TrustLeap
Global-WAN

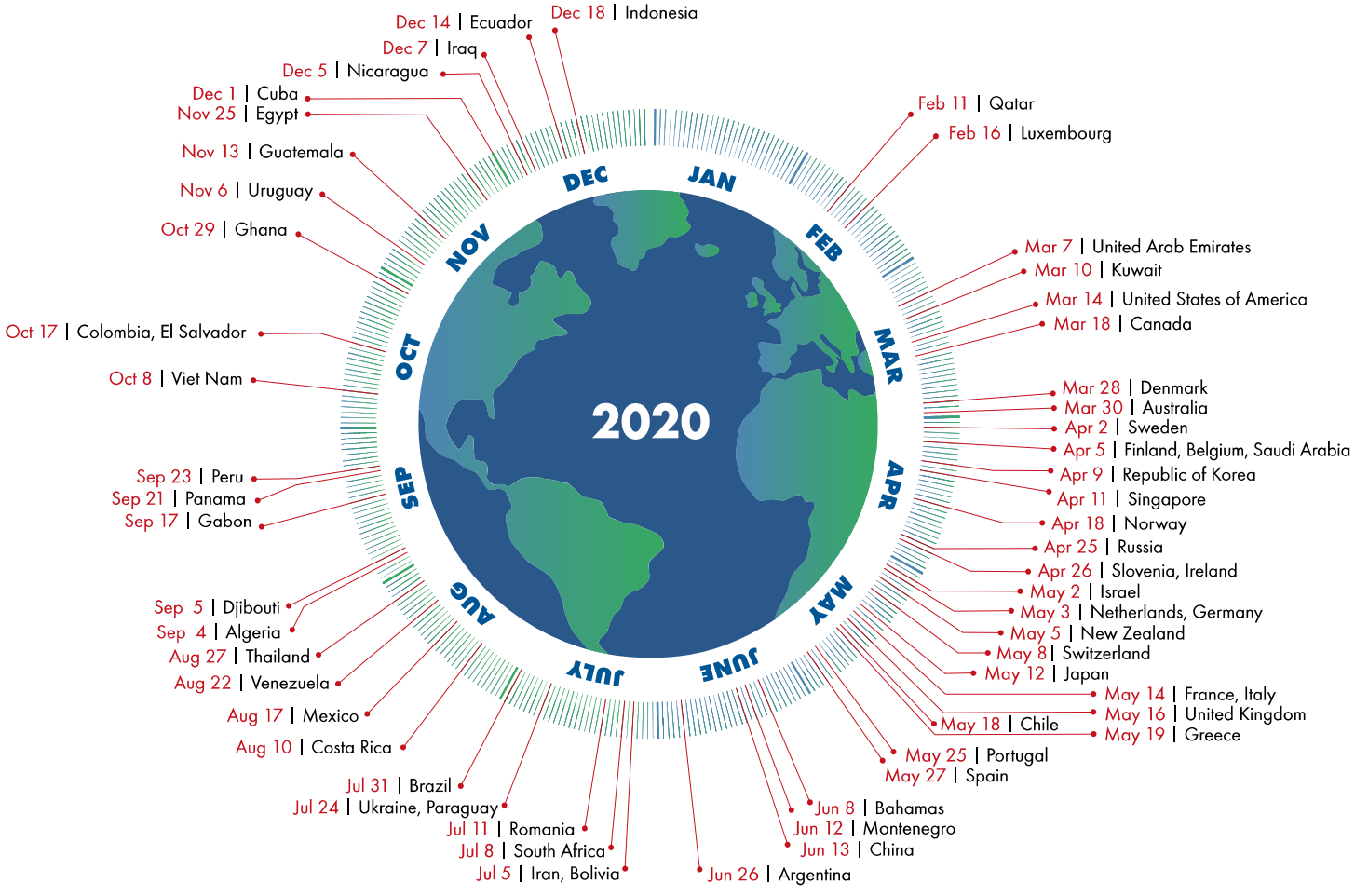
Wireless data+energy

(without any infrastructure)

Selected Partners can operate their own, fully-independent, unbreakable Global-WAN network.

Country Overshoot Days 2020

When would Earth Overshoot Day land if the world's population lived like...



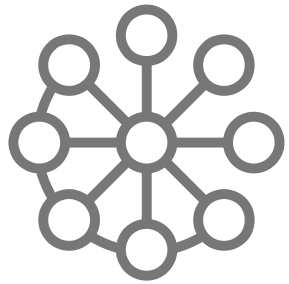
EARTH OVERSHOOT DAY

Source: Global Footprint Network National Footprint and Biocapacity Accounts 2019

Global Footprint Network
Advancing the Science of Sustainability

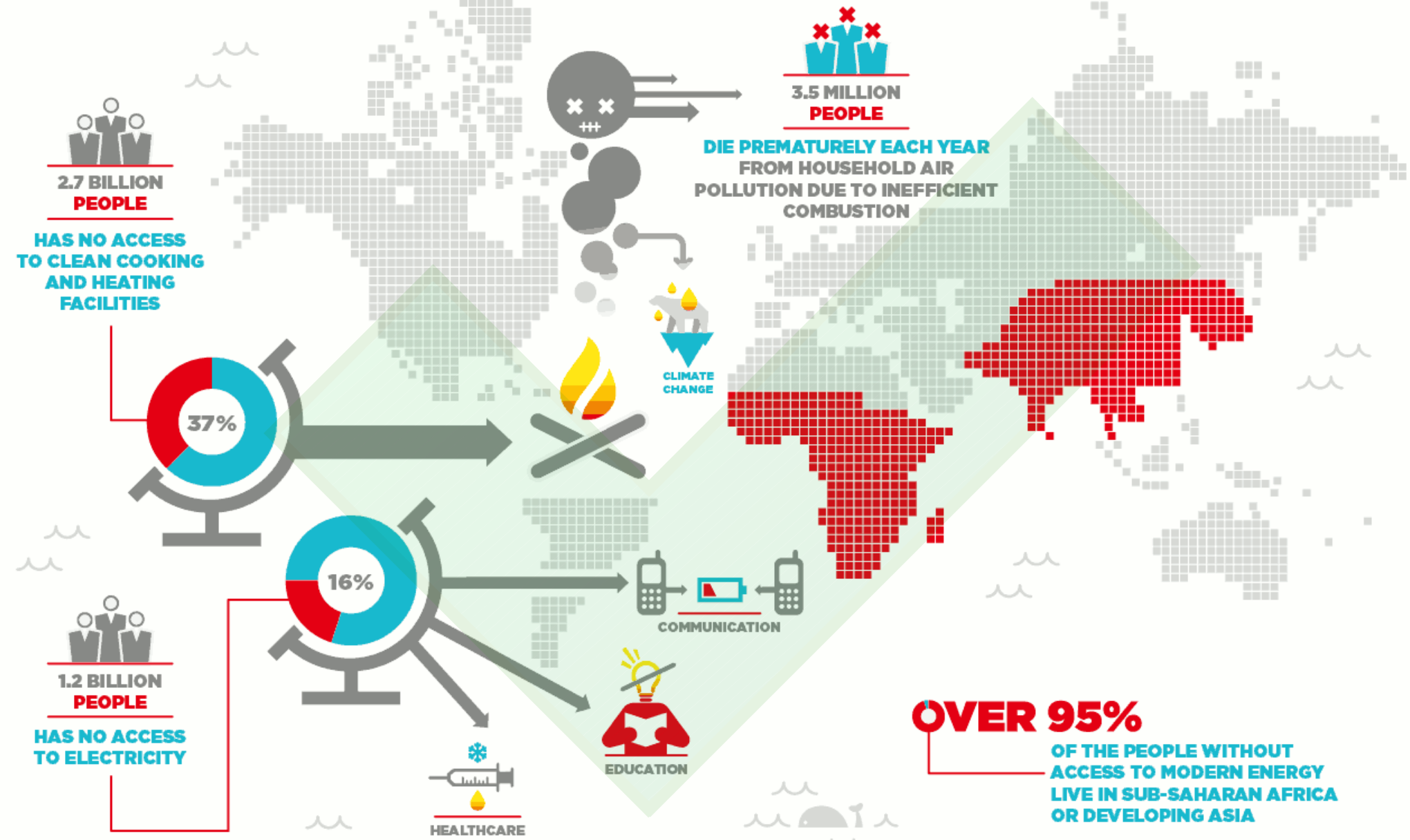
Global-WAN

Energy = Life



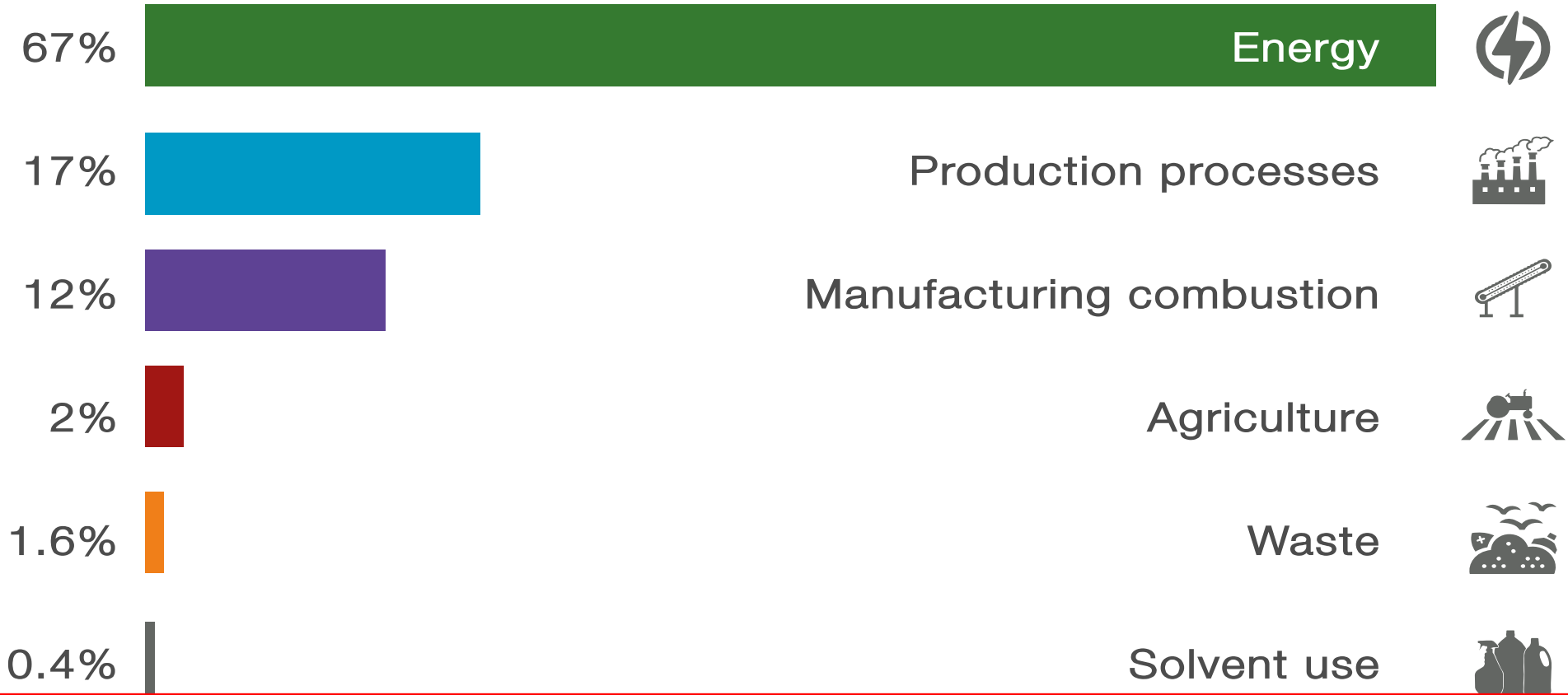
Electricity transmission losses cost USD 99-352Bn per year (IEA 2019).

Global-WAN *eliminates transmission and distribution costs, all related emissions, divides the electricity price by three, and offers free global telecoms for all.*



Air Pollution > Europe

Total cost: **€329 billion** (and up to €1053 billion)



Global-WAN

Grid Losses > Costs (MTCO2)

Lost energy from the electric grid adds up

Annual emissions due to energy loss from the transmission of electricity on the power grid is more than emissions from some industries. Measured in millions of metric tons of carbon dioxide equivalents.

