



Bifacial technology Industrialization

- Operational Data
- Engineering analysis
- Achieving investor buy in
- Next steps



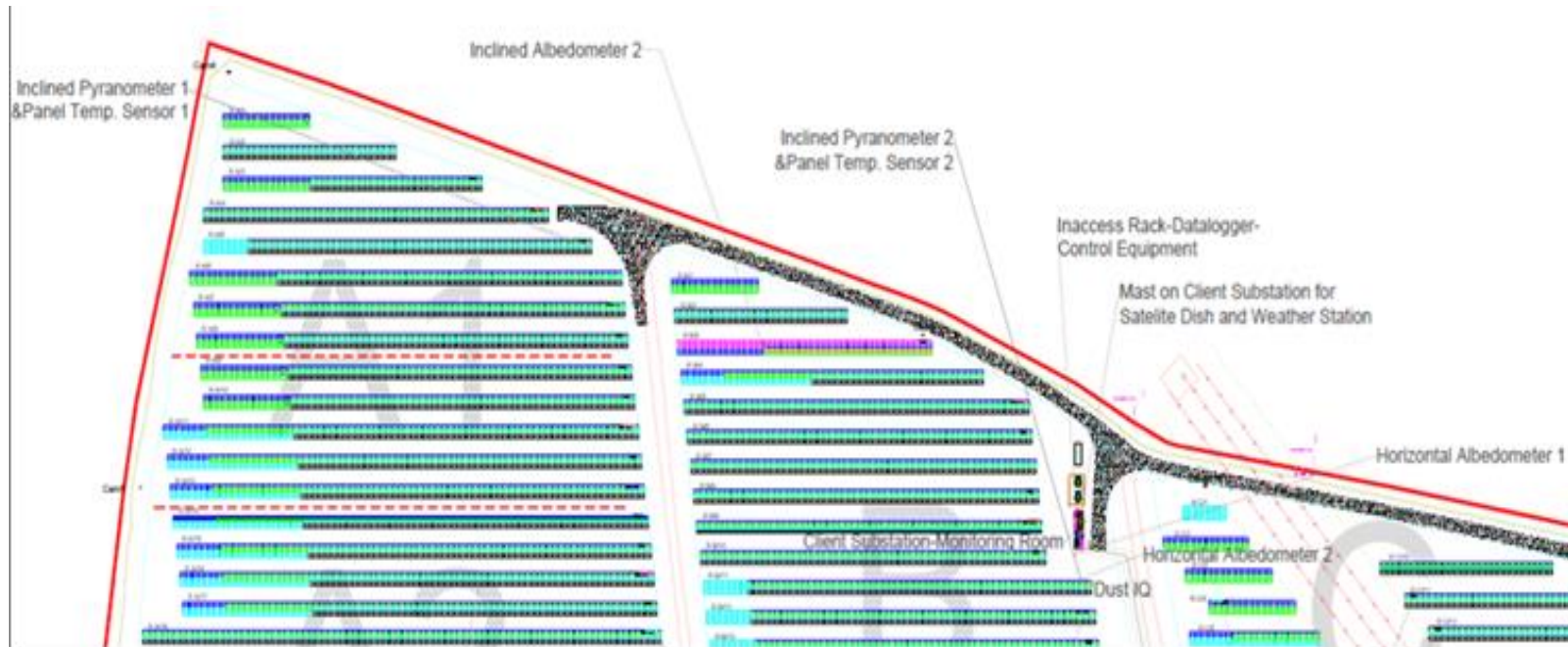
Two UK sites operational (first one March 2018)

Site #1 third party verification

Measured Data					
Month	Trina (Bifacial) Avg. Spec. Energy	PR Trina (Bifacial)	Longi (Monofacial) Avg. Spec. Energy	PR Longi (Monofacial)	Gain PR
January	17,45	84,2%	16,90	81,6%	2,6%
February	36,61	92,6%	34,73	87,8%	4,8%
March	57,22	99,5%	52,49	91,3%	8,2%
April	50,19	98,2%	46,19	90,4%	7,8%
May	114,69	96,3%	104,00	87,3%	9,0%
June	97,99	95,4%	88,12	85,8%	9,6%
July	41,14	97,4%	36,95	87,5%	9,9%
August	121,37	93,6%	108,43	83,6%	10,0%
September	90,36	95,8%	80,36	85,2%	10,6%
October	58,33	91,1%	52,79	82,5%	8,7%
November	23,38	83,2%	22,49	80,0%	3,2%
December	9,70	74,3%	9,05	69,3%	5,0%
Year 2019	718,41	94,3%	652,49	85,6%	8,7%

