

23RD ANNUAL



23RD LCI CONGRESS
OCTOBER 19-22

Reducing Constraint Clouds to See Wisconsin Sunshine—Solar Project Standardized Work

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LEARN BY DOING FROM THOSE WHO DO

WEDNESDAY, OCTOBER 20, 2021

Health precautions to keep everyone as safe as possible at Congress:

- Wear masks at all times in indoor events.
- Complete your daily health screening on your phone and bring it with you when you enter the center each day.
- Practice social distancing to the extent possible. Seating at plenary sessions is structured to help with this.
- If you feel ill at any time, please leave the conference and return to your room/consult a physician as necessary.
- Ultimately, our collective health and safety at Congress is up to all of us. Thanks for your support!



A Story using Standardized Work @ O'Brien Solar Farm

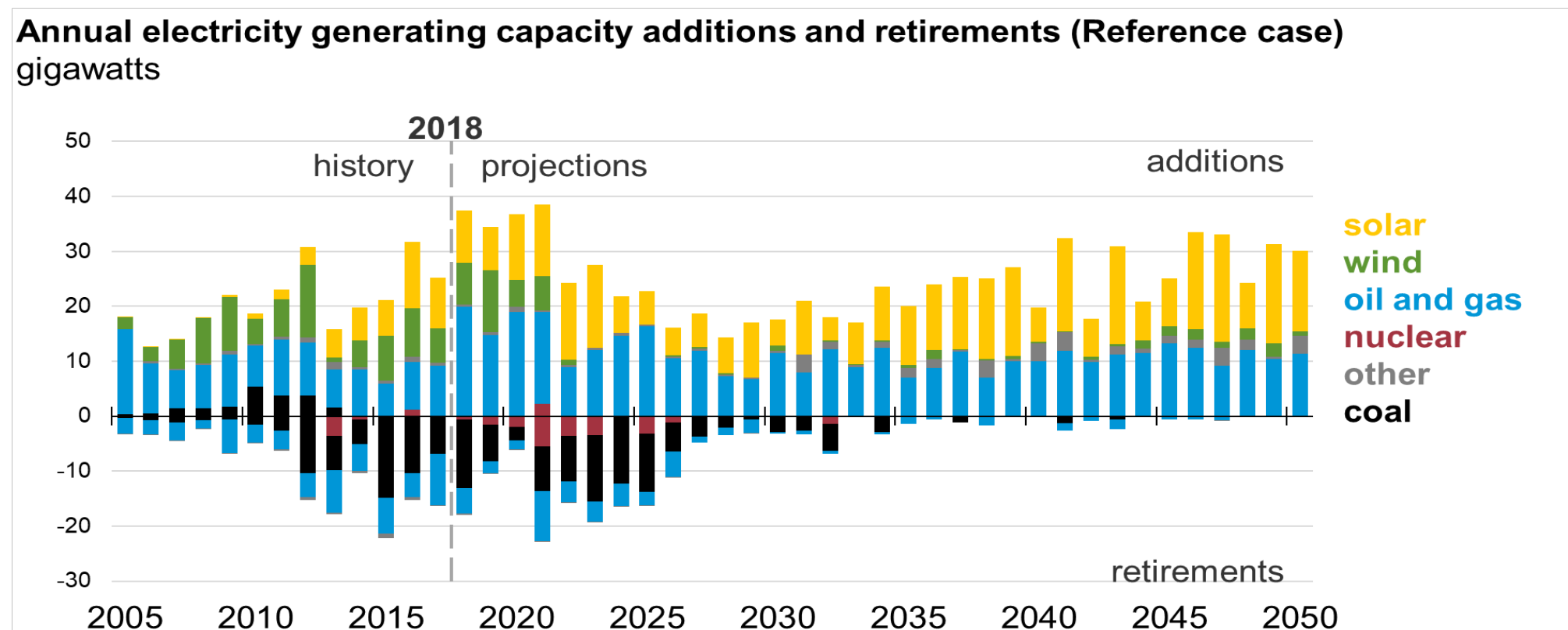


Meeting customer demand



Reason for Action – Serving a growing market

- Wind additions drop dramatically in 2023
- Gas additions drop significantly in 2023, but levelizes thereafter
- Solar and gas additions dominate after 2023
- Coal retirements slow by 2025; most are gone after 2025



Problem Statement

- The Boldt Company was brought onto the project just in time, according to the Developer's schedule. The team had to mobilize quickly and ensure minimal variation solar tracker installation quality.
- The team had to install 103,188 linear feet of trackers in 18 weeks. In terms of an developing an even workflow, that meant installing:
 - 62 complete trackers/week
 - 12.5 complete trackers/day
 - 1.25 complete trackers/hour
- The Boldt team knew the demand outlined above would not be met right away. They needed to make room for ramp up time with the workers.

