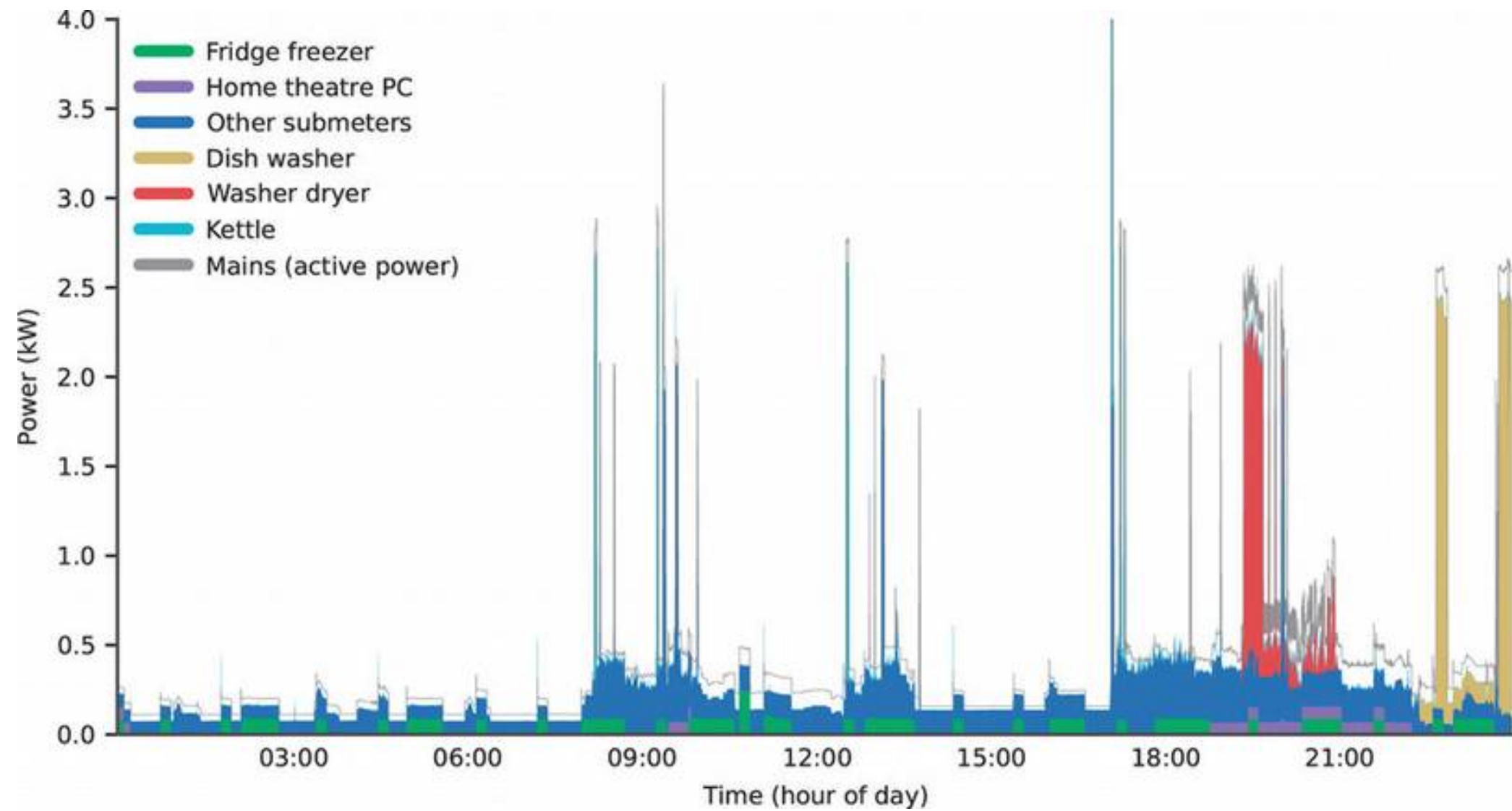


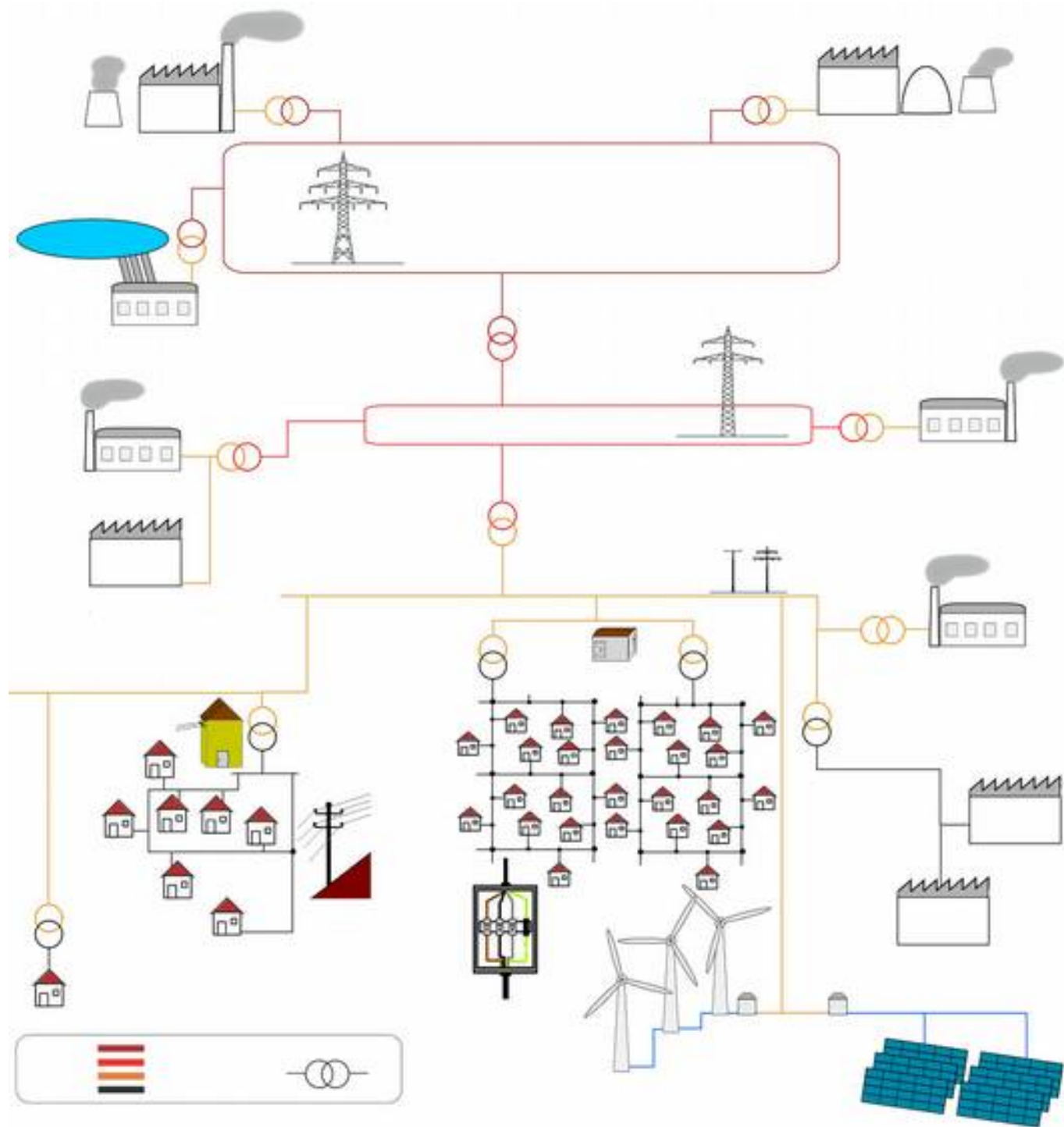
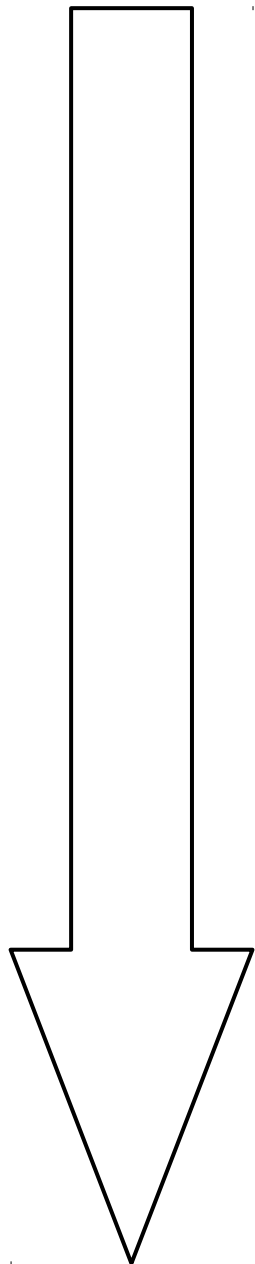


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Every data is important to you!