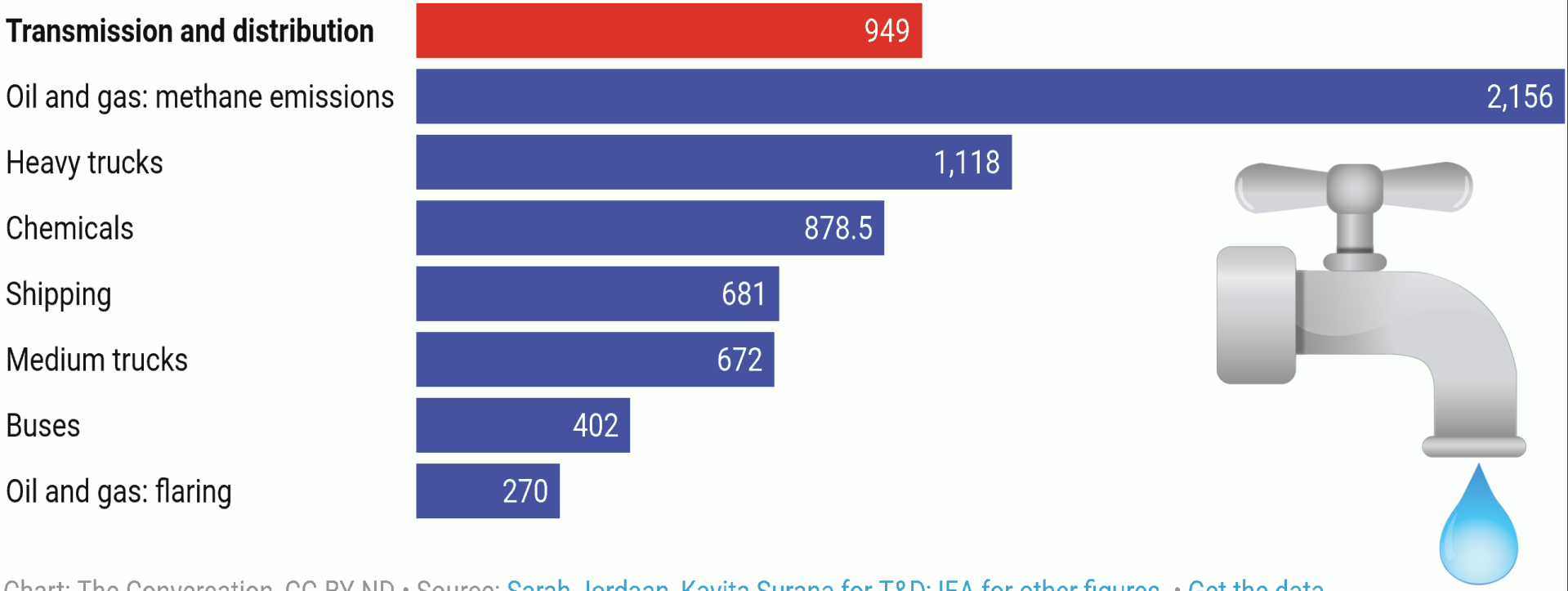
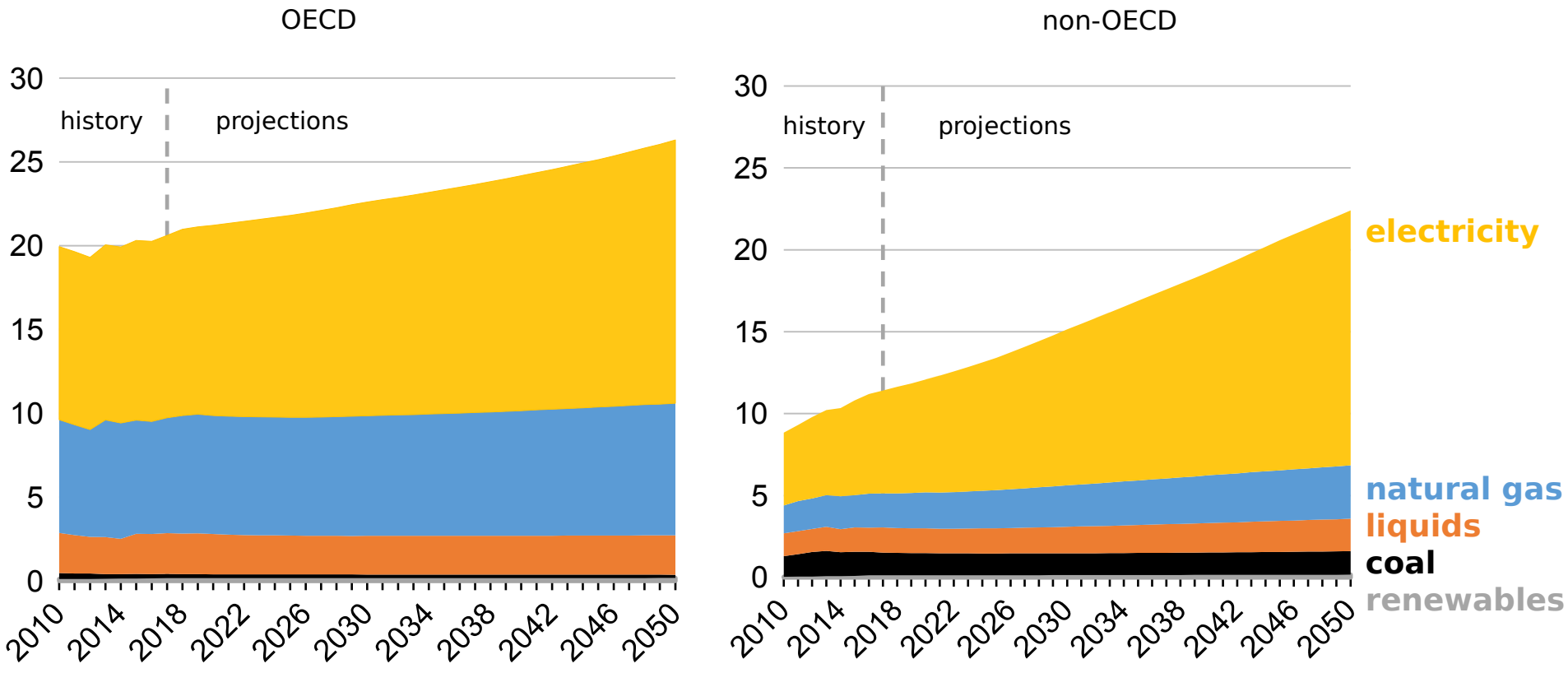


Chart: The Conversation, CC-BY-ND • Source: Sarah Jordaan, Kavita Surana for T&D; IEA for other figures. • Get the data

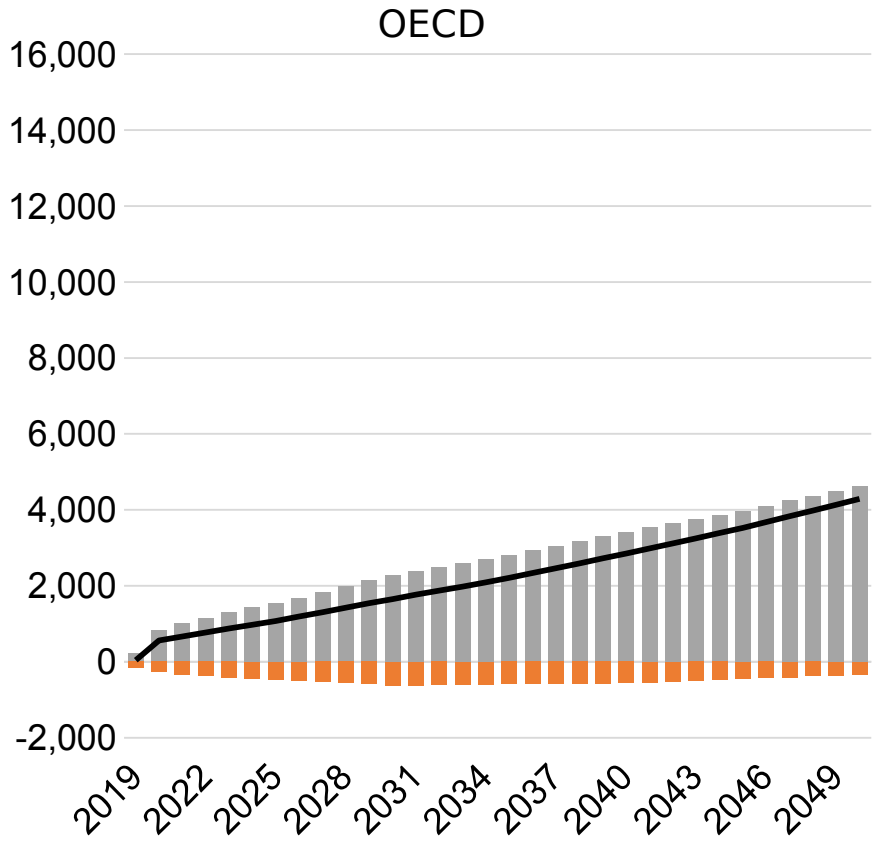
Market > Electricity 1st

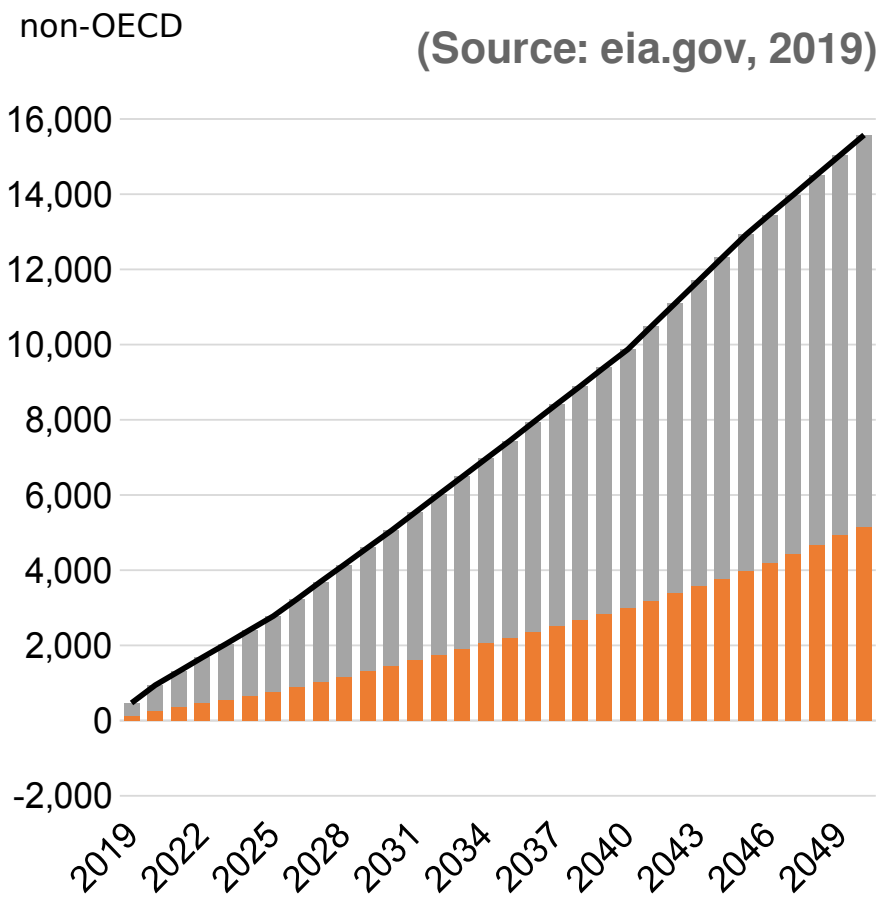
(Source: eia.gov, 2019)

