

Environmental Impact Assessment

Lapwing Fen
EIA Screening Opinion/Pre-
Planning Application

Land at: Swaffham Prior,
Burwell, Reach,
Cambridgeshire,
CB25 0JZ

Proposal: Installation of 45MW Solar Park:
Solar panels, plant, security fencing,
landscaping and other associated
works.

Dated: 22nd Dec 2013

Oakes Environmental

Tel: 07810374103

Email: info@oakesenvironmental.com

www.oakesenvironmental.com



SOLAR

ASSOCIATES

Planning
East Cambridgeshire District Council
Planning Services
The Grange
Nutholt Lane
ELY,
Cams
CB7 4EE

EAST CAMBS DISTRICT COUNCIL

30 DEC 2013

REF:

24 December 2013

Dear Sirs

Lapwing Fen Solar Park: Construction Of Solar Park To Include The Installation Of Solar Panels, With End Of Array Inverters, Security Fencing, Landscaping And Other Associated Works.

Please find enclosed cheque to the value of £960 in support of previously submitted pre-application paperwork from Oakes Environmental. We look forward to hearing your consideration of the potential planning challenges presented by our proposed development at Lapwing Fen: Land near Reach, TL 55905 66400.

We are seeking a pre application consultation meeting and a judgement on an Environmental Screening Opinion for this site.

Regards



Chris Poulton
Solar Associates

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m: +44 7971 594037

East Cambridgeshire District Council
Planning Services
The Grange
Nutholt Lane
ELY,
Cambs
CB7 4EE

Dear Sirs,

TOWN AND COUNTRY PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) (ENGLAND AND WALES) REGULATIONS 2011: REGULATION 5(1)

1. REQUEST FOR EIA SCREENING OPINION

CONSTRUCTION OF A SOLAR PARK TO INCLUDE THE INSTALLATION OF SOLAR PANELS TO GENERATE UP TO 45MW OF ELECTRICITY, WITH END OF ARRAY INVERTERS, SECURITY FENCING, LANDSCAPING AND OTHER ASSOCIATED WORKS.

1.1 I write on behalf of my client, Solar Associates to request a Screening Opinion to confirm that an EIA is not required in relation to the proposed planning application and additionally obtain some Pre-Planning Application advice.

1.2 We enclose a plan showing the location of the areas for development; its OS Grid Reference is TL 55905 66400, (X 555905: Y 266400). The land is presented in three separate compartments, with ownership divided between the National Trust, and farmers Percy Watts & Sons, John Robinson. This land is agricultural land, access to the land is to be determined as part of the planning iterative process and with consultation with the landowners.

1.3 The site is situated on agricultural land and consists of three compartments of land. Its immediate environs are agricultural, with land to the north consisting of rough pasture from dry to wet grassland and protected fenland at 2km; the residential settlements of Burwell and Reach are located to the east of the site. The landscape is distinctly open in its characteristics with hedgerow, drainage ditches and field networks predominant. It is anticipated that the Solar Park will generate sufficient energy to supply 10,127 homes; a significant contribution to local power generation and carbon dioxide reduction.

2. Development Proposal

2.1 The application site occupies 104ha, with the total amount of land to be covered in PV panels representing 30%.

2.2 Planning permission is sought for a total of 13,000 panels with a generating capacity of approximately 45MW fixed on to metal arrays, with 1000 enclosed inverters. The construction of the site is such that there will be no requirement for any hardstandings. The frames supporting the panels will be secured into the ground. Ground investigations have yet to establish the requirement for concrete foundations. However, it is proposed that each frame will be kept stable by piling.

2.3 Trina utility panels are to be used as the preferred make and model. The panels are 77 × 39.05 × 1.57 inches and weigh 27.6kg. Each panel is made of 72, multicrystalline solar cells making them more efficient than the majority of other panels on the market. The fronts of the panels are covered with high transparency solar glass some 0.16 inches thick, enabling them to withstand snow loads of up to 5400Pa and wind loads up to 2400Pa. The product is manufactured according to international Quality and Environment Management System Standards ISO9001, ISO14001.

2.4 Panels will be raised to a maximum of 2.4m above the ground. There will be small inverters interspersed across the site; these are manufactured to be sound proofed to inhibit any noise production during operation.

2.5 The panels will be tilted towards the South with an angle of approximately 30 degrees. It is intended that the park will be connected to the electricity grid via the high voltage lines crossing the site onto the existing pylon. The site will serve the dual purpose of both a solar park for power generation directly into the national grid and a wildlife area. A similar ecological project of this type has been successfully undertaken by Solar Associates in Cambridgeshire.

2.6 The low profile in the landscape and indigenous additional visual screening will seek to ensure that the scale of the development will be in keeping with the surrounding landscape. Site security is to be achieved by creating a complete enclosure with a maximum height of 2.5m. This includes climb over protection with wire and a video surveillance system. The fence will be sympathetically coloured to blend with the landscape.