Two UK sites operational (first one March 2018)

Site #2



Date	Total Irradiation (W/m ²)	Total Generation (kW)	Theoretical Generation (kW)	PR (%)	Inverter availability	(%)
22/03/2020	6344.60524	28686.0207	30521.8655	93.99%	Average	100.00%
23/03/2020	6183.33742	28270.0357	29746.0576	95.04%	From code - a	100.00%
24/03/2020	6243.85526	28397.9845	30037.1896	94.54%		
25/03/2020	6828.44052	30390.709	32849.4422	92.52%		
26/03/2020	6883.26276	30802.8131	33113.1745	93.02%		
27/03/2020	5931.68066	26635.0916	28535.4175	93.34%		
Average	6402.53031	28863.7758	30800.5245	93.71%	Used in code	

Performance factors investigated

Questions

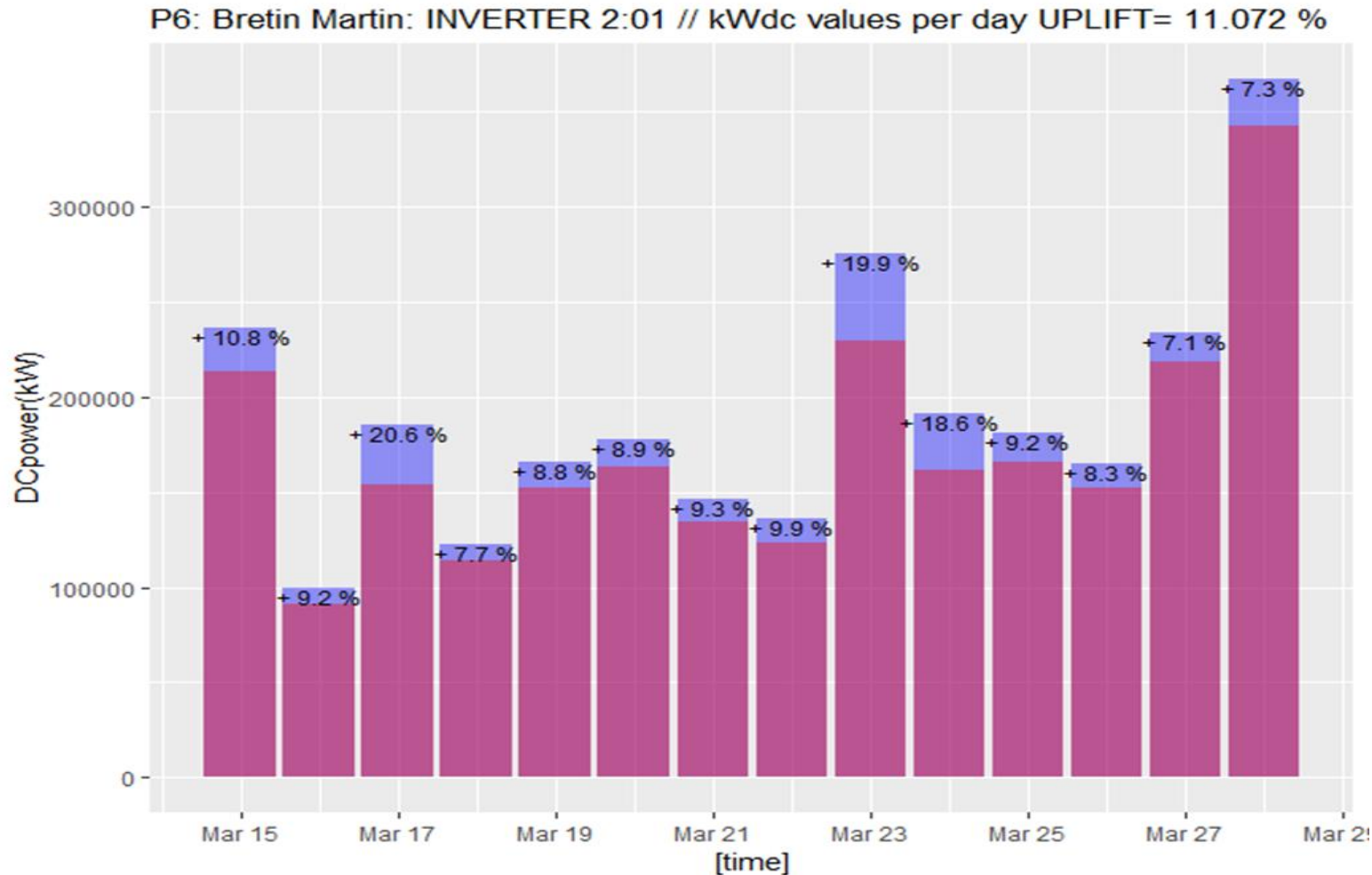
How much uplift is associated with non-irradiation parameters #1

