User:Giovanni Lostumbo

From OpenWetWare

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Line 615:	Line 615:
https://en.wikipedia.org/wiki/Recreational_mathematics	https://en.wikipedia.org/wiki/Recreational_mathematics
http://vihart.com/	http://vihart.com/
-	+ http://openmaterials.org/
The stitching of this wiki was made possible by ontological [https://secure.wikimedia.org/wikipedia/en/wiki/Ontology] systems and their self-organizing, recursive[https://secure.wikimedia.org/wikipedia/en/wiki/Recursion], node-centralizing [https://secure.wikimedia.org/wikipedia/en/wiki/Node_%28disambiguation%29] gravity. The format is based in part on David Pearce's cerebrally-taxing web ring of cyclically-resonating pages on medical health ideas (which is fine for that purpose as it's not about being too fixated on one synapse/neuronal receptor on the circuit board) whereas this maintains the dense text:link ratio (not for the sake of links but to link to specific concepts of relevance) but uses one single panorama page designed like a Mission Control Center [https://secure.wikimedia.org/wikipedia/en/wiki/Mi	The stitching of this wiki was made possible by ontological [https://secure.wikimedia.org/wikipedia/en/wiki/Ontology] systems and their self-organizing, recursive[https://secure.wikimedia.org/wikipedia/en/wiki/Recursion], node-centralizing [https://secure.wikimedia.org/wikipedia/en/wiki/Node_%28disambiguation%29] gravity. The format is based in part on David Pearce's cerebrally-taxing web ring of cyclically-resonating pages on medical health ideas (which is fine for that purpose as it's not about being too fixated on one synapse/neuronal receptor on the circuit board) whereas this maintains the dense text:link ratio (not for the sake of links but to link to specific concepts of relevance) but uses one single panorama page designed like a Mission Control Center [https://secure.wikimedia.org/wikipedia/en/wiki/Mi

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"The "power" of the open source concept isn't so much the cost, it's the "community"." -Richard Jefferson (from the intro of Chapter 33- "Open-Source Biology," p.316, of an uncorrected proof of Present at the Future: From Evolution to Nanotechnology, Candid and Controversial Conversations on Science and Nature, 2007, by Ira Flatow)

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Revision as of 11:26, 18 July 2012

Welcome to my OWW page. Link to the Open Source Solar LED Lighting Project: http://openwetware.org/wiki/OSSolarLED

Contents

[hide]

Synopsis

"If it's not less than $5, it's not punk." (better taken relatively/figuratively in the contemporary, and adjusted for inflation;)

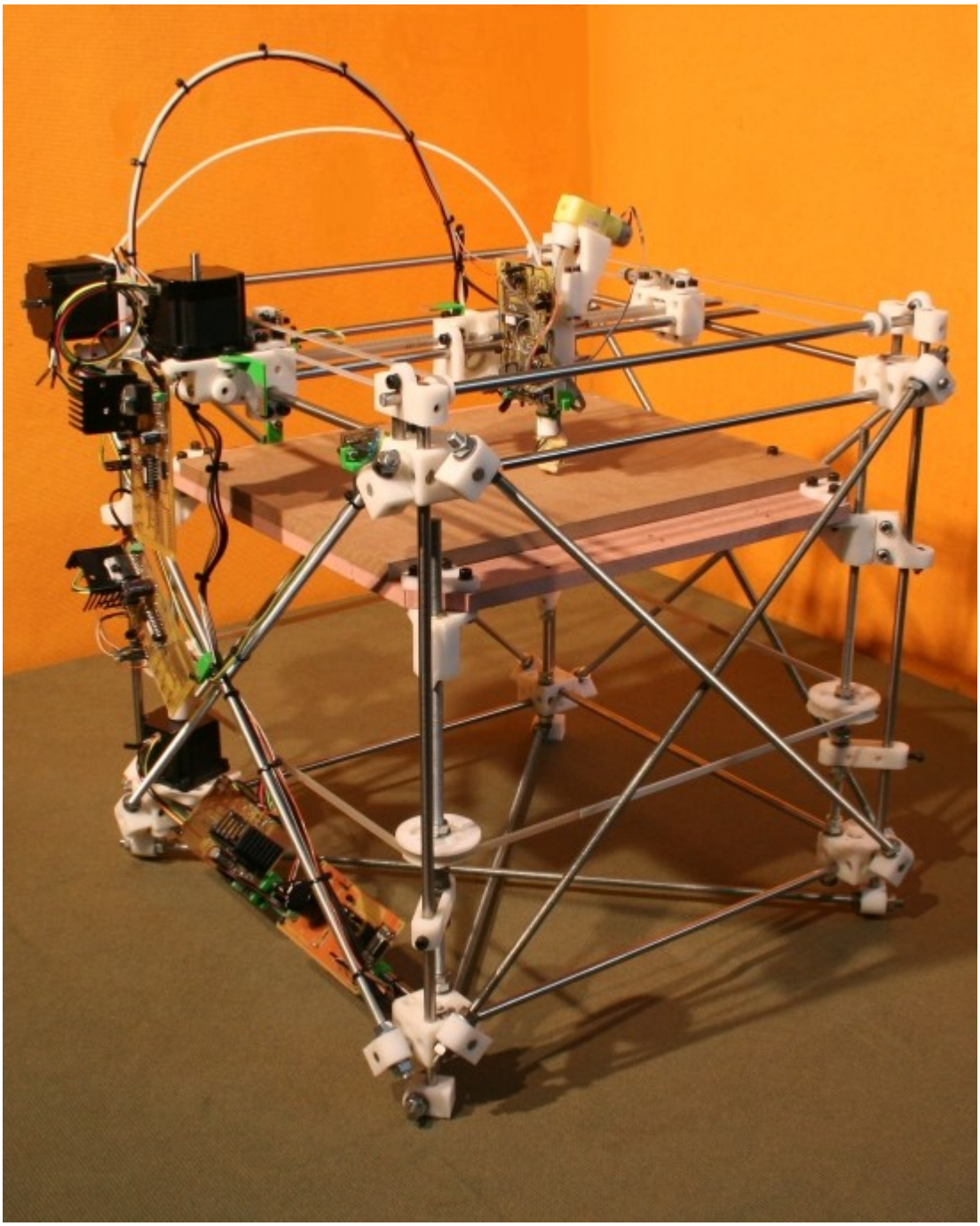
Microbes oozing ink of printable solar photovoltaic thin film panels. Using inkjet printer to print solar panel sheets. Individually genetically & metabolically engineered microbial strains to yield (separately) the building blocks of a soluble organic traditional heterojunction (-p or -n) semiconductor or the building blocks of a dye-sensitized organic dye-oxide-electrolyte complex. The organic building blocks would be then be mixed post-harvest for inkjet preparation. Ideally, the anodes and cathodes would also be organic [anthraquinone cathode link in References].

