



QUARTER 2 – 2018

31 December 2017

# Quarterly Report & Appendix 4C



**greatcellsolar**

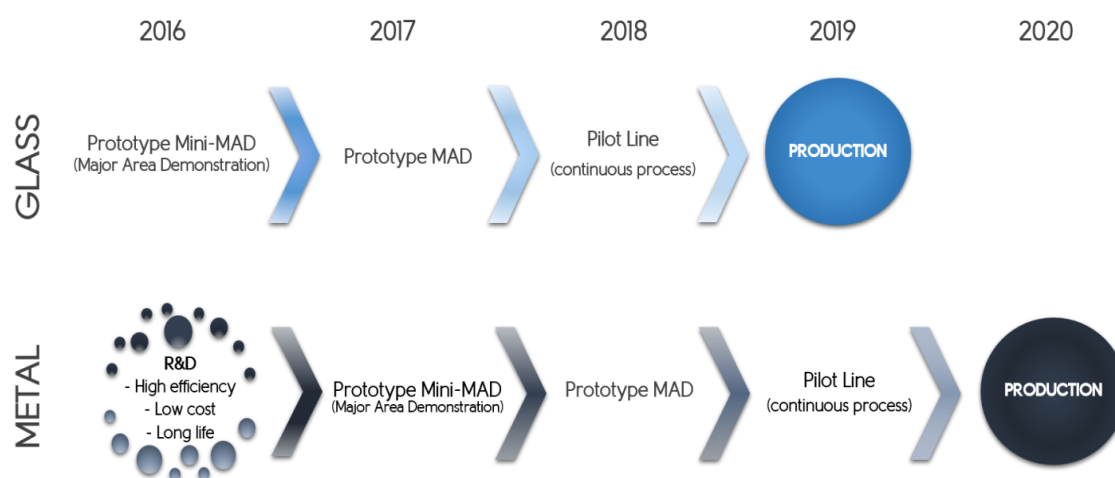
Global leaders in hi-tech solar



## Second Quarter FY 2018 – Quarterly Report & Appendix 4C

- 2QFY2018 TAB Milestone Achieved – 13% MPPT Performance for Au free P-I-N cells
- \$6 Million ARENA Grant – Terms Agreed and Signed
- Prototype Facility Fitout and Equipment Plans Nearing Finalisation
- Capital Equipment Orders for Prototype Facility Commenced
- Greatcell Awarded €700,000 Horizon 2020 (Apolo) Grant
- New World Record of 13.5% for Roll-To-Roll Metals PSC for BIPV Applications
- Key Blocking Patent Acquired from Abengoa

### COMMERCIALISATION SCHEDULE



### CORPORATE AND FINANCIAL

The momentum of our Major Area Demonstration (MAD) prototype project continues to grow. Greatcell and CSIRO will lead the world in very significant steps to commercialise Perovskite Solar Cell (PSC) technology. The prototype facility fitout will go to tender next month and equipment purchases have already commenced. In exciting, new developments, both CSIRO and the Victorian Government have expressed interest to further invest in the project, and investment and grant proposals, respectively are well underway. In the meantime, favourable foreign exchange movements in the AUD/USD have reduced the estimated capital expenditure for MAD by approximately 5% or A\$350,000.

There has been a two month delay to the New Moonie Petroleum investment of \$4 million. The funds are now expected in mid-February, at the latest. The delay has been attributed to the UK/European Christmas break. A number of similar non-GSL Australian projects have been affected. We have accepted this variation in the subscription agreement with all other terms remaining unchanged. Regardless of the delayed investment, capital equipment orders have now commenced, in particular for long-lead time items. Again, the structure of the payment terms allows us to benefit from the recent and continuing appreciation of the Australian dollar against the US dollar.

