

Energía y cambio tecnológico



Guillermo I. García Alcocer

@garcialcocer

garcialcocer@itam.mx

Guillermo I. García Alcocer

Economista mexicano con ~30 años de experiencia en el sector energético y financiero, destacando el desarrollo de regulación para el despliegue de proyectos renovables y la liberalización de los precios de la gasolina y el diésel.



- Maestría en Finanzas – ITAM
- Licenciatura en Economía – ITAM
- Cursos: ITAM, Harvard, Oxford y George Washington
- Miembro del Consejo Mexicano de Asuntos Internacionales (Comexi)
- 100 Líderes en Energía en 2023 de la Revista Petróleo y Energía

Experiencia profesional

ITAM (19 – Actualidad)

- Director de Planeación y Evaluación de Desempeño, así como profesor de economía y regulación en el ITAM
- Conferencista y consultor
- Consejero Independiente de Énestas

Comisión Reguladora de Energía (16 – 19)

- Comisionado Presidente del Regulador Nacional de logística de hidrocarburos y del mercado de electricidad

Secretaría de Energía (07 – 16)

- Jefe de Unidad de Exploración y Explotación de Hidrocarburos
- Director General de Desarrollo Industrial de Hidrocarburos
- Jefe de Asesores del Subsecretario de Hidrocarburos

Comisión Nacional del Sistema de Ahorro para el Retiro (03 - 06)

- Director General Adjunto de Planeación
- Director General Adjunto de Órganos de Gobierno

Secretaría de Hacienda y Crédito Público (95 – 03)

- Director de Incentivos Fiscales y de Coordinación Fiscal
- Asesor del Jefe de la Unidad de Política de Ingresos
- Jefe del Departamento de Proyectos Especiales

WSJ

REFORMA

CORAZÓN DE MÉXICO

"El Sr. García Alcocer, nombrado para su cargo por el Senado de México en 2016, fue un firme promotor de la liberalización del sector energético de México".

The Wall Street Journal





"¿Cómo quebraste?
De dos maneras.
Gradualmente, luego de
repente".

Ernest Hemingway, The Sun Also Rises.

Del carbón al petróleo

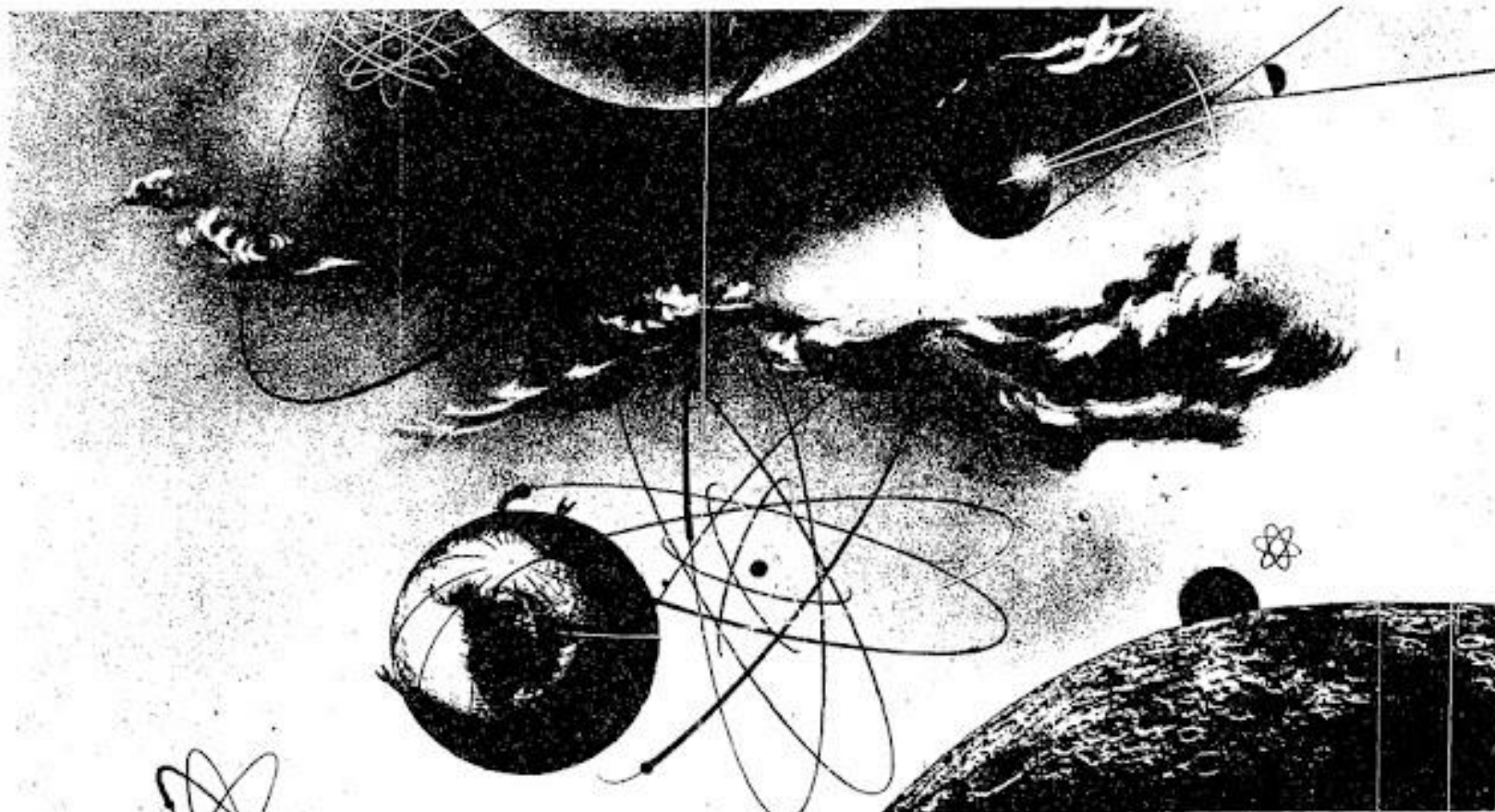


Red de ductos



Guerra de las corrientes





"In the world around us, atomic energy is working on a tremendous scale."

Drawing by Herbert Bayer. 45 General Electric Co.

We Enter a New Era—the Atomic Age

THE power of the atom has been unleashed. For better or for worse we have entered upon a new era in the history of mankind. The dreams and speculations that have been with us since the Curies discovered the amazing radioactive powers of the atom have become stern reality in the proving grounds of New Mexico and the streets of Japan.

