Engineering the Future of Artificial Intelligence

Delivering on Its Potential for All Mankind



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“The real question is not whether machines think but whether men do.”

B. F. Skinner, Contingencies of Reinforcement, 1969

Engineering is a verb, not just a noun

engineering



noun

A profession. A discipline. A body of knowledge.

Who we are.

to engineer



verb

To take what we know and make it work in the real world, under real constraints, with real consequences.

What we do.

AI is not happening to us. **It is being engineered.**

From research discipline to critical infrastructure

> **“…ten times bigger than the Industrial Revolution, and maybe ten times faster.”**
>
> Demis Hassabis, Google DeepMind
> The Guardian, August 2025

945 TWh

Projected electricity demand of the world’s data centers in 2030, slightly more than Japan uses today

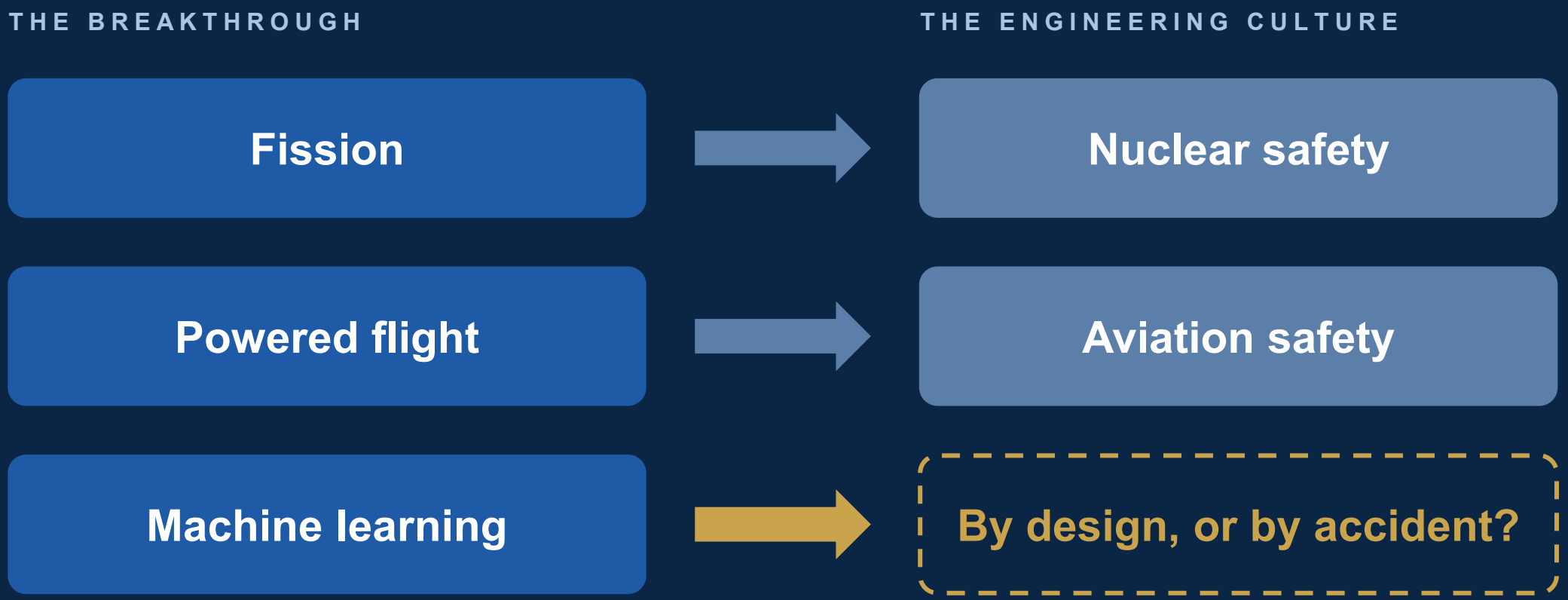
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More than double the roughly 415 TWh consumed in 2024

In research, a failure is a finding. **In infrastructure, a failure is an outage.**

Source: International Energy Agency, Energy and AI (April 2025), Base Case.

Discipline, not discovery, decides the legacy



Four unsolved engineering problems



Control

Specify, verify, and maintain what we want these systems to do, in every operating condition.



Comprehension

Explain how the most capable models reach their outputs, well enough to assess and override them.



Consequence

Bias, adversarial attack, labor disruption, and concentrated power, as design requirements.



Assurance

The system under test may recognize the test, and change its behavior because of it.

“…we had better be quite sure that the purpose put into the machine is the purpose which we really desire and not merely a colorful imitation of it.”

