

Why an end-to-end IIoT platform matters to solar now

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Agenda

- Define elements of an IIoT platform (PF)
- Solar "why nows" (CCR)
- CCR use case (CCR)
- Why does technology approach matter? (PF)
- Q&A



Beyond the buzz...what is IIoT?



An IIoT system has:

Physical assets

- Sensors and security that sense, transmit and/or store data
- Data communications infrastructure
- Analytics and applications that convert raw data into consumable information



People

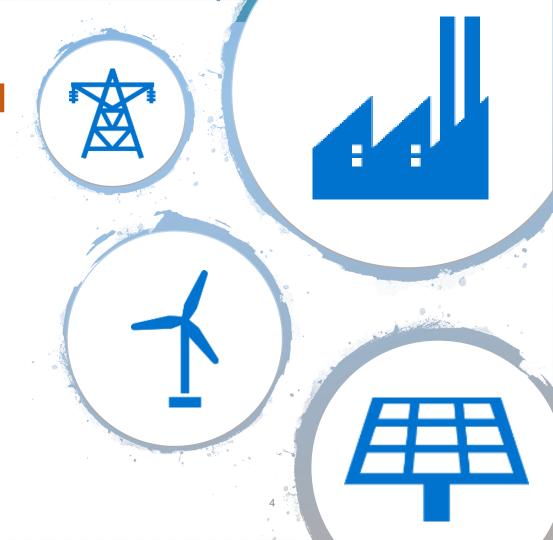


Power Factors is a system of engagement



PI System as System of Record

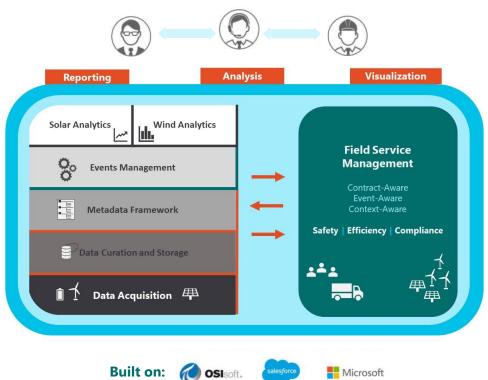
- · One version of the truth
- Resolve issues of heterogeneity
- High-fidelity data
- Reliability of data and analytics
- AF framework
- Governance
- Extensibility
- Asset context



System of Engagement

sensors => people => outcomes

- Modular, IIoT platform purpose-built for renewable energy
- **Built on industry-scale** platforms: OSIsoft® PI System™, Microsoft® Azure and Salesforce
- More than an application: makes sense of data to connect people and organizations













Cypress Creek Renewables

Description

Cypress Creek is a vertically integrated solar IPP with well over \$2B invested

Founded

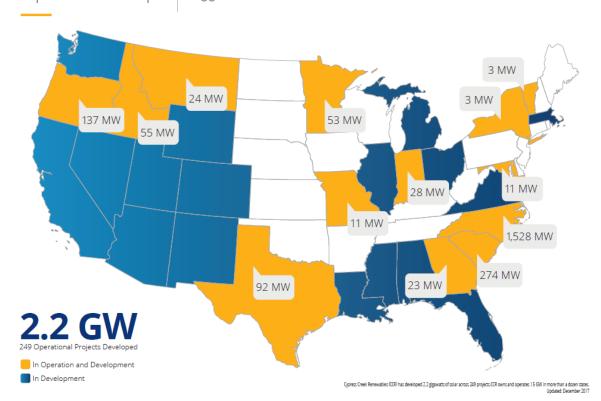
2013

Mission

CCR partners with local communities to provide widespread access to clean energy at or below market costs.

Development and Operations Map

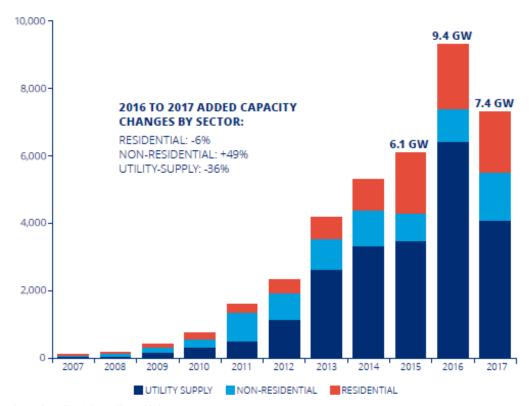
Cypress Creek has successfully developed 2.2 gigawatts of solar.





Solar Why Now's

- 1. **Scale:** Aggressive growth
- 2. **Tighter margins:**Renewed focus on efficiency
- 3.LCOE: Human labor = \$\$\$



Source: Smart Electric Power Alliance, 2018



Lowering costs = Optimizing people

...by improving the "O" of O&M. If we can do more before the truck roll, we minimize costs by making work more effective.



Existing CCR investments

- Cypress Creek Control Center (C4)
- Performance analysis team
- Local training programs





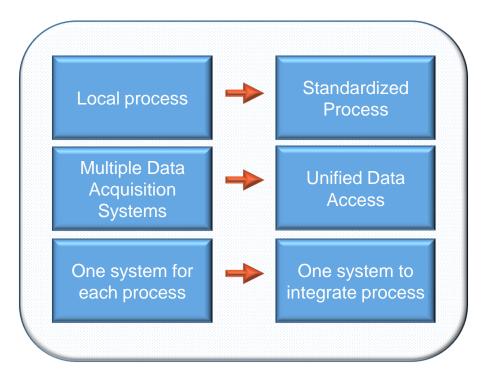
Restructuring O&M at scale

System Complexity:

Operators struggling to identify outages

Small teams: Highly trained staff diverted from primary roles (software admin, etc.)