The development is of Promethean significance. Generations millenniums hence

**Here is the momentous story of the atom
whose energy science has now unleashed.**

By **HARRY M. DAVIS**

the 1940 model atom as it was publicly known before atomic physics became a military secret, we can form a pretty workable idea of what atoms are, what

Small as the atom may be, it is composed of particles which are very much smaller. The simplest of all atoms, hydrogen, consists mostly of empty space

The other is a particle called the neutron, which seems to be identical with the proton except that, as its name was meant to indicate, it is electrically neutral.

Heavier atoms, going up the scale through magnesium, oxygen, iron, lead and uranium, have more and more protons and neutrons in the nucleus, but in every case the positive electrical charge of the nucleus due to its protons is normally balanced by the negative charge





**ARE WE ENTERING
A GOLDEN AGE OF GAS?**

**Special
Report**

WORLD ENERGY OUTLOOK

**2
0
1
1**



Golden Rules for a Golden Age of Gas

May 29, London

*World Energy Outlook
Special Report on Unconventional Gas*

**The
Economist**

The 90% economy, revisited

African pop culture goes global

In praise of citizens' assemblies

TikTok and the rise of Frankenfirms

SEPTEMBER 19TH–25TH 2020

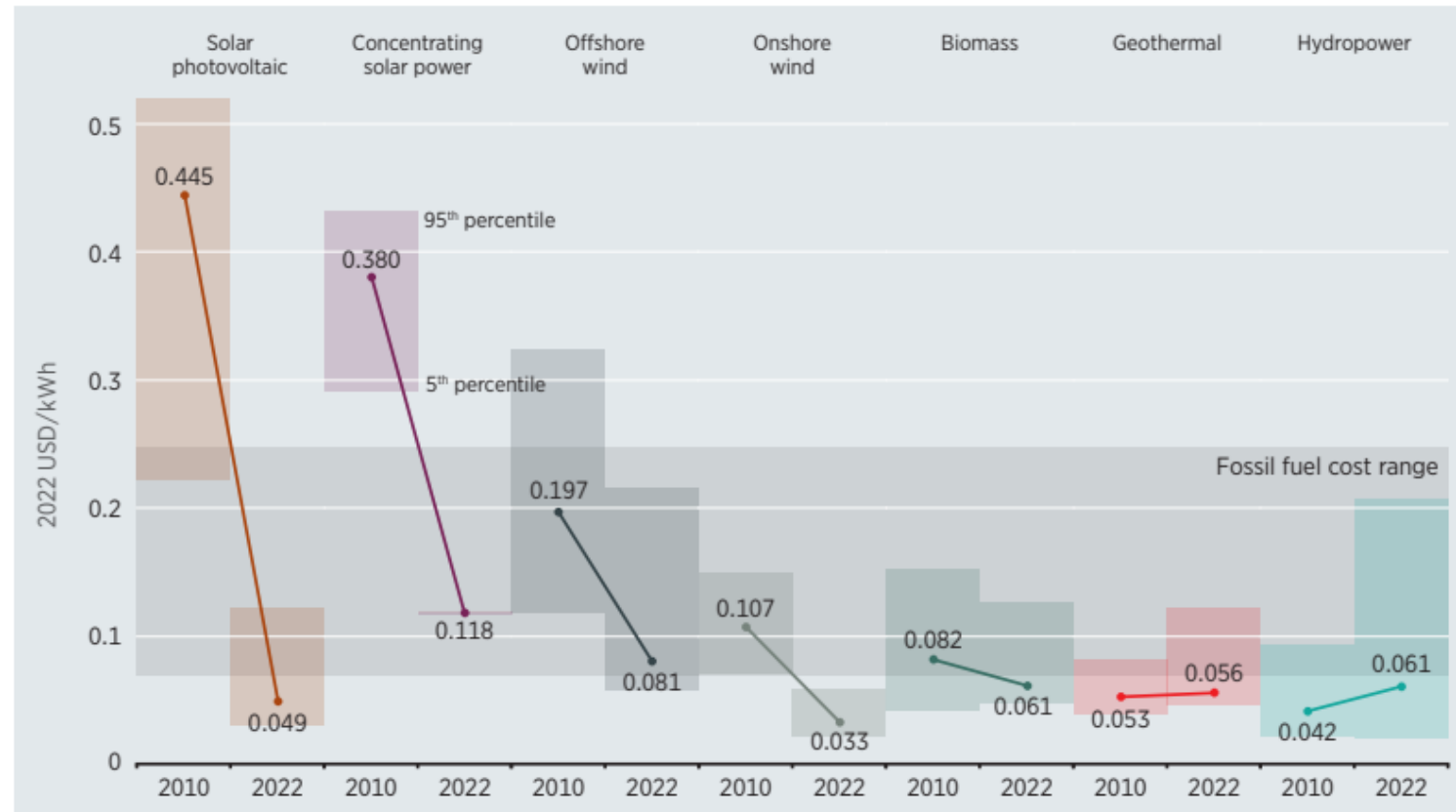
21st century power

How clean energy will remake geopolitics



Las energías solar y eólica cada vez más baratas (2022)

Figure S.4 Global LCOE from newly commissioned utility-scale renewable power technologies, 2010 and 2022