O'brien Solar Farm



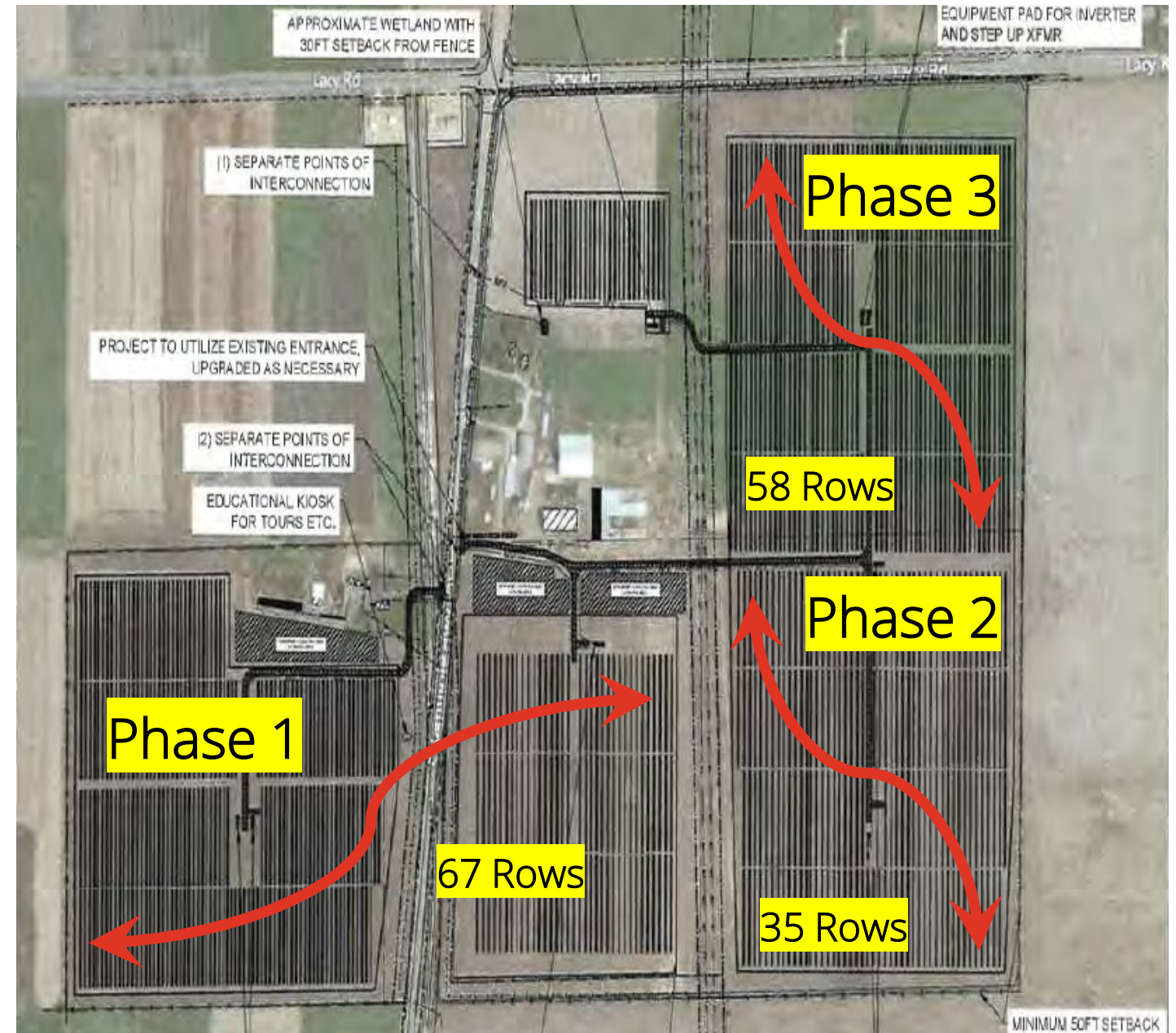
Project Specifics – O’Brien Solar Farm



Developer	EDF Renewables; DG Group
Owner and Power Off-taker	Madison Gas & Electric
Size	20,000 kW-ac (24,948 kW-dc)
Interconnect	13.8 kV
Land (163 acres)	Pat and Tom O’Brien leased to MG&E
Modules	62,370 Canadian Solar 400watt, 38.7volt, 10.34amp, 7.0 ft x 3.4 ft, bifacial
Inverters	Eight (8) SMA 690volt central inverters
Racks and Trackers	Soletec single axis trackers

