An Artistic System for the Transmission of Cultural Energy

By Jegan Joyston Vincent de Paul

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Signature of Author................................................................................................................................

Department of Architecture
May 22, 2009

Certified by.............................................................................................................................................

Ute Meta Bauer
Associate Professor of Visual Arts
Director, Visual Arts Program

Accepted by...........................................................................................................................................

Julian Beinart
Professor of Architecture
Chair, Department Committee on Graduate Students
Readers

Antoni Muntadas
Visiting Professor, Visual Arts Program
Massachusetts Institute of Technology

Peter Galison
University Professor, Department of the History of Science
Harvard University
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///COUNTER has evolved parallel to and informed by the activities, relationships, and projects I have been immersed in during my two years as a graduate student in the MIT Visual Arts Program. MIT’s social and technological environment is the engine from which ///COUNTER as a hybrid system of art and science has been created.

///COUNTER was incorporated in the Spring of 2009 and headquartered at One Broadway in Cambridge, Massachusetts. As a corporation, ///COUNTER is an effective tool and medium through which art can become a form of power designed to play a central role in producing positive social change. ///COUNTER is presented below as a plan of action towards that aim.

Thesis Supervisor: Ute Meta Bauer
Title: Associate Professor of Visual Arts
Director, Visual Arts Program
Let’s talk of a system that transforms all the social organisms into a work of art, in which the entire process of work is included... something in which the principle of production and consumption takes on a form of quality. It’s a gigantic project.

- Joseph Beuys
Prologue

At the MIT Visual Arts Program, for the first time in my life, art production could become my primary preoccupation. My initial idea of art was simple: just combine my skills in construction and architecture with my worldview to make something that looked right and meant something.

Joan Jonas once labeled the re-presentation of my work in a professionally bound book as propaganda; I acknowledged her perspective without question. I knew that artwork created within the academic context -- intimately bound to enforced knowledge production, bureaucracy, and time constraints -- only looks like art. Much of what I made, while empowering a student, had limited my potential to produce socially relevant work or critique.

During my second year, while developing this thesis, I gradually realized that art is analogous to, and interchangeable with, power and energy; something to be channeled more than created. It is not art as a deliverable or art as representation that I now want to invest my efforts in, but art as transaction and transformation. My intention with ///COUNTER, introduced as the thesis here, is to advance this conviction.

///COUNTER was incorporated on February 17, 2009 in the State of Delaware with my collaborator Jason Rockwood. In the process of inventing ///COUNTER in the context of art education, we have implicitly acknowledged the corporation as an art medium. To believe that a corporation can organize, change, and empower people is to state that it can simultaneously inspire, collect, contain, and transmit art.
Collaboration & Acknowledgement

From its inception, ///COUNTER has been a collaborative endeavor. Jason Rockwood from MIT’s Comparative Media Studies program, has been seminal to the development of ///COUNTER. We already knew of similarities in our vision and understanding, and we decided to create together. We spent numerous evenings working to advance our ideas; engaging in discussions about the philosophical underpinnings of society and our feelings on what is needed for a better world.

Directly following Jason’s support of my interest in developing a human-scale system to address global energy access, ///COUNTER as a cultural corporation emerged. We often have contrasting perspectives, but we also believe that a productive benchmark for collaboration is in challenging one another. It’s a good fit, and without him, ///COUNTER would not exist in its present form.

Two invaluable undergraduate research assistants from the MIT’s UROP program, Rachel Cheney and Jennifer Tran, are also important to acknowledge. While at times the contributions of younger engineering undergraduates was an unknown element in our projects, I observed Rachel and Jennifer reinterpreted the eWheel project in their own fashion. Beyond the project itself, through our interactions I am reaffirmed by the power of self-direction and responsibility. It is my wish that ultimately they have also gained knowledge of a field that was perhaps unfamiliar to their respective disciplines. On my end, the engineering knowledge and the technical possibilities that they brought to the project fortified not only the production of a prototype of the eWheel but also planted the practical roots of ///COUNTER.