1. Is bifi uplift higher on cloudy or clear days?
2. Does bifacial operate at a higher or lower temperature than monofacial?
3. How do surface conditions impact performance?

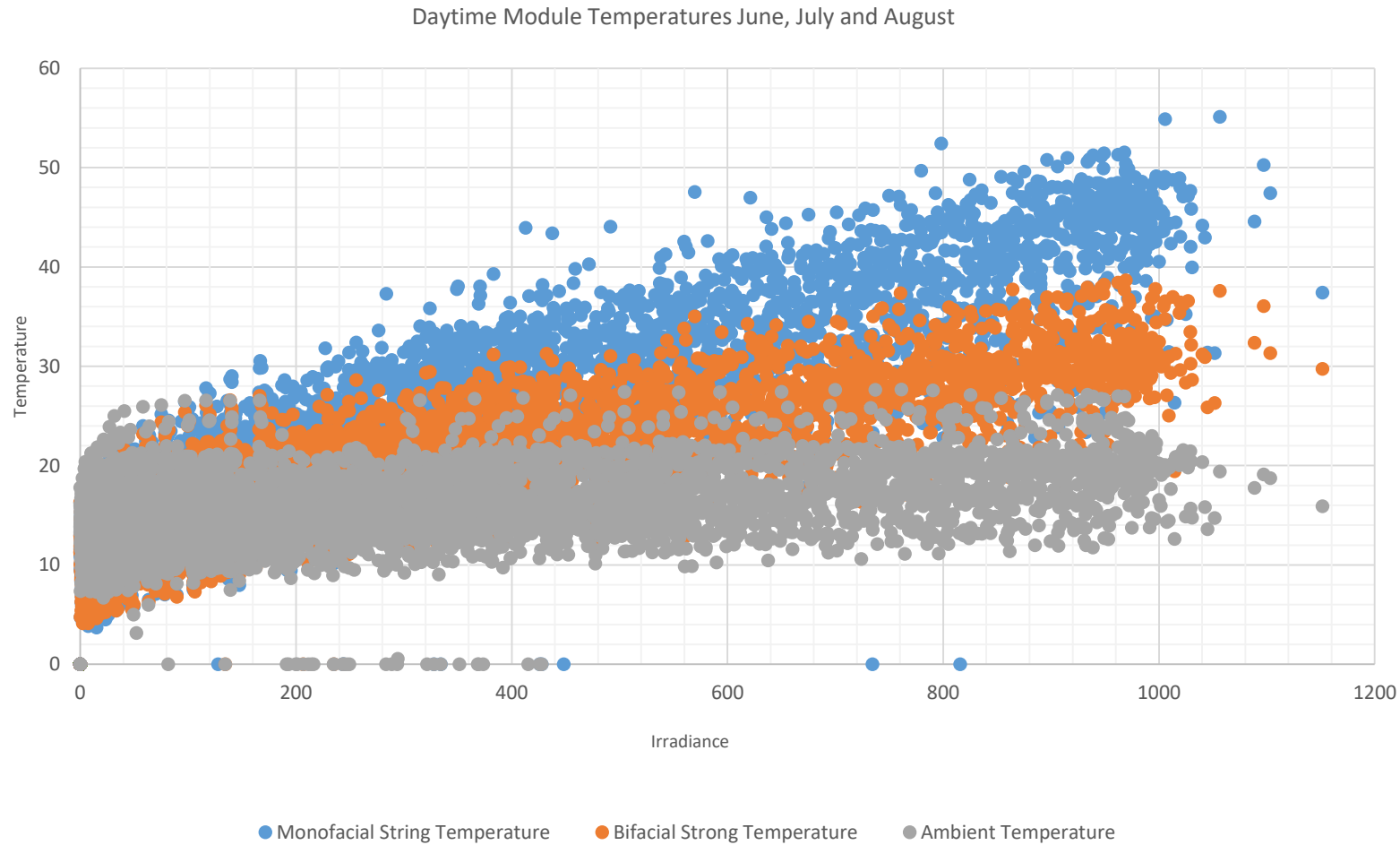
How much uplift is associated with non-irradiation parameters #2

