Why choose between Radio and PLC if you can have both?

G3-Hybrid: Two powerful technologies in one single solution!

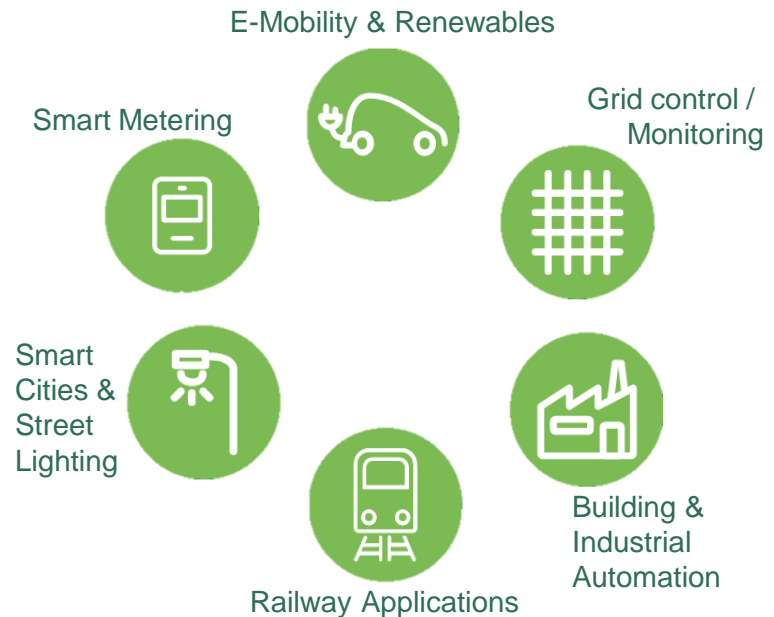www.g3-alliance.com
generalsecretary@g3-alliance.com

G3 provides proven technologies offering lowest total cost of ownership and independency on telco operators

Cost effective, reliable and secure communication…

Cost-effective		Long range communi-cation	Real-time communi-cation
ITU standard	Supports IPv6	Secure	
	High robustness	High data rate	Future proof
Routing		Plug and play	

… in a wide range of applications

E-Mobility & Renewables

Smart Metering

Grid control / Monitoring

Smart Cities & Street Lighting

Railway Applications

Building & Industrial Automation

G3-Alliance

G3 is a mature technology with over 80 million products in operation in more than 30 countries worldwide

Known pilots and roll-outs of worldwide

- Deployment Vattenfall, Sweden
- Pilot Tauron, Poland, deployment EON Warsaw
- Deployment ST, Latvia
- Deployment EVN, Austria
- Deployment CREOS, Luxemburg
- Deployment CIS, Uzbekistan
- Deployment ENEDIS, France
- Deployment DEE, Romania
- Deployment SODO, Slovenia
- Deployment IFR (Rail), Italy
- Deployment in Bangladesh
- Deployment EDF, Martinique & Guadeloupe
- Deployment HEP, Croatia
- Deployment Tepco, Japan
- Pilots EEHC and ECDC, Egypt
- Pilots with Hybrid, India
- Pilot Celsia and EPM, Colombia
- Deployment STEG, Tunisia
- Deployment TNB, Malaysia
- Deployment EPS, Serbia
- Deployment KPLC and Tatu City, Kenya
- Deployment Engie, Tahiti
- Deployment EDF, French Guyana
- Deployment in Madagascar
- Deployment EDF, New Caledonia
- Deployment Eskom, South Africa

G3-Alliance

3

In France over 35 million G3-PLC meters have been successfully installed by Enedis (part of EDF group)

An industrial program for a massive roll-out

ENEDIS
L'ELECTRICITE EN RESEAU

- **2 million** remote operations per month
- *99%* of successful remote operations

1 billion remote readings of consumption data per month
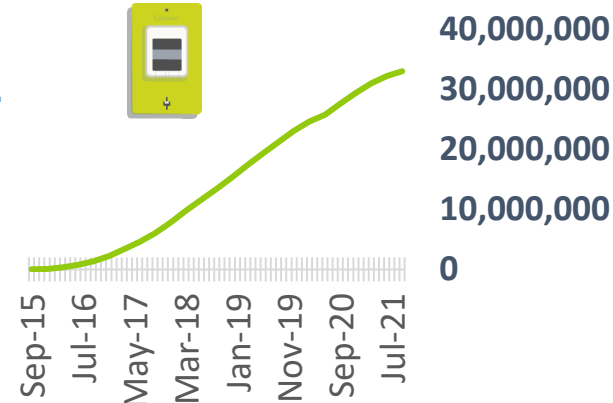**98%** of successful remote readings