Commercial sector energy consumption by fuel
quadrillion British thermal units



Growth > Renewables

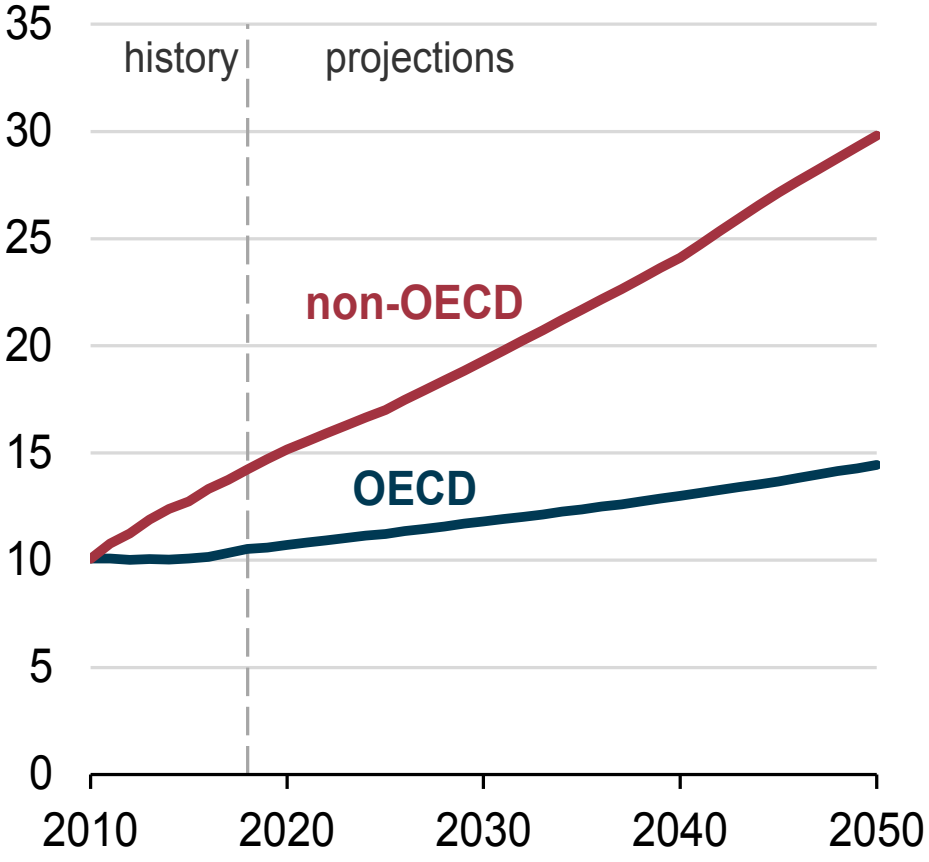




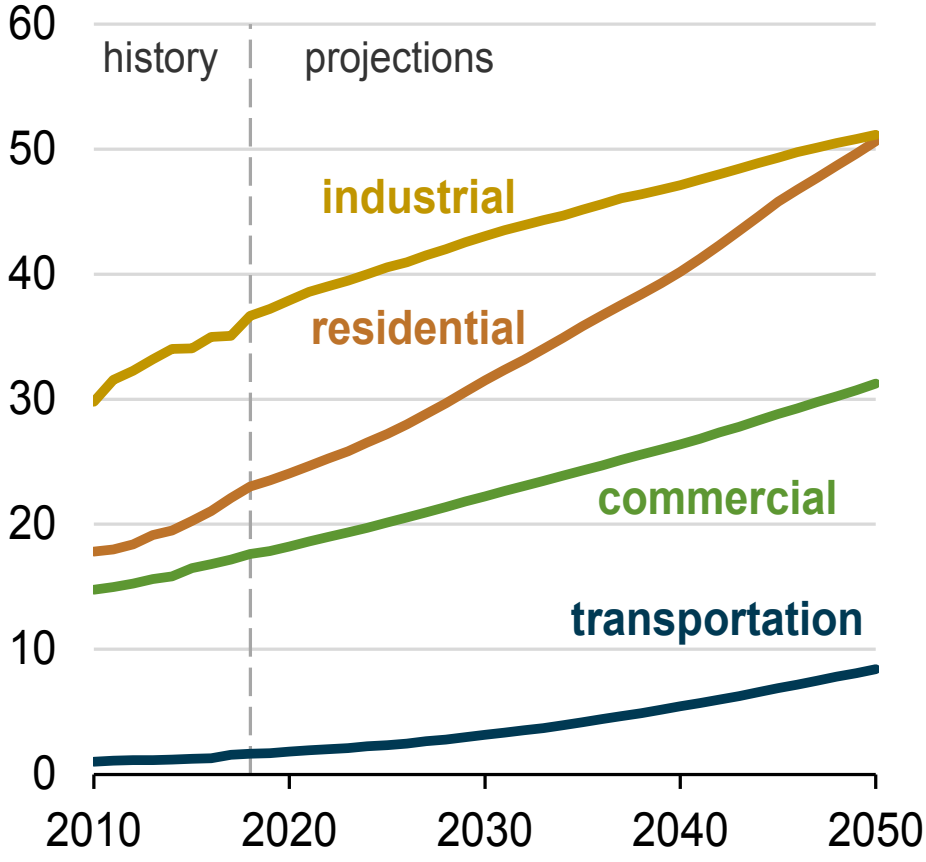
(Source: eia.gov, 2019)

People > Electricity Use

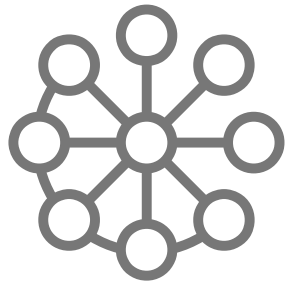
Global net electricity generation
trillion kilowatthours



Global electricity use by sector
quadrillion British thermal units



Global-WAN

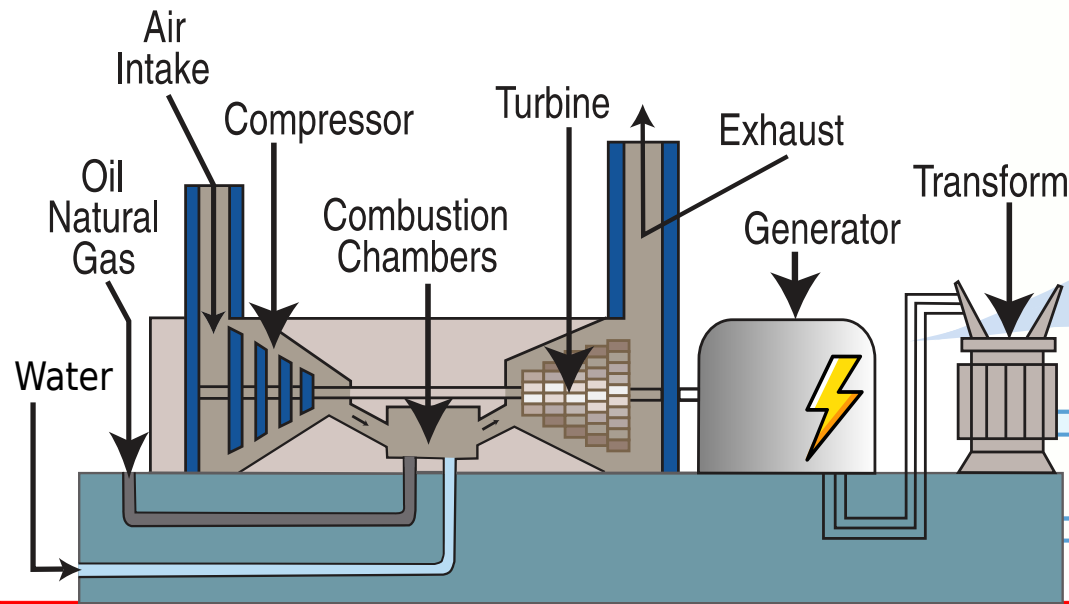


Solution I.

Global-WAN (1) eliminates the need to ***physically transport energy*** removing all emissions/pollutions related to transmission and distribution, (2) replaces losses by a gain so it reduces energy extraction and costs, and (3) lets power plants be any distance from energy consumers so toxic emissions are no-longer necessarily a threat to mankind and wild-life.

Lossless Wireless Global ENERGY transmission

TIP: using water (H2O) reduces oil consumption by 30% and toxic emissions by 97% (a trick used during WWII). Gas combustion is much cleaner (rejecting only CO2 and water vapor).



Global-WAN

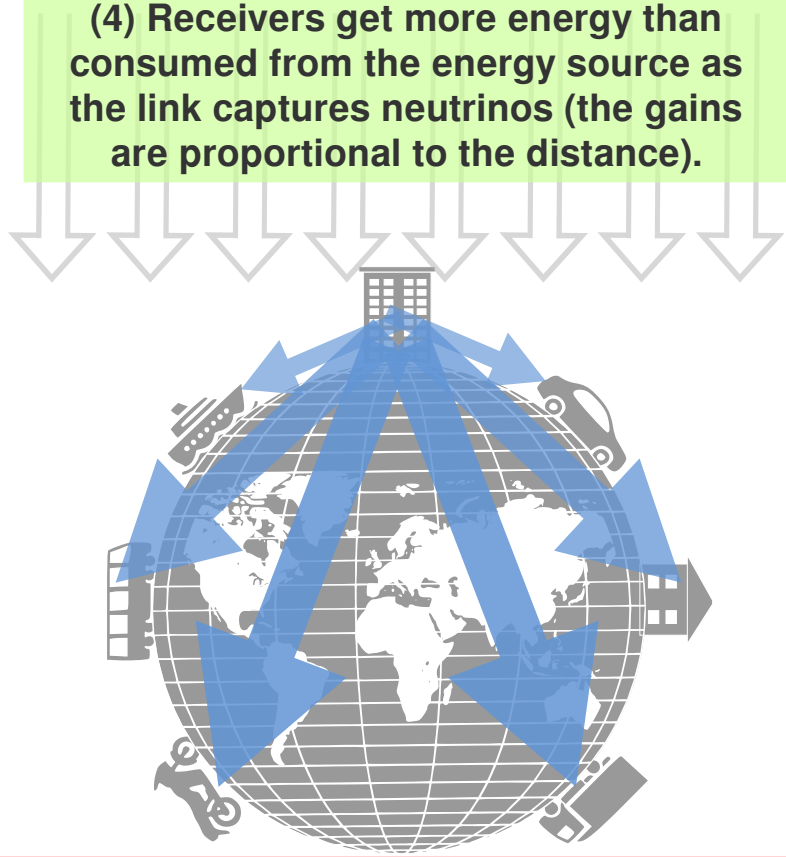
Lossless Wireless Global ENERGY transmission

(1) Endpoints synchronize to establish a link.

(2) Any energy excess is transferred to the other side, until both sides are balanced (or one side has cut the link).

(3) The energy source does not broadcast energy all around: receivers fetch it in a straight line.

(4) Receivers get more energy than consumed from the energy source as the link captures neutrinos (the gains are proportional to the distance).



(5) The signal traverses metal and water losslessly (no relay needed: no absorption, no diffraction).

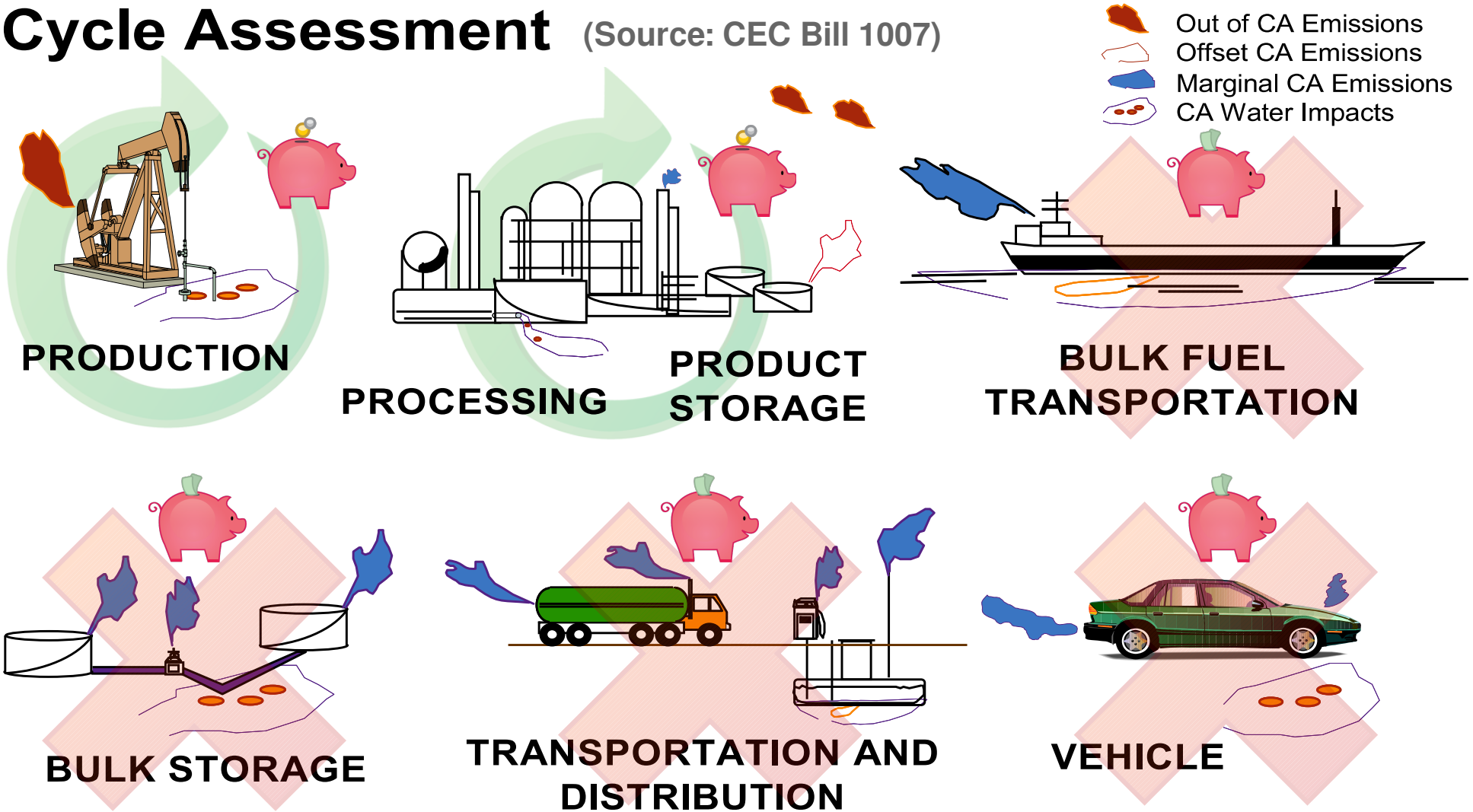
(6) Modulating the signal allows to transmit data.

