GOGLA.ORG

The Voice of the Off-Grid Solar Energy Industry

GOGLA

12V Connector Standardisation

14 July 2020

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About us

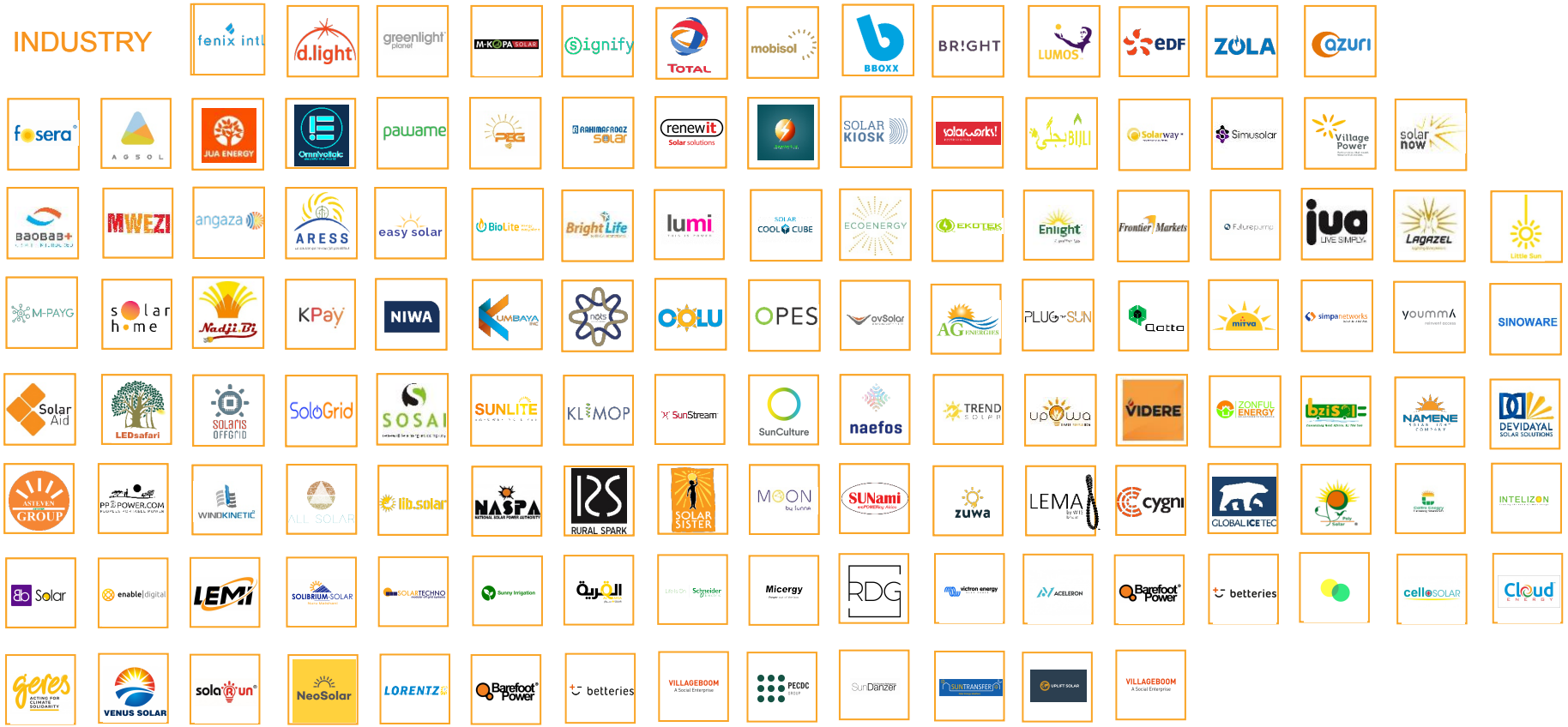
GOGLA is the global association for the off-grid solar energy industry.

Our mission is to help our members build sustainable markets, made up of profitable companies, delivering quality, affordable off-grid electricity products and services to as many customers as possible across the developing world.