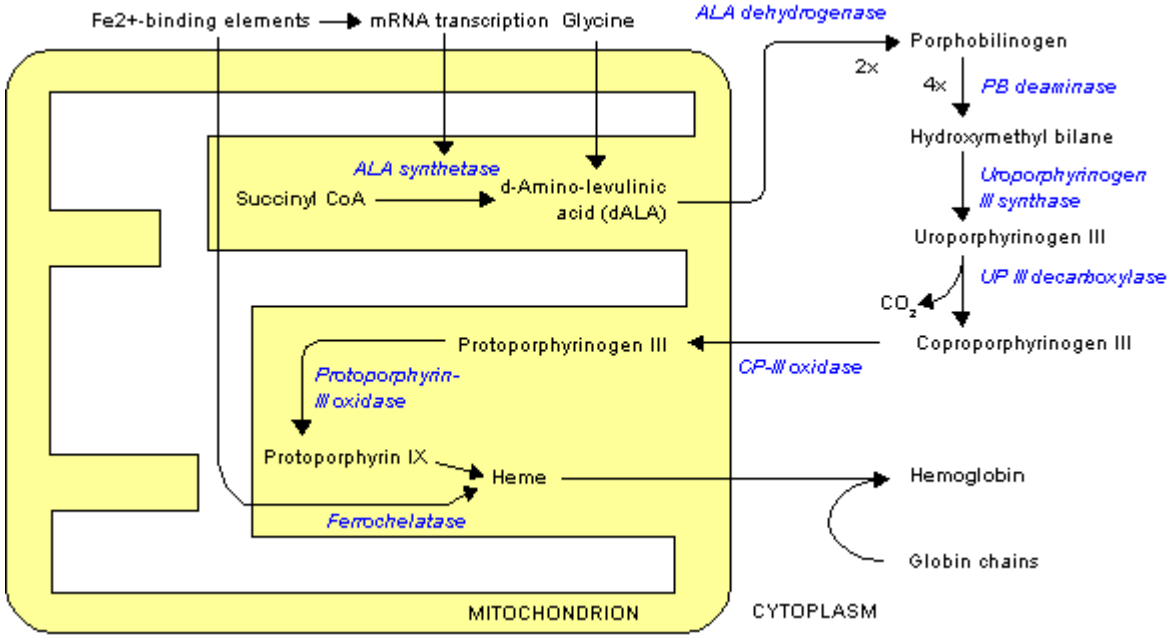
GNUOPV

I am interested in starting an OpenWetWare lab project in bioengineering organic semiconductors, batteries+solar utilities, and Fab@Home[1][2] +RepRap[3][4][5], three developments which are mutually inclusive towards a free electricity project called GNUOPV. These designs, protocols, and biokits/strains will be freely downloadable and replicable for anyone to share and modify, exactly like GNU/GPL free software[6][7]. Bacteria cost very little to copy, as are harddrives with lots of data can copy operating systems and public domain media. At least one lab that I've recently discovered is researching virally-grown batteries and solar panels[8]. Richard Stallman[9] began the Free Software Foundation[10] and wrote the first General Public License for software[11] after fixing printers at MIT and realizing the source code was proprietary[12][13]. Further back in time, Johannes Gutenberg[14][15] developed the movable type in the 15th century. One of the most significant contributions to the Scientific Revolution was the ability to replicate the printed word. 3-D printing offers a similar potential for the Industrial Revolution. A particularly useful utility from 3-D printers could be towards the development of free electricity. I say electricity and not energy because electricity is the barenaked, universal medium/platform for most energy needs, and solar panels are the distributed/decentralized (off-line) utility (personal computer-like) that allows one to use software without an energy carrier[16] or, in software, SaaS[17][18] (a.k.a. on-line electricity [19], the middleman, gas, municipal water, and garbage bills). Though, I may use the terms electricity and energy interchangeably as I refine this page or to describe them in different contexts. I use a lot of analogies in this page since I previously studied English and am familiar with metaphors. I also liken its use in Biology [20].

Technical Synopsis

My first project will document with protocols on how to harvest porphyrins/phthalocyanines [21][22][23], PCBM [24] [25](and later, organic cathodes, anodes from polyaniline/anthraquinone+other organic conductors: [26]) from yeast, *bacillus atropheus*, *b. thuringiensis*, *or b. subtilis*[27] for use in OLEDs, capacitors, organic solar photovoltaic panels using soluble small molecules/solar cells/dye-sensitized solar cells[28]/quantum dot solar cells[29]/ on the scale of semi-synthetic artemisinin[30][31] while encouraging an open-ecosystem of protocols, data, materials on the scale of the Debian project[32][33], batteries[34] and other electronics. The integration of bioinspired systems and supramolecular chemistry of non-covalent structures can reduce the number of steps in developing inexpensive, renewable, and organic energy systems using self-assembling molecules like quinacridones -which are used for PLED lights- but porphyrins and phtalocyanines could form supramolecular assemblies in -p/-n junctions or DSSCs with advances in nanotechnology methods: https://en.wikipedia.org/wiki/Supramolecular#cite_note-20 "Supramolecular Chemistry: From Molecules to Nanomaterials, P.A. Gale and J.W. Steed (Eds), Wiley (2012) ISBN 978-0-470-74640-0". as in Additional molecules of interest include the photovoltaic mechanisms of xanthopterin. Free 17MB paper: Ariga, Katsuhiko; Hill, Jonathan P; Lee, Michael V; Vinu, Ajayan; Charvet, Richard; Acharya, Somobrata (2008). "Challenges and breakthroughs in recent research on self-assembly" Science and Technology of Advanced Materials 9: 014109. doi:10.1088/1468-6996/9/1/014109.[35]-voluminous and comprehensive at 97 pages. Additionally, integrating high-efficiency inkjet-printed[36] quantum dots: [37] http://stc-mditr.org/research/lsoe/projects.cfm http://photonicswiki.org/index.php?title=Organic_Heterojunctions_in_Solar_Cells