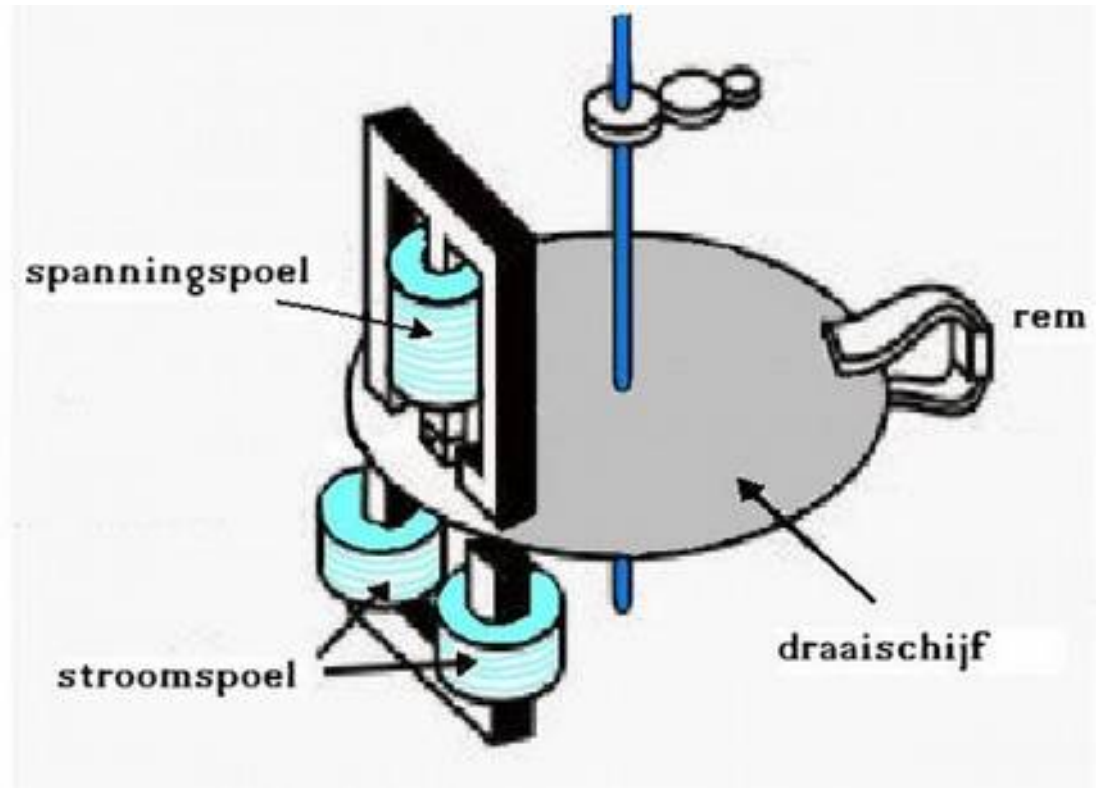
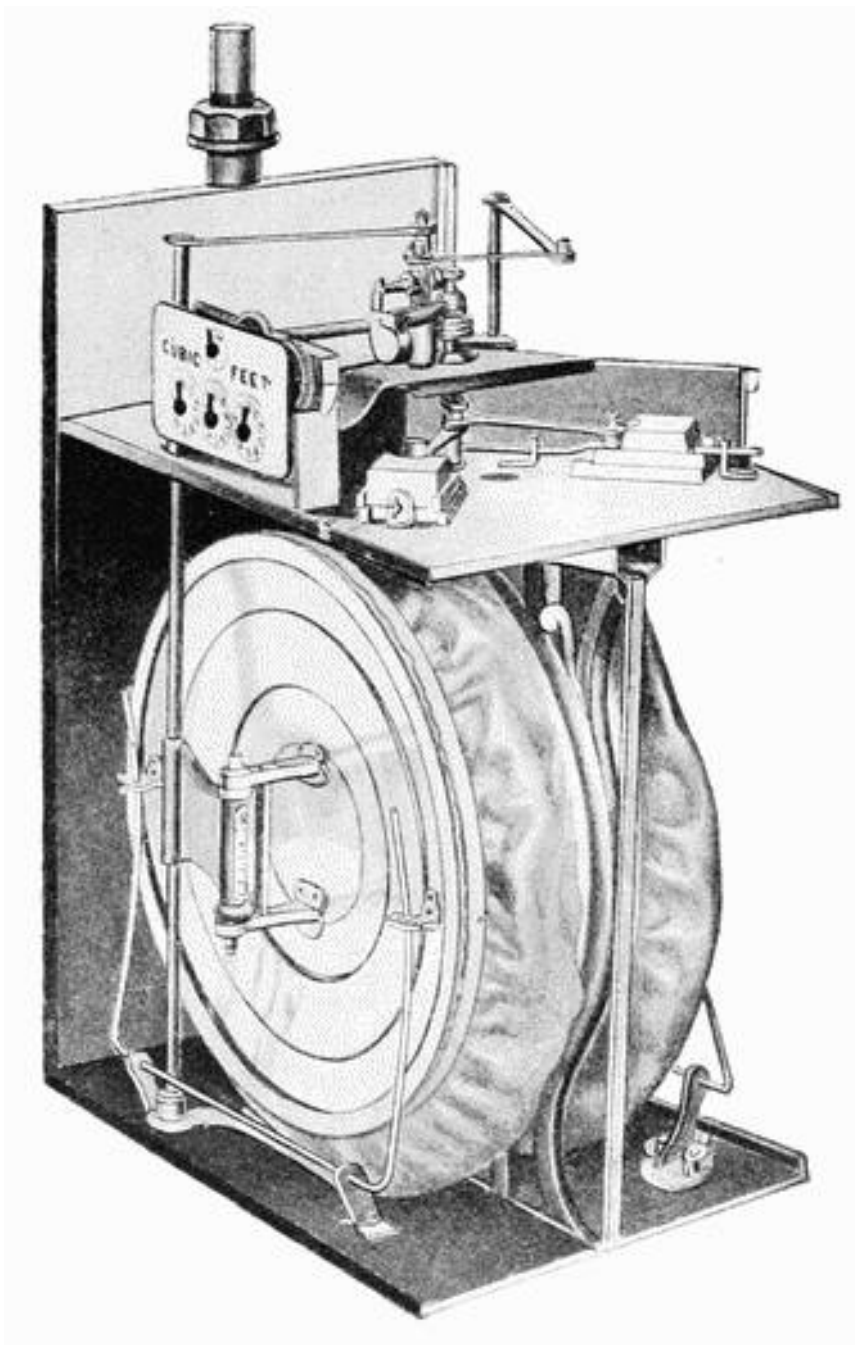


<http://www.nature.com/articles/sdata20157/figures/2>



https://commons.wikimedia.org/wiki/Category:Power_grids#/media/File:Electricity_grid_schema-_lang-none.jpg