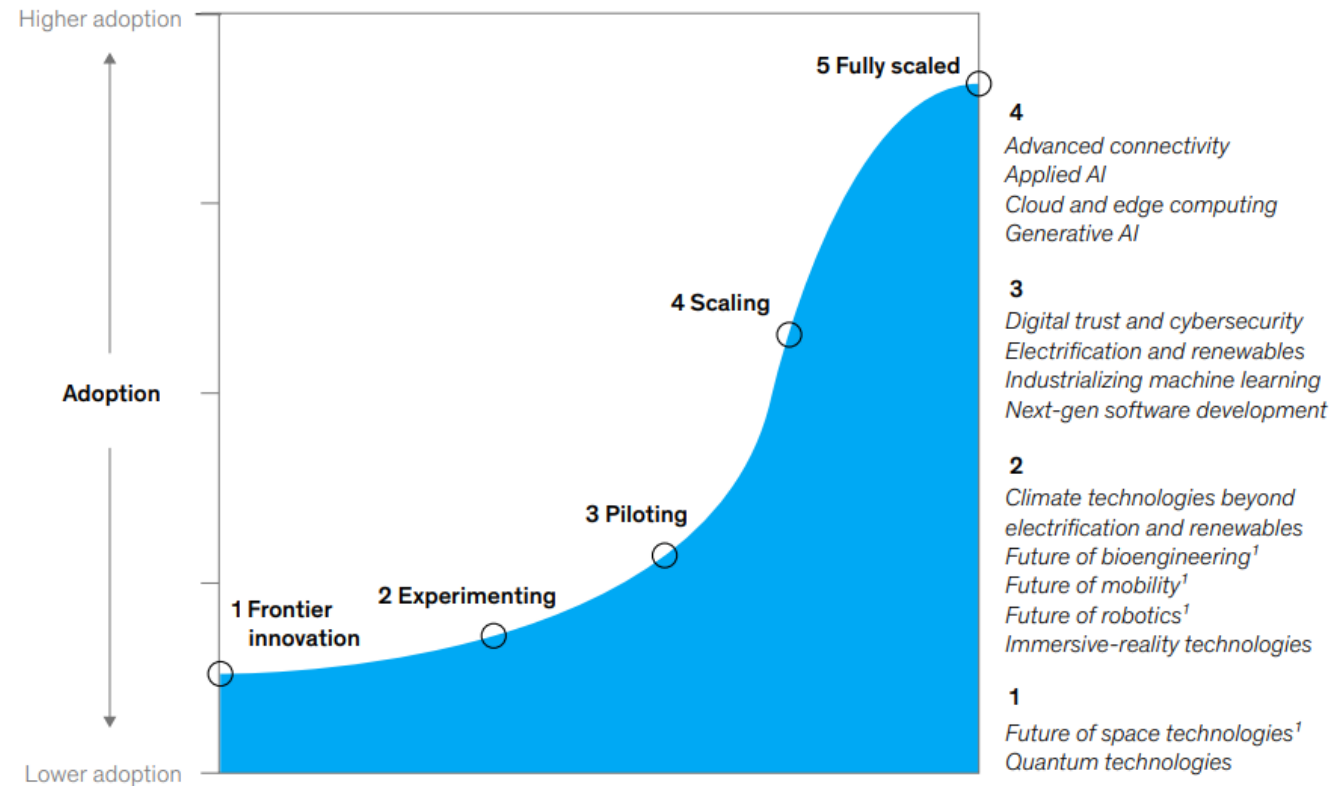


Note: These data are for the year of commissioning. The thick lines are the global weighted average LCOE value derived from the individual plants commissioned in each year. The LCOE is calculated with project-specific installed costs and capacity factors, while the other assumptions, including weighted average cost of capital (WACC), are detailed in Annex I. The grey band represents the fossil fuel-fired power generation cost in 2022, assuming that 2021 fossil gas prices were the correct lifetime benchmark rather than the crisis prices of 2022. While the bands for each technology and year represent the 5th and 95th percentile bands for renewable projects.

La curva de adopción tecnológica, Mckinsey 2024

Technologies progress through different stages, with some at the leading edge of innovation and others approaching large-scale adoption.

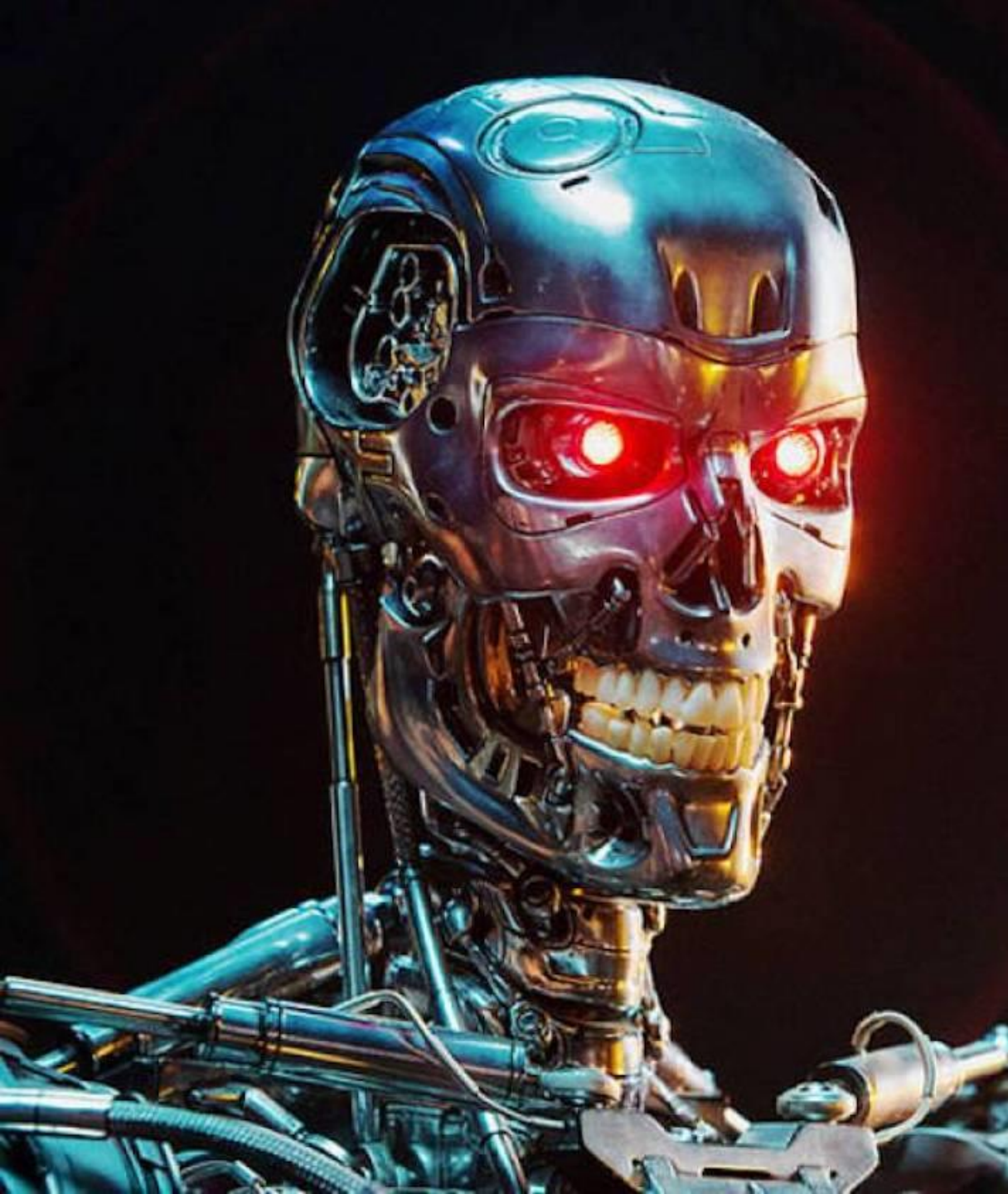
Adoption curve of technology trends, adoption score