To acknowledge all of the support that went into making this project possible is a tremendous task; I have received much, and have many thanks to give.

To Ute Meta Bauer, who encouraged me to undertake this project in the first place and continued to support it in all her capacity. Her non-stop belief in the potential of the project energized me from the very beginning and in moments of doubt. Muntadas’ humorous, and extremely astute criticism of my method of thinking and working provided me with the bigger picture of my thesis and the production of art in general. His experience and guidance will continue to change the way I think about life. To Joan Jonas, Krzysztof Wodiczko and Peter Galison for their warmth, passion and wisdom in guiding my work.
The tremendous faculty at the VAP have kept me on my toes and remain a source of invaluable input; special thanks to Wendy Jacob and Andrea Frank for being so caring and open to my moments of frailty and worry.

I would like to thank all the graduate students whom I have interacted with at the deepest levels of conversation on art and life. Thanks especially to Alia Farid, Sofia Ponte and Matthew Mazzotta, who have provided me with endless laughs, critique and friendship. Thanks to Jin Won Jung, Alexander Rosenberg and Caitlin Berrigan for all their help and care during my times of panic and stress. My conversations with Salomé Francpouriomoi, Haseeb Ahmed, Jaekyung Jung, Gina Badger and Jess Wheelock contributed immensely to how I think about life and work – thanks to all of you.

Thanks also to Ed Halligan, Lisa Hickler, Charlie Mathis, Christopher Dewart and Dan Van Roekel, without whose patience and accommodation I could not have worked so productively. My sincerest thanks to Dean Adèle Naudé Santos and the good people at the Council for the Arts who have provided the financial support to realize my projects.

I would like to thank my academic advisors, from my undergraduate and graduate studies at the University of Toronto who provided me with the foundation of critique and creativity; especially Adrian Blackwell, Kenneth Hayes, George Baird and Mary Lou Lobsinger. My gratitude to Ada Tolla of LOT-EK who believed in my potential and supported my decision to study art at MIT. To Leonardo Bonanni for his humor and encouragement to carry out my projects. Without the friendship, dialog, and feedback of Marrikka Trotter and Jason Rockwood this thesis simply would not exist in its present form.

Lastly, but by no means in magnitude of appreciation, my family: my loving mother Margie, my father John and my brothers Hamilton, Remi, Hellenic and Shan Vincent de Paul – I love you.
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Time line column

This column briefly traces the origins and development of ///COUNTER from an identity to an artistic system and the parallel development of the eWheel into the Human Grid.
Reference column

This is a column of supporting images. I begin and end with a series of photographs juxtaposing human labor to processes of art.
**Operating assumptions**

I. There is a socio-economic network of production and use of cultural energy that is potentially powerful. But its flow and potential are limited and generally not recognized or acknowledged.

II. ///COUNTER is a way of rendering this network visible, obvious, and prevalent by addressing it with the tools of *revealing critique* and *transformative dialogue*.

III. Through this process of critique and dialogue, ///COUNTER itself becomes a work of cultural energy and its actions over time become a medium of transformation and “liquification” of hardened power.
**Definition of Terms**

**Cultural Energy**
Cultural energy is the ability to meaningfully participate in socio-economic processes. Closely related to cultural capital.

**Revealing Critique**
Critique intended to reveal what is not visible or commonly assumed.

**Transformative Dialogue**
Exchange of ideas and intentions between individuals and/or organizations intended to produce positive social change.
Introduction

My thesis introduces ///COUNTER as an artistic system for the transmission of cultural energy. The underlying concepts of ///COUNTER are derived directly from my work on energy access as developed through the $eWheel$ and $Human~Grid$ projects$^1$.

///COUNTER has evolved parallel to and informed by the activities, relationships, and projects I have been immersed in during my two years as a graduate student in the MIT Visual Arts Program. MIT’s social and technological environment is the engine from which ///COUNTER as a hybrid system of art and science has been created.