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mRNA transcription
Glycine
ALA dehydrogenase
Porphobilinogen
2x
4x
PB deaminase
Hydroxymethyl bilane
Uroporphyrinogen III synthase
Uroporphyrinogen III
UP III decarboxylase
CO2
Coproporphyrinogen III
CP-III oxidase
ALA synthetase
Succinyl CoA
d-Amino-levulinic acid (dALA)
Protoporphyrinogen III
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Protoporphyrin IX
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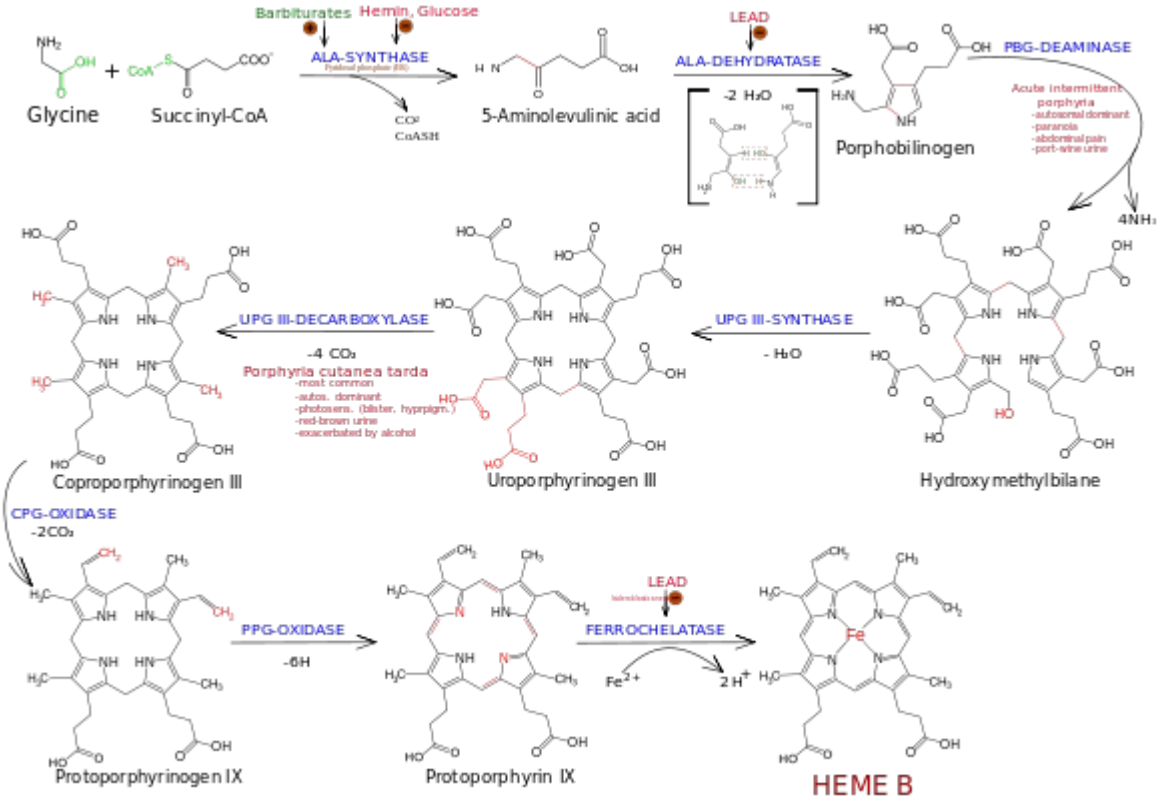
Ferrochelatase
Hemoglobin
Globin chains
MITOCHONDRION
CYTOPLASM


Barbiturates
Hemin, Glucose
ALA-SYNTHASE
Glycine
Succinyl-CoA
5-Aminolevulinic acid
LEAD
ALA-DEHYDRATASE
-2 H2O
Porphobilinogen
PBG-DEAMINASE
Acute intermittent porphyria
-autosomal dominant
-paranoia
-abdominal pain
-port-wine urine
4NH3
UPG III-DECARBOXYLASE
-4 CO2
Porphyria cutanea tarda
-most common
-autos. dominant
-photosens. (blister, hyperpigm.)
-red-brown urine
-exacerbated by alcohol
UPG III-SYNTHASE
- H2O
Coproporphyrinogen III
Uroporphyrinogen III
Hydroxymethylbilane
CPG-OXIDASE
-2CO2
PPG-OXIDASE
-6H
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FERROCHELATASE
Fe2+
2 H+
Protoporphyrinogen IX
Protoporphyrin IX
HEME B

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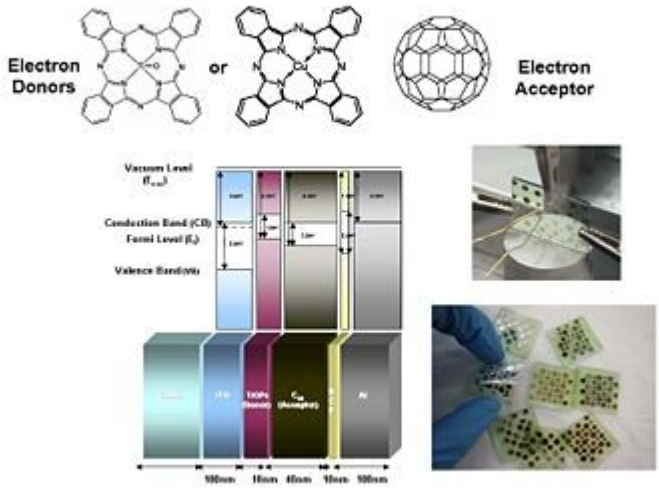

] Source: Photonicswiki.org

stock images from Wikimedia

alternate-official logo: http://openwetware.org/wiki/Image:GNU_PV_logo_3.png
http://openwetware.org/wiki/Image:GNU_PV_logo_4.png

Status

Project is currently vaporware. With time it will become condensed matter.