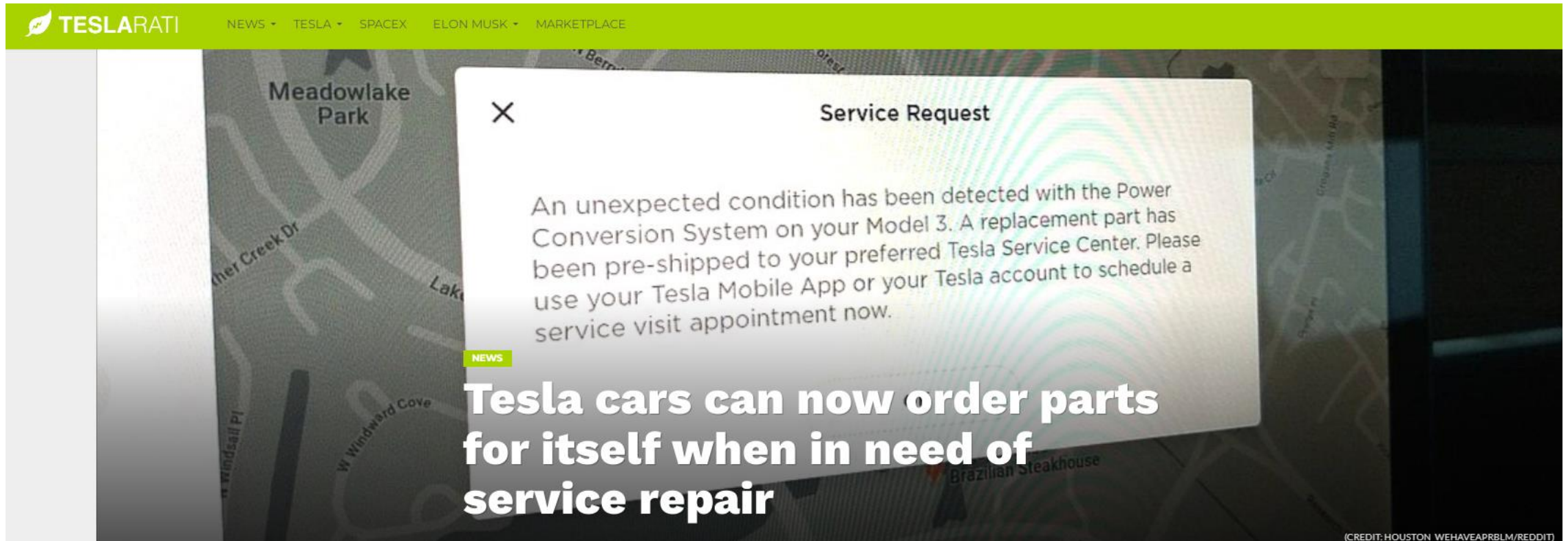
¹Trend is more relevant to certain industries, resulting in lower overall adoption across industries compared with adoption within relevant industries.
Source: McKinsey technology adoption survey data; McKinsey analysis



Automatización



Los automóviles Tesla ya ordenan sus piezas de reemplazo sin preguntar a sus dueños



Sign in

Contribute

The
Guardian
News website of the year

News

Opinion

Sport

Culture

Lifestyle



World UK Coronavirus Climate crisis

More



iPhone

iPhones calling 911 from owners' pockets on rollercoasters

New iPhones which can detect car crashes and notify emergency services appear confused by thrill rides



Electrificación de usos finales

Electrificación de lo electrificable (transporte ligero, procesos industriales no intensivos en calor) y uso de combustibles limpios en los procesos restantes.

