

CAB Prototyping at SolarTac

6/25/14 – 6/27/14



CAB Overview

- CAB is an above ground, wire harness, cable routing solution with lots of advantages over alternative cable routing solutions
 - Reduced BOS Costs
 - Faster Installation and Cycle Times
 - Simplified Maintenance
 - Simplified project planning



Per AP90 w/ 30 Rows

	Current State PV Wire in Conduit, CB Cable Direct Bury	Vega Project* 100% Direct Bury	Future State CAB
Material Cost	\$5,105	\$3,841	
Labor Cost	\$18,312	\$10,156	
Total (\$)	\$23,417	\$13,997	
Total (\$/watt)	\$0.069	\$0.041	

* 100% direct bury for Vega was a one time approval. Both engineering and services are uncomfortable with direct bury of #6 AWG cable or smaller

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SolarTac CAB Demo Details

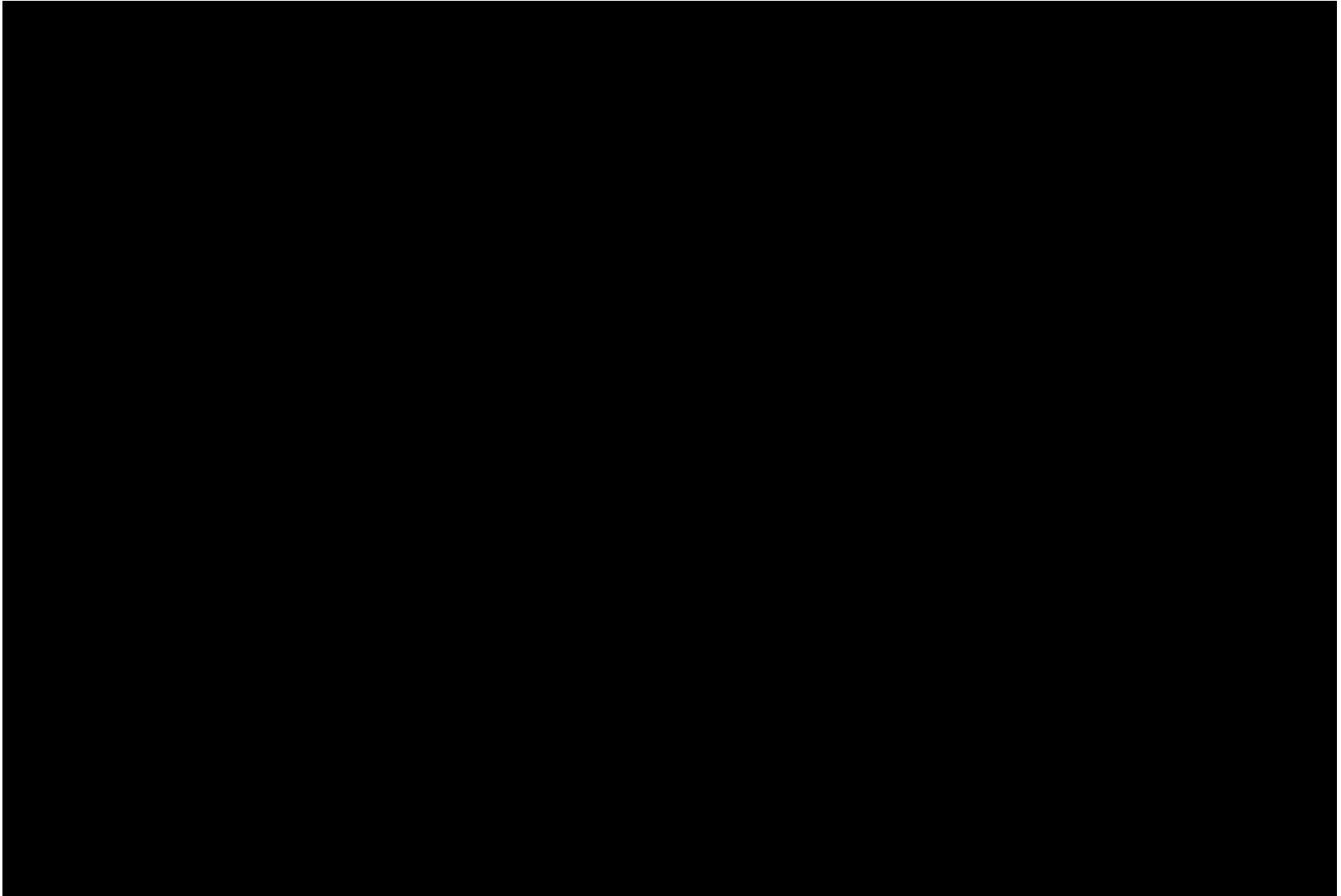
- The CAB Cable Routing Solution was Demoed at SolarTac for form, fit and function of:
 - Cable Routing
 - Transitions to Electrical Boxes
 - Transitions to Underground
 - Maximum Cabling Requirements (Derived from a NexTracker, 2.5 MWac block)
 - [REDACTED]
 - [REDACTED]