Lab Notebook

Lab notebook is located here(hasn't been used yet):
http://openwetware.org/wiki/User:Giovanni_Lostumbo/Notebook

A 2nd open lab project has been started called Open Source Solar Lighting Project:
http://openwetware.org/wiki/OSSolarLED:Notebook/Open_Source_Solar_LED_Lighting_Project

Introduction

Energy comes in several mediums. The consumption of energy usually involves the combustion of fuel to generate heat to spin motors for the purpose of kinetic energy[38] or to spin turbines to generate electricity via electromagnetic induction [39] for the purpose of potential energy[40] when stored in a battery or capacitor. The ability to develop an energy generator utility that is accessible and affordable could come with advanced research and development efforts towards RepRap technology and bioengineering of microbes for the purpose of yielding abundant organic battery[[41]] and solar voltaic panel[42] raw materials[43]. World energy consumption is heavily based on non-renewable fossil fuels[44] and a new replacement could be developed faster through a distributed/decentralized effort similar to how the Linux GNU/GPL operating system was developed [45][46] and adopted with varying "market share" (with mild to moderate popularity) since the early 1990s. Linux software is stored in online repositories such as FTP servers [47] and via p2p [48] file-sharing[49]. Computer-aided design (CAD) stores 3D manufacturing blueprints in electronic medium as well. Efforts such as those by http://gnusha.org/skdb/ for hardware and http://biobricks.org/ for biological molecules allow both an electronic repository and an organization for physically replicable parts that could be accessed for research and applied towards hardware[50] and biotech instruments (Addenum: Gnusha.org also develops biological constructs). The same type of organization inspired from http://www.gnu.org/ led to the development of digital sharing content/media with http://creativecommons.org/, http://p2pfoundation.net/, and Open Farm Tech [51]. Furthermore, there are incentives such as the Gada Personal Manufacturing Prize[52]:

```
"Grand Personal Manufacturing Prize

The Grand Prize would seek to make the technology more rapidly scalable by increasing the productivity of the

replication process. As a bonus, the Grand Prize may additionally be helpful in recycling material waste
(such as

plastics) into material suitable for RepRap use. Plastics such as HDPE and Polypropylene, of which millions
of tons

exist as waste matter, may be suitable candidates, and recycling of such waste material would be viewed
favorably

by the judging panel.

The Grand Prize is expected to be funded at $80,000 before launch (it is presently not funded). There are
three

parameters that will be used to judge the efforts of the teams participating in the competition.

   * That the cost of the material used for printing does not exceed $4/kilogram.

   * The capacity to print a full set of parts for a complete replica of itself within 7 days, including the

   * time for reloading, and clearing of printer head jams.

   * Maintain a total materials and parts cost under $200 and that 90% of the volume of the printer parts be

   * printed.

The judging committee envisions a variety of technologies which might be deployed to achieve this end
including:

   * Software to drive and manage banks of RepRap printers

   * Hardware and software systems to automatically unload printed parts from RepRap printers

   * Hardware and software systems to sort, clean and package or assemble printed parts
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* Innovations in plastics recycling, and development of a suitable grinder and extruder"

This could accelerate the development of RepRaps that could be used towards distributed/decentralized, mass-production[53] of progressively efficient solar panels that would generate enough electricity to be "too cheap to matter"[54]

There may be little incentive to pass that energy barrier on an individual basis, due to prohibitive costs and efforts involved. Informational resources that could be used to integrate and realize the potential of solar power towards further development:

"The available solar energy resources are 3.8 YJ/yr (120,000 TW)[86,000 TW in link]. Less than 0.02% of available resources are sufficient to entirely replace fossil fuels and nuclear power as an energy source." [55]

from: https://secure.wikimedia.org/wikipedia/en/wiki/World_energy_consumption#Solar_power Also of reference:

https://secure.wikimedia.org/wikipedia/en/wiki/Insolation

To demonstrate how rapidly a freely distributable RepRap and solar utility kit could be developed, several affiliated projects could be developed simultaneously in an ad-hoc[56], self-organizing[57], hologenomic [58] hive-minded[59] superorganism[60][61]: an international[62][63][[64] effort to engineer microbial strains that yield durable, organic semi-conductors for the purpose of progressively efficient (5->40%+?) capture of insolation into organic solar photo voltaic panels and energy storage which could be integrated into a modular[65], future version[66] of a RepRap to develop a multiversal[67][68] battery, connector [69] and a compatible PV frame set [70] using a format similar to that of ISO standards and IEEE-SA specifications. Recharging a battery[71], auto, and home could be as fast as Wall-E [72] at sunrise as he gets ready for compacting trash of the long-departed humans orbiting space and surviving easily from space-ship automation.

"The proper tool for a task, Not every nail needs a hammer. Are we too fixated on Exotitech?" "Connectors and Batteries. Designing them to be society wide." (above links)

A comprehensive analysis and research center for global annual energy consumption, the source and endpoint of that energy, and its effects (both natural and anthropogenic) on climate change and the environment: http://gcep.stanford.edu/research/exergy/flowchart.html

"All things good on this Earth flow into the City" -Pericles

https://secure.wikimedia.org/wikipedia/en/wiki/Epicureanism

And all good things flow from...farms. Vertical polyculture[73][74] farms [75] using microbially-synthesized and RepRap'd OLED [76] grow lights [77] for food, and bioreactor farms for energy. Microbes can harvest conductors which can then yield solar energy for renewable power. Off-grid[78] solar utilities represents energy independence and is a right[79][80], not a privilege. GPL and post-scarcity[81] can make that possible. Just past the greenwashing[82] horizon is the "blue sky"[83] approach.

A warehouse of refrigerators insulated with SEAGel? [84][85]? Sounds like a modern arcology[86]. Grown aerogel(video-[87]) with rice husks[88][89]?

Arduino-based[[90]] microcontrollers[91] are a significant platform for hardware development and can benefit solar utilities with custom Battery Management Systems [92] and charge controllers [93][94][95]. Recent[96] developments in residential-based solar utilities using lithium-ion batteries[97] instead of larger absorbed glass mat[98] indicates an potentially expanding interest in solar energy using more compact

battery designs, but also opens up the opportunity for modified digital battery controllers[99] that can be reverse-engineered for additional control systems[100], including regulation of HVAC[101], solar thermal[102] utilities, and even residential-based miniature water treatment plants [103][104][105][106] 3D Printers that could replicate entire waste treatment instruments, including nanoporous filters, strains, and pumps could be scaled down to the size of a water cooler to purify rainwater, sewage, and flooded basements. Even smaller homes themselves have found a resurgent popularity, due to the Small House Movement[107] and arcane zoning code research discoveries by Jay Shafer in changes to the federally adopted building codes since the late 1970s[108] Solar-powered atmospheric water generators [109][110] could derive enough potable water from thin, humid air, while desalination plants [111] deliver larger volumes of water at the expense of intensive electricity consumption.