Recycle

Emissi

able
ment

Climate
change

ment

Energy
saying

CO₂

Ind

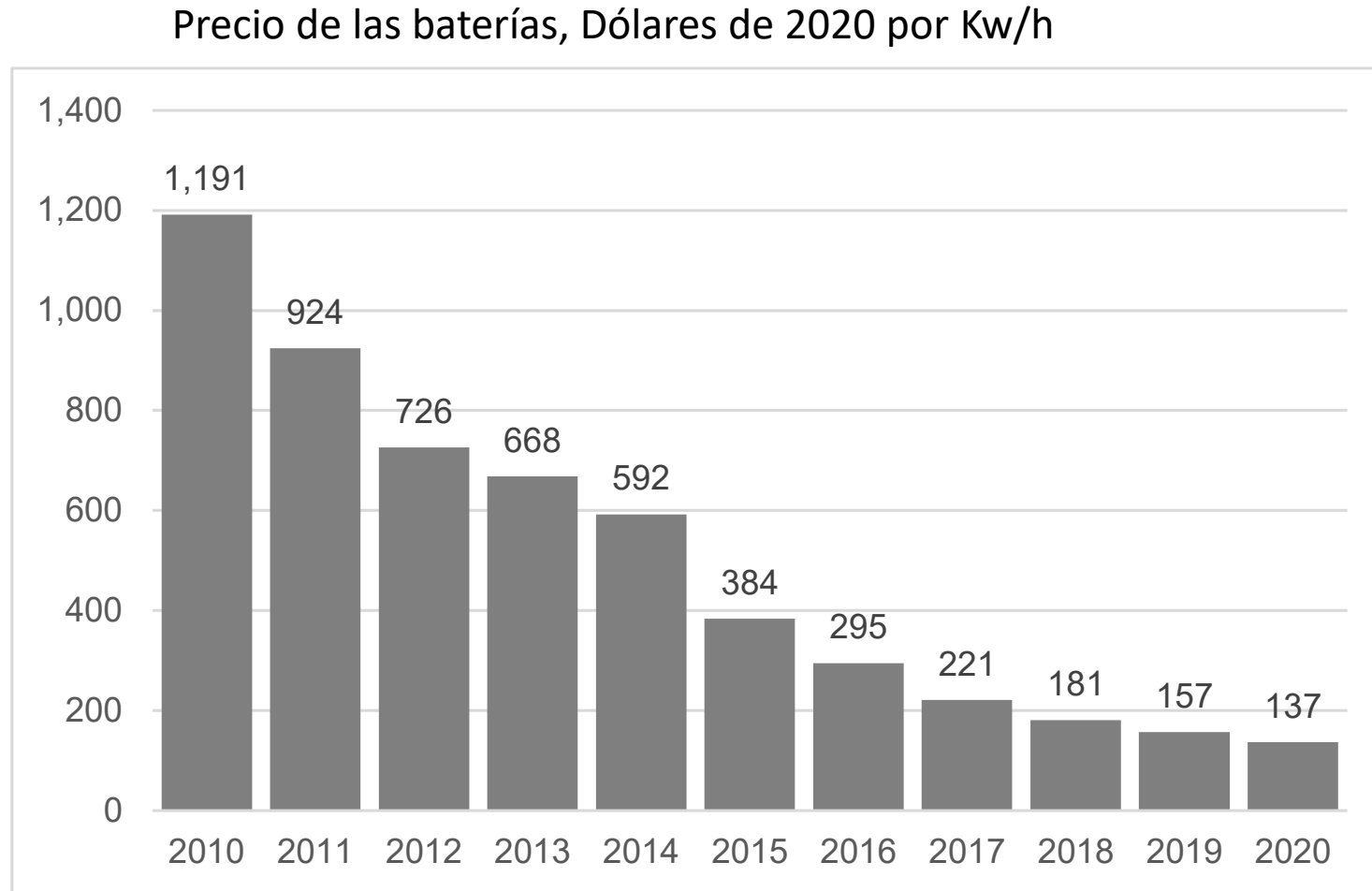
Descarbonización



El desastre de **Hindenburg**



En los últimos años, el costo de las baterías se ha reducido, al tiempo que se han vuelto más eficientes





Descentralización

El almacenamiento eléctrico tiene beneficios tangibles a lo largo de la cadena de valor de la energía



Se estima que el **potencial del mercado Mexicano es de 2,333 MW**, bajo un pronóstico de 10 años

Fuente: Quanta Technology "Feasibility Study for Large Scale Energy Storage Systems in Brazil, Colombia and Mexico". Proyecto realizado por Quanta Technology para ISA, bajo el financiamiento de la Agencia de Comercio y Desarrollo de los EE.UU. (USTDA, por su sigla en inglés)

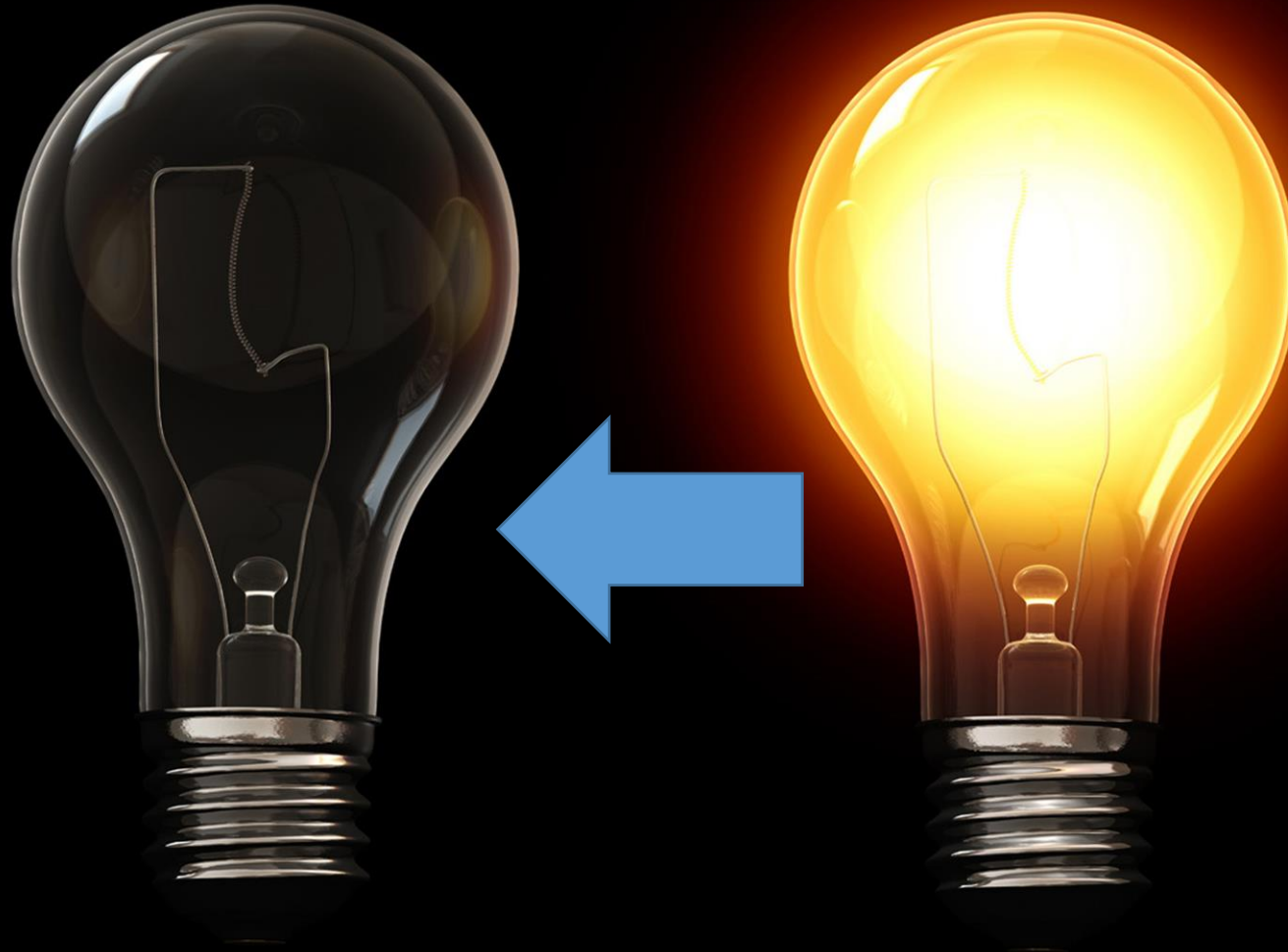
Brindar regulación de frecuencia y otros servicios conexos



