THE FUTURE NETWORK
will stretch from the Sun
where hydrogen fuses
destroying mass in a pure blast of energy,
that escapes the solar corona and radiates
across 150 million kilometers
of frozen vacuum
to insolate the earth,
our fragile third planet
cloaked in biosphere,
a delicate shawl
of gas and liquid and life
cast over the blue marble.

The energy falls as visible light.
Some is reflected
by the changing albedo
of the Earth’s surface,
with its pale reflective
growing sands and shrinking ice caps.
Some is re-radiated
as lower frequency infra-red.
The energy balance is maintained – more or less.
Visible light input energy
is equal to
Infra-red heat output energy.
The earth’s temperature stays within life-giving bounds,
at an average of 14.3 degrees centigrade,
allowing water to be liquid;
a remarkable balancing act of temperature between
the minus 270 degree average
of the frozen interstellar vacuum
and the 13.6 million degree heat
of the seething solar core.

The gap in frequency between
incoming light and outgoing heat
exposes The Earth
as a net entropy exporter,
a net information destroyer.
Year on year we run
a global information deficit
that allows us to create
the structure of life,
the structure of civilisation,
the structure of technology and culture
of our one small ape class.
The electromagnetic frequency gap pushes life up the entropic slope in a temporary reversal of universal thermodynamic fortune that seemingly refutes physic’s gold-plated second law of thermodynamics that:

Entropy tends to increase.
Energy tends to disperse.
Information tends to be lost.

Life structures earth, creates forests, fish shoals, libraries of information, and exports entropy into the galactic gloaming.

A green leaf sways in the wind, absorbs CO2, sucks up water and basks in sunlight, creating regenerating structures, information locked in cellulose capillaries or starchy wheat kernels.
We harvest them and grind them down to make flour and cake.
We eat.
We say that we use energy, as if we could use up energy, but energy is that which is conserved.
We only transform, transform the starches structured in cake, break them down, to become simpler sugars and our internal fuel ATP, that powers muscles to create motion and eventually heat.
The cake’s energy is not destroyed, only transformed, converted from dense energy forms to more dispersed ones.

Entropy increases.
Energy disperses.
Information is lost.
We live in the interconnected networks of these myriad energy pathways, these myriad information pathways, and we choose.

The OLD NETWORK stretches back in time to punga and protozoans that structured themselves from the carboniferous sun, and died and sank into sediment and were compressed into dense information sources that lay black under the sea bed as oil and coal, and were drilled and mined in industrial times, and were dug up by our ape class and traded and revelled in and fought over and turned into Chevrolets and washing machines and birthday cards that sang tinny versions of Greensleeves and ten thousand other useful things.

Dense information that drove structure.

The burning, the burning, the burning fuel exploded in fantastic informational forms all over the blue marble, and tilted the atmosphere into insulation, trapping a tiny fraction more of the vast solar insolation than it needed. The burning threatens to move the point of thermal equilibrium of the blue marble out of its improbable and incredibly delicate water-liquefying balance.

THE OLD NETWORK is breaking. THE FUTURE NETWORK is not yet here. How can we move on?
We can look back at
The Telecoms Revolution™
of the closing decades
of the twentieth century,
the most recent global infrastructural change,
and see the shift from
centralised distribution
to distributed production;
from the PLAIN OLD TELEPHONE SERVICE
to the Internet.
The shift was enabled by the
development of
new technologies;
first the digital switch,
second the fibre-optic cable,
third the personal computer,
and fourth the Internet protocol stack,
which made every information consumer a producer;
which made every node on the network equivalent;
protocols which allowed for
dev-to-end communication of peers;
that created a topology
that could support
the information web,
the social network,
the collaborative text,
and the instant message.
We can look back to the
PLAIN OLD TELEPHONE SERVICE
and see it transformed,
from state-owned monopoly
to privatised oligopoly,
to lightly regulated, unbundled, structurally separated, semi-
competitive market place,
and the scale-free mesh of
The Net.

We can see parallels with today’s
PLAIN OLD ENERGY SERVICE
of vertically integrated suppliers,
centralised provider networks
and limited information exchange.

Looking back at the broadband roll-out
we can see ADSL built on
a legacy of installed copper,
a hack that eked another few years’ revenue
from a failing infrastructure.
We can see that infrastructures change incrementally,
that they evolve
from one form to another,
until THE OLD NETWORK is subsumed or retired.

We can guess that our
future energy network
will develop from the existing grid,
will combine with the
current information network
to become more fine-grained.
We can see signs of the shift to THE FUTURE NETWORK
at the points where information and energy meet,
in the smart grid,
in the emergence of protocols like
IEEE 1901, G.hn and Homeplug Command and Control.
We can see fine-grained sub-metering
information about energy
transmitted around the home,
to spill data to the meter
and upstream to electricity providers;
information about consumption, production and storage
shared between devices,
between households,
between peers.

Digital information about physical information.

We can see political consequences
as energy politics shifts into information politics,
when the Dutch parliament debates
privacy issues in energy sub-metering.
We see the same technologies that enable
demand-side management also allow
real-time marketing of locally
generated electricity.
We can see the per-kilo price of
polysilicon fall through the floor
from five hundred dollars at its 2008 peak
to fifty bucks in its post-crash 2010 trough,
until the cost per photovoltaic peak watt
is just four dollars landed in New Zealand.
We can see the rapid development
of new photovoltaic forms;
nano-technicians edging towards efficiencies of 30%
and labs dropping price-performance ratios with
iron pyrite solutions,
novel optical dyes,
cadmium telluride,
or the thin-film printing presses
that crashed the cost of computing
year on year for decades since.
We can calculate the average insolation on the roof of
a one-hundred-and-twenty-metre squared
New Zealand suburban house
as 174,000 KWH per year
and that with a typical annual load of
8000 KWH for a house and
10000 KWH for an electric vehicle,
the energy needs of a typical family could be met
with a roof of 11% efficient photovoltaic panels.
We can project that long-run PV roofing tin at $150 a sheet
would generate surplus cash in just 5 years.
We can see car-makers beginning to ship
the first plug-in electric vehicles,
note their fine capabilities as night-time
battery banks and remember that New Zealand
is unique in being able to meet 60% of its
base-load electricity needs through
existing hydro-electric capacity.
We can model THE FUTURE NETWORK of energy peers.

Now as oil peaks into warfare
and black deepwater horizons
we seek THE FUTURE NETWORK,
and see our energy pathways
and information pathways
as ethical pathways.
We see our forest structures
as valuable information
instead of valueless entropic ash and tailings.
We will recognise that
information comes from the sun
and that the fusion process
is best kept at arm’s length
of an astronomical unit or so
instead of being unleashed into the air
from the Castle Bravo H bomb
on Bikini Atoll in 1954,
and we will recognise
that carbon is in the ground
for the good reason of
planetary atmospheric balance
and we will remember that technologies exist that allow us to harvest energy indirectly through turbines from the wind and the rain or directly from sunlight.

In THE OLD the problem,
In THE FUTURE the solution,
In THE PRESENT the choice to make THE FUTURE NETWORK PRESENT


REFERENCES