2.7 The lifespan of the proposed installation is estimated to be 30 - 35 years. Operation and maintenance agreements with the supplier will seek to ensure inverters parts will be replaced if necessary. All other components such as panels, substructure, cables, buildings etc. are durable for a long period of time. After decommissioning the installation can be removed. The majority of

3.1 The NPPF's core aims include support for the transition to a low carbon future in a changing climate, encouraging the reuse of existing resources and promoting the use of renewable resources through development of renewable energy that makes a positive contribution to conserving and enhancing the natural environment. Paragraph 28 states that planning policies should support economic growth in rural areas in order to create jobs and prosperity by taking a positive approach to sustainable new development. It continues that LPAs should promote such development and diversification of agricultural and other land-based rural businesses.

3.2 Paragraphs 93 – 98 are most relevant to the proposed development. Within these paragraphs the NPPF aims to support and help shape places to secure radical reductions in greenhouse gas emissions, minimise vulnerability and provide resilience to the impacts of climate change by supporting the delivery of renewable and low carbon energy and associated infrastructure.

4. Environmental Effects

The overriding principle applied by planning authorities when determining planning applications is that each case must be determined on its "individual merits", and that there is a presumption in favour of development, although other 'material considerations' may shape such determinations. The design of Lapwing Fen Solar Park will seek to identify and quantify these impacts where appropriate with commissioned consultants reports briefed to take these potential impacts into consideration and inform any design mitigation requirements.

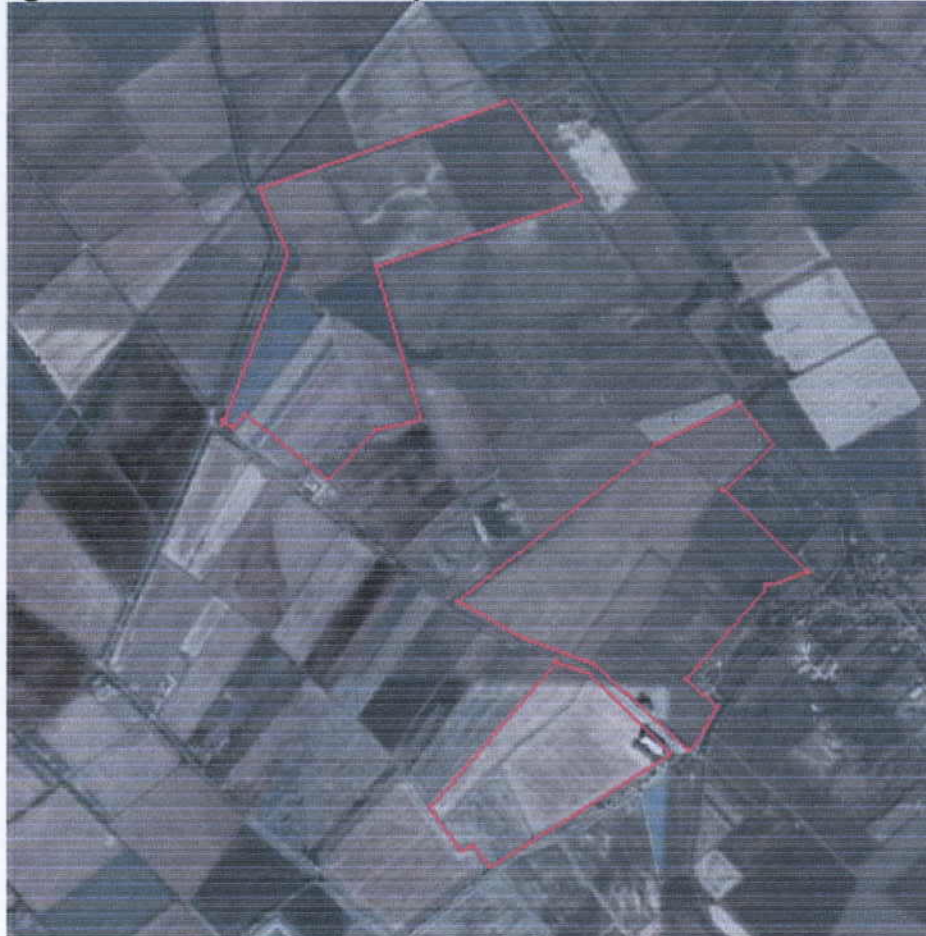
4.1 Visual Effects

The client is sensitive to the potential for impacts to arise from visual intrusion within the landscape and expertise will be secured to ensure that panel positioning and screening protect the landscape quality and character. The development proposes to retain, improve and manage all existing trees and hedgerows, and would propose significant additional planting along the boundaries of the site as required. Visual impact would be further investigated to ensure that the site is not overlooked by any residential amenity within close proximity. Planting schemes would be undertaken in close consultation with the local authority and the National Trust to ensure that the extended fenland vision is supported and nurtured.

Longer shot montages are also proposed, under advisement from the Local Authority and stakeholder consultation, to ensure the protection of existing site features of landscape, ecological, heritage and amenity value. The client is keen to ensure protected views and areas of heritage value are not adversely impacted.

component parts are made of steel, aluminium and copper, most of the PV-plant will be recycled, with decommissioning disposal activities adhering to the hierarchy for waste. The gravel footings under the panels and the anchoring of the substructure with ground screws make dismantling a simple process. The substructure, posts and cables can be removed from the soil easily for recycling and also the PV-Modules can be recycled.