Ayudar a diferir las necesidades de transmisión y distribución

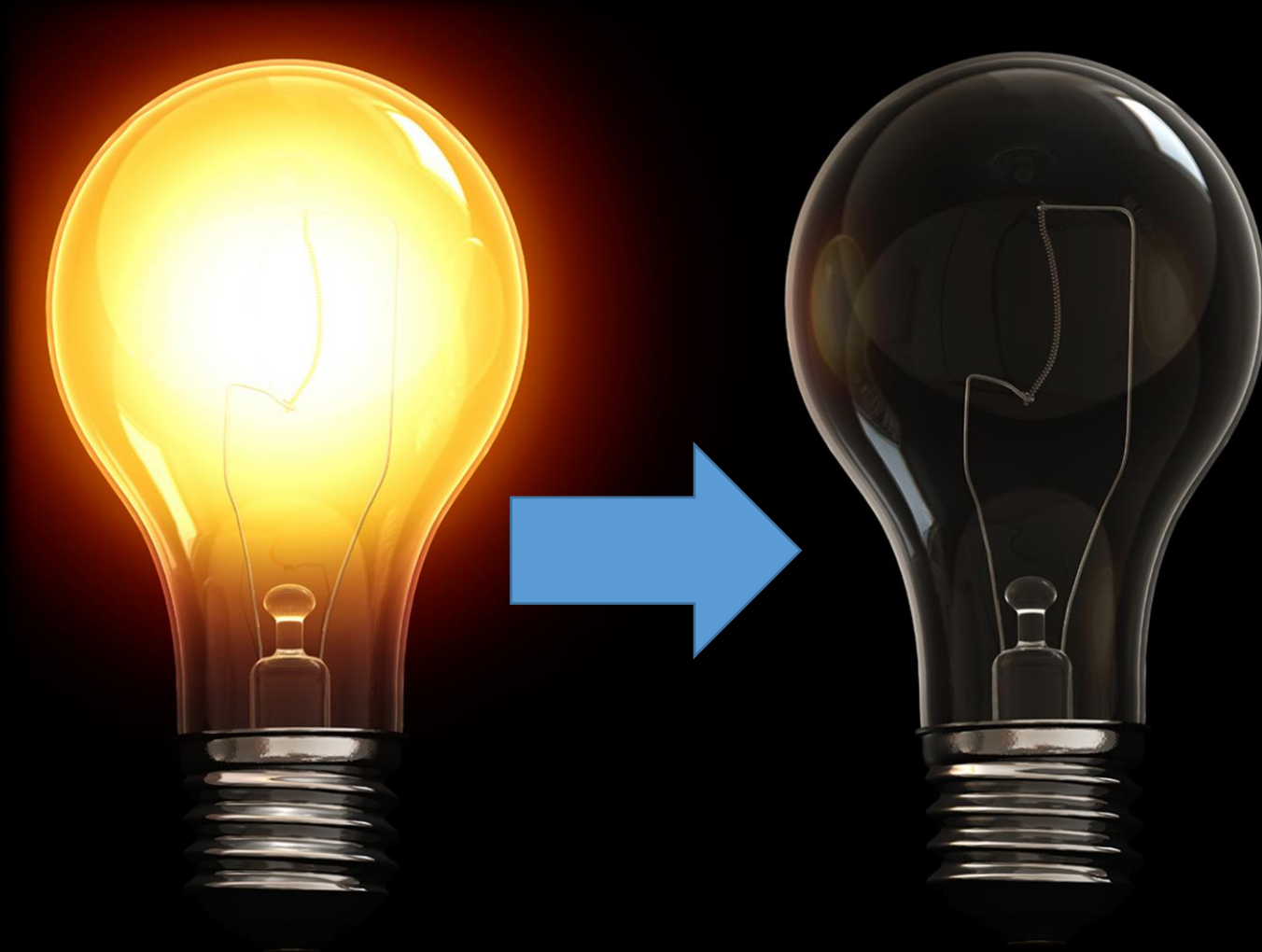
Proveer energía dada la intermitencia en la generación renovable

Eficiencia energética



La energía más barata y limpia, es aquella que en principio no necesita generarse

Suficiencia energética



La energía más cara es la que no se tiene

**The
Economist**

How the pandemic ends

Latin America's growth opportunity

Will there be a wage-price spiral?