(7) Latency is much lower than with 5G (no relays) and the range is unlimited (no losses: no diffraction, no absorption).

Energy-Grid

Losses, pollution, and GHG emissions

Emission Events Included in a Full Fuel Cycle Assessment (Source: CEC Bill 1007)



LCA Model – Emissions Sources

1. Extraction

- **Drilling**
  - Prime movers
- **Artificial Lift**
  - Rod pumps
  - Gas lift
- **Surface Processing**
  - Heater/treater
  - Crude stabilizer
  - Wastewater treatment
  - Water re-injection
  - Flaring, venting, fugitive
- **Enhanced Oil Recovery**
  - CO_2 flooding
  - Steam injection
  - Gas injection
- **Unconventional Oils**
  - Canadian oil sands
  - Tight oil
- **Land-Use Change**
  - Vegetation
  - Soil carbon

2. Crude Movement

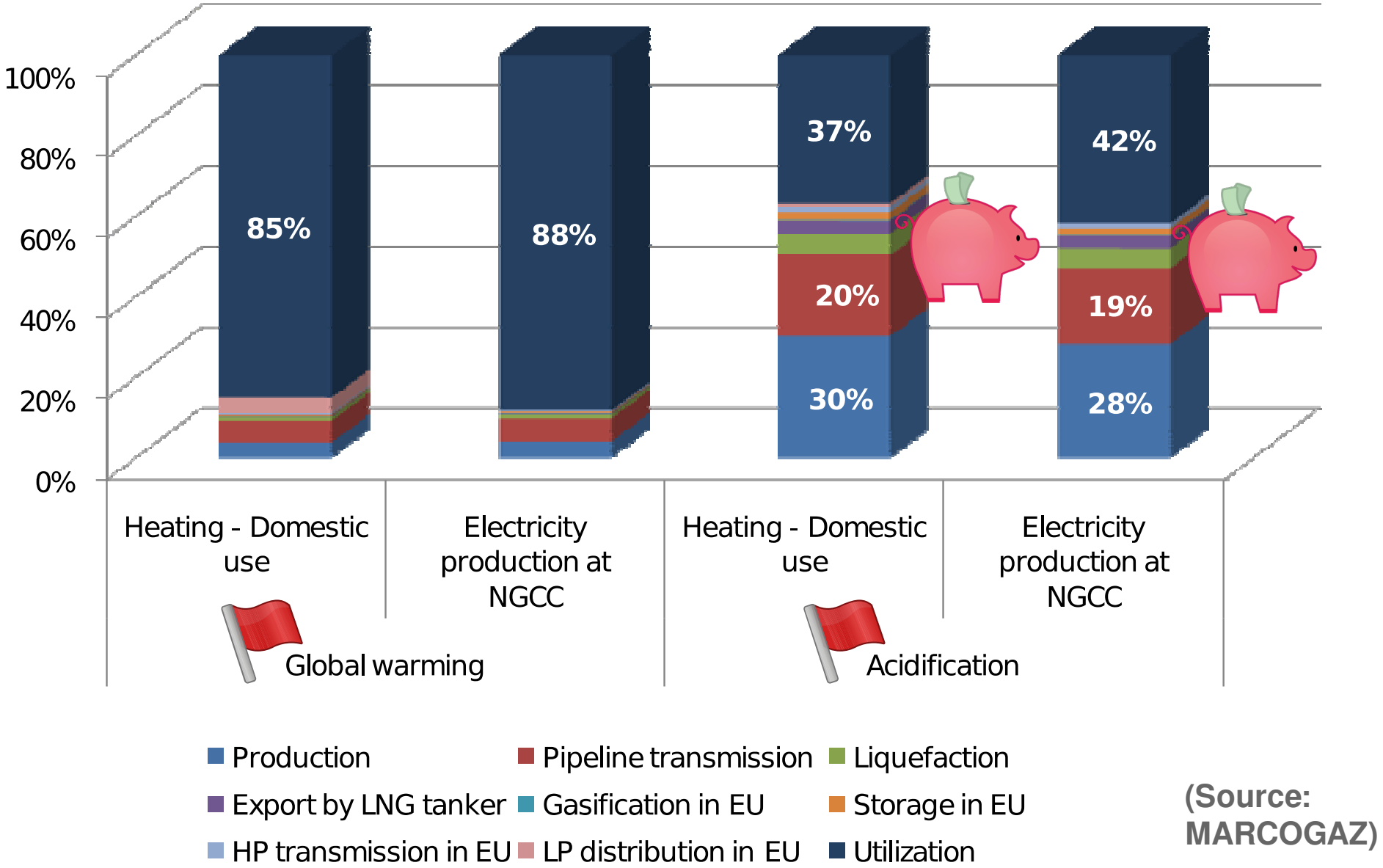
- **Fuel Consumption**
  - Tankers
  - Pipeline
  - Rail
  - Trucks
  - Barge
- **VOC Emission**
  - Loading
  - Transit
  - Ballasting

3. Refining

- **Distillation**
  - Atmospheric
  - Vacuum
- **Reforming**
- **Hydrotreating**
  - Naphtha
  - Gasoline
  - Diesel
  - Kerosene
  - Gas oil
- **Catalytic Cracking**
  - FCC
  - Hydrocracking
- **Thermal Cracking**
  - Vis breaking
  - Coking
- **Alkylation**
- **Isomerization**
- **Cogeneration**
- **Flaring & Fugitive**

4. Product Movement

- **Fuel Consumption**
  - Tankers
  - Pipeline
  - Rail
  - Trucks
  - Barge
- **VOC Emission**
  - Loading
  - Transit
  - Ballasting

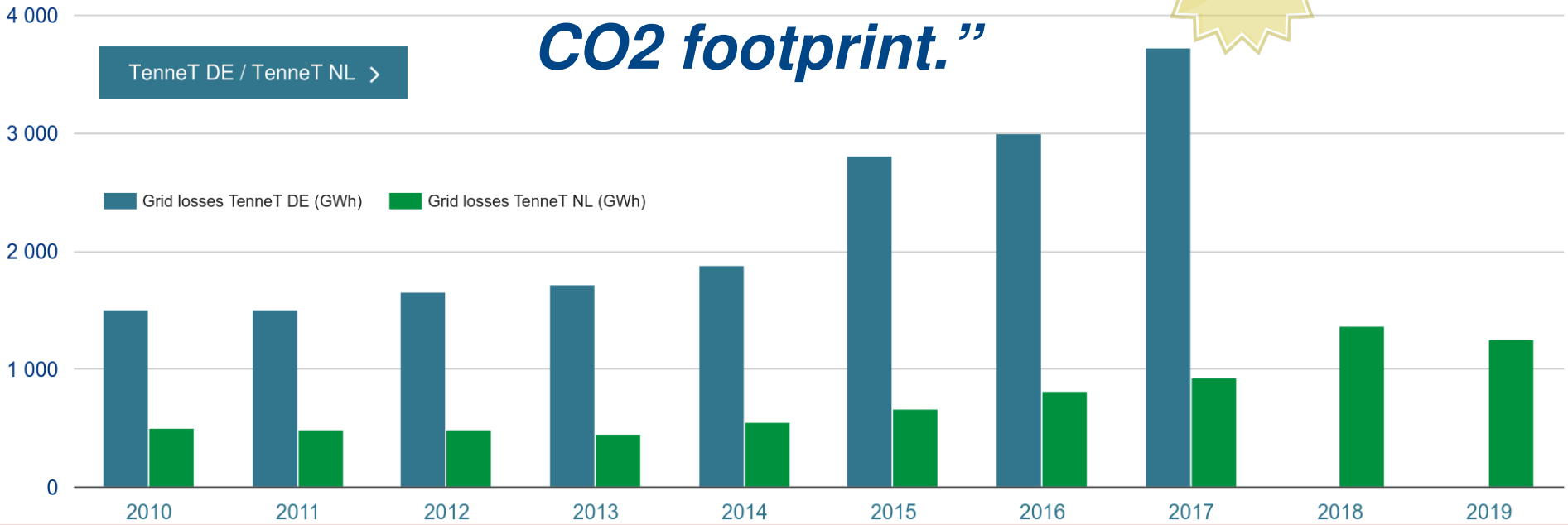


(Source: MARCOGAZ)

Grid losses depend on the current, voltage, conductor, transformers, distance, and weather.

And wind and solar electricity is often generated remotely, far from where most people consume it.

"Grid losses contribute to more than 90% of our CO2 footprint."



Global-WAN

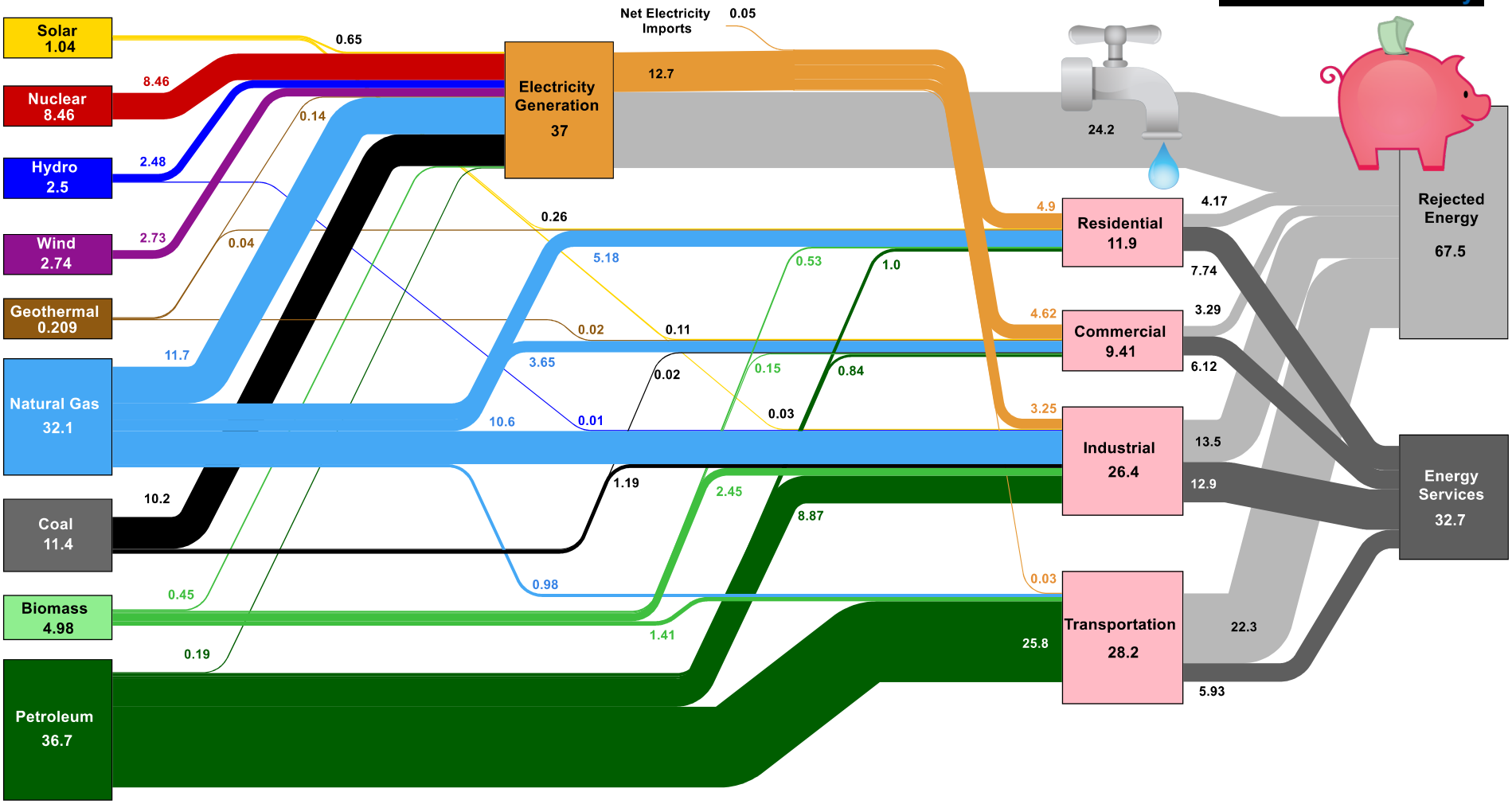
Annual Grid Transmission Losses

(TWh price range: USD 49m-174m)

	LOSSES (TWh)	LOSSES (USD Bn)
SWITZERLAND	4.56	0.2 – 0.8
FRANCE	38.60	1.9 – 6.7
GERMANY	27.02	1.3 – 4.7
U. K.	26.14	1.3 – 4.5
U.S.A	244.11	11.9 – 42.5
CHINA	319.58	15.6 – 55.6

(Source: International Energy Agency, 2019 report)