Figure One: Site for Development



Copyright: Google Earth

3. National Planning Policy Guidance

The National Planning Policy Framework (NPPF) was published on 27th March 2012 and has been introduced by the Government with the purpose of overhauling and simplifying the planning process. The NPPF replaces much of the previous suite of national Planning Policy Statements, Planning Policy Guidance Notes and some Circulars with a single, streamlined document. The NPPF sets out the Government's planning policies for England and how these are expected to be applied under the 'presumption in favour of sustainable development'.

4.2 Traffic

Whilst there would be traffic movements during the construction phase, this would be a short term, reversible impact. It is not envisaged that the proposal will generate traffic movements through any residential areas, nor is it anticipated that it would prejudice highway safety or materially harm the living conditions of local residents. The proposed development will require a relatively short construction period, where after only occasional minimal maintenance traffic will be necessary.

4.3 Biodiversity

The application site does not lie within a statutorily designated ecological area/habitat and as such the restrictive policies do not apply in this instance. However, the site is located within 2km of Wicken Fen a designated Site of Special Scientific Interest, a RAMSAR and a National Nature Reserve. Application is to be accompanied by a Phase 1 Habitat survey to assess the ecological potential of the site to support protected species. It is noted that Arable and Grassland Assemblage Farmland Birds predominate on and around the site. It is the clients' intention to enhance ecological corridors and ensure that all planting schemes adhere to indigenous plant stock, thereby increasing the biodiversity and habitat within this area. In addition by providing large areas of habitat and reversing habitat fragmentation species.

4.4 Agricultural Land

The proposal does not involve the permanent loss of agricultural land of grades 1, 2 or 3a. It is presented that, on developmental balance, renewable energy generation far outweighs the temporary loss of such agricultural land.

4.5 Renewable Energy

Policy states that in view of the environmental benefits associated with harnessing renewable energy sources, the Council will support the development of renewable energy schemes provided that it can be shown that such development would not cause significant harm to interests of acknowledged importance in the local environment. The policy continues that in assessing proposals for renewable energy schemes, in addition to the local and wider benefits which the proposal may bring.

4.6 Sustainable Development

The successful permission of the proposed solar park extension will further mitigate against the effects of climate change, provided a strongly compelling positive environmental effect.

4.7 Noise and Disturbance

During operation, previous investigations on constructed sites show that there will be no audible noise from onsite transformers/inverters beyond the limits of the site. Construction noise would be limited to certain times only.

4.8 Light spillage, Air Quality and other forms of pollution

There is no pollution associated with the proposed development.

4.9 Safety and Security

It is proposed to erect a security fence around the extent of the site which will be monitored by CCTV. As indicated, the site will be enclosed by extending existing and proposed planting to increase its visual aesthetics.

4.10 Flood Risk

The majority of the site sits on Environment Agency designated flood risk zones; the majority of land presenting as a medium flood risk. Suitable flood risk assessments will be undertaken to understand the relationship between the proposed development and the local hydrology and identify any necessary mitigations. The size of the site and extent of panel coverage is likely to have a minor impact on surface water attenuation. It is therefore proposed that a suitable SUDS system will be designed to ensure that surface water drains at a rate that prevents any risk of localised flooding. Flood risk does not usually increase with the installation of solar farms. Little hard standing material will be used during construction and within the final development design. Thereby avoiding soil compaction and ensuring the ability for surface water to attenuate.

4.11 Archaeology and Contaminated Land

If deemed appropriate investigations will be instigated to identify any potential impacts as they relate to contaminated land and archaeological vulnerability.

5. Conclusion

In addition to this Environmental Impact Assessment Opinion request, a pre application meeting is sought to fully appreciate the concerns of the Council and identify any potential constraints and challenges. Should you require any further information to assist in this matter, we may be contacted on the number below.