More threats to free speech

OCTOBER 16TH- 22ND 2021

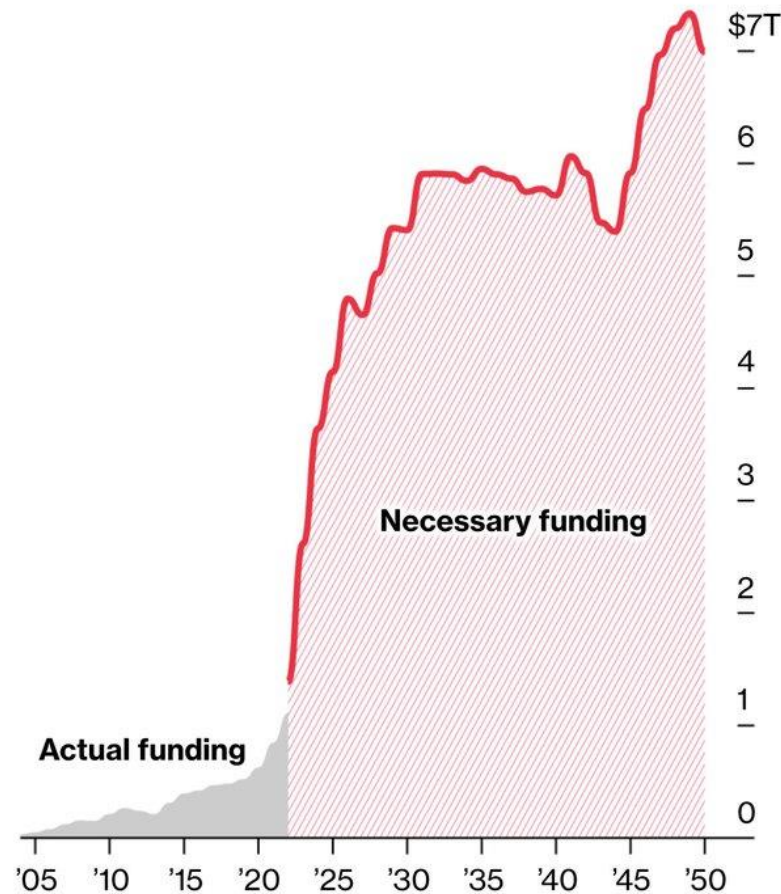
The energy shock



El costo de la transición

Funding Shortfall

Investment needed to reach net-zero by 2050

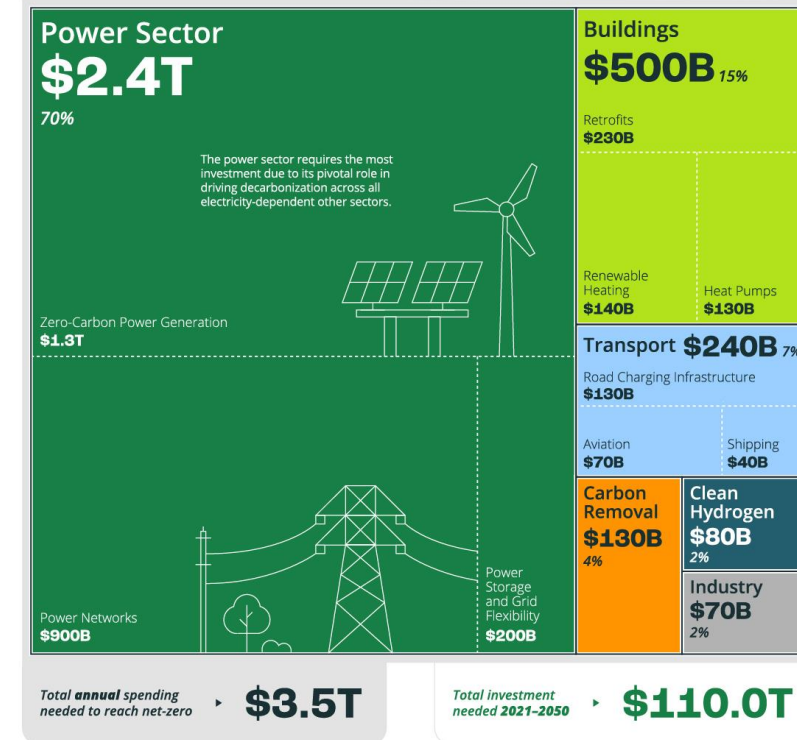


Source: BNEF

The Cost of the Clean Energy Transition

The Energy Transitions Commission estimates that the net-zero transition will cost **\$110T** in global capital investments between 2021 and 2050, averaging **\$3.5T** annually. Here is that sum broken down by sector.

Average Annual Capital Investment Needed Worldwide
2021–2050, USD



In 2022, global investment in the clean energy transition totaled \$1.1T. To remain on track to net-zero, significant and rapid injections of investment must be made in the above sectors.

Source: Energy Transitions Commission

Numbers may not total 100 due to rounding. All figures are in real 2021 U.S. Dollars.