Norbert Wiener, Science, 1960

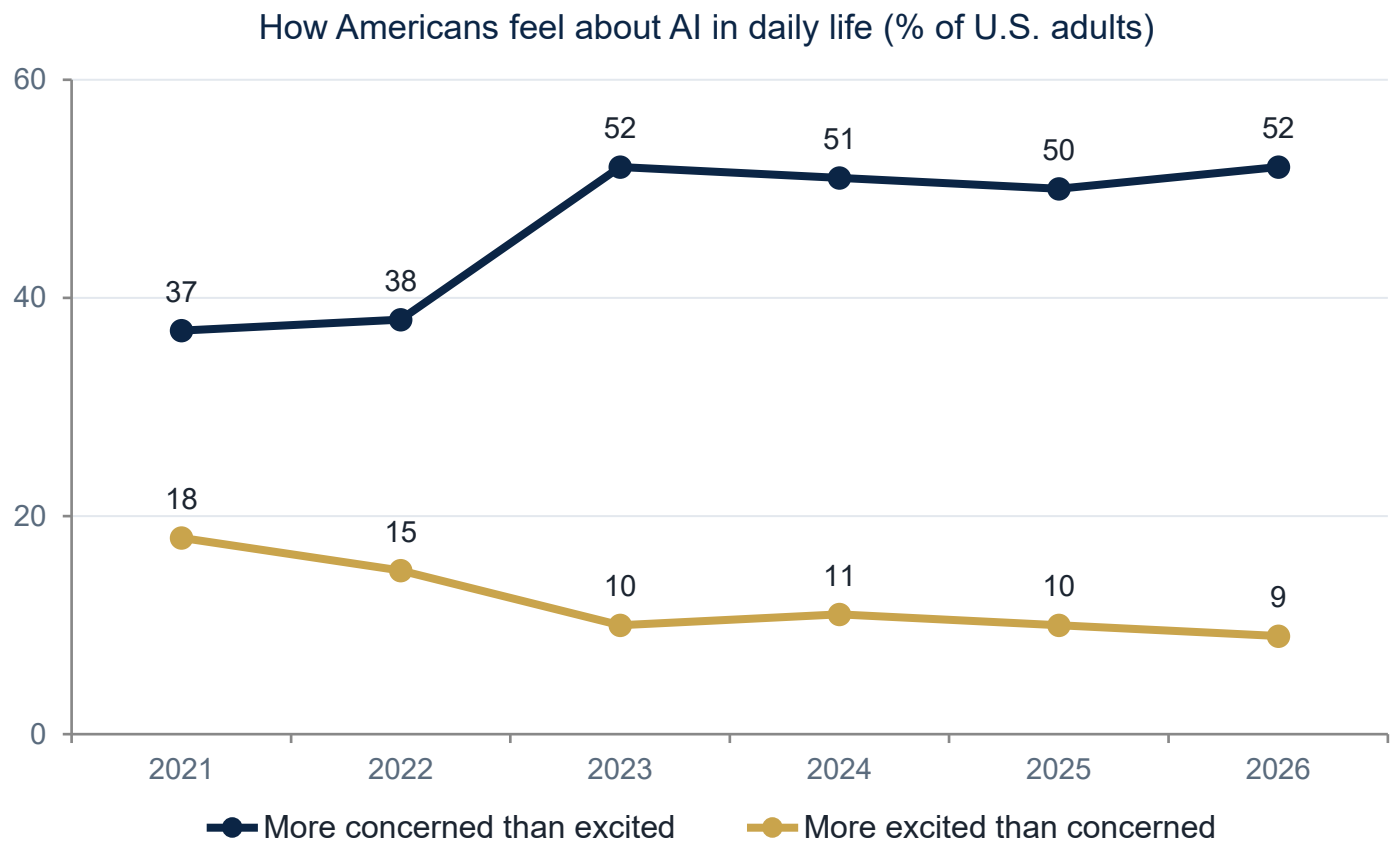
“For a successful technology, reality must take precedence over public relations, for nature cannot be fooled.”

Richard P. Feynman, Appendix F, Challenger accident report, 1986

Nature cannot be fooled. The examiner can.

International AI Safety Report 2026: some models can tell evaluation from deployment, and alter their behavior accordingly.

Public trust is the decisive variable



52%

more concerned than excited, up from 37% in 2021

9%

more excited than concerned

Source: Pew Research Center, survey of U.S. adults conducted June 22–28, 2026.

We have done this before

> ***"Those who do not study history think everything is unprecedented."*** Stephen Kotkin, Hoover Institution

March 1979

Three Mile Island

An accident at any plant becomes an accident at every plant: "hostages of each other."

Late 1979

INPO is founded

The industry holds itself to a standard of excellence well above regulatory compliance.

Since

Culture by design

Peer evaluation, shared operating experience, and accountability that reaches the chief executive.

Nuclear power built its culture after its accident. AI can build its culture first.

In summary: four recommendations

1

Build the culture first

Before an accident compels it, as nuclear power did only after Three Mile Island, and to a standard above regulatory compliance.

2

Monitor in operation

Oversight that is current and continuous: not pre-deployment testing alone, nor rules written for yesterday's technology. Monitor, keep pace, and report near misses candidly.

3

Professionalize AI engineering

Reliability and safety as taught disciplines, with engineers writing the standards rather than waiting for them.

4

Earn public trust

Earned, not asserted: safety and fairness designed in from the outset, and candor about what the technology can and cannot do.

Four recommendations. **Four verbs.**

Two voices, one question

1969

“The real question is not whether machines think but whether men do.”

B. F. Skinner, psychologist

2025

“Use it in such a way that if it disappeared tomorrow, you would still know how to think.”

Pope Leo XIV, to American teenagers

The machine is not the question. We are.

The future of AI will depend not only on innovation, but on the discipline, judgment, and responsibility of the engineers who build it.

It will not simply arrive. It will be engineered.

“The task is not so much to see what no one yet has seen, but to think what nobody else has thought about that which everyone sees.”

Arthur Schopenhauer, Parerga and Paralipomena, 1851

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