<http://electronica.infonu.nl/diversen/34655-hoe-werkt-een-kwh-meter.html>

https://upload.wikimedia.org/wikipedia/commons/d/d4/PSM_V57_D197_Interior_of_a_common_gas_meter.png



http://www.ed.nl/polopoly_fs/1.2077933.1350502158!/image/image-2077933.JPG

0.0.0(EM72000656621)
 0.9.1(172751)
 0.9.2(100209)
 1.8.0(343642.9*kWh)
 2.8.0(1958.9*kWh)
 3.8.0(120.7*kvarh)
 4.8.0(7068.5*kvarh)
 1.6.0(18014*kW)(10-02-01 00:15)
 2.6.0(0*kW)(10-02-01 00:15)
 3.6.0(186*kvar)(10-02-01 00:15)
 4.6.0(366*kvar)(10-02-01 00:15)
 1.2.0(275663*kW)
 2.2.0(2158*kW)
 3.2.0(54*kvar)

OBIS codes



DLMS/COSEM IEC 62056

OBIS Code	Unit	Description
0.1.0		Billing period counter
0.1.2 * F		Timestamp of the billing period
0.8.6 * F	Day	Billing period duration
0.9.1	hh:mm:ss	Time (with an optional delimiter)
0.9.2	YY-MM-DD	Date (with an optional delimiter)
1.8.0	kWh	kWh import (Q1+Q4), total
1.8.1-1.8.8	kWh	kWh import (Q1+Q4), tariff 1-8
2.8.0	kWh	kWh export (Q2+Q3), total
2.8.1-2.8.8	kWh	kWh export (Q2+Q3), tariff 1-8

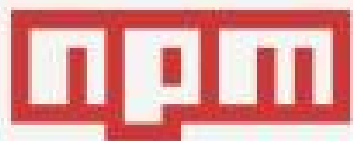
smartmeter-obis public



This library supports the reading and parsing of smartmeter protocols that follow the OBIS number logic to make their data available.

npm **v0.2.6** downloads **794/month** dependencies **up-to-date**
code climate **4.0**

Tests: coverage **86%** Linux/Mac: build **passing** Windows:  build **passing**



npm install smartmeter-obis

3 dependencies version 0.2.6
1 dependent updated 35 minutes ago
794 downloads in the last month

<https://www.npmjs.com/package/smartmeter-obis>



https://commons.wikimedia.org/wiki/File:Renewable_Energy_on_the_Grid.jpg



<https://antinuclear.files.wordpress.com/2014/04/solsr-city-sonnenschiff.gif>

E&ENEWS

SUSTAINABILITY

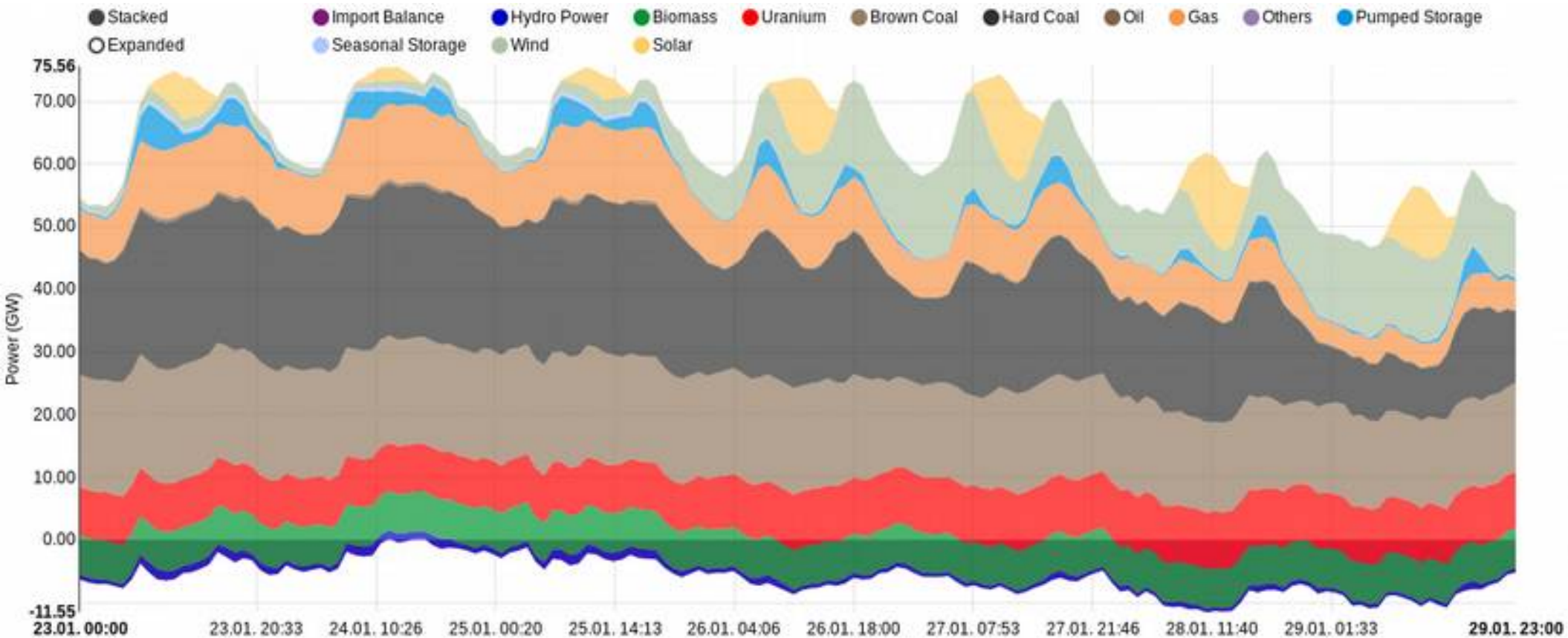
How Solar-Heavy Europe Avoided a Blackout during Total Eclipse