Estimated U.S. Energy Consumption in 2019: 100.2 Quads



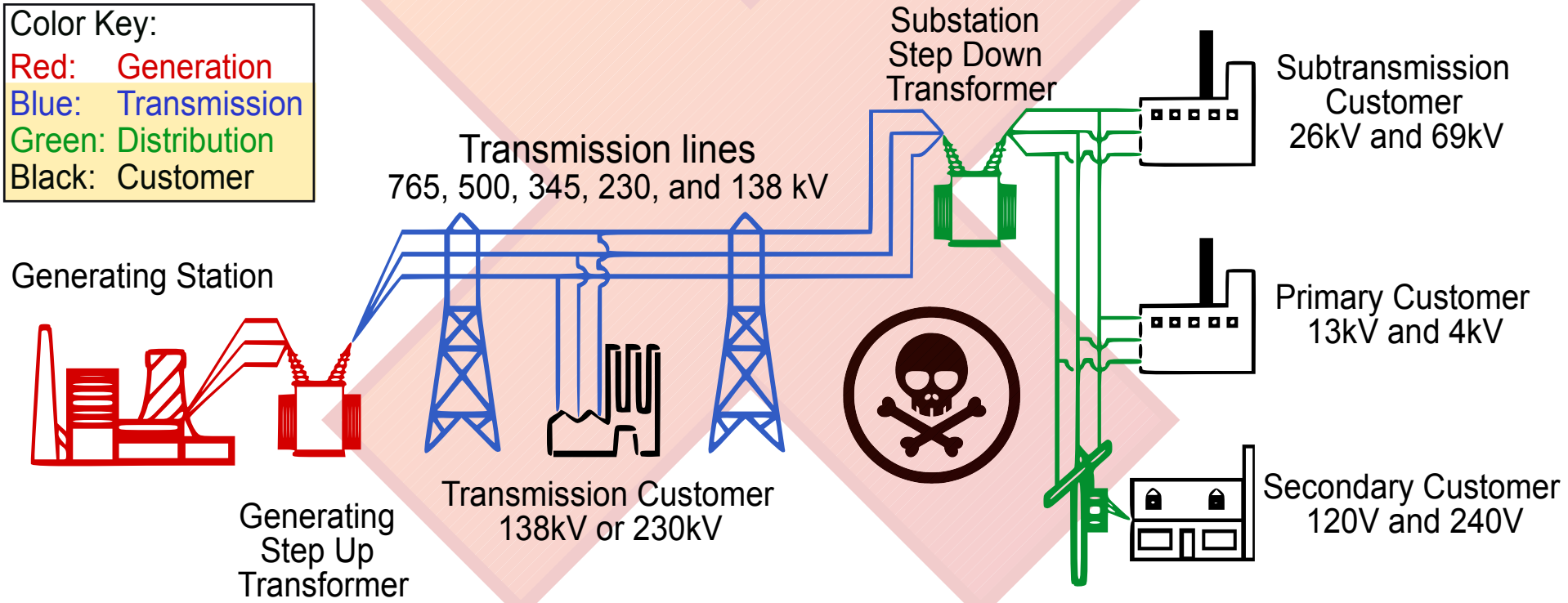
Source: LLNL March, 2020. Data is based on DOE/EIA MER (2019). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant heat rate. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential sector, 65% for the commercial sector, 21% for the transportation sector and 49% for the industrial sector, which was updated in 2017 to reflect DOE's analysis of manufacturing. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

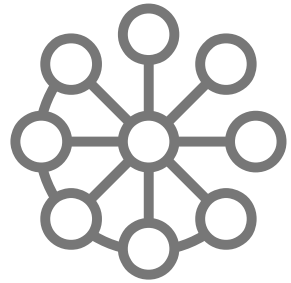
Wireless ENERGY

5 million miles in the US

$1-3 million / mile!

$7.5Tn



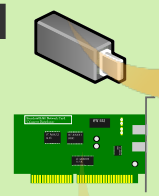


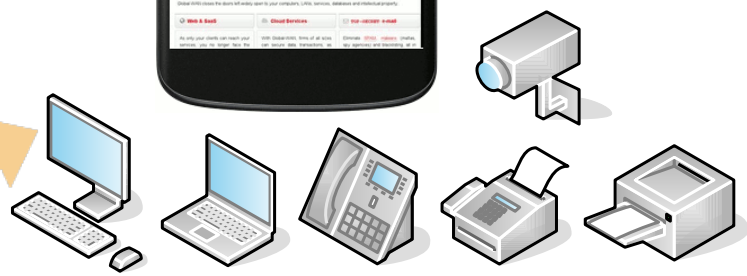
Solution II.

Global-WAN (1) wirelessly provides ***telecoms*** & energy, (2) ***without any infrastructure*** - so with much lower latencies, costs, and exposure to risks, and (3) eliminates all *related* energy consumption and GHG emissions/pollution.

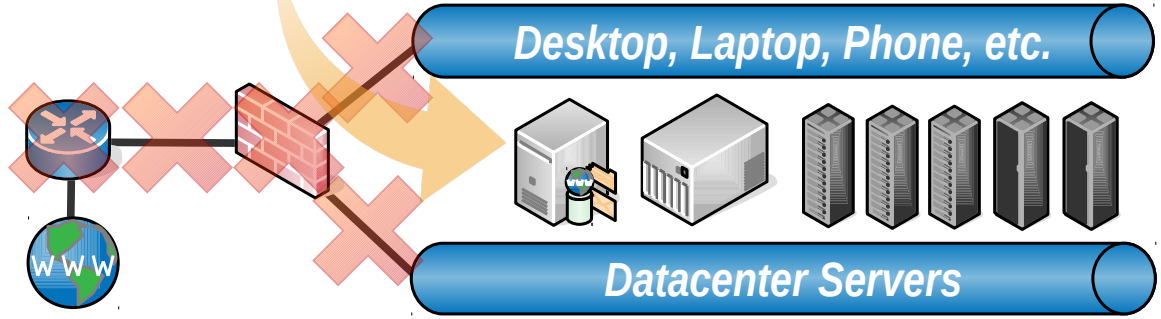
Lossless Wireless Global TELECOMS

Global-WAN network adapters



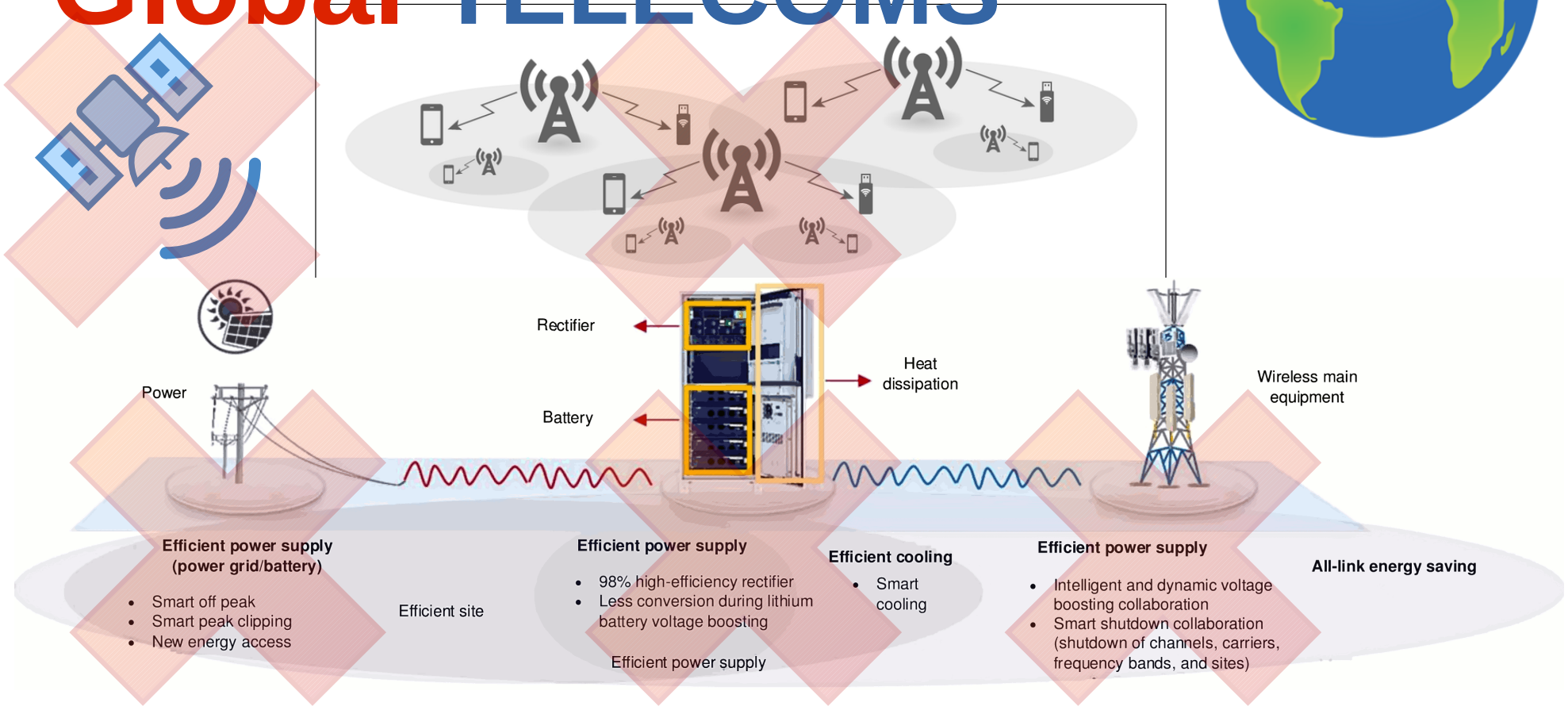


Desktop, Laptop, Phone, etc.