Our 180+ members

Off-grid solar manufacturers and distributors make up three quarters of our membership base.

Others include investors, trade bodies, think tanks, funders and universities.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fenix intl
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TOTAL
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ECOENERGY
EKOTEK
Enlight
Frontier Markets
Futurepump
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USEA
Calvert Impact Capital
KAWISAFI
PPI
LIONS HEAD
UpforSolar
Triple Jump
mfx
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ADVANCECONSULTING
OIKO CREDIT
OPEN ROAD
60__decibels
EcoNetworks
Venture Builder
camco
CLEAN ENERGY

Off-Grid Solar Products

Our impact

Our industry has provided 313 million people with access to affordable, clean electricity with off-grid solar in just nine years.

With product and financial innovation, the industry is rapidly shifting households from toxic kerosene lamps, candles and diesel generators to clean electricity.

Our services

We support members with the following services

- Market intelligence
- Knowledge-sharing and networking events
- Advocacy, for building enabling policy and investment
- Creating industry standards and guidelines
- As our sector is still growing, we attract significant funds beyond our industry members to increase our impact.

The off-grid solar market at a glance (based on affiliate sales)

2019

No. of SHS kits (11+ Wp) sold: 1.5 million
(65% through PAYGo financing)

No. of lighting products sold: 8.5 million

No. of appliances sold: 1.2 million
(TVs, fans, refrigerators, solar water pumps)

TOTAL

No. of products sold since 2010: 51 million

Proposed Objective of GOGLA 12V Connector Standardisation

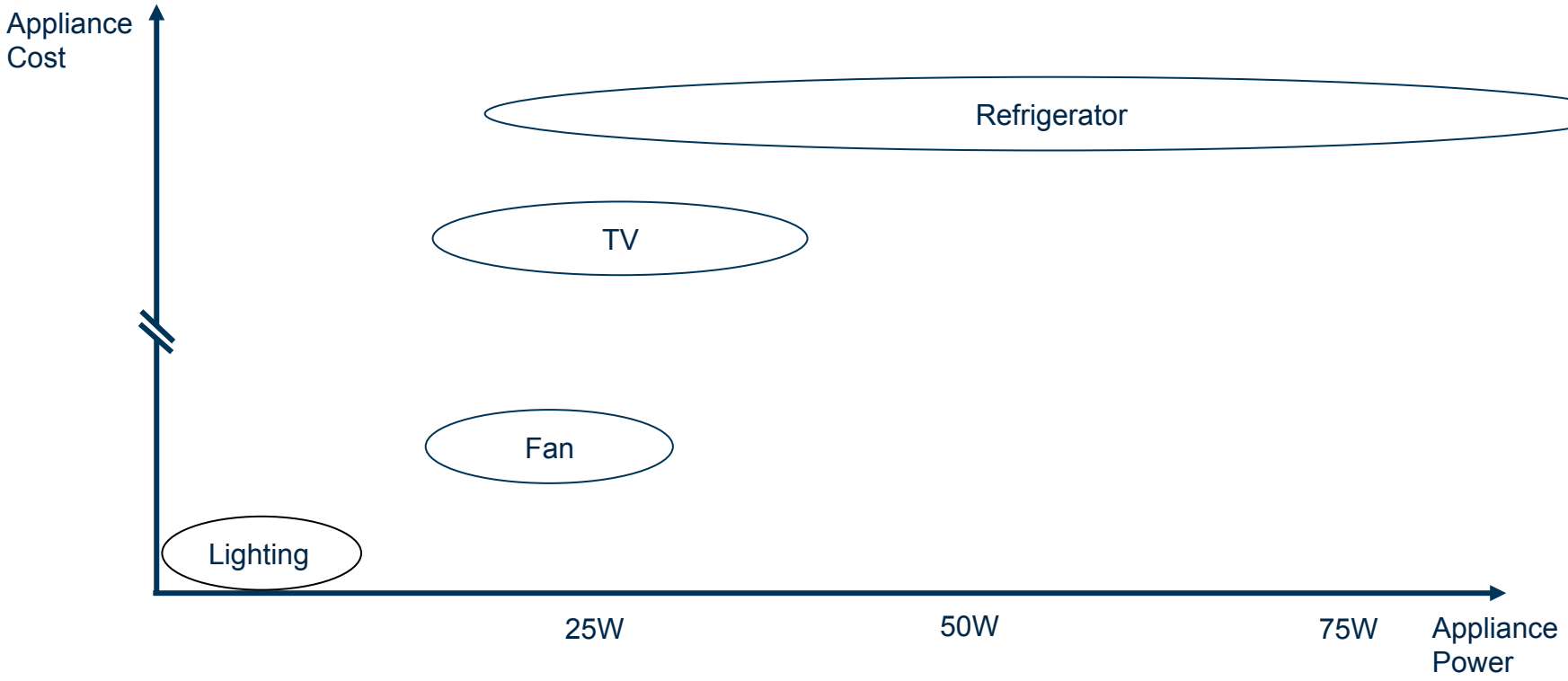
Define a voluntary SHS to appliance 12V connector standard that will support basic power delivery, including communication between devices