7 million people follow their consumption online

G3-PLC **100% G3-PLC** communication

6 years
2015 → 2021

35 MILLION LINKY

750 000 CONCENTRATORS

40,000,000
30,000,000
20,000,000
10,000,000
0

Sep-15 Jul-16 May-17 Mar-18 Jan-19 Nov-19 Sep-20 Jul-21

6 MANUFACTURERS WITH FACTORIES BASED IN FRANCE

45 ELECTRICAL INSTALLATION COMPANIES AND RECYCLING COMPANIES

- Linky mass roll-out in France is completed
- Linky roll-out started or is in preparation in French foreign territories such as French Guyana, Martinique, Mayotte, etc. and in Haiti
- Experimentation started in France with the hybrid solution

G3-Alliance

G3-Alliance is supported by an international group of 100 utilities and industrial players from over 30 countries

G3-Alliance operates a successful certification program enabling multi-vendor implementations

- Two certification labs in France and Japan

- Certification covers conformance, interoperability and performance

- Certification for platforms as well as products

- Over 500 devices certified since opening of certification

Number of certified devices (cumulative)
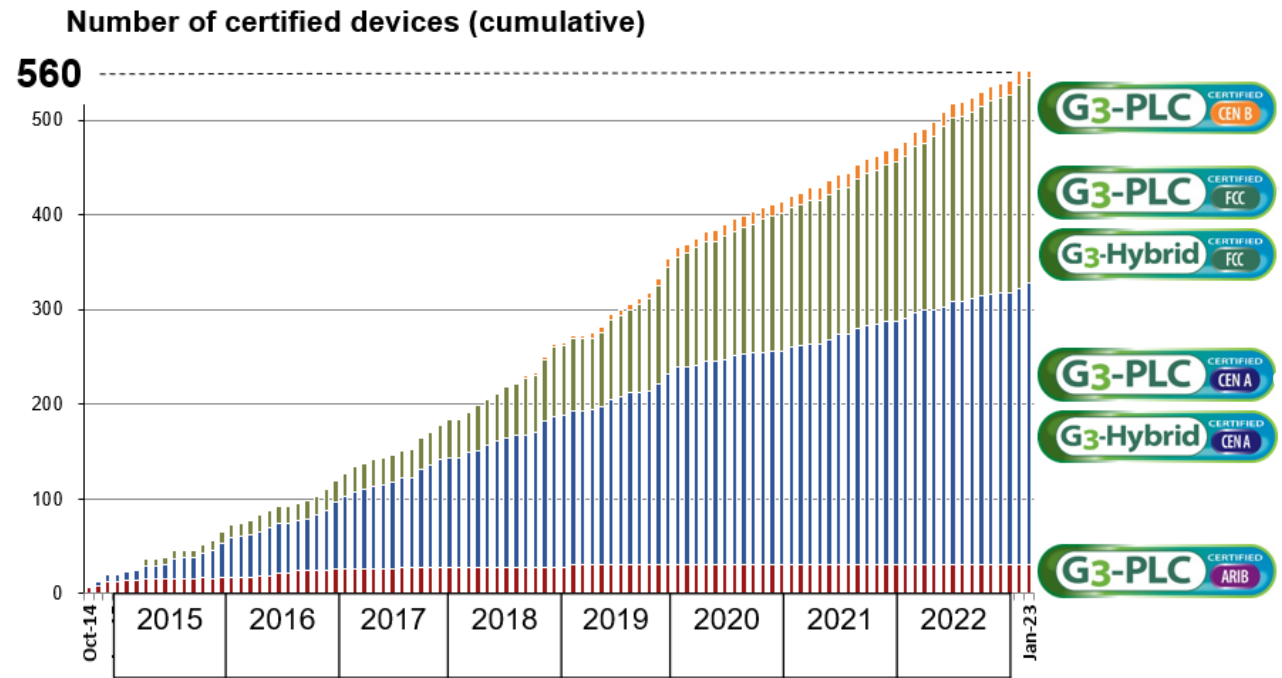
For list of all certified devices: https://g3-plc.com/g3-plc-certification/certified-products/

G3-Alliance

RF or PLC Communication?