With lots of solar and an eclipse, Europe's grids found different ways to
avoid losing power

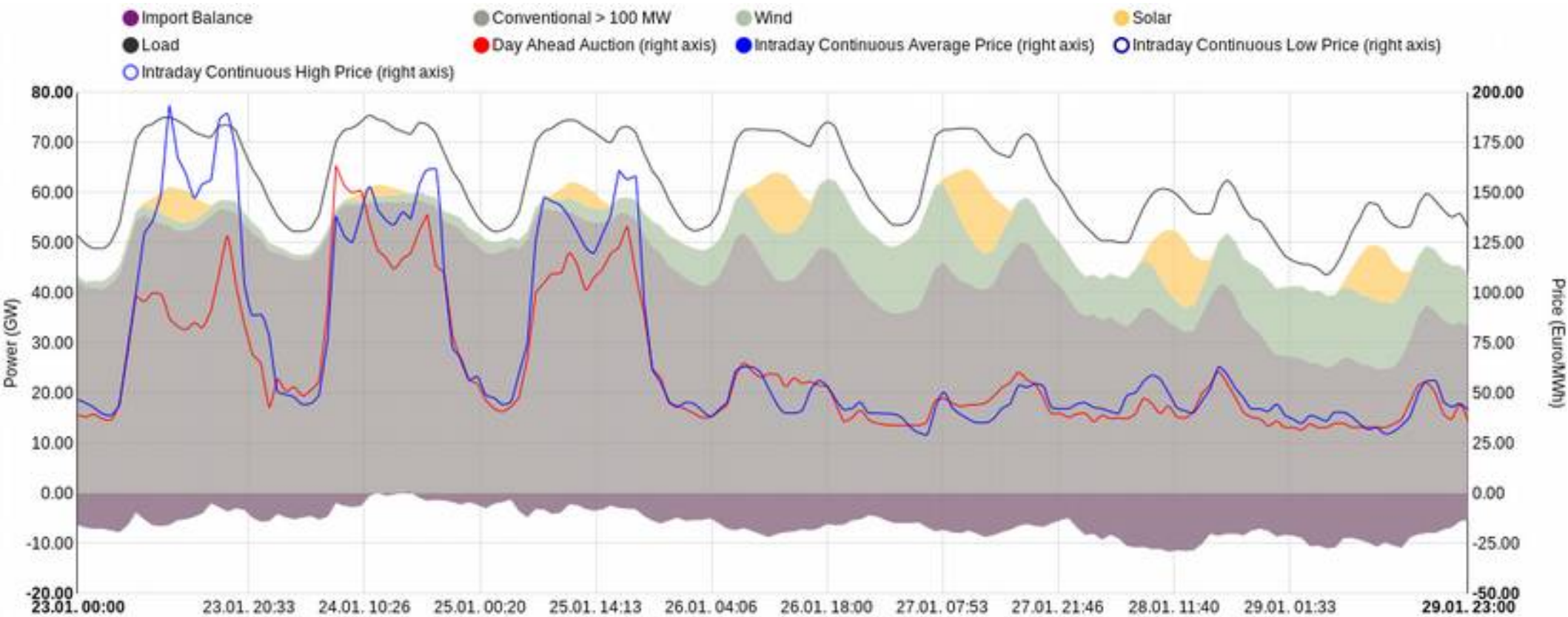
By Eric Marx, ClimateWire on March 24, 2015

<https://www.scientificamerican.com/article/how-solar-heavy-europe-avoided-a-blackout-during-total-eclipse/>

Electricity production in Germany in week 4 2017



Electricity production and spot prices in week 4 2017



little solar & wind → high prices

<https://www.energy-charts.de/power.htm>

lock-in fridge



2009
3000 fridges



lock-in boiler



2017
10.000 boilers
25 megawatt





<https://energyonesolar.com/wp-content/uploads/2016/02/Four-Solar-Panel-Solutions.jpg>