Proposed Basic Requirements for 12V Connector Standard

- For domestic use SHSs up to 350W (in-line with Lighting Global, IEC/TS 62257-9-5 and IEC/TS 62257-9-8)
- For systems with 12V* outputs
- Excludes higher power productive use applications approx. > 100W and voltages other than 12V*
- Connectors for different load ratings should not be physically interchangeable
- Connector current ratings should be appropriate for the type of load
- The standard should support the future widespread introduction of communication with appliances
- Contact materials should be specified to avoid galvanic corrosion and environmental effects
- Over-mould dimensions for plugs should be specified
- The standard should apply to wire-to-board and inline wire-to-wire

* Based on Lighting Global / IEC 12V definition being 10.5V to 15V

Proposed Basic Requirements for 12V Connector Standard – Coverage of Appliance Loads

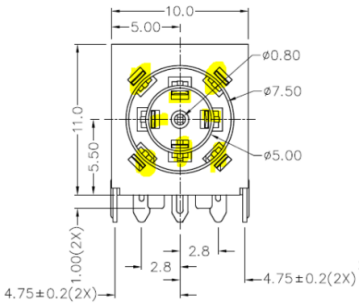


Connectors Survey

- 16 companies submitted their connector details and provided feedback on 12V standard connector options
- Option 2 was determined to have majority support from members

12V Connector Standard – Option 2 – Power and Communications

- **For loads ≤ 8A WITHOUT communications -**
  - 2 pole DC barrel connector, 5.5mm outer diameter / 2.5mm inner diameter
  - Rationale: Identified as most commonly used lighting connector from survey
    Prevents connection of 2.1mm – commonly used for PV
  - Note: Should be appropriately rated and outputs protected to prevent over-current
- **For loads ≤ 8A WITH communications** –
  - 3 pole laptop-style DC barrel connector 7.5mm OD / 5.0mm ID for power + data (costs approx. USD0.30)
  - Data pin supports single wire communication, e.g. LIN
  - This power + data connector is cost-effective when compared with the cost of using a separate data cable and connectors
  - Can be used with “dumb” appliances using 3 pole -> 2 pole cable



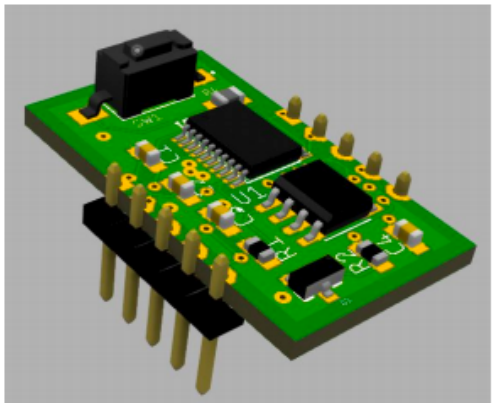
3 pole DC socket

12V Connector Standard – Option 3 – Forward-looking connector

- Option 3 is to specify a connector standard that is not based on existing connectors currently being used by companies (as uncovered by the connectors survey)
- It would specify a forward-looking, future-proof connector instead that integrates both power and data into one connector
- Monitoring work on 48V connectors