PLC Advantages

- Built on existing infrastructure which lowers deployment costs
- Able to communicate with hard-to-reach nodes without attenuation
- No line-of-sight limitation (Underground, through walls)
- Not affected by weather

RF Advantages

- Immune to noise on the lines
- Able to connected isolated meters to the main network
- Mesh RF network can help extend the effective range of the network

What if you can have both in one?!

Hybrid PLC+RF Advantages

- Maximises coverage and connectivity
- Strongly reduces the complexity of the roll-out and with that the cost
- Increases performance (communication success rate and data rate)

G3-Alliance

The G3-Hybrid unifies powerline and radio frequency technology creating one, seamlessly managed network using both media

**Unified G3-Hybrid PLC+RF protocol stack**
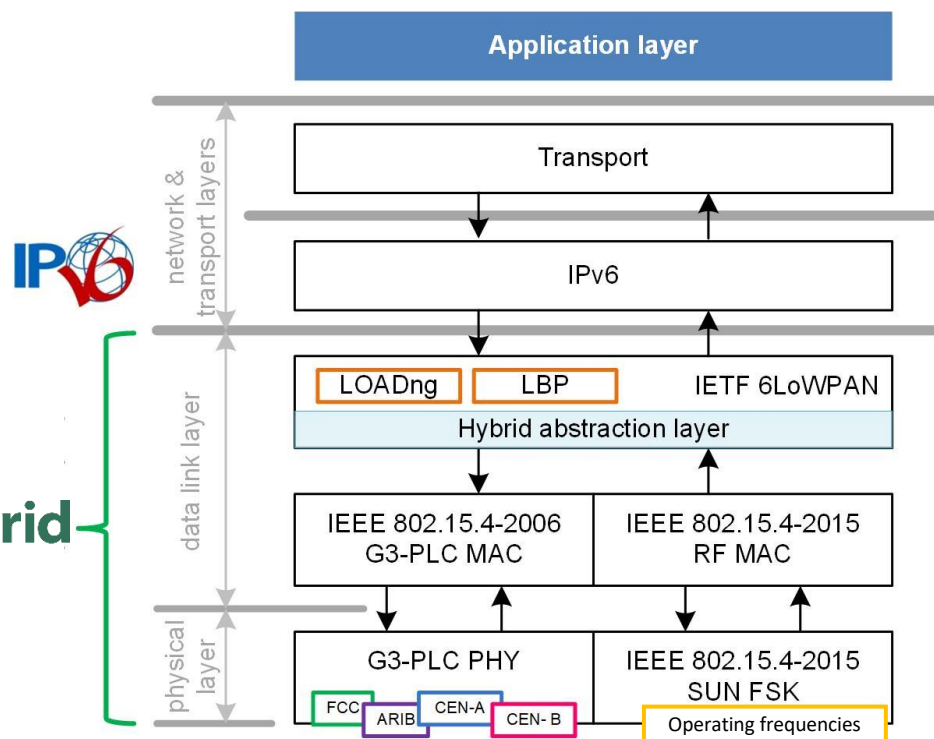
- Unifies wireless RF and wired power line communication

- One, seamlessly managed network over both media

- The hybrid protocol stack is built using open standards IEEE 802.15.4-2015 in addition to the existing G3-PLC protocol

- Switching between PLC and RF is decided above the hybrid abstraction layer

G3-Alliance

What is G3-Hybrid: Two powerful communication technologies in one single solution!