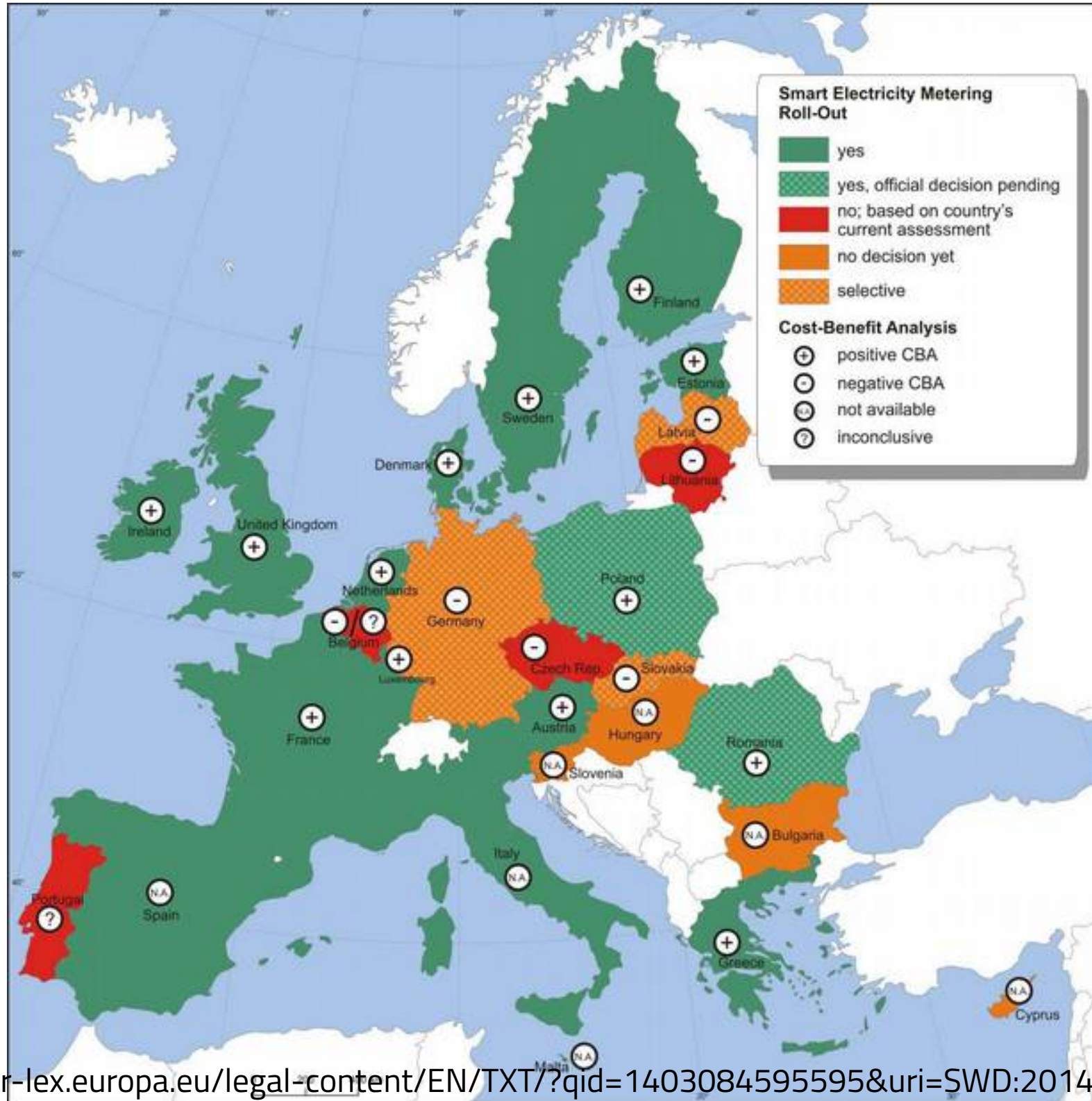
Flexible pricing

→ Frequent billing

→ Frequent readout

→ Digital remote readout





Electricity Smart Meters Roll-Out Timelines in MS (at least 80% coverage)



Learning from Sweden

2009: monthly billing

2012: hourly billing for hourly-based contract

“Once customers began to move from annual meter readings to monthly readings, they became more aware and concerned with their electricity use. This has set the stage for future technology and market pricing that will allow the customer to participate in a more active retail market.”

<http://governmentgazette.eu/?p=5540> (2013)

SLIM METEN = SLINKS WETEN



**Stop de 'slimme' spionagemeters
voor gas en elektriciteitsverbruik**

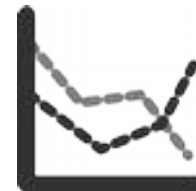
Translation: "stop the 'smart' spy-meters for gas and electricity usage"

DSMR P1



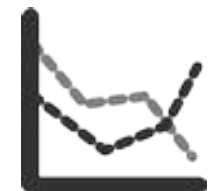
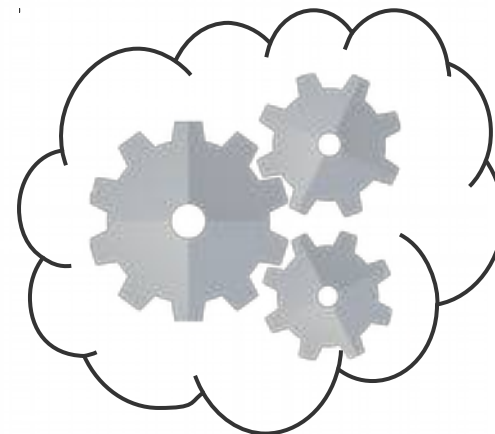
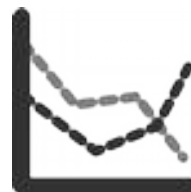
ZigBee Smart Energy