The rebranding project is now complete. Final touches included release of the new website ([www.greatcellsolar.com](http://www.greatcellsolar.com)), including an updated German language section. The revised Investors section of the website has enhanced functionality, including share price graphs and daily activity. Importantly, sales of basic materials such as TiO<sub>2</sub> mesoporous pastes and perovskites have never been stronger, indicating that our large customer base has transitioned comfortably with the change. New enquiries from the US, in particular, have been a key driver of stronger sales. We will have further opportunity to grow our customers at a number of conferences over the coming weeks. The lead conference, AP-HOPV18 will be held in Japan on January 28-30 and Greatcell is a Main sponsor.

## RESEARCH AND DEVELOPMENT

During the quarter, PSC leapfrogged mainstream 2<sup>nd</sup> and 3<sup>rd</sup> generation PV technologies to achieve a new laboratory performance record of 22.7% conversion efficiency. CdTe (22.1%) and CIGS (22.6%), considered as competing technologies, have now been eclipsed and the trajectory of improvement for PSC remains steep. For comparison's sake, multi-crystalline silicon is at 22.3%. The global PV industry is on a roll and some of the fascinating developments can be tracked on [www.nrel.gov/pv/assets/images/efficiency-chart](http://www.nrel.gov/pv/assets/images/efficiency-chart).

Greatcell Solar and its partners within the Solliance consortium have also projected PSC into the forefront of PV technology development by achieving record efficiencies from low cost, high throughput Roll to Roll processed flexible cells and modules, with 13.5% efficiency at cell level, and 12.5% at module level. Such achievements are fundamental enablers to the commercialisation of large area steel based BIPV products. Parallel developments at GSUK in Manchester have established a high performance device architecture using materials and processes compatible with continuous processing on flexible substrates compatible with Roll to Roll production. This technology has been patented jointly with GSL's key strategic development partner, Cristal Global in order to create competitive advantage through unique materials processing techniques. These developments have been validated by our partners at EPFL with whom we have jointly published the breakthrough.

The Technical Advisory Board met on January 22 and passed the quarterly milestone. The milestone was achieved in our laboratory in Switzerland by GSA where a non-gold back contact was substituted for gold contact in a P-I-N cell to produce a MPPT conversion efficiency in excess of 13%. This is part of the industrialisation of the technology where cheap, abundant materials are substituted for more expensive, research-grade materials.

Since we achieved our internal milestone for mini-MAD performance we have now begun outdoor testing. A similar round of tests have been proposed at CSIRO in Newcastle as well. The results so far have been very encouraging with no loss of performance and achieving high energy yield in real world conditions. We were proud to demonstrate these 450 mm x 650 mm panels at our AGM in late November. Shareholders were treated to a world first for this technology at scale with the solar array powering several mobile phone chargers and a corporate video and screen. The impression created was very positive with the CSIRO representative at the meeting, Dr Greg Wilson highlighting the considerable progress in scaling and commercialisation since the commencement of the mini-MAD project. No commercial or academic institution is able to achieve these results.

One Horizon 2020 EU grant (known as Apolo) of €700,000 was confirmed during the quarter. A similar sized grant for another major European research project is also looking highly prospective. In each case GSI and/or GSUK are technology leads for the industrial PSC role in the project. These grants are complementary to our technology development plan and supplement our R&D budget. Horizon 2020 Projects are extremely competitive, and GSL's success in being awarded such grants is testament to our reputation and the credibility of our technology and capabilities.

We are pleased to inform our shareholders that we have purchased an important process patent from Abengoa, a large Spanish renewable energy company. The patent, at PCT stage, referred to as 'High Performance Perovskite-Sensitized Mesoscopic Solar Cells' (International Publication No. WO/2014/180789 A1) strongly fortifies our freedom to operate. The opportunity became available because of Abengoa's strategic decision to withdraw from PV technology development due to its underlying, adverse financial circumstances and we consider the purchase price very reasonable.

For our ARENA grant project we completed a project risk management plan that was independently assessed by tier 1 business services consultant, EY. The plan was submitted to ARENA and represents a major deliverable for the first milestone of the project allowing the associated payment claim to be made.