- RF mesh and power line communication in one *single* solution

- Each device can use PLC as well as RF for communication

- Open standard adopted by ITU

- Strong certification program

- Enables multi-vendor interoperability

- Complies to FCC and regulatory requirements globally

G3-Hybrid

—— PLC link	**DCU** Data concentrator or gateway
)) ((RF link	G3-Hybrid device
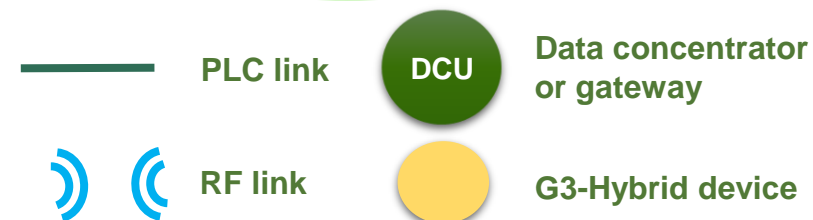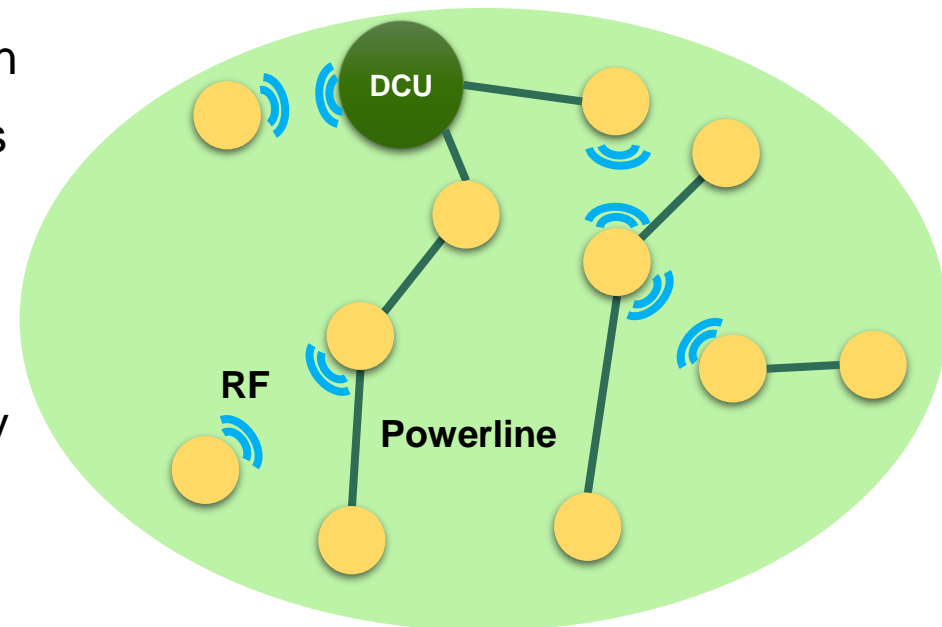
G3-Alliance

G3-Hybrid benefits: Maximises coverage and connectivity and strongly reduces the complexity of the roll-out

G3-Hybrid

Cost of Ownership

- Avoids high cost of last 1% connectivity
- Reduces complexity of the roll-out
- No OPEX for using the network
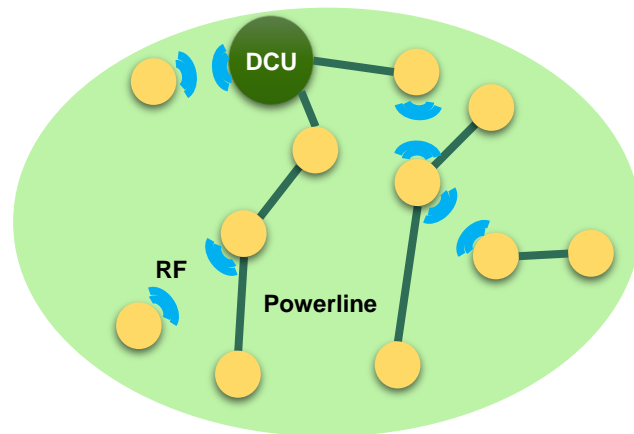
DCU

RF

Powerline

Flexiblity

PLC and RF work hand-in-hand and complement each other, maximising coverage and connectivity

Performance

- Higher communication success rate
- Higher data rate as more nodes use best available channel
- Opens other IoT applications such as sensors, gas and water meters

G3-Alliance

G3-Hybrid is a full-fledged RF solution with all mechanisms in place to meet regulatory requirements in any part of the world

- Based on open standard IEEE 802.15.4-2020

- Supports a wide range of RF frequencies bands

- Supported mechanisms include:
    - Frequency Hopping
    - Adaptive power control (APC)
    - Duty-cycle handling

- Last gasp mechanism supported

- Certification program includes conformance, interoperability and performance testing