Warmest regards

Justine Oakes
Oakes Environmental
07810374103
www.oakesenvironmental.com

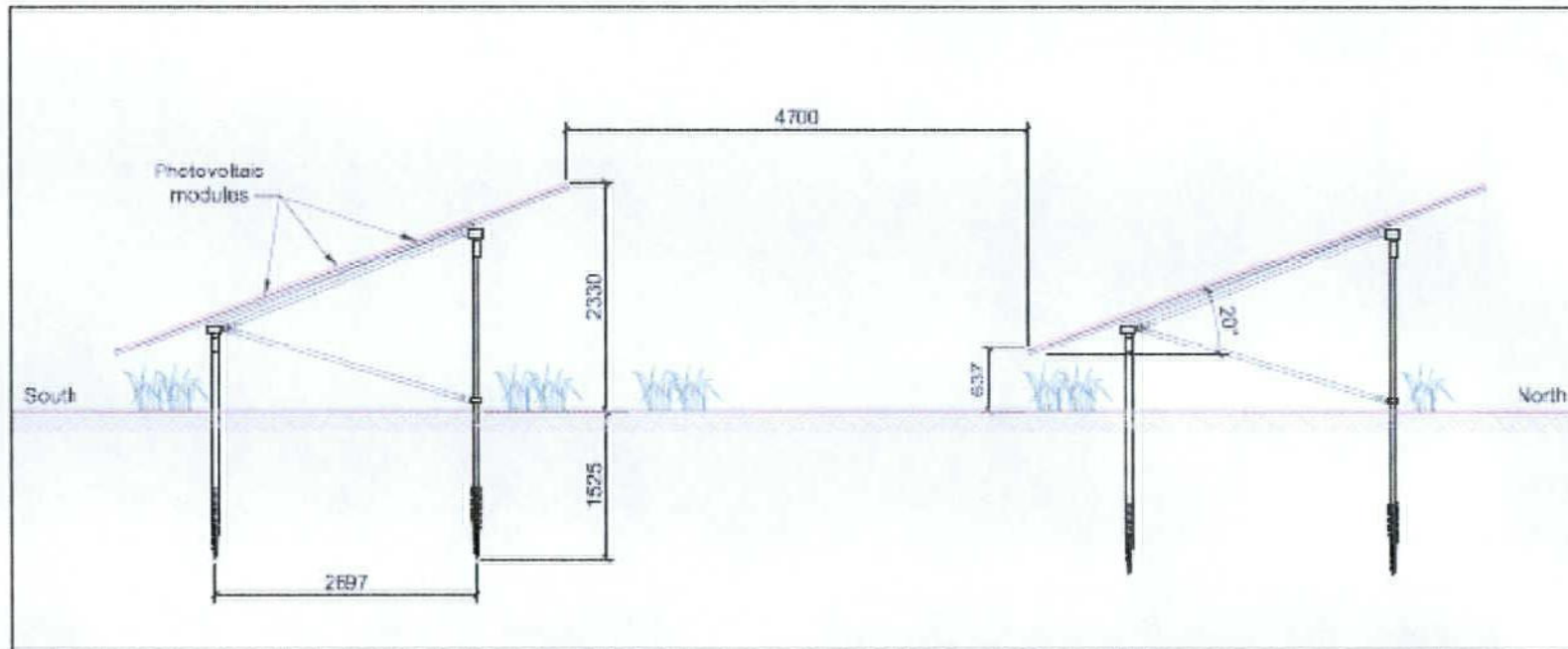
Annexes

Annex A: Block plan
Annex B: Panel Elevations
Annex C: Trio General Specifications Outdoor Models
Annex D: TSM Panel Specifications

Annex A:

Block Plan Lapwing Fen 2013

Annex B: Panel Side Elevations



SECTION THROUGH PV ARRAYS
Scale 1:50

Annex C:

General Specifications Outdoor Models

TRIO-20.0-TL TRIO-27.6-TL

GENERAL SPECIFICATIONS OUTDOOR MODELS

The latest in Power-One's Aurora Trio range, this new-look three-phase inverter fills a specific niche in the commercial solar market. This new three-phase inverter benefits from the three-phase inverter technology perfected in the PVI-10.0 and 12.5, probably the world's most commonly used three-phase inverter which has led the way in best-in-class efficiency.

Controlling more PV panels than its smaller predecessor, the Trio-27.6 and Trio-20.0 will offer more flexibility and control to installers who have large installations with varying aspects or orientations. This device has two independent MPPTs and efficiency ratings of up to 98.2%. The very wide input voltage range makes the inverter suitable to installations with reduced string size.

The new look inverter has new features including a special built-in heat sink compartment and front panel display system. The unit is free of electrolytic capacitors, leading to a longer product lifetime.