Finally, Monash University has been awarded an ARENA grant focusing on Building Integrated Photovoltaics, where Greatcell has been invited to participate. This is consistent with our strategy of collaborating with world-class academic partners and retaining commercialisation rights on newly created IP.

## MANUFACTURING AND COLLABORATIONS

In December 2017, Greatcell had the privilege of presenting to the Deputy Minister in two key Turkish government ministries, the Ministry of Economics and the Ministry of Science, Industry and Technology. This is an unequivocal escalation in the level of commercial engagement in Turkey and the Turkish Government is now sending a technical representative to AP-HOPV2018 to further investigate the opportunity for large-scale investment and to meet with the CTO, Dr Damion Milliken and Professor Michael Grätzel. During the day long presentations by the Managing Director the strong message from government was the current focus on expanding renewable energy capability to meet ambitious emissions reduction targets and the importance of energy security in Turkey.

The Jinko Solar collaboration remains active. The next round of module evaluation will be marked by a more co-ordinated approach, with Jinko needing to learn and respect the specific attributes of PSC relative to Silicon. This has led to revised accelerated testing protocols. We are excited by these next steps, especially with the significant improvement of industrial performance of the P-I-N architecture in recent months.

The relevant performance improvement was best captured by the announcement from Solliance during the quarter of a 13.5% cell 12.5% module prepared on an automated roll-to-roll (R2R) line. There has also been very pleasing progress with direct encapsulation processes for in-cell barrier layers, translating into excellent stability results (1,500hrs 85 °C >90%). As Solliance's reputation as a centre of excellence grows, it is attracting strong media attention and the attention of some of Europe's largest energy and materials companies. GSL is Solliance's lead commercialisation partner and is uniquely placed to translate such advances into commercial reality. The aggressive commercialisation schedule we commit ourselves to is reflected in these achievements.

## FINANCIALS

The net operating monthly cash burn (Sec. 1.9) for the second quarter averaged \$441k (excluding the FY2017 R&D cash rebates of \$3.8m). Cash received from various grants during the quarter totalled \$1.2m which assisted in lowering the cash burn. Net cash usage from operating and investing activities for the half-year to 31 December 2017 totalled \$436k, including the R&D rebates.

At the end of the second quarter, cash balances totalled \$930k.

During the quarter, the Company drew down \$810k from its renewed FY2018 CBA finance facility (total limit \$4m) that allows an advanced payment of up to 90% of accrued R&D tax offset credits. In addition, the Company has fully repaid the FY 2017 CBA finance facility loan amount of \$3.3m, and another borrowing of \$500k.

The Company is expecting to receive significant cash deposits subsequent to quarter-end from the following sources:

- Grants income totalling \$1.4m during Q3
- Tasnee's convertible note initial Tranche 1 of \$600k in the final quarter FY 2018

In January 2018, the Company received its next quarterly drawdown of \$810k from its CBA finance facility, leaving \$2.4M available for future drawdown.

### About Greatcell Solar LIMITED

Greatcell Solar is a global leader in the development and commercialisation of Perovskite Solar Cell (PSC) technology – 3<sup>rd</sup> Generation photovoltaic technology that can be applied to glass, metal, polymers or cement. Greatcell Solar manufactures and supplies high performance materials and is focussed on the successful commercialisation of PSC photovoltaics. It is a publicly listed company: Australian Securities Exchange ASX ([GSL](#)) and German Open Market ([DSI](#)). Learn more at [www.greatcellsolar.com](http://www.greatcellsolar.com) and subscribe to our mailing list in English and German.

### About PEROVSKITE SOLAR CELL TECHNOLOGY

Perovskite Solar Cell (PSC) technology is a photovoltaic (PV) technology based on applying low cost materials in a series of ultrathin layers encapsulated by protective sealants. Greatcell Solar's technology has lower embodied energy in manufacture, produces stable electrical current, and has a strong competitive advantage in low light conditions relative to incumbent PV technologies. This technology can be directly integrated into the building envelope to achieve highly competitive building integrated photovoltaics (BIPV).

