ref time to when data can be used operationally

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Forecast Latency Chain, US West -- Illustrative

Legend:
- High Res Data Gen.
- IR Cloud Motion Gen.
- IR Wind Vector Gen.
- VIS Cloud Motion Gen.
- VIS Wind Vector Gen.
- Realtime Model Gen.
- Satellite Image Download

Y-axis: Minutes (0, 5, 10, 15, 20)

Requirements for *operational* solar forecasting

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- Data availability

- **Data quality**

- No revisions

- Hardware issues, e.g. offline inverters, misaligned trackers

- Curtailment

- Measurement issues, e.g. pyranometer drift / soiling

- Bad data, timeshifts, etc.

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Requirements for *operational* solar forecasting

- Data availability

- Data quality

- Models robust to delayed or missing data

- Automated QC if using sensor data

Requirements for *operational* solar forecasting

- No revisions

- Operational testing

  - Built into product

  - Metrics based on highest quality actuals

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- Models robust to delayed or missing data

- Automated QC if using sensor data

- Operational testing

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