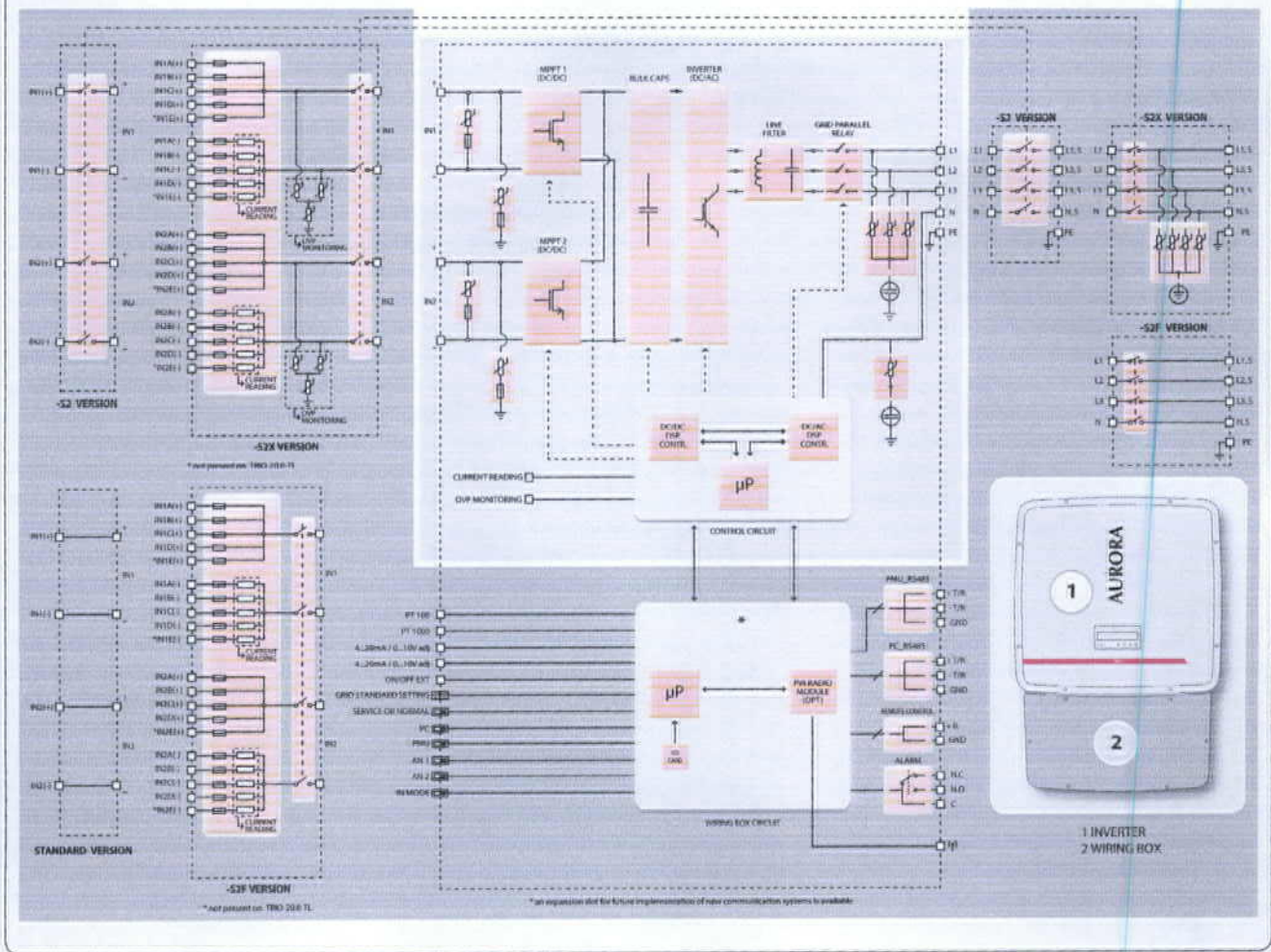


Features

- 'Electrolyte-free' power converter to further increase the life expectancy and long term reliability
- Quiet Rail
- True three-phase bridge topology for DC/AC output converter
- Each inverter is set on specific grid codes which can be selected in the field
- Dual input sections with independent MPP tracking, allows optimal energy harvesting from two sub-arrays oriented in different directions
- Wide input range
- Detachable wiring box to allow an easy installation
- Integrated string combiner with different options of configuration which include DC and AC disconnect switch in compliance with international Standards (-S2, -S2F and -S2X versions)
- High speed and precise MPPT algorithm for real time power tracking and improved energy harvesting
- Flat efficiency curves ensure high efficiency at all output levels ensuring consistent and stable performance across the entire input voltage and output power range
- Outdoor enclosure for unrestricted use under any environmental conditions
- Capability to select via display the Active Power reduction and the Reactive Power regulation (fixed $\cos(\phi)$, standard $\cos(\phi)=f(P)$ curve, Fixed Q (Q/Pn))
- Capability to connect external sensors for monitoring environmental conditions
- Availability of auxiliary DC output voltage (24V, 300mA)

AURORA JNO
TRIO

BLOCK DIAGRAM OF TRIO-27.6-TL-OUT



Block Diagram and Efficiency Curves





www.power-one.com

Power-One Renewable Energy Worldwide Sales Offices

<u>Country</u>	<u>Name/Region</u>	<u>Telephone</u>	<u>Email</u>
Australia	Asia Pacific	+61 2 9735 3111	sales.australia@power-one.com
China (Shenzhen)	Asia Pacific	+86 755 2988 5888	sales.china@power-one.com
China (Shanghai)	Asia Pacific	+86 21 5505 6907	sales.china@power-one.com
India	Asia Pacific	+65 6896 3363	sales.india@power-one.com
Singapore	Asia Pacific	+65 6896 3363	sales.singapore@power-one.com
Belgium / The Netherlands / Luxembourg	Europe	+32 2 206 0338	sales.belgium@power-one.com
France	Europe	+33 (0) 141 796 140	sales.france@power-one.com
Germany	Europe	+49 7641 955 2020	sales.germany@power-one.com
Italy	Europe	00 800 00287672 Opt. n°5	sales.italy@power-one.com
Spain	Europe	+34 91 879 88 54	sales.spain@power-one.com
United Kingdom	Europe	+44 1903 823 323	sales.UK@power-one.com
Dubai	Middle East	+971 50 100 4142	sales.dubai@power-one.com
Canada	North America	+1 877 261-1374	sales.canada@power-one.com
USA East	North America	+1 877 261-1374	sales.usaeast@power-one.com
USA Central	North America	+1 877 261-1374	sales.usacentral@power-one.com
USA West	North America	+1 877 261-1374	sales.usawest@power-one.com