The key material layers include a hybrid organic-inorganic halide-based perovskite light absorber and nano-porous metal oxide of titanium oxide. Light striking the absorber promotes an electron into the excited state, followed by a rapid electron transfer and collection by the titania layer. Meanwhile, the remaining positive charge is transferred to the opposite electrode, thereby generating an electrical current.

- Ends -

### Media & Investor Relations Contacts:

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# Appendix 4C

## Quarterly report for entities subject to Listing Rule 4.7B

Name of entity

**GREATCELL SOLAR LIMITED**

ABN

**92 111 723 883**

Quarter ended ("current quarter")

**31 DECEMBER 2017**

### Consolidated statement of cash flows

1.	Cash flows from operating activities	Oct 17 to Dec 17 Quarter \$A'000	Year to date (6 months) \$A'000
1.1	Receipts from customers	254	562
1.2	Payments for		
	(a) research and development	(747)	(1,625)
	(b) product manufacturing and operating costs	(120)	(231)
	(c) advertising and marketing	(87)	(174)
	(d) leased assets	(121)	(267)
	(e) staff costs	(1,285)	(2,708)
	(f) administration and corporate costs	(383)	(935)
1.3	Dividends received(see note 3)	-	-
1.4	Interest received	-	3
1.5	Interest and other costs of finance paid	(38)	(59)
1.6	Income taxes paid	-	-
1.7	Government grants and tax incentives	4,959	5,034
1.8	Other (provide details if material)	-	-
<b>1.9</b>	<b>Net cash from / (used in) operating activities</b>	<b>2,432</b>	<b>(400)</b>

## Consolidated statement of cash flows

2.	Cash flows from investing activities	Oct 17 to Dec 17 Quarter \$A'000	Year to date (6 months) \$A'000
2.1	Payments to acquire:		
	(a) property, plant and equipment	(76)	(76)
	(b) businesses (see item 10)	-	-
	(c) investments	-	-
	(d) intellectual property	-	-
	(e) other non-current assets	-	-
2.2	Proceeds from disposal of:		
	(a) property, plant and equipment	-	-
	(b) businesses (see item 10)	-	-
	(c) investments	-	-
	(d) intellectual property	-	-
	(e) other non-current assets	-	-
2.3	Cash flows from loans to other entities	-	-
2.4	Dividends received (see note 3)	-	-
2.5	Other (loans to related parties-net)	34	40
2.6	<b>Net cash from / (used in) investing activities</b>	<b>(42)</b>	<b>(36)</b>
3.	<b>Cash flows from financing activities</b>		
3.1	Proceeds from issues of shares	-	2,721
3.2	Proceeds from issue of convertible notes	-	-
3.3	Proceeds from exercise of share options	-	-
3.4	Transaction costs related to issues of shares, convertible notes or options	-	-
3.5	Proceeds from borrowings	810	2,110
3.6	Repayment of borrowings	(3,845)	(3,888)
3.7	Transaction costs related to loans and borrowings	(37)	(73)
3.8	Dividends paid	-	-
3.9	Other –Treasury shares purchase	(267)	(490)
3.10	<b>Net cash from / (used in) financing activities</b>	<b>(3,339)</b>	<b>380</b>



## Consolidated statement of cash flows

4.	Net increase / (decrease) in cash and cash equivalents for the period	Oct 17 to Dec 17 Quarter \$A'000	Year to date (6 months) \$A'000
4.1	Cash and cash equivalents at beginning of quarter/year to date	1,890	995
4.2	Net cash from / (used in) operating activities (item 1.9 above)	2,432	(400)
4.3	Net cash from / (used in) investing activities (item 2.6 above)	(42)	(36)
4.4	Net cash from / (used in) financing activities (item 3.10 above)	(3,339)	380
4.5	Effect of movement in exchange rates on cash held	(11)	(7)
4.6	<b>Cash and cash equivalents at end of quarter</b>	<b>930</b>	<b>930</b>

