

**Smart Grid:
Privacy e
sicurezza nella
Rete (elettrica)**

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HACK IN BO

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OUTLINE

Smart-Grid: definizione e struttura
Pros & Cons Security: casi e questioni
Privacy: casi e questioni Standards,
Guidelines & Norms Q&A



SMART GRID

Sistema a due vie
di comunicazione

Generalmente si fa riferimento alla
potenzialità piuttosto che alla
struttura

Architettura



Supervisory control and data acquisition (SCADA) and network operation

- Energy management
- Distribution automation
- Customer inquiry
- Meter reading and control
- Substation protection, monitoring, and control
- Records and asset management
- Network expansion planning
- Operational planning and optimization
- Maintenance and construction

Advanced Metering Infrastructure (AMI)

- Evoluzione di AMR (automatic meter reading) verso un sistema di comunicazione integrato

entro il 2018 il 60% dei contatori gas dovrà essere smart

TECNOLOGIE UTILIZZATE

integrated communications, sensing
and measurement technologies,
advanced components
advanced control methods and
improved interfaces
and decision support.

FASI DEL PROCESSO

- Acquisizione
estrazione del
dato

- Sharing and
archiving

- Local processing
and archiving

- Collaborative
processing

SMARTER GRID



- self-healing
- able to motivate and engage the customer
- resistant to attacks
- provides power quality suitable for 21st century needs

SMARTER GRID



- accomodates all generation and storage options
- enables markets optimizes assets and operates efficiently

Jan 2007 white paper, A System's View of the Modern Grid, U. S. Department of Energy's (DOE) National Energy Technology Laboratory (NETL)

PROS

Implementing the
National
Broadband Plan
by Empowering
Consumers and
the Smart Grid:
Data Access,
Third Party Use,
and Privacy, DOE
Request for
Information, 75
Fed. Reg 26203
july2010

The promise of the Smart Grid is enormous
and includes improved reliability, flexibility
and power quality, reduction in peak
demand, reduction in transmission
congestion costs,
Environmental benefits gained by
Increased asset utilization, increased
security, increased energy efficiency, and
increased durability and ease of Repair in
response to attacks or natural disasters

CONS

SICUREZZA

nazionale
e privata

PRIVACY

domestica
e aziendale

SALUTE
emissioni

PROTECTING THE PRIVACY OF OUR CUSTOMER-RELATED DATA. INCREASING YOUR CONTROL OVER ENERGY USE.

Over the past decade, information technologies, such as cell phones, ATMs and WiFi, have greatly improved how we live and work. These same technologies are now being used to modernize the nation's electric system and create a smart grid that supports the 21st century economy.

The benefits of a smart grid include:

- Fewer and shorter outages through devices that can automatically reroute power when problems occur, once the smart grid is complete.
- Operational efficiencies that will create savings which will be passed on to all customers.
- More information about your home's electricity usage, which you can access securely through the Internet to give you greater control over your monthly bills.
- Easier integration of renewable energy sources, such as wind and solar power.
- Creation of thousands of full-time equivalent jobs at the grid's peak investment period.

PROTECTING DATA ABOUT OUR CUSTOMERS' ENERGY USE

Making sure customer-related energy use information remains confidential and secure has always been a top



Just like standard meters, smart meters will measure the amount of electricity you use – not how you use it. They are not surveillance devices.

PRIVACY FACT SHEET

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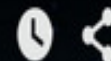
<https://www.comed.com/newsroom/fact-sheets/Pages/fact-sheets.aspx>

Excusatio non petita, accusatio manifesta

Scusa non richiesta, accusa manifesta

Smart Meter Hacking

Lights Off! The Darkness of the Smart Meters




black hat
EUROPE 2014

Reversing the System-Security Structure

- MCU is making ALL the decisions and handling/storing all relevant data.
- PLC Modem is handling encryption (AES128). Key is the same for all units, and is set by the external host (MCU) on each boot.
- Optical Port is connected to the ST7581 via UART. Data is forwarded to the MCU via I2C.


black hat
EUROPE 2014

▶ ⏮ 🔊 24:06 / 55:37



Black Hat USA 2015 - ZigBee Exploited The Good, The Bad, And The ...



black hat
USA 2015

black hat
USA 2015

BLACK HAT SOUND BYTES

- Proper implementation of security measures is crucial - Compliance is not Security
- Learn from history and do not rely on "Security by Obscurity"
- There is a world beside TCP/IP



40:56 / 42:23



STANDARD E GUIDELINES

- National Institute of Standards and Technology (NIST)
- U.S. Department of Commerce
- Guidelines for Smart Grid Cyber Security
- NISTIR 7628 (Aug. 2010)
- NISTIR 7628, Rev. 1 (Sept. 2014)

Vol. 2 PRIVACY AND THE SMART GRID

183 pagine, in soli quattro
anni lo scenario evolutivo
è profondamente mutato e la
questione privacy ha
assunto un ruolo centrale

LINEE GUIDA SECURITY UK

- Giugno 2015
- CESG The National Technical Authority for Information Assurance
- Product Category Security Characteristic Published Date
- Smart Meters Gas Smart Metering Equipment v1.1 Jun 2015
- Smart Meters Electricity Smart Metering Equipment v1.1 Jun 2015
- Smart Meters Smart Meters Communications Hub v1.1 Jun 2015
- Smart Meters Smart Metering HAN Connected Auxiliary Load Control Switch v1.1 Jun 2015
- <https://www.cesg.gov.uk/servicecatalogue/Product-Assurance/CPA/Pages/Security-Characteristics.aspx>

REAZIONE (RIBELLIONE) DEGLI TUTENTI



<http://stopsmartmeters.org/>

<https://takebackyourpower.net/>

OPTING OUT

- IL CONSUMATORE HA IL DIRITTO DI DECIDERE SE INSTALLARE O MENO LO SMART METER?

Michigan Bill 4916

DATI TRATTATI

customer energy usage data (CEUD)

geo
data,

power
consumption
,
lifestyle

life
pattern
data,

PRIVACY

:By design

By default

PRIVACY DIFFERENZIALE

- Introduzione di rumore nei dati al fine di non rendere identificabili gli utenti

IN CONCLUSIONE

Meglio accendere
una candela
che maledire
l'oscurità

LAO TZU



GRAZIE PER
L'ATTENZIONE



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