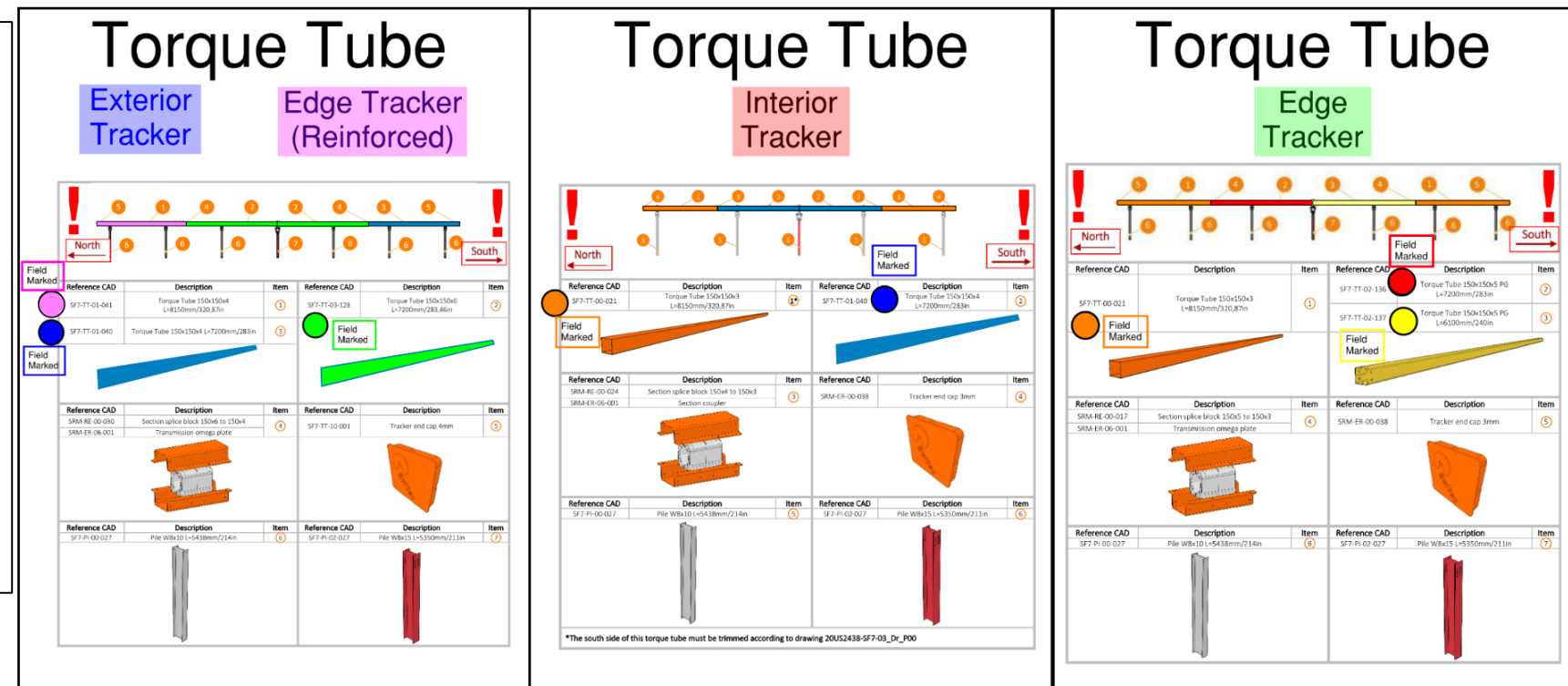
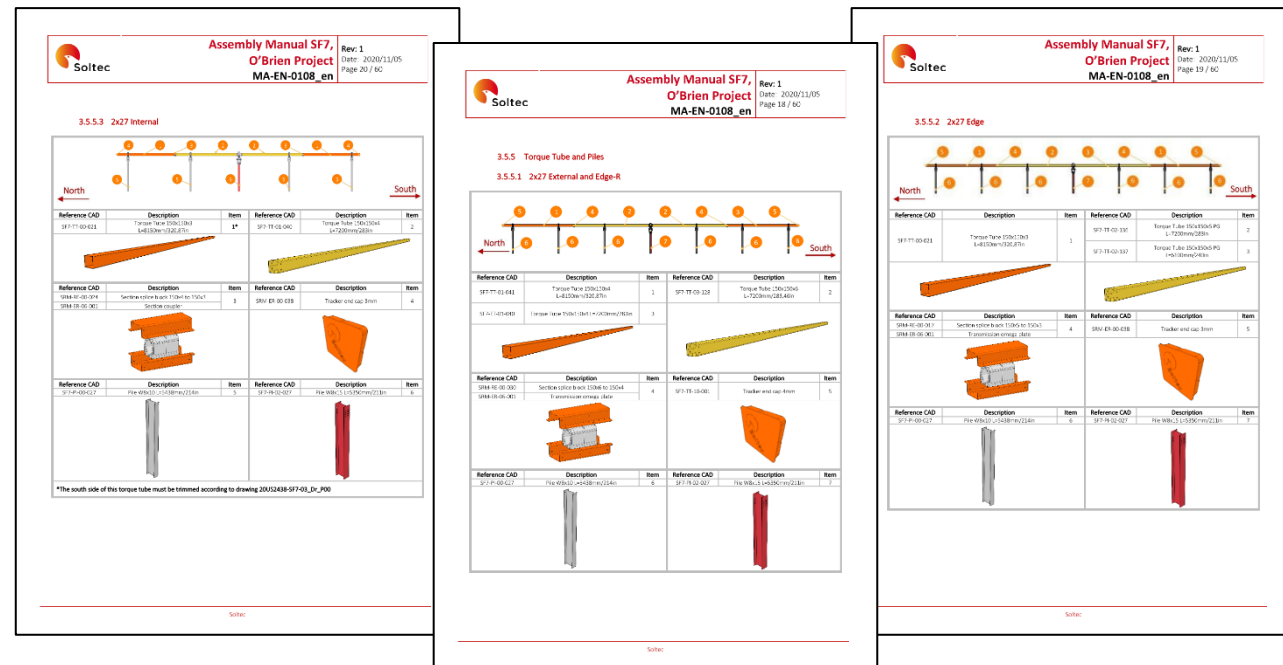
Project Specifics – O'Brien Solar Farm