5.	Reconciliation of cash and cash equivalents at the end of the quarter (as shown in the consolidated statement of cash flows) to the related items in the accounts	Current quarter \$A'000	Previous quarter \$A'000
5.1	Bank balances	930	1,890
5.2	Call deposits	-	-
5.3	Bank overdrafts	-	-
5.4	Other (provide details)	-	-
5.5	<b>Cash and cash equivalents at end of quarter (should equal item 4.6 above)</b>	<b>930</b>	<b>1,890</b>

6.	Payments to directors of the entity and their associates	Current quarter \$A'000
6.1	Aggregate amount of payments to these parties included in item 1.2	143
6.2	Aggregate amount of cash flow from loans to these parties included in item 2.3	-
6.3	Include below any explanation necessary to understand the transactions included in items 6.1 and 6.2	
	Directors and associates remuneration	143

7.	Payments to related entities of the entity and their associates	Current quarter \$A'000
7.1	Aggregate amount of payments to these parties included in item 1.2	-
7.2	Aggregate amount of cash flow from loans to these parties included in item 2.3	-
7.3	Include below any explanation necessary to understand the transactions included in items 7.1 and 7.2	

8.	<b>Financing facilities available</b> <i>Add notes as necessary for an understanding of the position.</i>	<b>Total facility amount at quarter end \$A'000</b>	<b>Amount drawn at quarter end \$A'000</b>
8.1	Loan facilities	4,000	810
8.2	Credit standby arrangements	NIL	NIL
8.3	Other (please specify)		
8.4	In December 2017, the Company established a new \$4 million Financing Facility with the CBA that allows an advanced drawdown of up to 90% of accrued Research and Development Tax Offset credits. The Company drew down \$810k from its CBA finance facility during this quarter, and another \$810k subsequent to the quarter-end. The eligible R&D tax offset cash rebate expected from the ATO for the financial year ending 30 June 2018 forms the primary security for the Facility. The financing facility incurs a line fee of 4.3% p.a. on the Facility Limit, and a Liquidity Fee of BBSY (Bank Bill Benchmark Rate for the Funding Period) plus 0.25% p.a. on amounts drawn down.		

9.	<b>Estimated cash outflows for next quarter</b>	<b>\$A'000</b>
9.1	Research and development	950
9.2	Product manufacturing and operating costs	135
9.3	Advertising and marketing	80
9.4	Leased assets	169
9.5	Staff costs	1,350
9.6	Administration and corporate costs	650
9.7	Other (provide details if material)	-
9.8	<b>Total estimated cash outflows</b>	<b>3,334</b>

10.	<b>Acquisitions and disposals of business entities (items 2.1(b) and 2.2(b) above)</b>	<b>Acquisitions</b>	<b>Disposals</b>
10.1	Name of entity	-	-
10.2	Place of incorporation or registration	-	-
10.3	Consideration for acquisition or disposal	-	-
10.4	Total net assets	-	-
10.5	Nature of business	-	-



## COMPLIANCE STATEMENT

1. This statement has been prepared in accordance with accounting standards and policies which comply with Listing Rule 19.11A.
2. This statement does give a true and fair view of the matters disclosed.

Sign here:



Date: 31 January 2018

Print name:

Richard Caldwell, *Managing Director*

### Notes

1. The quarterly report provides a basis for informing the market how the entity's activities have been financed for the past quarter and the effect on its cash position. An entity that wishes to disclose additional information is encouraged to do so, in a note or notes included in or attached to this report.
2. If this quarterly report has been prepared in accordance with Australian Accounting Standards, the definitions in, and provisions of, *AASB 107: Statement of Cash Flows* apply to this report. If this quarterly report has been prepared in accordance with other accounting standards agreed by ASX pursuant to Listing Rule 19.11A, the corresponding equivalent standard applies to this report.
3. Dividends received may be classified either as cash flows from operating activities or cash flows from investing activities, depending on the accounting policy of the entity.