PARAMETER	TRIO-20.0-TL-OUTD	TRIO-27.6-TL-OUTD
Input Side		
Absolute Maximum DC Input Voltage ($V_{max,abs}$)	1000 V	1000 V
Start-up DC Input Voltage (V_{start})	360 V (adj. 250...500 V)	360 V (adj. 250...500 V)
Operating DC Input Voltage Range ($V_{demin}...V_{dmax}$)	$0.7 \times V_{Rst}...950 V$	$0.7 \times V_{Rst}...950 V$
Rated DC Input Power (P_{dc})	20750 W	28600 W
Number of Independent MPPT	2	2
Maximum DC Input Power for each MPPT ($P_{MPPTmax}$)	12000 W	16000 W
DC Input Voltage Range with Parallel Configuration of MPPT at P_{dc}	440...800 V	500...800 V
DC Power Limitation with Parallel Configuration of MPPT	Linear Derating From MAX to Null [$800V \leq V_{MPPT} \leq 950V$]	Linear Derating From MAX to Null [$800V \leq V_{MPPT} \leq 950V$]
DC Power Limitation for each MPPT with Independent Configuration of MPPT at P_{dc} , max unbalance example	12000 W [$480V \leq V_{MPPT} \leq 800V$] the other channel: $P_{dc} = 12000W$ [$350V \leq V_{MPPT} \leq 800V$]	16000 W [$500V \leq V_{MPPT} \leq 800V$] the other channel: $P_{dc} = 16000W$ [$400V \leq V_{MPPT} \leq 800V$]
Maximum DC Input Current (I_{dmax}) / for each MPPT ($I_{MPPTmax}$)	50.0 A / 25.0 A	64.0 A / 32.0 A
Maximum Input Short Circuit Current for each MPPT	30.0 A	40.0 A
Number of DC Inputs Pairs for each MPPT	1 (4 in -S2X and -S2F Versions)	1 (5 in -S2X and -S2F Versions)
DC Connection Type	Tool Free PV Connector WM / MC4 (Screw Terminal Block on Standard and -S2 versions)	Tool Free PV Connector WM / MC4 (Screw Terminal Block on Standard and -S2 versions)
Input Protection		
Reverse Polarity protection	Yes, from limited current source	Yes, from limited current source
Input Over Voltage Protection for each MPPT - Varistor	2	2
Input Over Voltage Protection for each MPPT - Plug In Modular Surge Arrester (-S2X Version)	3 (Class II)	3 (Class II)
Photovoltaic Array Isolation Control	According to local standard	According to local standard
DC Switch Rating for each MPPT (Version with DC switch)	40 A / 1000 V	40 A / 1000 V
Fuse Rating (Versions with fuses)	12 A / 1000 V	12 A / 1000 V
Output Side		
AC Grid Connection Type	Three phase 3W or 4W+PE	Three phase 3W or 4W+PE
Rated AC Power (P_{ac})	20000 W	27600 W
Maximum AC Output Power (P_{acmax})	22000 W ⁽³⁾	30000 W ⁽⁴⁾
Rated AC Grid Voltage (V_{ac})	400 V	400 V
AC Voltage Range	320...480 V ⁽¹⁾	320...480 V ⁽¹⁾
Maximum AC Output Current (I_{acmax})	33.0 A	45.0 A
Rated Output Frequency (f_r)	50 Hz	50 Hz
Output Frequency Range ($f_{min}...f_{max}$)	47...53 Hz ⁽²⁾	47...53 Hz ⁽²⁾
Nominal Power Factor ($\cos\phi_{i,cr}$)	> 0.995 (adj. ± 0.9 , or fixed by display down to ± 0.8 with max 22 kVA)	> 0.995 (adj. ± 0.9 , or fixed by display down to ± 0.8 with max 30 kVA)
Total Current Harmonic Distortion	< 3%	< 3%
AC Connection Type	Screw terminal block	Screw terminal block
Output Protection		
Anti-Islanding Protection	According to local standard	According to local standard
Maximum AC Overcurrent Protection	34.0 A	46.0 A
Output Overvoltage Protection - Varistor	4	4
Output Over Voltage Protection - Plug In Modular Surge Arrester (-S2X Version)	4 (Class II)	4 (Class II)
Operating Performance		
Maximum Efficiency (η_{max})	98.2%	98.2%
Weighted Efficiency (EURO/CEC)	98.0% / 98.0%	98.0% / 98.0%
Feed In Power Threshold	40 W	40 W
Stand-by Consumption	< 8W	< 8W
Communication		
Wired Local Monitoring	PVI-USB-RS232_485 (opt.), PVI-DESKTOP (opt.)	PVI-USB-RS232_485 (opt.), PVI-DESKTOP (opt.)
Remote Monitoring	PVI-AEC-EVO (opt.), AURORA-UNIVERSAL (opt.)	PVI-AEC-EVO (opt.), AURORA-UNIVERSAL (opt.)
Wireless Local Monitoring	PVI-DESKTOP (opt.) with PVI-RADIOMODULE (opt.)	PVI-DESKTOP (opt.) with PVI-RADIOMODULE (opt.)
User Interface	Graphic display	Graphic display
Environmental		
Ambient Temperature Range	-25...+60°C / -13...140°F with derating above 45°C/113°F	-25...+60°C / -13...140°F with derating above 45°C/113°F
Relative Humidity	0...100% condensing	0...100% condensing
Noise Emission	< 50 dB(A) @ 1 m	< 50 dB(A) @ 1 m
Maximum Operating Altitude without Derating	2000 m / 6560 ft	2000 m / 6560 ft
Physical		
Environmental Protection Rating	IP 65	IP 65
Cooling	Natural	Natural
Dimension (H x W x D)	1061 mm x 702 mm x 292 mm / 41.7" x 27.6" x 11.5"	1061 mm x 702 mm x 292 mm / 41.7" x 27.6" x 11.5"
Weight	< 70.0 kg / 154.3 lb (Standard Version)	< 75.0 kg / 165.4 lb (Standard Version)
Mounting System	Wall bracket	Wall bracket
Safety		
Isolation Level	Transformerless	Transformerless
Marking	CE	CE
Safety and EMC Standard		
	EN 50178, AS/NZS3100, AS/NZS 60950, EN61000-6-1, EN61000-6-3, EN61000-3-11, EN61000-3-12	EN 50178, AS/NZS3100, AS/NZS 60950, EN61000-6-1, EN61000-6-3, EN61000-3-11, EN61000-3-12
	Enel Guideline (CEI 0-21 + Attachment A70 Terna, CEI 0-16) ⁽⁵⁾ , VDE 0126-1-1, VDE-AR-N 4105, G59/2, EN 50438, RD1663, AS 4777, BDEW	Enel Guideline (CEI 0-21 + Attachment A70 Terna, CEI 0-16) ⁽⁵⁾ , VDE 0126-1-1, VDE-AR-N 4105, G59/2, EN 50438, RD1663, AS 4777, BDEW
Grid Standard		
Available Products Variants		
Standard	TRIO-20.0-TL-OUTD-400	TRIO-27.6-TL-OUTD-400
With DC+AC Switch	TRIO-20.0-TL-OUTD-S2-400	TRIO-27.6-TL-OUTD-S2-400
With DC+AC Switch and Fuse	TRIO-20.0-TL-OUTD-S2F-400	TRIO-27.6-TL-OUTD-S2F-400
With DC+AC Switch, Fuse and Surge Arrester	TRIO-20.0-TL-OUTD-S2X-400	TRIO-27.6-TL-OUTD-S2X-400