- Interoperable solution enabling multi-vendor implementations

ISM band designation	RF frequency bands
863	863-870 MHz
866	865-867 MHz
870	870-876 MHz
915	902-928 MHz
915-a	902-928 MHz (alt.)
915-b	902-907.5 MHz & 915-928 MHz
915-c	915-928 MHz
919	919-923 MHz
920-b	920-923 MHz
920	920-928 MHz

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Trials for example in India by Sagemcom show G3-Hybrid is performing well under very harsh conditions

- Location represents a challenging environment for both RF & PLC communications:
  - Very high level of PLC noise

Sagemcom

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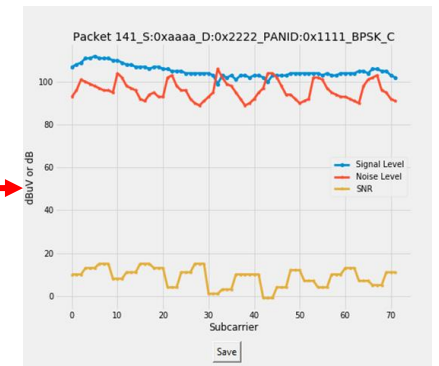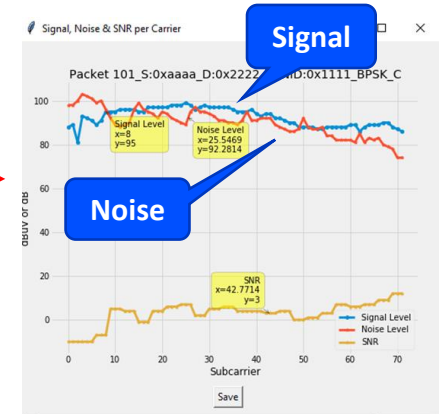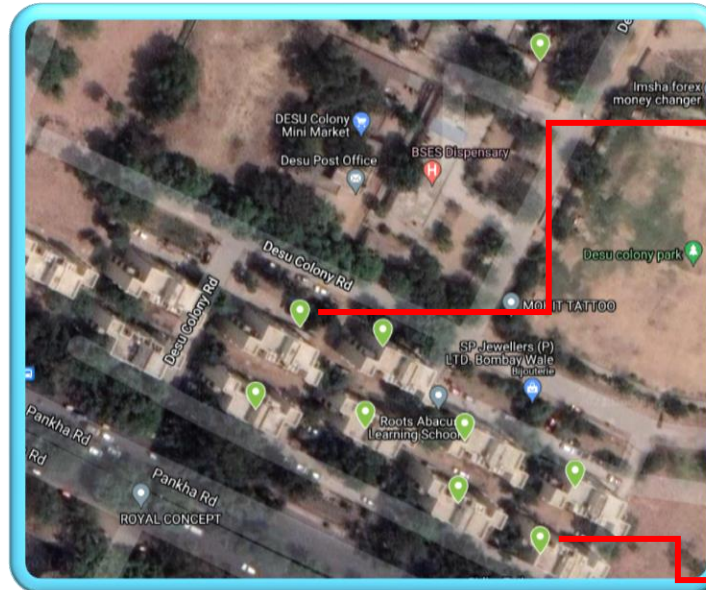
Trials for example in India by Sagemcom show G3-Hybrid is performing well under very harsh conditions

- Location represents a challenging environment for both RF & PLC communications:
  - Very high level of PLC noise
  - Obstacles create a very harsh environment for back meters to communicate in RF with the front Meters

Sagemcom

1 H collect with Retry and recovery	30-sept	01-oct	02-oct	03-oct	Today AVG
LP1(2690 Bytes)- Daily KPI %	100	98	97	100	98.5
Billing (76 Bytes) Daily KPI %	100	98	99	100	99

G3-Alliance

G3-Hybrid PLC+RF communication: A global solution extending the capabilities for the smart grid and IoT!

✓ Offers both RF mesh and Powerline communication in a single solution

✓ Standards based and interoperable solution

✓ Maximises coverage and connectivity and strongly reduces complexity of roll-out

✓ Complies to regulatory requirement in any part of the world

✓ Unlocks new use cases such as multi-utility metering

G3-Alliance

If you have any questions,
please visit www.g3-alliance.com or
contact generalsecretary@g3-alliance.com

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