Solaris OpenPAYGO Link

- Bi-directional communication over a **single wire** with multiple devices on one bus
- Reliable: tolerance for high noises on the power line

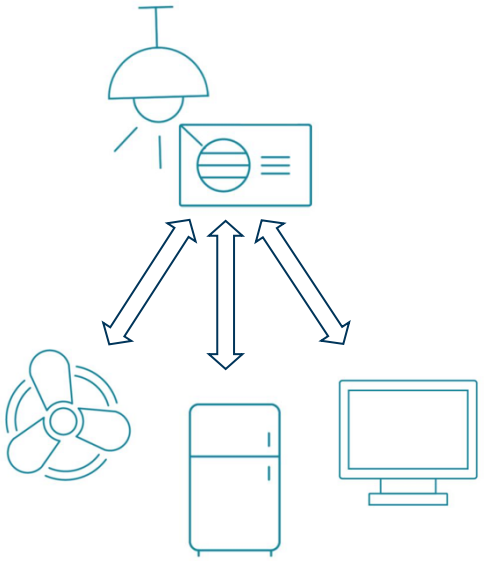


- Add-on board design for **ease of integration** + library that can easily work on different HW architectures
- Small footprint: runs fine on a <0.20$ MCU with 8K of flash
- MIT Licensed

- Base commands for common use cases (load sched, PAYGO, etc.) with **customizable commands** to be easily added on top

Angaza Nexus Channel

- Open Source device-to-device communication application + security layer for the Nexus offering
- Agnostic to hardware and transport layer
- Developed using existing standards of the Open Connectivity Foundation (OCF)
- Uses a **Resource Model** that supports any feature or functionality manufacturers wish to develop



OpenPAYGO Link + Nexus Channel

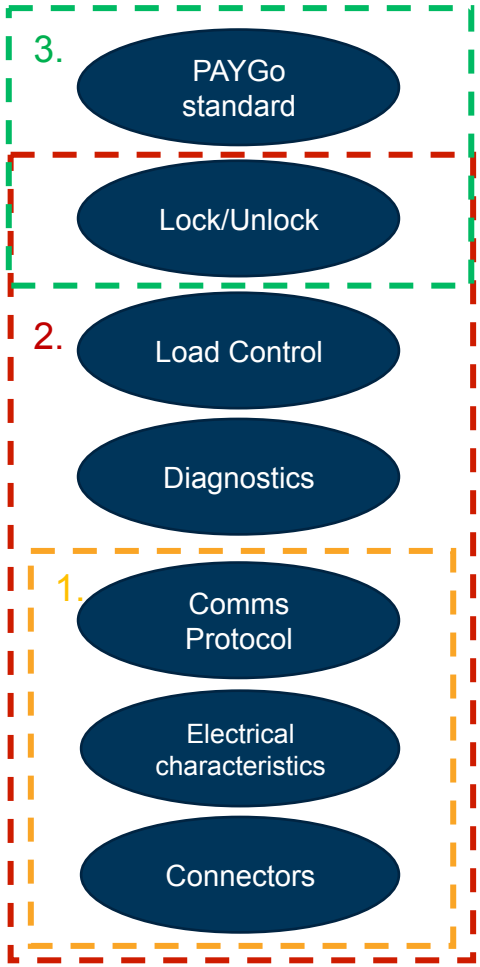
- The two solutions provide two pieces of the same puzzle:
  - OpenPAYGO Link provides the lower communication layers (physical, transport, etc.)
  - Nexus Channel provides the upper communication layer (application)

- Used together they can ensure interoperability for SHS and appliance communication

Technical options / opportunities for standardisation and interoperability

2. Standardized messaging to support diagnostics, load management, verify elec. compatibility, PAYGo activation, and power management.

1. The foundation: a universal (family of) connectors, electrical compatibility and communications protocol.



3. A PAYGo standard with protocols (token generation, etc.), software compatibility standards, and PAYGo-enabling hardware.

Thank you

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