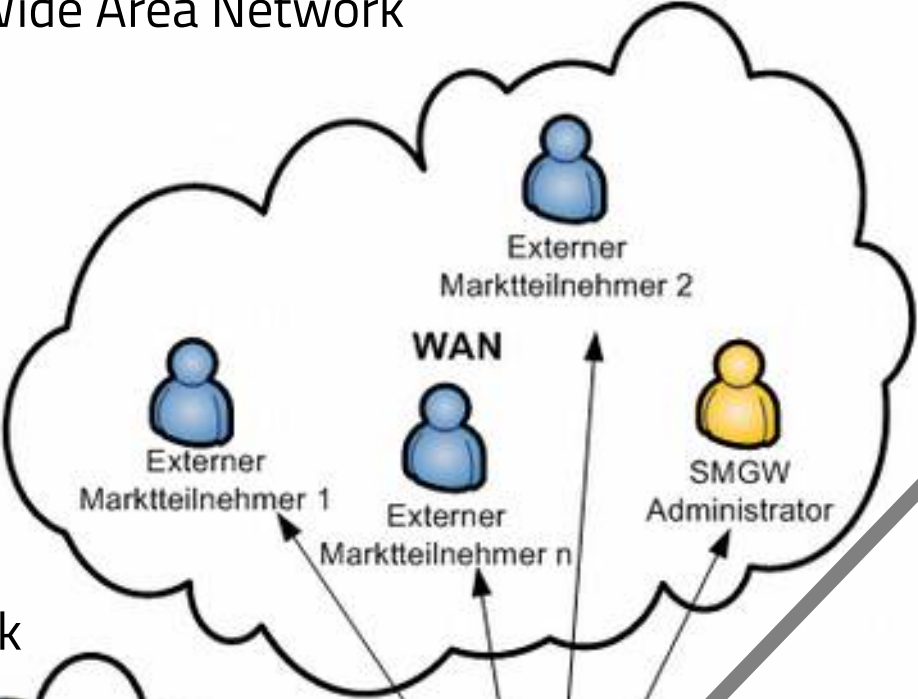
low frequency, high latency, verified

high frequency, low latency, not verified

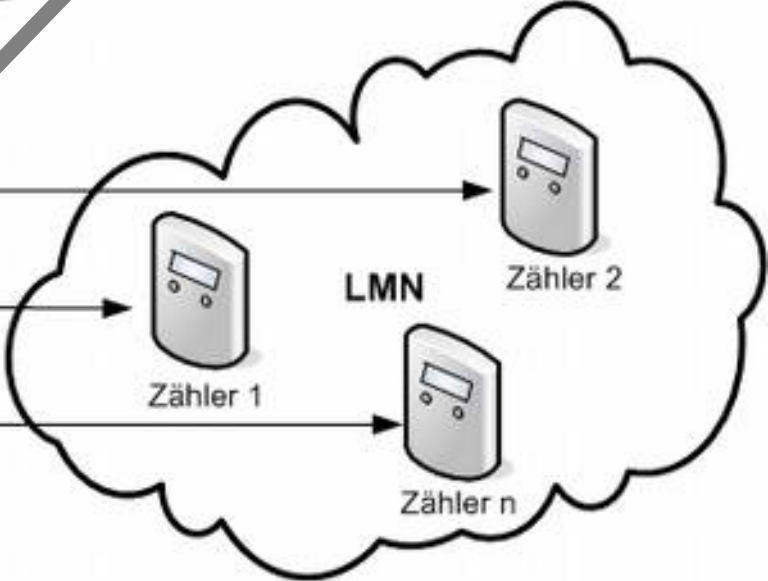




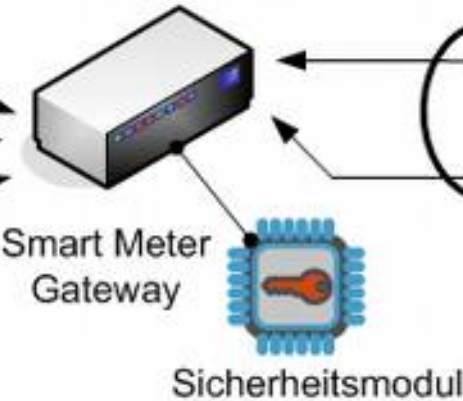
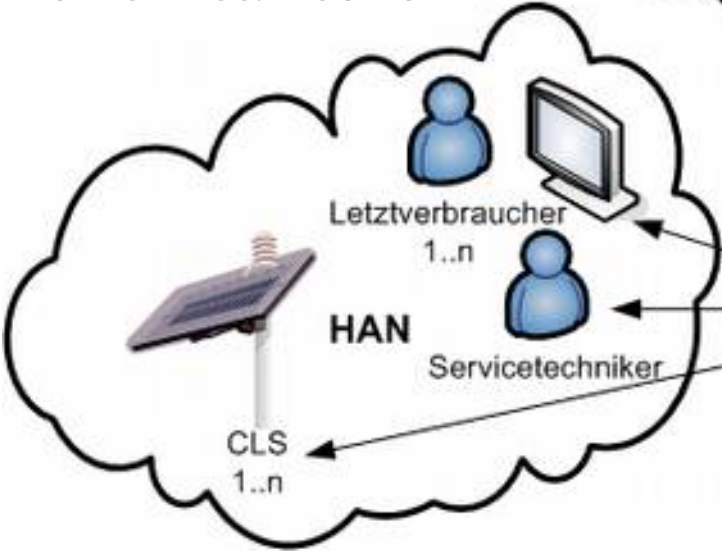
Wide Area Network



Local Metrological Network



Home Area Network



Controllable Local Systems

[illegible]