1. The AC voltage range may vary depending on specific country grid standard

2. The frequency range may vary depending on specific country grid standard

3. Limited to 20000 W for Germany

4. Limited to 27600 W for Germany

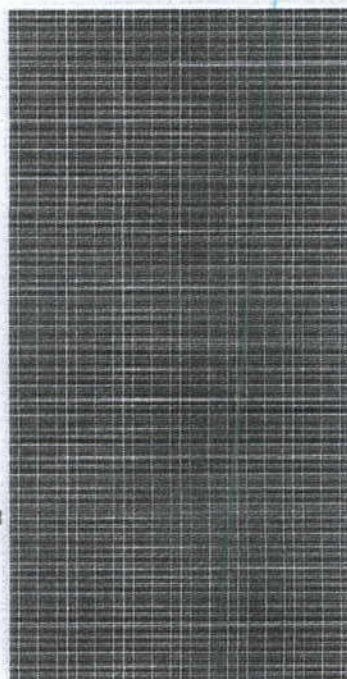
5. Since their applicability dates

Remark: Features not specifically listed in the present data sheet are not included in the product

Annex D:

TSM Panel Specifications

TSM-PC14 TSM-PA14 THE UTILITY SOLUTION



15.7%
MAX EFFICIENCY

305W
MAX POWER OUTPUT

10 YEAR
PRODUCT WARRANTY

25 YEAR
LINEAR POWER WARRANTY

Founded in 1997, Trina Solar (NYSE: TSL) has established itself as a leader in the solar community with its vertically integrated business model. Our modules and system solutions provide clean solar power in on-grid and off-grid residential, commercial, industrial and utility-scale systems.

With more than 22 offices worldwide, Trina Solar has partnerships with leading installers, distributors, utilities and developers in all major PV markets. Trina Solar is committed to driving smarter energy choices.