Making the transition: Data migration, system integration too time-consuming



Adopting a platform was not an option



The solution

- PF Implementation services
- Performance Analysis
- C4
- "Smart" Dispatch
- Field Teams
- Specialized Training





Benefits

C4 operators

- Reduced deployment risk
- Faster outage detection
- Smart dispatch

Maintenance

- Compliance
- Safety
- Efficacy

Performance Analysts

- Uniform data access
- Develop own IP
- · Distinguish performance issues from artifact

When we rolled out Power Factors, I spent less time on software admin and more on improving plant performance.

- Zoë Little, CCR O&M Administrator



Cypress Creek Renewables

Why an IIoT platform matters to solar NOW





CHALLENGE

Improve the "O" of O&M to reduce costs

- With growth, heterogeneous systems led to process and complexity
- Different data access procedures, visualization and sketchy data quality led to more work for O&M

SOLUTION

Simplify and standardize operations

- Normalize data and metadata
- Connect to maintenance workflows within the same system
- Services to ensure data quality, security and soundness of metadata framework

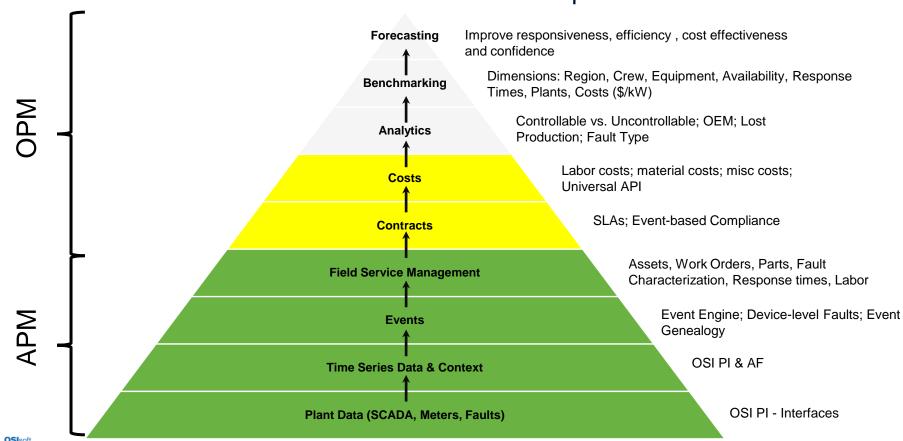
RESULTS

Power Factors removed complexity and enabled team to focus on plant optimization

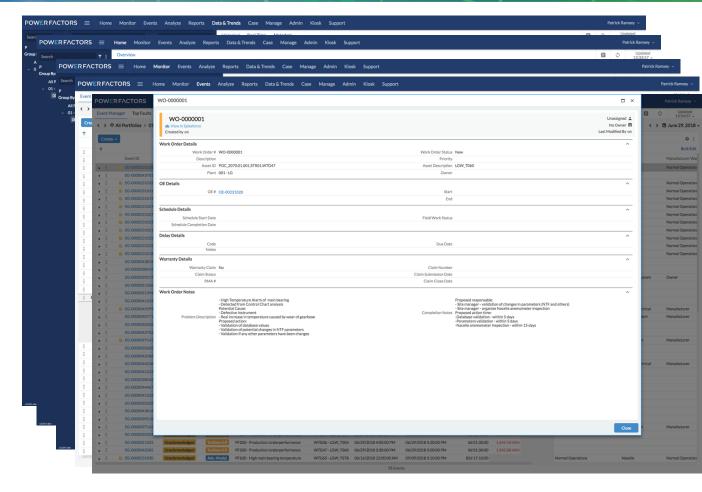
- Services included to accelerate time to value
- One system to scale team expertise
- Streamline process



Asset optimization value creation



Power Factors utilizes "bestof-breed" platforms to deliver renewable energy customers value as a system of engagement





How does technology support engagement?

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The swivel chair, copy/paste, dark data, spreadsheets....

Employee Experience:

Modern technology should deliver information personalized to role, operational context and deliverable For solar, biggest contributor to LCOE

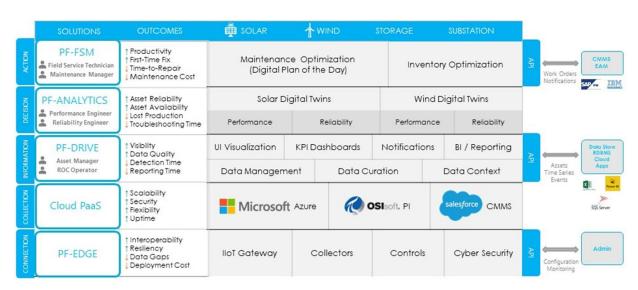


System of engagement

Reduces complexity Wraps traditional system of records and intelligence to improve employee (and executive, IT) experience

Streamlines process Designed to personalize surface information based on operational context and role

Freedom All data and metadata frameworks available for independent analysis, troubleshooting and continuous improvement





Summary

- Solar is both a young and extremely dynamic, data-intensive industry
 - Next-gen ops born from IIoT?
 - Operational fiefdoms costly
- High quality, unified time series data crucial to cost-effective operations
- Next-generation technology will add intelligence to simplify, personalize and contextualize information, optimizing people and process



Please contact us for questions



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Questions?

Please wait for the **microphone**

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CẨM ƠN BẠN

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UA TSAUG RAU KOJ
ТИ БЛАГОДАРАМ
СИПОС