<https://insights.ubuntu.com/wp-content/uploads/e297/energy-3d-house.png>

Uncontrollable



Timeshiftable



Buffer/storage



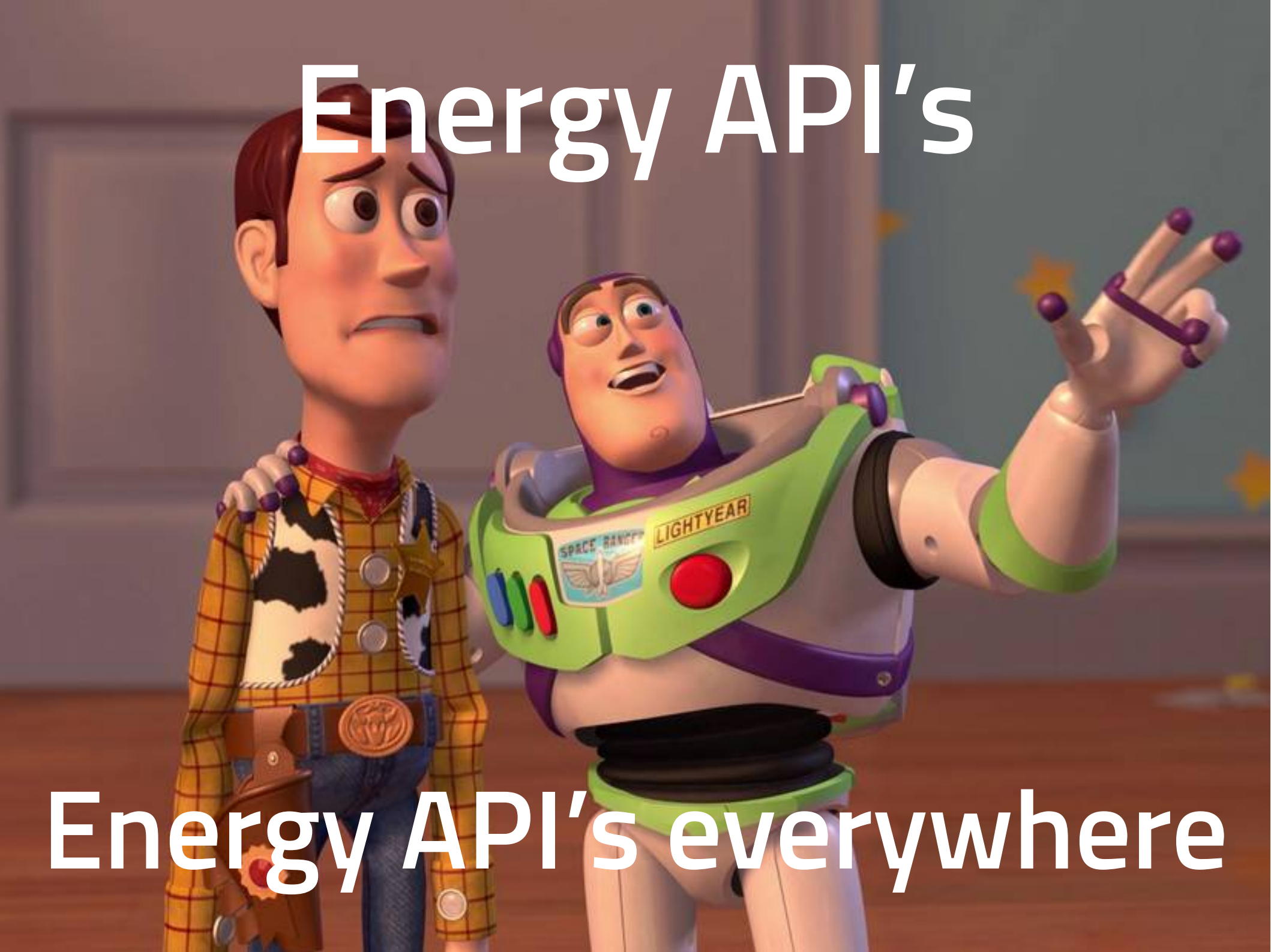
Unconstrained





<http://news.energysage.com/what-does-it-cost-to-charge-a-tesla-with-solar-energy/>

Energy API's

A scene from the movie Toy Story featuring Woody and Buzz Lightyear. Woody, on the left, is a cowboy doll with a yellow and black plaid shirt, a red bandana, and a large gold belt buckle. He has a concerned expression. Buzz Lightyear, on the right, is a space ranger action figure in his iconic green, white, and purple suit. He is gesturing with his right hand, showing three purple rings on his fingers, and has a wide-eyed, enthusiastic expression. The background is a simple indoor setting with a wooden floor and a light-colored wall.

Energy API's everywhere

Microgrid on Ethereum



Tokenization

Tokenization of energy consumption and surplus energy production **makes a market**



P2P Markets

Markets recognize local investments, impacts and the **real value** of local renewable energy



Prosumers

Rise of the **Prosumer**: Producer-Consumer of Energy. Neighbor-to-neighbor, neighbor-to-business



Community ESCOs

Community Microgrid and Energy Services Companies (ESCOs): **empower customers** to optimize energy costs according to their priorities, monetizing system & social values

<https://www.youtube.com/watch?v=kq8RPbFz5UU>
<http://www.slideshare.net/JohnLilic/transactive-grid>

Protocols

XMPP IoT

Open ZWave

Zigbee

OBIS

M-Bus

Modbus

Price

PowerMatcher

USEF

Hardware

OpenEnergyMonitor

Frameworks

DomotiGA

Eclipse SmartHome

EEBus

Flexible Power FPAI

Home Assistant

Linksmart

OGEMA

OpenHAB

OpenMotics

OpenMUC

The Thing System

The background is a dark, abstract composition of numerous thin, golden-yellow lines that radiate from a central point, creating a sense of depth and movement. These lines intersect to form a complex, web-like pattern. Overlaid on this background are several concentric, semi-transparent golden rings or arcs, which further enhance the geometric and futuristic feel of the image. The overall color palette is dominated by dark browns and blacks, punctuated by the bright, metallic gold of the lines and rings.

increased smart meter coverage

more smart devices

IoT frameworks maturing

API's for measurement & control

A photograph of a two-story house with a tiled roof, featuring several solar panels. The image is overlaid with a solid yellow filter. White text is centered over the image, listing four concepts: 'easier market participation', 'open standards and API's', 'energy management systems', and 'personal data locker'.

easier market participation

open standards and API's

energy management systems

personal data locker



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