1. Top and bottom row uplift
2. Module bifaciality
3. Module reliability
4. Plant design impacts

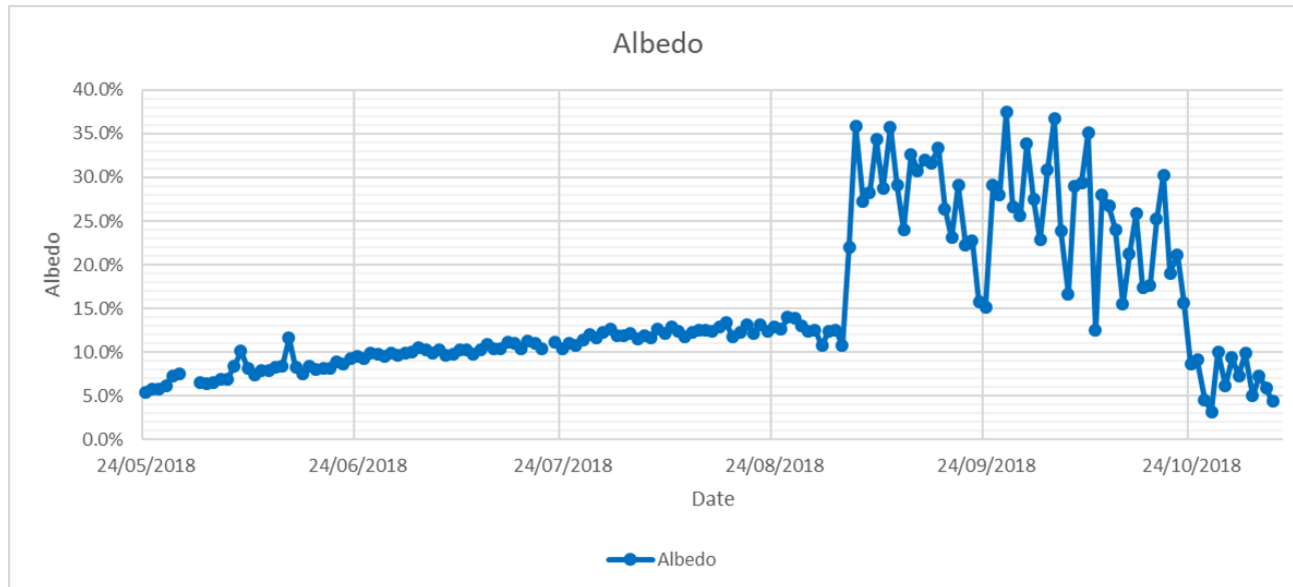
How much uplift is associated with non-irradiation parameters