Relevant Fields of Research, Capability Maturity Model Integration and Agile Software Development

https://en.wikipedia.org/wiki/Agile_software_development
https://en.wikipedia.org/wiki/Capability_Maturity_Model_Integration
http://www.sei.cmu.edu/library/abstracts/reports/08tn003.cfm http://www.sei.cmu.edu/reports/08tn003.pdf

Microbiology[112][113]

Engineering Physics: [114][115][116][117][118][119][120][121]

Materials Science[122]/NanoMaterials- math, thermodynamics, statistical mechanics, kinetics, solid state physics, semiconductor heterojunctions, photovoltaic effect [123]

Bioengineering[124]/Metabolic Engineering -soluble small (conducting) molecules

Mechanical Engineering[125] -CAD[126], Fab@Home[127]

Ecology[128][129] [130][131][132]

High Priority Projects

Like the Free Software Project, a list of high priority projects[133] helps clarify the focus of this wiki and concentrate efforts on widely needed utilities (such as energy-efficient wireless internet [134]- operates at 2mW).

Two high priority projects here are

1. GNU photovoltaic panels

2. PLED lamps[135][136][137] in the milliwatt range (1-1000mW). (free/abundantly 3D printable, because neither old incandescant (2700k) nor planned obsolescence[138] bulbs should be the only two options: http://ceolas.net/#li12ax)(potential hybridized concepts include designing molecules to self-assemble supramolecular structures as in quinacridones for illumination, including using FRET: "Quinacridone can form a self-assembling, supramolecular organic semiconductor. [139] Alternativey, Quantum Dot LED inkjet printing [140](QDLED, or all-organic QDLED (OQDLED-without metal plate)

3. Arduino-programmed solar controllers

The first two, developed through RepRap and bioengineered molecules, would allow solar electricity to power lights in addition to extending the reading and cell-phone[141] charging times of remote villages[142] across the world.

4. Waterfilters- ultra and nano filters capable of filtering some of the dirtiest, contaminated water, along with portable, desalination instruments. This 2006 article [143] provides a good background starting point. Additionally, for 3D printng and Extreme Ultraviolet Lithography (EUV) (for washable, inorganic filters): [144][145][146][147][148][149][150]

5. Atmospheric water generator.

6. Bioplastic-based water bottles and/or bioplastic cups

Obstacles: Systems Ecology: Choosing Applied and/or Basic Science Research?

Inorganic Industrialization and the Environment are at odds. Industrialization with spills[151] and planned obsolescence[152] makes environmental remediation more difficult, like added paperwork (if only it were that easy), delaying restoration. The late 20th century's transition from centralized manufacturing to service-based economies[153] is not enough to reduce global warming because many service sectors are unscientific and many old technologies are still used- internal combustion engines, Jet fuel, and air-conditioning[154] [155] at excess levels-in 3,000 square foot homes. To suggest on this page that more manufacturing will solve the climate situation does not immediately make sense, even to me. However, the habits of consumers[156] suggests that new purchases aren't going away anytime soon, thus a kind solution is to phase out old-tech with phased-in "greener" tech. What happens in landfills[157] is still a bit of a mystery to me. As Blue Man Group simply put it for sewage, it flows "away" [158]. But the role of bacteria is not to do society's bidding, as bioremediators or pure factories. In a New Biology for a New Century[159], Carl Woese's abstract reads:

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"Biology, therefore, has a choice to make, between the comfortable path of continuing to
follow  molecular biology's lead or the more invigorating one of seeking a new and inspiring
vision of the living world, one that addresses the major problems in biology that 20th century
biology, molecular biology, could not handle and, so, avoided. The former course, though highly
productive, is certain to turn biology into an engineering discipline. The latter holds the
promise of making biology an even more fundamental science, one that, along with physics,
probes and defines the nature of reality. This is a choice between a biology that solely does
society's bidding and a biology that is society's teacher."
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I interpret this to mean that society cannot rely on biotechnology to solve all of nature's problems without acknowledging that Biology requires basic research acknowledgment and should not solely be treated as a technology or tool. However, Rob Carlson's[160] book, despite the title, includes a thorough analysis of the emerging bioengineering field and the old establishment's shortcomings in adapting to the citizen/DIYBio science movements. So far, I've only read the parts on free software and open source biology, but I like the contrasts and comparisons of two and how the Apollo and Manhattan projects were mentioned. Both free software operating systems-GPL and atomic race+space race projects were analyzed to have been completed with large group efforts. The reasoning behind biology and my interest in it being free are for the same reason free software improved the Internet, Information and Communication age. Free source biology will certainly improve the medical/healthcare industry by promoting a lower (or non-existent) risk exchange[161] of ideas and tools towards solving diseases and developing cures. An economic model based on a free source biology would not be able to run on a conventional currency system, however. While a monetary exchange works most of the time, the leading edge of nanotechnology and increasingly diversifying research

discoveries suggests, as is a problem in the software industry, that developments travel faster than snail mail patents beyond a workable model. I include links to barter software at the bottom of this page- I'd like to think they'll be useful one day, but as I like to think in terms of spacetime[162], maybe some form of human photosynthesis[163] could work, gaining net energy from the sun during the day and storing the energy to hibernate at night, but additional amounts externally, perhaps in a pail for simple retrieval. That's one way to put the pants on the table and wear the bread[164] in the house. A nomadic, phototrophic[165] lifestyle would certainly be stigmatized, at least initially, but it's the classic salad bowl[166][167]-turned-melting pot[168] story of immigration[169] in the United States.

What if renewable energy was only sustainable if it were biosynthetic, biodegradeable[170][171], and freely distributable? The mining of rare earths puts an extraordinary strain on manual labor. The generation of energy and consumption and its impact on the environment are treated as if they are mutually exclusive events [172]. Critical thinking[173][174] (a.k.a thought and number-crunching) is good for the environment, the same way crushed-aluminum cans compact space. But why are we buying cans anyways, and not drinking from a spring[175]? [176]

Bioremediation-based climate change solutions and studies [177][178][179]

The following is from [180] (but disagreeing with the point on methane clathrate as I think methanotroph bioremediation is a more environmentally friendly solution compared to exploitation of natural gas/methane.

"If there was ever a time for a massive investment in research into long-term energy sources, that time is now.
We need something on the scale of the Manhattan Project (which created the atomic bomb), or the Apollo Program
(which put a man on the moon).
Both initiatives succeeded in a short period of time and at a relatively low price. In current dollars, each cost