Datacenter Servers

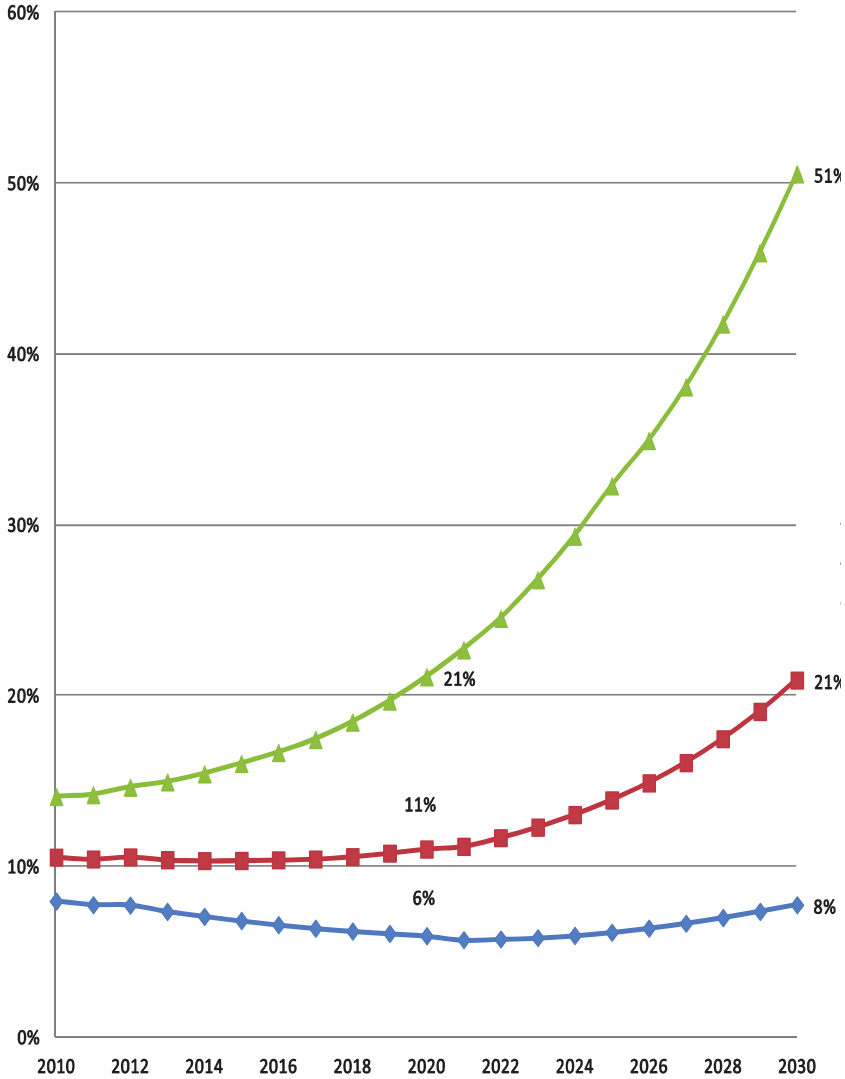
Lossless Wireless Global TELECOMS



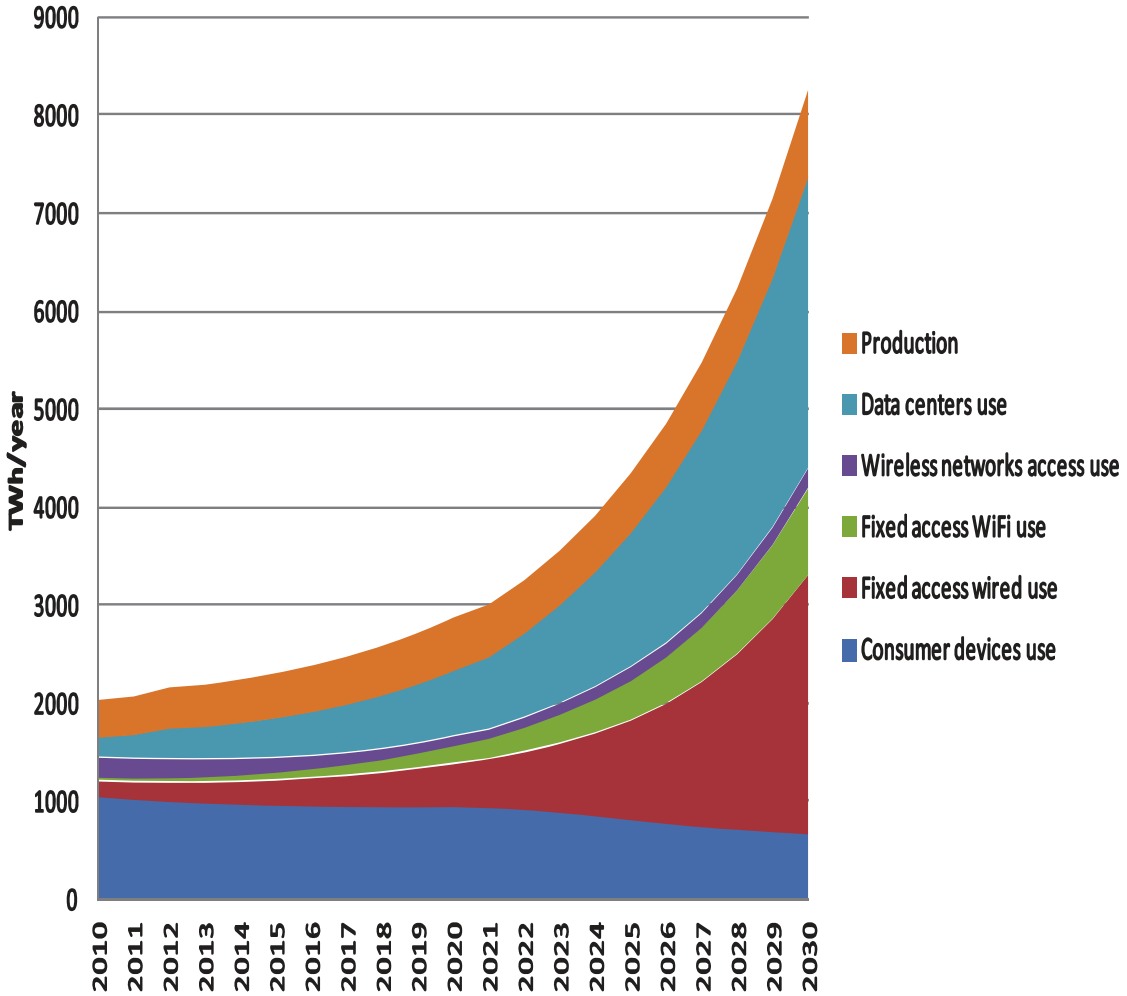
Telecoms

Energy Consumption & GHG/toxic emissions

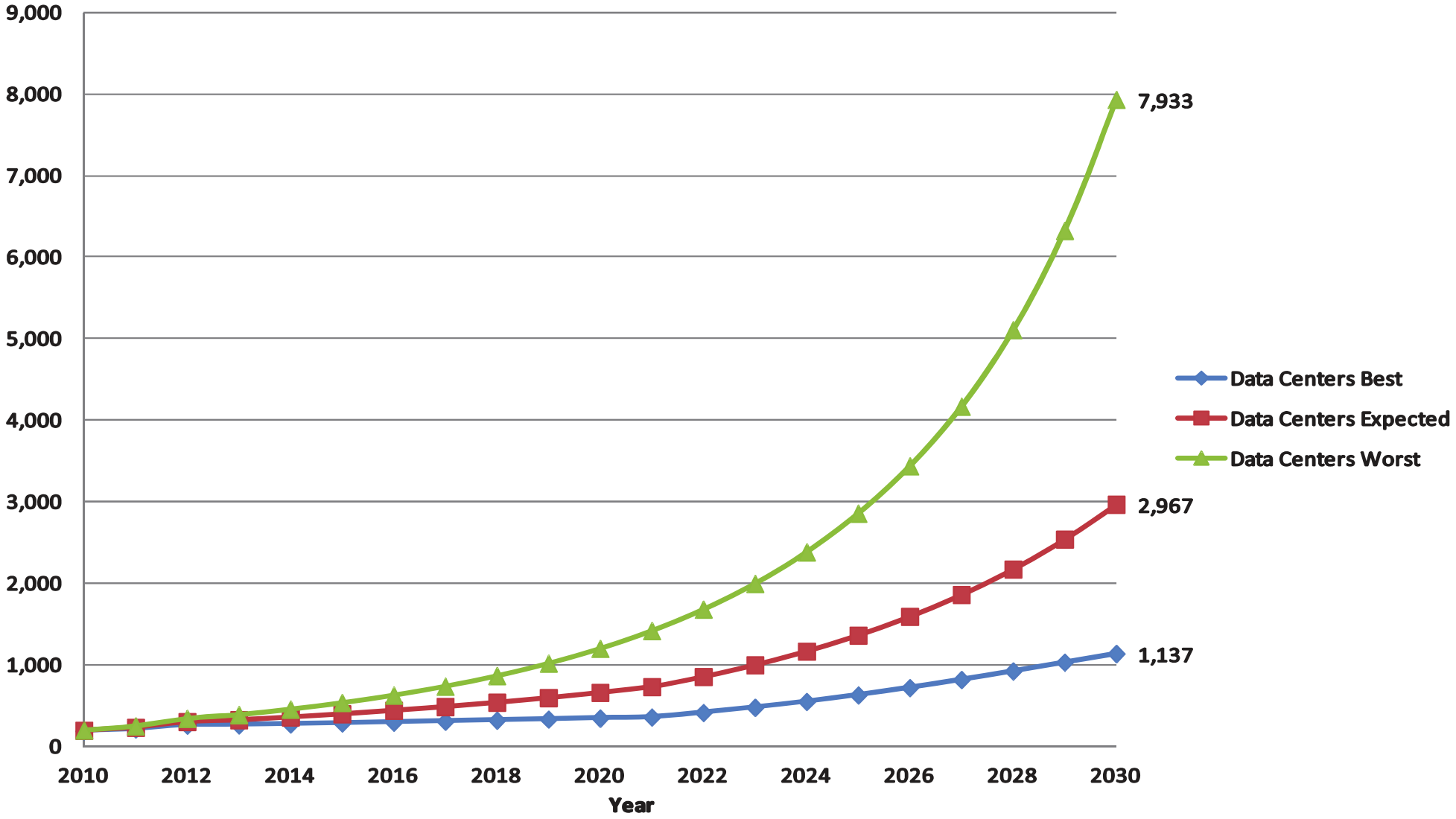
Share of Communication Technology of global electricitv usage



Expected case scenario CT electricity



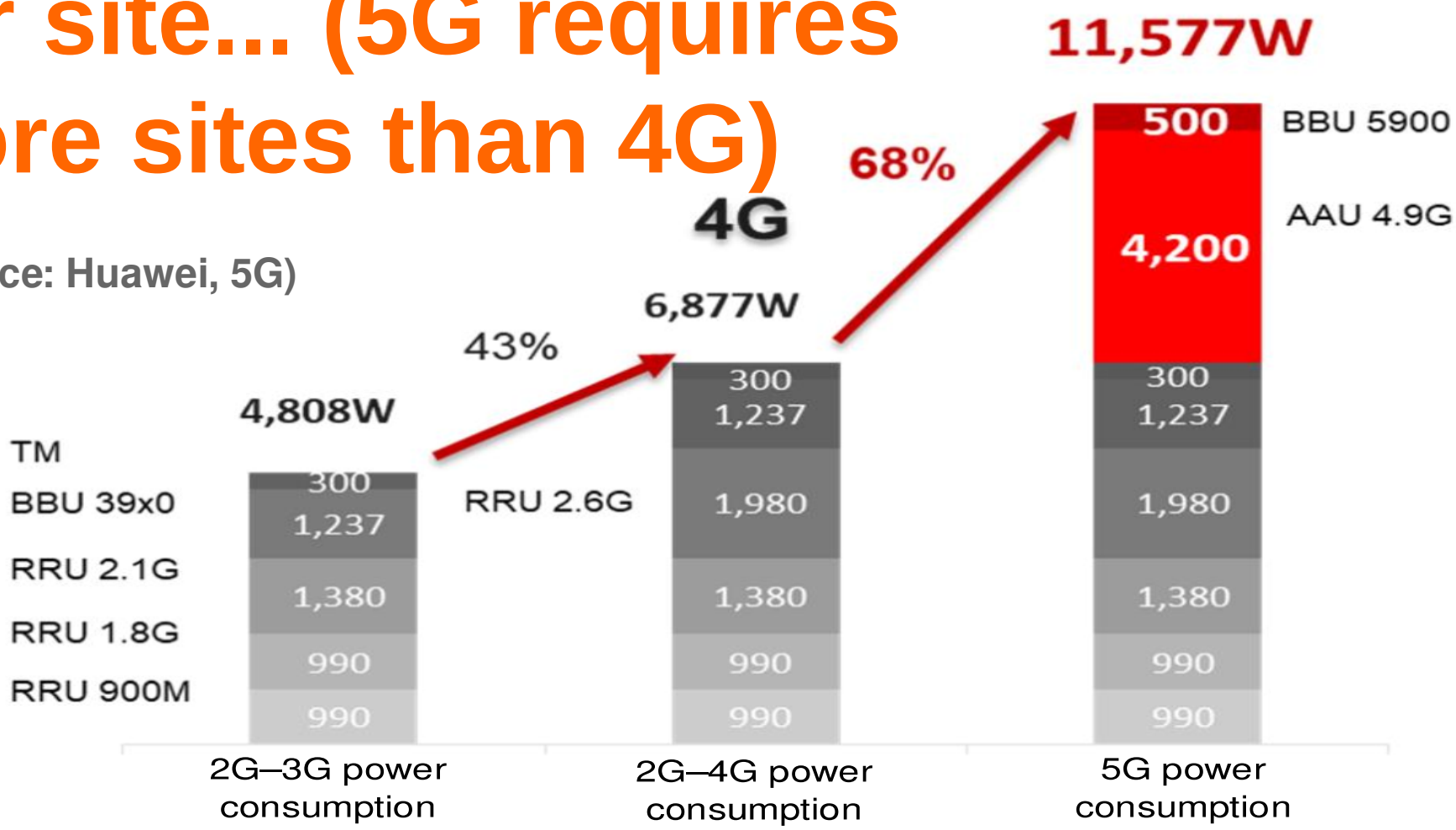
Electricity usage (TWh) of Data Centers 2010-2030