							MAX LOAD
Description	Name	Quantity	Size	Type	O. D. (in.)	lb/ft	lb/ft
[REDACTED]							

Total Weight per ft
Total Weight per 20 ft Span

[REDACTED]

CAB Specs and Dimensions



SolarTac CAB Pictures - Materials

Key CAB Materials

-  Steel Cable
- CAB Cable Hangers
- Cable Support Brackets & Hardware
- Cable End Termination & Hardware

Key CAB Tools

- Qty. 2 Adjustable ($1/2''$ - $1 \frac{1}{4}''$)
Wrenches or equivalent



SolarTac Cab Pictures - Hardware

Cable End Terminations – Installed at end piles



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SolarTac Cab Pictures - Hardware

- Cable Supports – Installed at every pile
- Ideally, foundation mounting holes for CAB hardware will be pre-drilled at steel fabricator



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SolarTac Cab Pictures – Support Hangers



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SolarTac Cab Pictures – Cable Install



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SolarTac Cab Pictures – Transition to Underground



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SolarTac Cab Pictures – Transition to Electrical Boxes

- Side entry to electrical boxes is preferred
- Bottom entry is possible with the appropriate strain relief glands



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SolarTac CAB – Proposed Installation Sequence

1. Complete mechanical assembly of structure with modules
2. Install CAB
 - A. [REDACTED]
3. Pull and route wire on ground adjacent to CAB (2 people, time dependent upon qty of cable and distance)
4. Install wire into CAB and close cable hangers (2 people, 5 minutes per foundation span (~20 ft))

SolarTac CAB – Installation Differences

~40% Man-Hour and Cycle Time reduction

Current State - Direct Bury & Conduit

CAB - Above Ground Cable Routing

Installation Activity	Quantity (ft)	Units	Laborers	Man Hours	Cycle Time (hrs)	Quantity (ft)	Units	Laborers	Man Hours	Cycle Time (hrs)



VS



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Comparison Cost Details

Conduit

Per AP90

Material Part Description	Qty	Units	Price per Unit	Total Price
1", Schedule 40, PVC Conduit (10' Segment)	126	Each	\$ 8.70	\$ 1,096.20
1", Schedule 40, 90 Degree Elbow (each)	60	Each	\$ 2.16	\$ 129.54
Heico Weather Heads	30	Each	\$ 3.50	\$ 105.00
#10 PV Wire	7879	ft	\$ 0.34	\$ 2,678.72
4/0 THWN Al Wire - Combiner to Main Feeder Trench	1660	ft	\$ 0.66	\$ 1,095.60

Total Material \$ 5,105.06

Labor Part Description	Qty	Units	Price per Unit	Total Price
Trenching	193	CY	\$ 4.50	\$ 870.00
1", Schedule 40, PVC Conduit	1050	ft	\$ 2.38	\$ 2,493.75
1", Schedule 40, 90 Degree Elbow	60	Each	\$ 15.50	\$ 930.00
Heico Weather Heads	30	Each	\$ 15.50	\$ 465.00
#10 PV Wire Install - Above Ground	3859	ft	\$ 0.40	\$ 1,543.44
#10 PV Wire Install - Below Ground	4020	ft	\$ 1.10	\$ 4,422.00
4/0 Al THWN Wire Install - Below Ground	1660	ft	\$ 2.30	\$ 3,818.00
Backfill & Compaction	580	ft	\$ 6.50	\$ 3,770.00

Total Labor \$ 18,312.19

CAB

Per AP90

Material Part Description	Qty	Units	Price per Unit	Total Price
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Total \$

Labor Activity Description	Qty	Price per Unit	Total Price
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Total \$

Direct Bury

Per AP90

Material Part Description	Qty	Units	Price per Unit	Total Price
#10 PV Wire	7879	ft	\$ 0.34	\$ 2,678.72
4/0 Al USE Wire* - Combiner to Main Feeder Trench	1660	ft	\$ 0.70	\$ 1,162.00

Totals \$ 3,840.72

Labor Part Description	Qty	Units	Price per Unit	Total Price
Trenching (CY)	173	CY	\$ 4.50	\$ 780.00
#10 PV Wire Install - Above Ground	3473	ft	\$ 0.40	\$ 1,389.10
#10 PV Wire Install - Below Ground	4406	ft	\$ 0.58	\$ 2,555.40
4/0 Al USE Wire* Install - Above Ground	1660	ft	\$ 0.65	\$ 1,079.00
Screening of Native Soil	39	CY	\$ -	\$ -
3" Deep Sand Bedding (36" Wide) - Bottom of Trench	520	ft	\$ 0.94	\$ 486.20
3" Sand Bedding (36" Wide) - Top of Cables	520	ft	\$ 0.94	\$ 486.20
Backfill & Compaction	520	ft	\$ 6.50	\$ 3,380.00

Totals \$ 10,155.89

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