about $200 billion – a mere fraction of what the United States has paid for the Iraq war, and less than the cost
implied by the rise in oil prices over the past year.
Both the Apollo Program and the Manhattan Project had unique characteristics. Each marshaled the sharpest minds
from a range of countries to address one task. Tolerance for failure was slim in both initiatives, so they tended
to rely on the previous generation of scientific insight, because the resulting technology was more trustworthy.
Neither entailed a great scientific challenge, but rather **a vast engineering** problem. Although invention was required, existing scientific
methods were used.
Unfortunately, governments now focus only on one aspect of this investment format, in which technology that is
almost ready is funded. But this results in endless efforts to make non-ideal methods less troublesome. We need a
game changer, like the integrated circuit, radio, or **electricity**. Such a paradigm shift requires an Apollo-scale investment, but in basic science."

I think electricity is the game changer, via distributed/decentralized development of solar voltaic utilities printed w/RepRap. Mass-Biomass conversion. As linked above, the potential insolation is available:[[Image: [181]]].

The extraction of fossil fuels is an applied science. Fossil fuel depletion is bad for the environment even when fuel consumed as planned. The alternatives to this applied science, rather than the "best bad idea"[182], would require basic science research in systems ecology. Whether or not to turn its research results- those from simulation/scenario modeling into acts of geoengineering or ecological engineering[183] for the purpose of developing alternative sustainable renewable energy, electric/clean fuel utilities have to be integrated into a sustainable and predictable ecological system cycle.

Questions to be asked from basic science in systems ecology: What does thermodynamics teach us about irreversible entropy in the environment? How would the earth's climate progress if greenhouse gases did not increase as they currently are? Which ecological phenomena require the most study for the purpose of

bioremediation and sustainability? What are the levels of conservation needed in addition to net decreases in greenhouse gases?

Linux as a species serves a software ecosystem a diverse function- to prevent the blight of a monoculture in an instance of an epidemic such as the Irish Potato Famine of 1845. Wine[184][185] accomplishes something like a backup for a software that is widespread but not always considered adequately maintained due to its size. A similar situation appears to be occurring with the recent reverse-engineering of Skype voice-over internet software[186]. The premise here seems to be that if a large population relies on a communication protocol or software that is not adequately supported due to resources or private interests with no legal obligations to support said abandoned software versions, a motivated community or individual is likely to re-create an alternative or derivation as a type of insurance against that dependency's uncertain future. While not the same as an XMPP[187] client, an emulation of a proprietary software challenges the definition of software as property because it creates a new or grey definition/area of what was authored originally and what was written based on logical deduction by independent tinkering of software as property. The rationale used for defense of proprietary software defines software as "intellectual property", however it is sold as a "license" rather than "property," thus it cannot be defined as both at the same time while restricting the benefits to the author for an intangibly amorphous contract. The location of virtual property is thus redefined to be as intangibly undefined and emphemeral as biological knowlege[188], which is relational and not based on any central repository, as brain cells store memories but are altered every time they are retrieved. Virtual property does not disappear[189] but it is often designated as such when it is sold.

When electricity is or if biofuels are privately developed, the maintainers of that commodity likely would have many demanding customers interested in biokits or ways to develop or modify their own purchased products as a way to further innovate and make new discoveries. In agricultural biotechnology, other issues arise when proprietary seeds cannot be adequately contained from which ever direction the wind blows yet the end location of the migrations of the property are used as reasoning for being entitled to new areas of land, rather than returning just the crops/seeds themselves[190].

If free electricity were developed using a distributed/decentralized model similar to linux software repositories, then an open community itself can monitor, maintain and further develop the technology without requiring the cumbersome technology transfer agreements that walled gardens are designed to delay. A dynamic community having common, basic energy needs would be fragmented in a closed design which impedes research development as it should operate more like a feedback loop/mesh network[191] requiring both upstream and downstream cross-talk rather than vertically-integrated, unidirectional development models.

http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/2186/2062 :

"Home > Volume 13, Number 12 - 1 December 2008 > Chege"
"Jon “Maddog” Hall is a well-known personality in GNU/Linux circles [46]. During an interview on FLOSS Weekly, a popular free and open source software podcast (http://twit.tv/FLOSS), Hall recounts the following story [47]. Back in the
mid-1990s, when he was a marketing executive with the now-defunct Digital Equipment Corporation (DEC), Hall was on his way back home from a trip to Australia, when he made a stopover in Fiji and checked into a resort called the Hideaway Resort
hoping to enjoy a brief vacation. But the Hideaway couldn’t have been much of a hideaway because the local DEC salesman found him and managed to persuade him to give a talk on the GNU/Linux system at the local university. At the university,
Hall soon discovered that although the professors knew about GNU/Linux, it was difficult for them to get hold of a copy because at the time Fiji had an extremely dodgy connection to the Internet and every time anyone tried to download “a copy
of the [Linux] kernel ... they’d get it halfway through and some storm in the South Pacific would hit and drop the line.”
So Hall took out the last GNU/Linux CD he had with him and as he handed it to the professors he was suddenly reminded of the painting in the Sistine Chapel in which God is giving the touch of intelligence to Adam [48]. And this was when the
penny dropped for him. Up until this point, he had been more impressed by the low or zero cost of the GNU/Linux system, but as he handed his last CD over it suddenly struck him that in that CD was the equivalent of billions of dollars of ideas
and work that had been contributed by people from all over the world who were motivated by a desire to build

a better operating system. “And that’s when I really begun to understand the whole thing,” Hall confesses in the interview [49].
While we might have mixed feelings about Richard Stallman’s more radical claims regarding the immorality of non–free software [50], we readily acknowledge that free software is a Promethean gift to the world as vividly portrayed in Maddog
Hall’s story. We also acknowledge that without Stallman’s unwavering conviction and steadfast commitment, free software as we know it today might not exist. However, at the microeconomic level, how to ensure the sustainability of free software
remains a vexed question."

Thinking inside the Hole

In the 1995 movie Apollo 13, a filtration problem arose onboard the craft necessitating a solution using very little materials. An excerpt from script-o-rama:

```
Well, I suggest you gentlemen
invent a way to put a square peg
in a round hole. Rapidly.

Okay, people, listen up.

The people upstairs
have handed us this one,

and we gotta
come through.

We gotta find a way
to make this...

fit into the hole
for this...

usin' nothin' but that.

- Let's get it organized.
- Okay. Okay, let's build
  a filter.

Better get some coffee
goin', too, someone.
```

I see the GNUPV solar panel problem in the same way. Using nothing but a 3-D printer that can replicate itself (considering it is possible that every person on earth could have one in 18 days) the energy generation and storage problem could be solved by spreading the exercise to an open drawing board. To print solar panels from a device that appears much simpler than it is intended for, it can be developed to replicate the most expensive items first, rather than the least useful. In both the Apollo 13 case and the 3D printer/GNUPV case, the problem is CO2 and greenhouse gases that are toxic, to the crew, and to the earth, respectively.

Thinking outside the Grid-Tie cycle

The most common form of solar being promoted is grid-tie electrical systems[192] that connect(upload) to municipal or commercial utility stations. This is ultimately an ineffectual and underwhelming method to improving watt usage habits. The best way to manage consumption is to declare a watt usage ceiling such as 10 or 15Kwh per day, design a rooftop panel set that can collect that insolation amount on peak hours/seasons (which can be as low as 2kwh/day or less), and to work under that ceiling- by developing/purchasing AC or more efficient DC appliances that do not use more than the maximum capacity

of a solar array and energy storage rack. This also deters the introduction of frivolously purchased "entertainment" appliances into the household system such as gimmicks/toys that are purchased for single or trivial use. By establishing a theoretical, but explicit (quanticized) framework of how each home could manage its own solar electric use, the reduction in consumption can be adapted to in a similar way that one's budget is managed annually (Tax day) and how one's harddrive is not commonly filled with more gigabytes or megabytes than it possibly can store. Some online storage servers may offer "unlimited" storage, but at a cost and local storage is more common than municipal or commercial electric utility servive. Why shouldn't electricity be viewed the same way? Not only that, but Grid-tie and smart meters that are being installed place an unnecessary intrusion on privacy[193], suggesting that utilties/lobbyists discouraging the use of off-grid solar have not only an economic incentive, but social-engineering incentive to monitor consumption by using "energy conservation" as an excuse to moderate and monitor personal habits (a social scare tactic which became a "norm" with J. Edgar Hoover), which has no direct affect on global warming or carbon/greenhouse emissions. Rather, the manufacture of trivial plastics along with intensive transportation (speeds which should not exceed 15mph[194][195]) & tourism habits that constitute consumerism are the root of climate-effecting energy use and should be the practical foci of smart metering, not residential homes, though those could be self-managed or via peer-to-peer energy and ecological analyses.

Moore's law has been applied to transistors and genomic sequencing (Rob Carlson has some excellent analyses on the lowering costs of DNA sequences[196]), but they can also apply to photovoltaics, and a book by Brodie and Muray (1982) "The Physics of Microfabrication", seems one of the first textbooks to explicitly detail the technology behind making machines smaller (referencing a 1961 "landmark paper" by Kenneth Shoulders[197], Preface), and "As far as machines are concerned, machines may be classified into two general types- those with dimensions determined by their function and those whose size is limited only by economic factors" (Introduction).

Integris: Analysis+Synthesis+Integration

Engineering+Epicurean

[198]

Conclusion

What's not needed is another office filing [199][200]. Fortunately, this may hint at a sea change [201][202] from an outdated model [203].

About

I live in the postmodern world[204][205], rather than just reading novels about it and living in the modernist one, out of empirical observations that led me to accept scientific fact rather than a complete/initial interest in it. I've been compared to a human thesaurus, which accurately suggests that I purposely have abandoned all context and most primary sources for the purpose of reflecting the world as it exists and not as a bubble that is artificial and inconsequential to society's ability to adapt by moving on from outmoded, unhealthy, and environmentally unsustainable modernist/ethnocentric thought.

I was an English[206] major for a year and a half when I started college, but then I moved into Biology, not because I didn't find English important but because I was seeking to understand something universal to human life in contrast to the current (post-modern) literary era's underwhelming (at the time) thematic

conclusion-that realities are metaphysical and not quite universal. What I learned from Biology and evolutionary phylogenetics is that DNA might be somewhat universal (Arsenic DNA backbone pending but even then-still), but the phenotypic nature of life itself varies so much at the microbial scale that I reached the conclusion that the reason so much conflict exists in human society is because people can't deal/adapt with their differences[207]. Yet microbes do a lot better job at symbiosis, based on the vast majority of mutualism in the biosphere[208] and systems ecology[209]. Fortunately, at least some evolutionary sociobiologists[210] and psychologists[211] see a bigger picture. The rest depends on society's willingness and/or ability (from gene street[212] to K street[213]) to adapt[214][215][216][217][218].

Thus, I see myself more as a wedge/widget[219] between the arts/humanities and the sciences, similar to C.P Snow's The Two Cultures[220]. Perhaps in equal intensity or based on the situation/context, artists-humanists need to think more scientifically as scientists should think more culturally.

I was also interested in journalism as an undergraduate, and journalism is still the mode of inquiry I use to pursue new academic fields. However, rather than reporting on new subjects and quoting primary sources verbatim, I instead opt to become a primary source knowledgeable in the field by gaining competence of the parlance and understanding of the scientific principles of a new academic field. For example, when I began the Biology major, I was interested in learning about bacterial pathogenesis and bioterrorism. However, the news articles I read were not detailed enough in terms of depth, thus the only way I felt I could report objectively was to take on a major in microbiology. Since then, I have gained an interest in energy and electricity, and thus I have moved deeper into the physical and engineering sciences to gain competency in the subject matter to accurately report my findings. However, moving from the biological and physical sciences into engineering means that I am not as interested in reporting objectively as I am in immersion, or gonzo journalism. Theodore von Kármán once said, "Scientists study the world as it is; engineers create the world that has never been". Basic research allows me to continue to report science "ologies" as they are. Engineering is a transition from observation to subjective alterations in the physical world, similar to how immersion journalism's reports are related to the experiences of the writer.