- Driveways, culverts, temporary access roads and laydown areas,
- Storm water and erosion control
- Structural pilings
- Trackers/racking for the solar modules
- Modules install
- Installing DC and AC collection systems - direct buried & above-ground conductor tray spanning row to row; 690v cable run underground to the 13.8kV interconnect
- Combiner boxes, inverters, transformers, and other electrical and monitoring equipment
- Testing and commissioning by MG&E
- Restoration & seeding of site with a low growth pollinator friendly seed mix



O'Brien Solar Farm - Standardized Work

- Day of award: Arranged training with manufacturer
 - Superintendent
 - Union Rep/Trainer
 - Field Engineer
- Week 2: Standardized work packages
- Week 2/3: Set up prefabrication kits
- Week 3: Mobilize on-site work force





Pre-Fabrication – improving flow on the job site

- Pre-fabrication area set up beside jobsite
- Workers given ability to layout area to optimize flow
- Standardize work is developed, tested, re-written and then trained



Point of Use Material

- Sequence of steps tested and then repeated to help reduce waste and variation
- Point of Use locations laid out within job site to help reduce movement
- Production tracking measurements evaluated if daily goals were achieved



Learning helped to enhance standardized work

- Teams continued to communicate while working in harsh working conditions
- Real-time feedback loops were created to modify, when needed, standardized work
- Teams were able to realize productivity enhancements driven by pre-fabricated materials



Come on ride the train – Charlie's train

- Using a rapid prototyping mindset, helped to develop Charlie's Train
- Point of Use Assembly Area allowed workers to work at the correct height
- Productivity numbers were improved
- Work back stress was reduced



Focus on Safety

- Teams continued to practice safe working conditions in harsh working conditions



Applying your learning



How can you apply this tomorrow?

- *Send the project Superintendent, Field Engineer, and Union Hall Instructor to be trained by the manufacturer on the installation specifications so they have a complete understanding of risks and requirements*
- *Get the Field Engineers involved to reduce information down to one sheet, something easy to carry/pin up for the workers in the field*
- *Consolidate information by work type/workstation*



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In the spirit of continuous improvement, we would like to remind you to complete this session's survey! We look forward to receiving your feedback.

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Thank you for attending this presentation. Enjoy the rest of the 23rd Annual LCI Congress!