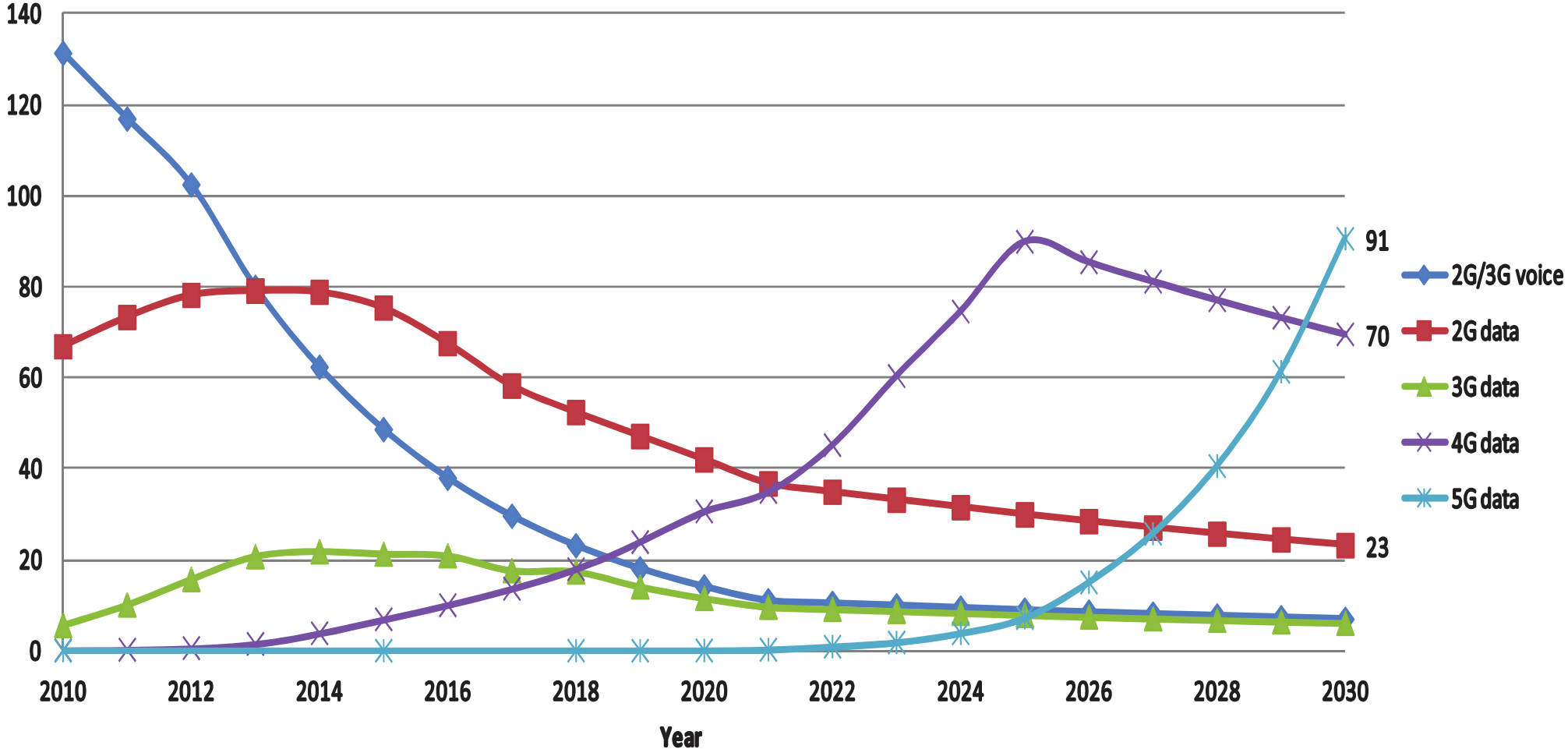
Radio-Wave Inefficiency per site... (5G requires more sites than 4G)

5G

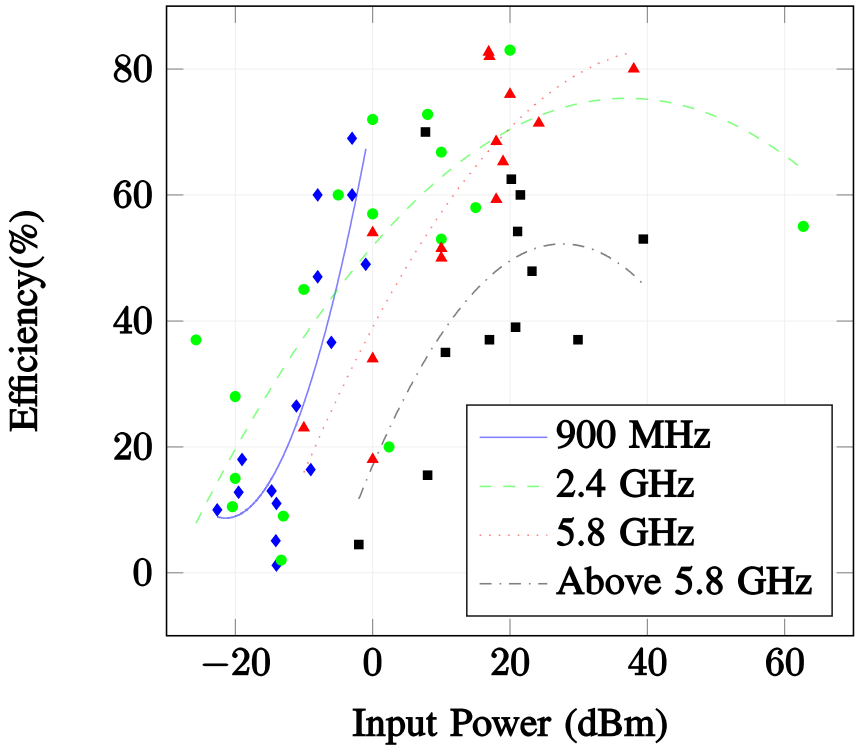
(Source: Huawei, 5G)



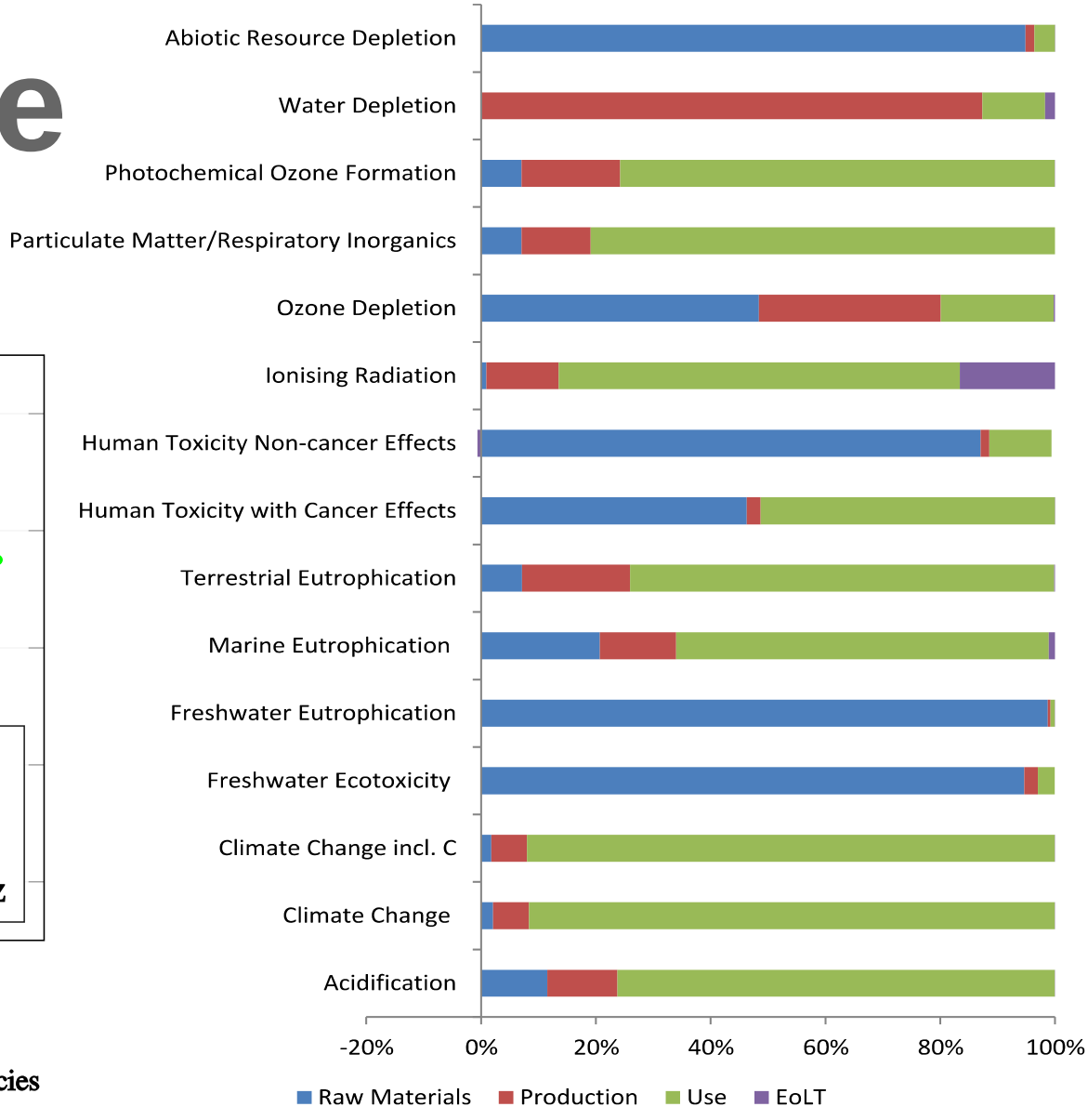
Expected case electricity usage (TWh) of Wireless Access Networks 2010–2030



