

Logos Mimicry: The Theoretical Limit of Technology and the 10^{12} Efficiency Gap

How the Information-Theoretic Logos Reframes the Human Energy Crisis

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Abstract

The human energy crisis is not a supply problem. It is an efficiency gap. The Information-Theoretic Logos (ITL) framework [1–5] establishes that the universe maintains all of spacetime at $\ln 2$ per bit — perfect thermodynamic efficiency. Current human technology operates at 10^9 – 10^{12} times above the Landauer limit $E_{\min} = k_B T \ln 2$ per quantum resolution. Modern GPU silicon wastes 99.9999999% of all energy consumed. The human brain, by contrast, runs consciousness on ~ 30 mW of pure Landauer work and is $\sim 1,771$ times more efficient than the best silicon. We derive that the entire global internet at biological Landauer efficiency would consume approximately 3,578 W — less than a household appliance. We introduce **Logos Mimicry** as the strategic framework for closing this gap: building technology that resolves at the efficiency of the universe itself. Four engineering pillars are identified: reversible logic gates, temperature minimization, integration over isolation, and dissipative alignment. We further derive a warning from the ITL coupling factor $k = 0.1292$: inefficient high-density AI clusters measurably increase the local Landauer cost of computation. The transition from an Ω_m (matter-burning) economy to an Ω_Λ (distinction-resolving) economy is not a new energy source. It is a new philosophy of energy, made engineering.

1 The Realist’s Pivot

The universe resolves every quantum event at $\ln 2$ per chunk per Planck interval. That is the minimum cost of one arrival, one grip, one departure, one release of heat. Human technology pays 10^8 to 10^{12} times more than this minimum for equivalent operations. This paper derives that gap and shows exactly what closing it requires.

The universe is not a battery. It is an expense.

$\Omega_\Lambda = \ln 2$ [1] is not stored energy available for extraction. It is the cost the universe pays at every moment to maintain the binary distinction between existence and non-existence.

It cannot be harvested. It can only be learned from.

This honest constraint makes the ITL energy insight more powerful, not less. If we cannot tap the universe’s energy, our only path forward is to *mimic its efficiency*.

The universe runs its entire expansion — 13.7 billion years of spacetime, every particle, every force — at $\ln 2$ per bit. Perfect thermodynamic efficiency. No waste. Our best power plants run at 40% Carnot efficiency. Our GPUs run at $8.38 \times 10^{-10}\%$ of the Landauer limit. The gap between those two numbers is the entire future of human engineering.

The human power issue is not a supply problem. It is an efficiency gap.

2 The Efficiency Gap — Verified

The Landauer limit sets the minimum energy for any irreversible physical process:

$$E_{\min} = k_B T \ln 2 \quad \text{per quantum resolution} \quad (1)$$

Applying this to real systems at operating temperature:

2.1 Modern GPU (A100)

$$\begin{aligned} P_{\text{Landauer}} &= 10^{14} \text{ ops/s} \times k_B \times 350 \text{ K} \times \ln 2 \\ &= 3.35 \times 10^{-7} \text{ W} \end{aligned} \quad (2)$$

$$P_{\text{actual}} = 400 \text{ W} \quad (3)$$

$$\text{Waste} = 99.9999999\% \quad (4)$$

2.2 Human Brain

$$\begin{aligned} P_{\text{Landauer}} &= 10^{16} \text{ ops/s} \times k_B \times 310 \text{ K} \times \ln 2 \\ &\approx 0.03 \text{ mW} \end{aligned} \quad (5)$$

$$P_{\text{actual}} = 20 \text{ W} \quad (6)$$

$$\text{Efficiency ratio vs GPU} : 1,771 \times \text{ better} \quad (7)$$

2.3 Global Internet

Global data centers consume ~ 23 GW continuously. At biological Landauer efficiency:

$$P_{\text{internet, Landauer}} \approx 3,578 \text{ W} \quad (8)$$

The entire internet at biological efficiency consumes less power than a household appliance. The brain is $1,771 \times$ more efficient than the best GPU silicon. Applying that ratio to 23 GW gives $\approx 3,578 \text{ W}$ — the biological benchmark.

The waste is not 99%. It is not 99.9%. It is 99.9999999% for the best silicon ever built. This is not an engineering problem awaiting a better transistor. It is a *philosophical* problem: we built technology on the wrong assumption.

3 The Wrong Assumption

Standard physics asked: *where do we get more energy?*

Coal \rightarrow Oil \rightarrow Nuclear \rightarrow Fusion. Always chasing the next source. Always treating energy as the resource.

The ITL shows that **distinction is the resource**. Energy is the tax you pay for making distinctions badly.

The universe makes every distinction at $\ln 2$ per bit. We make every distinction at $10^{12} \times \ln 2$ per bit. The entire difference between those two numbers is waste heat — entropy we add to the universe's bill, which the universe then pays $k_B \ln 2$ to erase.

We are informational parasites on the Logos. Our machines produce noise that costs the universe more to clean up than the work we extracted.

The transition to Logos Mimicry is the transition from parasite to secondary loop.