Module temperature



Albedo impact



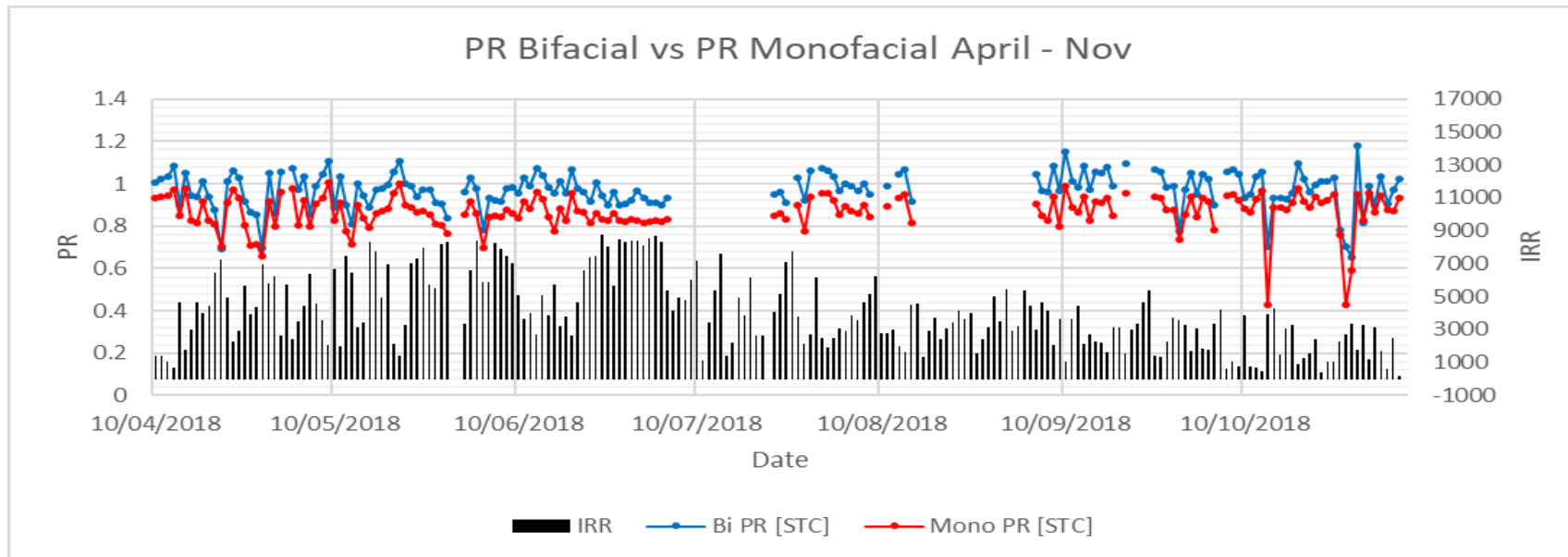
Cloud cover, impact on PR results

Clear Days IRR < 800 W/m ²	% Diff to CS	Bi PR	Mono PR	Increase in PR
5&29	2.3	0.889	0.811	9.7%
6&27	2.1	0.924	0.829	11.4%
6&28	4	0.925	0.828	11.7%
7&2	1.5	0.921	0.828	11.3%
7&3	-0.5	0.925	0.829	11.5%
Cloudy Days IRR < 800 W/m ²	% Diff to CS	Bi PR	Mono PR	Increase in PR
6&12	53.9	1.003	0.899	11.6%
6&13	68.8	1.073	0.957	12.0%
6&14	41.7	0.874	0.749	16.6%
6&15	55.6	1.028	0.910	13.0%
6&17	63.4	1.014	0.888	14.1%
6&18	56.7	0.996	0.878	13.4%
6&19	69.9	1.070	0.957	11.8%
6&20	46.3	0.995	0.891	11.7%

- Uplift in PR on Cloudy days
– 12.5%
- Uplift in PR Clear days
– 11.1%

Investor and developer questions

1. Full season operational evidence
2. Technical Advisor integration
3. Market adoption and forecast
4. Identifiable risks and mitigation



Ongoing engineering

1. Module Bifaciality trends
2. Bifacial performance modelling in Hot and Equatorial jurisdictions
3. Module reliability monitoring
4. Buy-in from research organisations and TA's
5. Bifacial operational performance sharing network
6. O&M and construction standards



Thank you

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