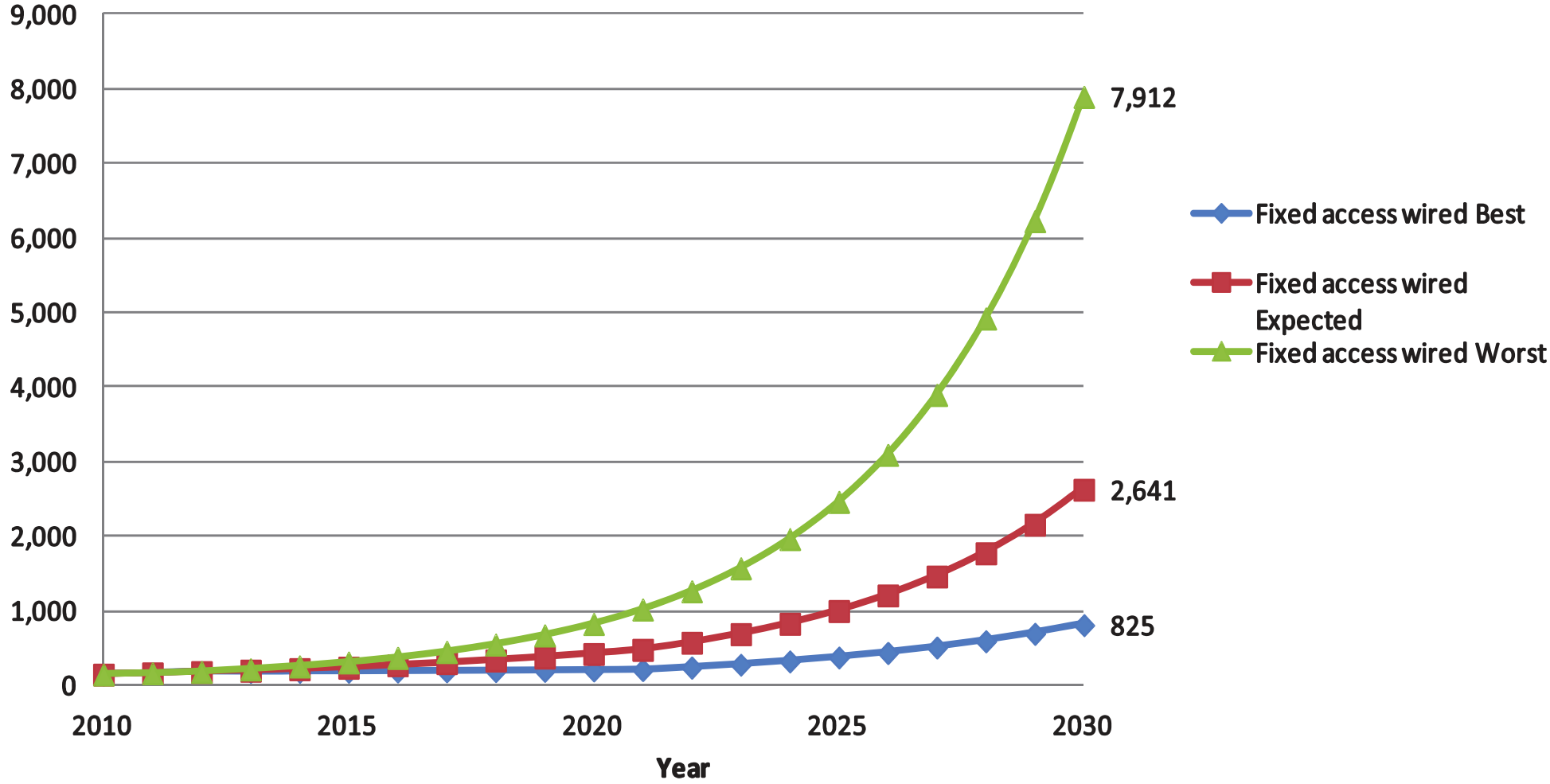
Radio-Wave Emissions

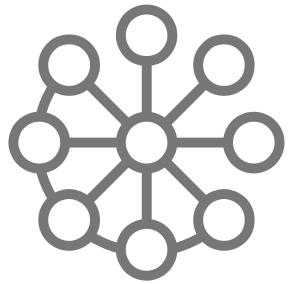


State-of-the-art RF and microwave conversion efficiencies



Electricity usage (TWh) of Fixed access wired networks 2010–2030





Opportunity

Design & Production

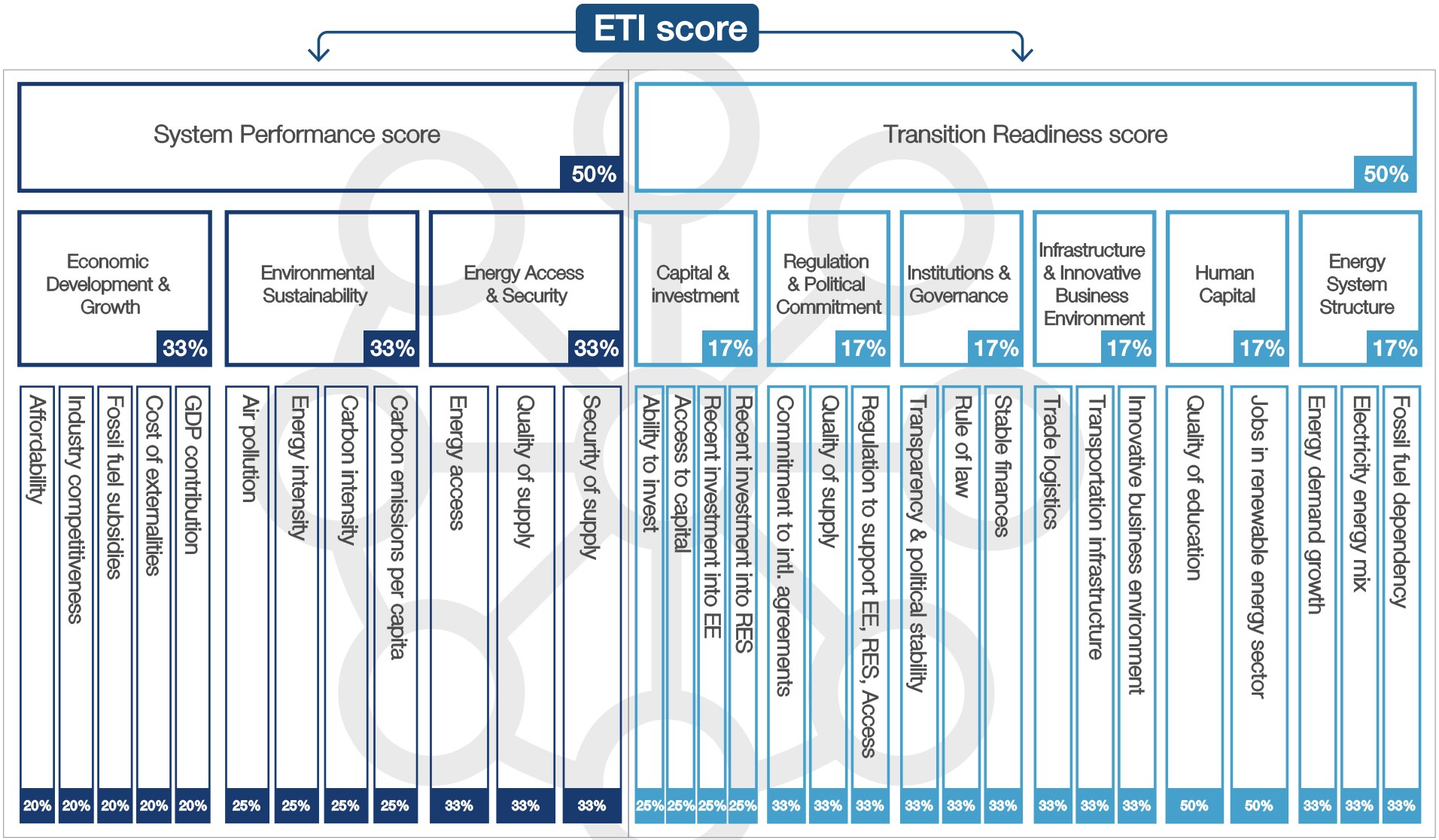
In 2014, the Swiss **EPFL Microelectronic Systems Laboratory** has conducted a 30-page study (costs/delays) of Global-WAN chips (these microchips serve as Global-WAN modems & antennas).

Under NDAs, TWD got **manufacturing contracts** from the two largest world **foundries**, and **integration contracts** of the chips from a major IoT manufacturer (supplying Apple Inc):

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

tsmc

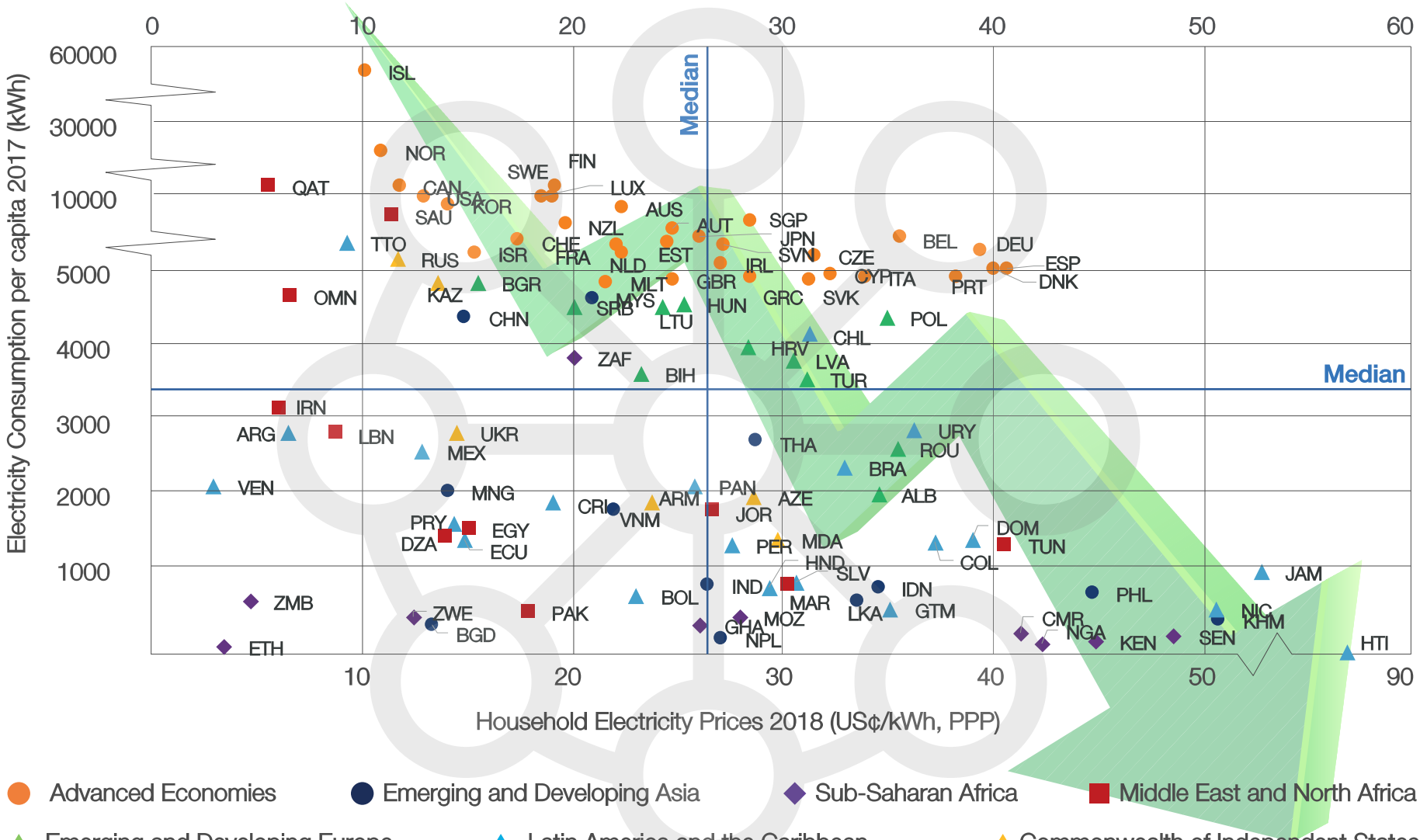
SAMSUNG



Details on the selection, aggregation and normalization of indicator data and the data sources can be found in Singh et al., "The energy transitions index: An analytic framework for understanding the evolving global energy system", *Energy Strategy Reviews*, vol. 26, 2019.

Source: World Economic Forum

Household electricity tariffs (US¢ 2018, PPP) vs per capita* electricity consumption (kWh)



Advanced Economies | Emerging and Developing Asia | Sub-Saharan Africa | Middle East and North Africa

Emerging and Developing Europe | Latin America and the Caribbean | Commonwealth of Independent States

*Based on total electricity consumption (does not consider segmentation by final demand category).

SUSTAINABLE DEVELOPMENT GOALS

16 of 17 SDGs

Business Model

Calculation details: Year #1 revenues = EUR 180m with 5m users, so 180/5 = EUR 36 of annual revenues per end-user (at least one sale of a Global-WAN chip and a 12-month subscription):

	Year #1	Year #2	Year #3	Year #4	Year #5
Subscribers	5m	30m	90m	180m	288m
Growth Rate	5,000%	600%	300%	200%	160%
Revenues	EUR 180m	EUR 1bn	EUR 3bn	EUR 6bn	EUR 10bn
EBITDA	EUR 59m	EUR 360m	EUR 1.5bn	EUR 2.3bn	EUR 3.6bn
EBIT	EUR 57m	EUR 354m	EUR 1.2bn	EUR 2.1bn	EUR 3.5bn

Pricing freedom: If users got free chips, then they paid EUR 3 per month to use Global-WAN. If users paid chips EUR 24 then EUR 1 per month was paid to use Global-WAN. *Both pricing models lead to the table's numbers.*

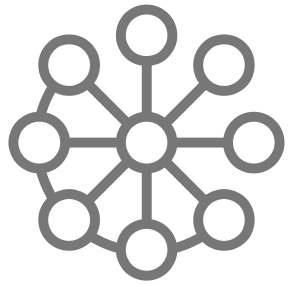
Investor Exit

Never before a software + hardware manufacturing project has been prepared for so long – *the cycles here are more similar to the Pharmaceutical industry* – ***just like the revenues:***

	Year #1	Year #2	Year #3	Year #4	Year #5
Subscribers	5m	30m	90m	180m	288m
Growth Rate	5,000%	600%	300%	200%	160%
Revenues	EUR 180m	EUR 1bn	EUR 3bn	EUR 6bn	EUR 10bn
EBITDA	EUR 59m	EUR 360m	EUR 1.5bn	EUR 2.3bn	EUR 3.6bn
EBIT	EUR 57m	EUR 354m	EUR 1.2bn	EUR 2.1bn	EUR 3.5bn

Global-WAN chip subscriptions will be extremely lucrative – *even with conservative projections*. Assumptions: EUR 300m investment (20% stake).

Exit: Sale or IPO at 2.5 times TWD's 5th year revenues.



Company
Background

Origin of the Business Idea

In **1998** TWD created **Remote-Anything (RA)**, deployed ***280m licenses*** in ***138 countries*** until 2004 – from governments, banks, insurers, R&D centers and universities, to nuclear plants.

In **2005**, facing unfair competitors TWD started **Global-WAN**, registered the brand in **2006**, and has found **"unconditional" security** ("unbreakable" in academic jargon) in **2007**.

Global-WAN as software is online since **2010**.

TWD's MISSION: allow people, organizations, and machines to safely operate, communicate and trade without unwanted interferences.

Status & Milestones

2019: TWD invited at the **Munich Security Conference**
2018: TWD invited to meet **government bodies in China**
2017: TWD invited by a **stock-exchange** to meet a **central bank**
2016: TWD's technology is **audited by the UK Gov. (GCHQ experts)**
2014: **EPFL** & **CTI** Global-WAN **ASIC chips** study (costs, delays)
2010: **http://Global-WAN.com/** is publicly online
2009: **http://G-WAN.com/** Application Server is publicly released
2007: Global-WAN project (provably-safe crypto found, brand registered)
2005: 280 millions of RA/DS licences deployed in 138 countries
2003: Firewall-traversal & by-design security international patents (DS)
2002: **http://SummitPartners.com/** offers *"liquidity for founders"*
1999: **http://Remote-Anything.com/** (RA) is publicly released
1998: TWD Industries has been incorporated on 23/04/1998

TWD Industries AG

TWD Industries AG
Paradiesli 17
CH-8842 Unteriberg SZ
Switzerland
http://twd.ag/

About TWD Industries

Founded in 1998 by **Pierre Gauthier**, **TWD Industries** is a privately held company. Commercial Register history: **USA**: “TWD Industries LLC” on 23/04/1998 (closed), **France**: "TWD Industries SAS" on 18/02/2002 (closed), **Switzerland**: "TWD Industries AG" since 15/01/2009 (active), owned at 100% by **TWD Holding AG** (active), which itself belongs at 100% to Pierre Gauthier.

Global-WAN protects digital assets with fully-compliant governments-audited **cryptanalytically unbreakable** technology (safe against unlimited computing power as no algebraic structures can be exploited to reconstruct the encryption algorithm, secret key, or plaintext). The **Global-WAN** platform leverages offers of enterprise, Cloud, IoT, networking, digital media and financial services in global strategic markets.

TWD lets partners and users form dynamic ecosystems where duly accredited strangers can safely trust each-other. Establishing widespread trust enables organizations to secure their infrastructure, raise the value of their offers and safely market their digital assets.