If the picking of an undergraduate major included the privileges of a hedge fund investment, college could be about studying whichever portfolio succeeds. Realizing this esoteric benefit, many twenty-somethings of this generation have become stem cells[221] and jacks/amateurs of all trades rather than mastering a particular field, especially if that fields' requisites become quickly outdated. A perma-pluripotent cell (polymath) would have more options and abilities to contribute to larger, but ad-hoc projects that accomplish community-defined goals in a shorter amount of time. But the value and enrichment that comes with higher education is still a good reason to complete[222] it, regardless the major, as long as it's in Liberal Arts & Sciences[223][224][225][226]. If it can be affordable[227] for anyone to be a student for life, there should be little reason to leave it. Google's Summer of Code (GSoC) [228] and Internationally Genetically Engineered Machine (iGEM)[229] and their contributions to GPL software/biology are examples of short-term projects with long-term applications. The question is why similar organizations are not being emphasized to address issues in climate change, bioremediation and accessible sustainable energy. Pink Army[230] is one such initiative in biomedicine, concerned with treating unique diseases with custom-made pharmaceuticals.

Lateral thinking[231] [232](of memes) and horizontal gene transfer[233] seem to have a lot in common for the purpose of evolutionary equilibrium[234] and survival.

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Contact Info, Donations, & CV

primary contact email: giovanni.lostumbo@gmail.com. If you would like to donate money to this project, it would be very helpful for continuing research (currently in the bioinformatics stage) please click on link next to this Paypal icon.

Donate alt="https://www.paypal.com/cgi-bin/webscr?cmd=_donations&business=UKG7YAGR6C9F2&lc=US&item_name=Wordpress%20Orjoule%27s%20Blog&currency_code=USD&bn=PP%2dDonationsBF%3abtn_donateCC_LG%2egif%3aNonHosted" />

blog: https://orjoules.wordpress.com/

(I also frequent OpenManufacturing, OpenCircuits and DIYBio (also here:[285]): https://groups.google.com/groups/profile?enc_user=UfVTNBsAAAAUop8qaq9-N_EijEqGqhzdvS6NllHqJt6FvmRxWW9AJg http://www.opencircuits.com/Talk:Projects#too_big_to_edit

Feel free to make edits to the project ideas and references and send me links/publications that I can also post for you on this page. If you would like to start an online lab on OWW regarding this specific project or a related one such as RepStrap printing [286] or plasmid/bacteriophage development, also please message me. Thanks!

CV is located here: http://openwetware.org/wiki/Image:CV_GL.pdf

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Distributed Solar Energy Independence

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QSAs (Questions, Seldomly Asked)

Did I actually read all of the URLs I hyperlinked to? If they are news articles, yes. If they are tutorials or large websites, I familiarized myself with the semantics ("the gist of it"), but I have read extensively on most of the links.

Why do I have so many lock icons on my page? I use HTTPS Everywhere and it defaults to wikipedia:secure when I paste links: https://www.eff.org/https-everywhere. Also, I use https://secure.wikimedia.org/wikipedia/en/wiki/NoScript

Other

links of interest: http://longnow.org/about/ https://en.wikipedia.org/wiki/Natural_Capitalism:_Creating_the_Next_Industrial_Revolution : "Beyond using biology as a model for the structure and function of industrial production, the year 2050 will see humans utilizing biology as the means of production itself.

Whereas most manufacturing today is highly centralized and materials are transported considerable distances throughout the assembly process, in the year 2050 human industry will use distributed and renewable manufacturing based upon biology. " http://www.synthesis.cc/biological-technology-in-2050.html http://freedomdefined.org/OSHW https://www.multiswap.net/about/ http://sourceforge.net/projects/cmb/ https://en.wikipedia.org/wiki/Gitorious https://twitter.com/ks91020 http://www.media-art-online.org/iwat/home.html http://mediagoblin.org/ http://www.lightingprize.org/requirements.stm http://en.wikipedia.org/wiki/Better_Off_Ted http://en.wikipedia.org/wiki/Voyager_Golden_Record http://www.nytimes.com/2010/12/19/magazine/19Urban_West-t.html http://news.cnet.com/8301-11128_3-20004766-54.html https://secure.wikimedia.org/wikipedia/en/wiki/Solid-state_lighting http://unetbootin.sourceforge.net/ The importance of electricity: http://www.youtube.com/watch?v=XckB846wRCI (@04:30) and http://www.youtube.com/watch?v=shQXKmxsnCY online security [288] Peer review: http://cameronneylon.net/about/ http://reprap.org/wiki/Wealth_Without_Money https://en.wikipedia.org/wiki/The_Diamond_Age#Sociology_and_cultural_relativism https://en.wikipedia.org/wiki/The_Diamond_Age#Material_and_immaterial_scarcity_and_a_nanotechnological_economy https://en.wikipedia.org/wiki/The_Diamond_Age#Snow_Crash https://en.wikipedia.org/wiki/Cryptonomicon https://en.wikipedia.org/wiki/Cryptonomicon#cite_note-Clayton2006-1 http://blog.longnow.org/category/digital-dark-age/ https://confluence.cornell.edu/display/AGUACLARA/Home http://mse.cornell.edu/mse/research/energy-production-and-storage.cfm http://www.whywork.org/ https://en.wikipedia.org/wiki/Recreational_mathematics http://vihart.com/ http://openmaterials.org/

The stitching of this wiki was made possible by ontological [289] systems and their self-organizing, recursive[290], node-centralizing [291] gravity. The format is based in part on David Pearce's cerebrally-taxing web ring of cyclically-resonating pages on medical health ideas (which is fine for that purpose as it's not about being too fixated on one synapse/neuronal receptor on the circuit board) whereas this maintains the dense text:link ratio (not for the sake of links but to link to specific concepts of relevance) but uses one single panorama page designed like a Mission Control Center [292]and its purpose is for visualizing an entire free electricity project's potential from start to finish and its integration into an ecological cycle.

"The *power* of the open source concept isn't so much the cost, it's the *community*." -Richard Jefferson (from the intro of Chapter 33- "Open-Source Biology," p.316, of an uncorrected proof of Present at the Future: From Evolution to Nanotechnology, Candid and Controversial Conversations on Science and Nature, 2007, by Ira Flatow)

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