Trina Solar Limited
www.trinasolar.com



Module can bear snow loads up to **5400Pa** and wind loads up to **2400Pa**



Guaranteed power output **0~+3%**



High performance under low light conditions
Cloudy days, mornings and evenings



Enhanced module durability with **4.0mm** thick tempered glass



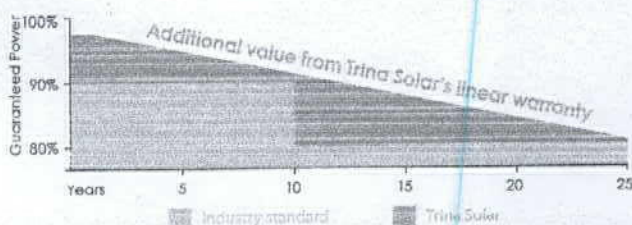
Manufactured according to International Quality and Environment Management System Standards **ISO9001, ISO14001**



MC4 photovoltaic connectors increase system reliability

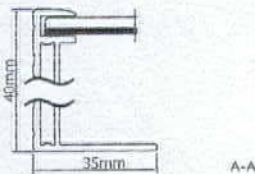
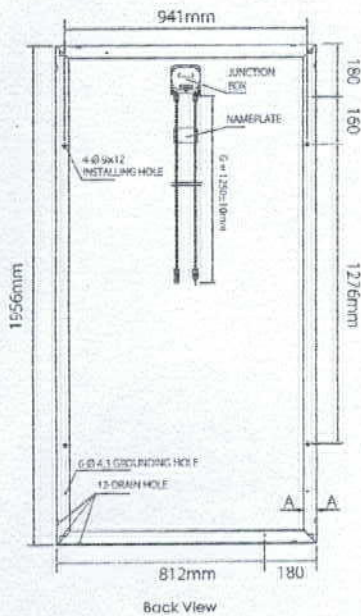
LINEAR PERFORMANCE WARRANTY

10 Year Product Warranty • 25 Year Linear Power Warranty

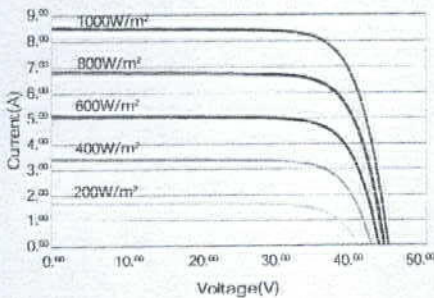


TSM-PC14 / TSM-PA14 Utility Scale Solar Module

DIMENSIONS OF PV MODULE TSM-PC/PA14



I-V CURVES OF PV MODULE TSM-290 PC/PA14



Average efficiency reduction of 4.5% at 200W/m² according to EN 60904-1.

CERTIFICATION



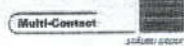
ELECTRICAL DATA @ STC	TSM-285 PC/PA14	TSM-290 PC/PA14	TSM-295 PC/PA14	TSM-300 PC/PA14	TSM-305 PC/PA14
Peak Power Watts-P _{MAX} (Wp)	285	290	295	300	305
Power Output Tolerance-P _{MAX} (%)	0/+3	0/+3	0/+3	0/+3	0/+3
Maximum Power Voltage-V _{MPP} (V)	35.6	36.1	36.6	36.9	37.0
Maximum Power Current-I _{MPP} (A)	8.02	8.04	8.07	8.13	8.25
Open Circuit Voltage-V _{OC} (V)	44.7	44.9	45.2	45.3	45.4
Short Circuit Current-I _{SC} (A)	8.50	8.53	8.55	8.60	8.75
Module Efficiency η _m (%)	14.7	14.9	15.2	15.5	15.7

Values at Standard Test Conditions STC (Air Mass AM1.5, Irradiance 1000W/m², Cell Temperature 25°C). Power measurement tolerance: ±3%

ELECTRICAL DATA @ NOCT	TSM-285 PC/PA14	TSM-290 PC/PA14	TSM-295 PC/PA14	TSM-300 PC/PA14	TSM-305 PC/PA14
Maximum Power-P _{MAX} (Wp)	207	211	214	218	221
Maximum Power Voltage-V _{MPP} (V)	32.1	32.6	33.0	33.3	33.4
Maximum Power Current-I _{MPP} (A)	6.46	6.47	6.48	6.55	6.62
Open Circuit Voltage (V)-V _{OC} (V)	40.7	40.9	41.2	41.3	41.4
Short Circuit Current (A)-I _{SC} (A)	6.93	6.97	7.00	7.04	7.17

NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s. Power measurement tolerance: ±3%

MECHANICAL DATA

Solar cells	Multicrystalline 156 × 156mm (6 inches)
Cell orientation	72 cells (6 × 12)
Module dimensions	1956 × 992 × 40mm (77 × 39.05 × 1.57 inches)
Weight	27.6kg (60.8 lb)
Glass	High transparency solar glass 4.0mm (0.16 inches)
Frame	Anodized aluminium alloy
J-Box	IP 67 rated
Cables	Photovoltaic Technology cable 4.0mm ² (0.006 inches ²), 1250mm (49.2 inches)
Connector	MC4 

TEMPERATURE RATINGS

Nominal Operating Cell Temperature (NOCT)	45°C (±2°C)
Temperature Coefficient of P _{MAX}	-0.44%/°C
Temperature Coefficient of V _{OC}	-0.33%/°C
Temperature Coefficient of I _{SC}	0.046%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1000V DC(IEC)/600V DC(UL)
Max Series Fuse Rating	15A

WARRANTY

10 year Product Workmanship Warranty
25 year Linear Power Warranty
(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 24 pieces
Modules per 40' container: 528 pieces