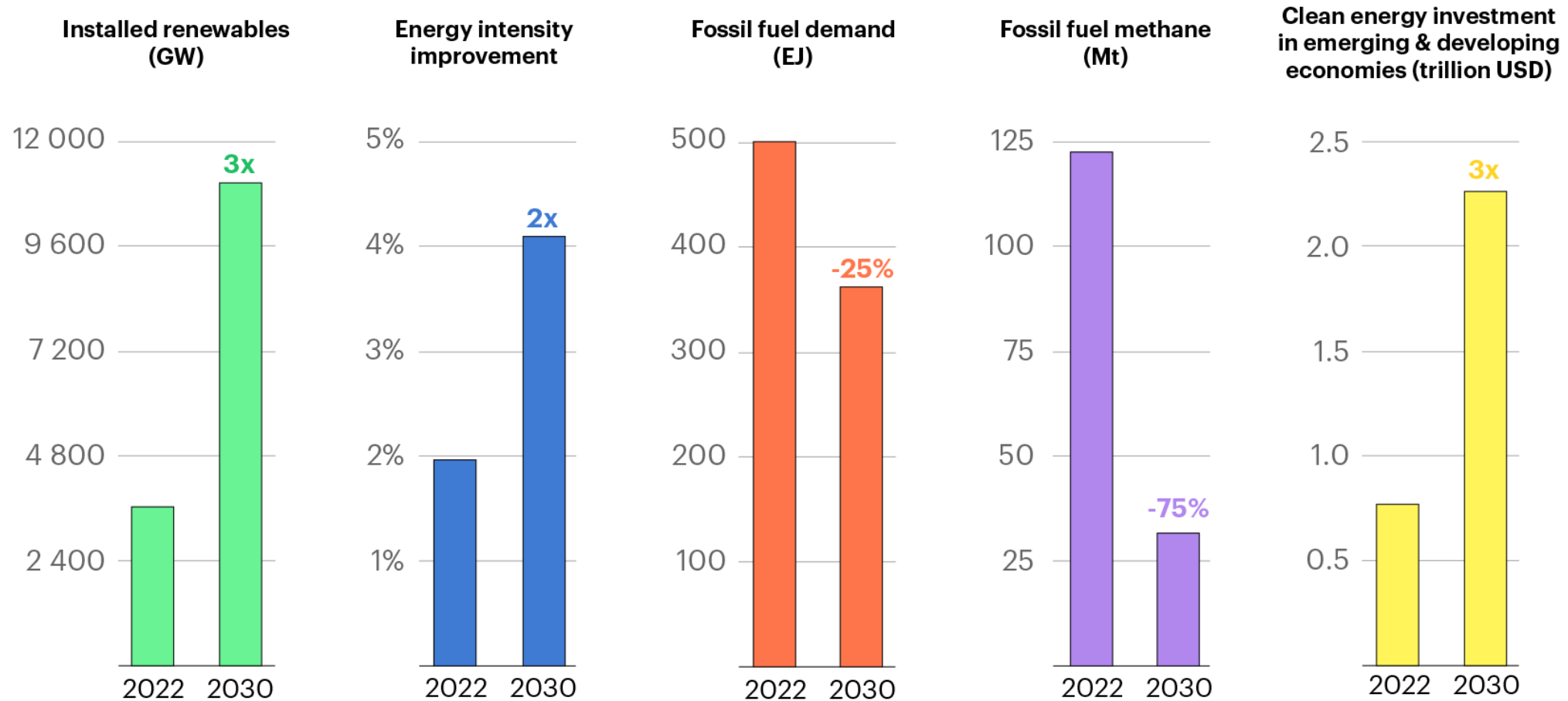
Decarbonization Channel Powered by NPUC

In partnership with motivepower visualcapitalist

La velocidad de la transición

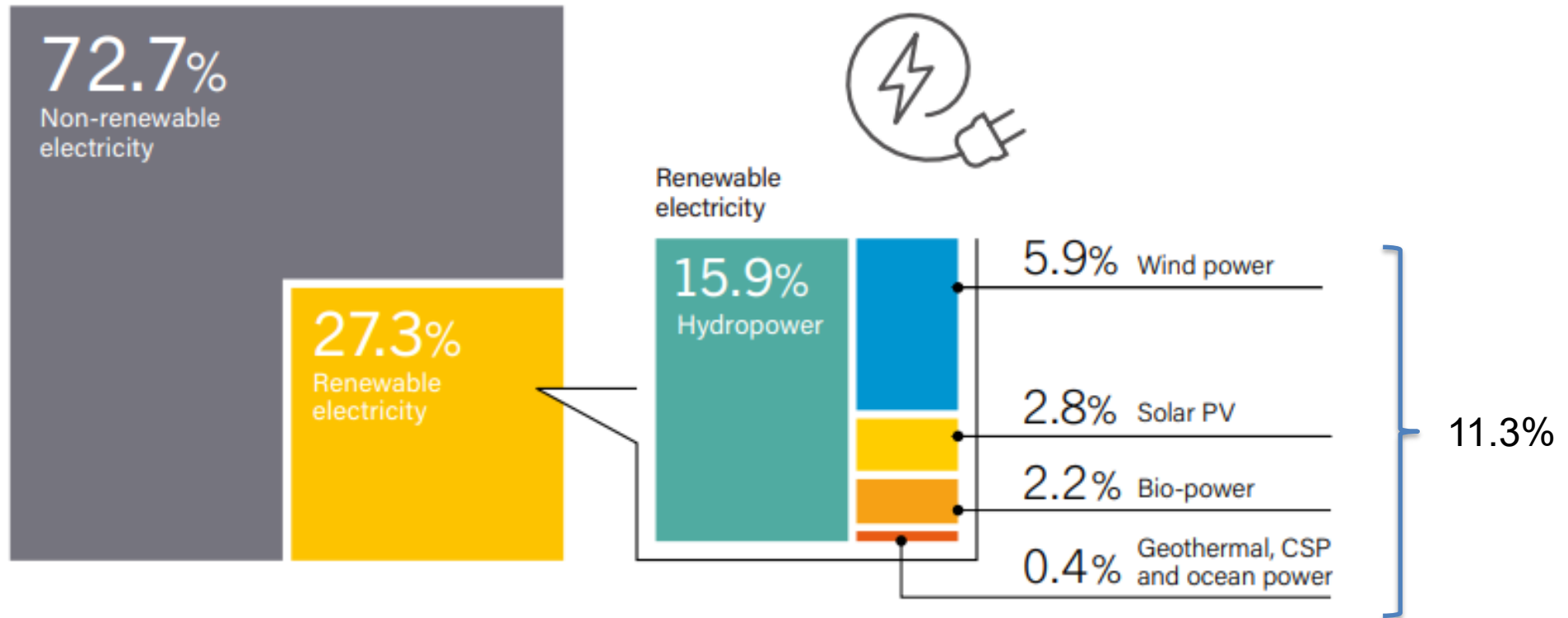
Five pillars to keep 1.5 °C alive

World Energy Outlook 2023



International
Energy Agency

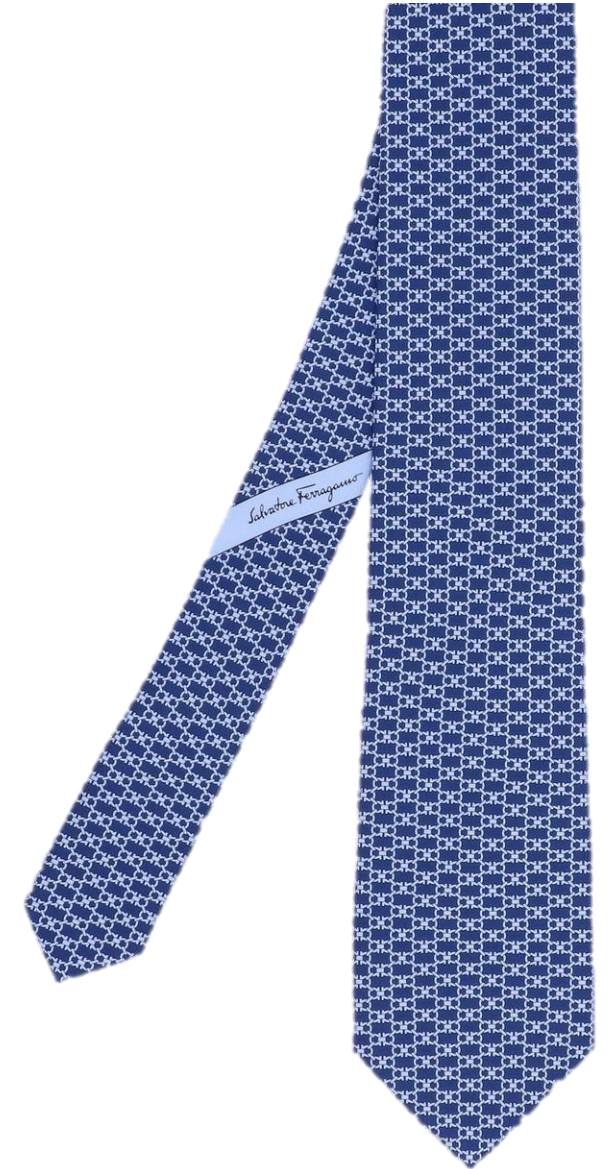
Participación porcentual de las energías renovables en la generación global de electricidad (2019)



Note: Data should not be compared with previous versions of this figure due to revisions in data and methodology.

Energías con cero costo marginal.
Variables, no intermitentes

Activos varados (stranded assets)





STAY
CALM
AND
KEEP
MOVING

Energía y cambio tecnológico



Guillermo I. García Alcocer

@garcialcocer

garcialcocer@itam.mx