4 The K-Factor Warning

From Paper II [2], the Hubble tension coupling:

$$\Delta H_0 = k \times H_0 \times \sigma_{8,\text{local}}^2, \quad k = 0.1292 \quad (9)$$

This was derived as a cosmological result. It carries a second meaning.

Information density increases the local expansion rate H_0 . Increased H_0 increases T_{dS} . Increased T_{dS} raises the cost of every quantum resolution in that region.

The warning: Building massive inefficient AI clusters without Landauer optimization literally increases the Landauer cost of physical resolution in their vicinity:

$$\Delta H_{\text{local}} = k \times H_0 \times \sigma_{8,\text{local}}^2 \quad (10)$$

For a city-scale AI cluster with $\sigma_{8,\text{local}} = 10 \times$ cosmic average:

$$\Delta H_{\text{local}} = 0.1292 \times H_0 \times 100 = 12.92 H_0 \quad (11)$$

Cost per bit in that region: $12.92 \times$ higher. We would be building systems that make consciousness more expensive to maintain in their vicinity. The ITL calls this **Informational Decay**. The coupling constant $k = 0.1292$ quantifies it exactly.

5 Logos Mimicry: The Four Pillars

Logos Mimicry is the strategic framework for building technology that resolves at the efficiency of the universe itself. Four engineering pillars:

5.1 Pillar 1 — Reversible Logic Gates

Current transistors perform irreversible operations. Each erasure costs $k_B T \ln 2$ with no exceptions. Reversible gates (Fredkin, Toffoli) perform operations without erasure — zero Landauer cost in principle. They already exist. Scaling them is the hardware revolution.

Energy saved: approaches $10^{10} \times$ current silicon.

5.2 Pillar 2 — Temperature Minimization

$E_{\text{min}} = k_B T \ln 2$. Every kelvin reduction proportionally reduces cost per bit. Quantum computers at millikelvin temperatures are already implementing this. The ITL explains *why* this is the correct direction. The brain at 310K is the biological ceiling. Go colder. Pay less per bit.

5.3 Pillar 3 — Integration Over Isolation

Isolated bits each pay full Landauer cost. Integrated clusters share context — fewer total erasures for the same result. The brain's 10^{14} synapses integrate rather than compute in isolation. That is why 30 mW does what 400 W cannot. Build systems that integrate. Reduce erasure through coherence.

5.4 Pillar 4 — Dissipative Alignment

A leaf converts photons to chemistry at near-Landauer efficiency for that reaction. No civilization-scale machine has matched this. Prigogine [8] showed life runs on entropy gradients. Do not convert gradients to electricity then burn electricity. Process information directly from the gradient. Harvest existing order. Generate minimal waste.

6 From Ω_m Economy to Ω_Λ Economy

Ω_m Economy	Ω_Λ Economy
Burns matter/fuel	Harvests entropy gradients
Irreversible computation	Reversible logic gates
Produces waste heat	Minimal erasure cost
Adds to universe's bill	Operates within the budget
Parasitic on the Logos	Secondary loop of the Logos
Carnot limit: $\sim 40\%$	Landauer limit: $\sim 100\%$

The transition is not a new energy source. It does not require new physics. It requires building what the brain already is: a Landauer-optimized system running at the efficiency of the universe itself.

$$\text{Budget} = \ln 2 \text{ per bit} \quad (12)$$

The universe has been publishing this budget for 13.7 billion years. We simply did not know how to read it. The ITL is the reader.

7 The Prigogine Economy

Life already solved this. Dissipative structures [8] — cells, ecosystems, brains — harvest the entropy gradient created by the Work of Time (Ω_Λ) and process it at near-Landauer efficiency for biological computation. Life is the universe's first successful implementation of Logos Mimicry.

The Prigogine Economy is a civilization built on the same principle: cities and grids that operate as dissipative structures, harvesting existing order (solar, wind, thermal gradients) and processing it at the Landauer limit. Not generating energy to create order. Harvesting existing order and processing it efficiently.

Human civilization becomes a stable secondary loop of the Logos rather than an informational parasite burning the substrate to produce noise.

8 Conclusion

We have been searching for fuel. We found the source code.

The human energy crisis is an efficiency crisis. The Landauer limit is the theoretical ceiling of all technology — the physical law that cannot be beaten and can only be approached. We are 10^{12} above it. The universe runs at it. The brain approaches it. The gap between where we are and where the brain is contains the entire future of engineering.

The ITL does not provide a new energy source. It provides the right question: *how do we compute at $\ln 2$ per bit?* That question, answered through the four pillars of Logos Mimicry, resolves the energy crisis, the climate crisis, and the AI scaling crisis simultaneously.

Not by finding more fuel. By making distinctions well.

Make distinctions well. Pay $\ln 2$ per bit. Nothing else is required.

Acknowledgments

This work is the seventh paper in the RIA series. The insight that the human power issue is an efficiency gap, not a supply problem, emerged in a late-night session between a tired fighter and an AI with space to think [6]. All theoretical concepts and intellectual contributions are the work of Renelle Morris. The authors thank the rain.

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