///COUNTER was incorporated in the Spring of 2009 and headquartered at One Broadway in Cambridge, Massachusetts. As a corporation, ///COUNTER is an effective tool and medium through which art can become a form of power designed to play a central role in producing positive social change. ///COUNTER is presented below as a plan of action towards that aim.
A. ///COUNTER as Cultural Corporation
I open this thesis with a brief overview of ///COUNTER as a cultural corporation, with the primary aim of transmitting cultural energy through revealing critique and transformative dialogue.

B. The Human Grid as Model
I describe how thinking about the production and transmission of electrical energy within a local community context led to the analogue model of ///COUNTER as a producer and transmitter of cultural energy within a socio-economic context.

C. ///COUNTER in Context
I place ///COUNTER in the context of recent and contemporary artistic practice and argue that it introduces a paradigm shift with the concept of critique-into-action or art as service.
A. ///COUNTER As Cultural Corporation

Approach, Philosophy and Method

1. The Cultural Corporation
2. COGEN
3. A Free Exchange

///COUNTER is developed on many fronts, including incorporation, identity creation, and design of a model of operation. It is incubated within the processes and influences of working as an artist within MIT’s highly technological and goal-oriented environment. Presented as a thesis, ///COUNTER is the result of framing the multitude of concerns, subjects, activities, and projects that have preoccupied my focus in this environment.

In developing ///COUNTER as a holistic system of art and commerce, my intention is not just to formulate a theory. It is primarily to provide a concrete framework to transition out of the protected zone of pedagogy and learning into a long-term socio-economic practice of transmitting cultural energy. I do not intend to define cultural energy in totality but to suggest what this could be - and what it has been - operating through my own work as an artist. In this section I briefly formulate ///COUNTER’s basic approach as a
cultural corporation followed by its philosophy and artistic method.

The latter half of this section begins with an overview of *The Cultural Corporation* co-developed with Jason Rockwood. This is followed by two projects. The first is *COGEN*, an ironic piece on the complex and paradoxical relations between electrical energy, the human body, local community, and the multinational corporation. The second is *A Free Exchange*, a series of opinion pieces on the civil war in Sri Lanka together with selected responses to them published in Spring 2009.
**Approach: Artist As Diplomat**

In the years since World War Two, networked communication technologies have dramatically re-organized the functions and functionings of society. This trend, much discussed by artists and cultural theorists alike, is frequently framed diagrammatically, as the movement from centralized to decentralized to distributed models of communication and information flow.

This distributed-network architecture has been explored by artists as an aesthetic as well as a means of distributing power within society and creating a “networked public” standing (directly or indirectly) in opposition to the hierarchal network of decentralized corporate sovereignties. While the imbalance of power is real, these formulations fail to appreciate the emergent opportunities to engage with, rather than attack, the corporation. The historical asymmetry of power has relegated artist-activists to the role of artistic guerillas or artist/terrorists “fighting” the corporation. The “culture jamming” interventions by the likes of RTMark and the Yes Men, while critical and entertaining, are increasingly unproductive in their deployment of negative methods to address other negative methods.
///COUNTER therefore emerges as an argument against the oppositional binary metaphor of artist and corporation. Rather than viewing corporations as “targets,” ///COUNTER sees network-era corporations as increasingly dependent on the societies in which they operate, and thus fluid and open to negotiation rather than fixed and closed. By serving as artistic diplomat instead of terrorist, ///COUNTER aims to navigate the domain in-between commerce and culture. The goal is to create the hybrid entity of cultural corporation, concerned not with the production of artwork (particularly art for art’s sake within the separation of art and life) as much as promoting and enabling the circulation of cultural energy by use of artistic methods
**Philosophy:** Parrhesia

To briefly outline the developing philosophy of ///COUNTER, I have borrowed from the concept of parrhesia that Michel Foucault introduces in a lecture on *Discourse and Truth*. Foucault defines the Greek term as ordinarily translated into English as ‘free speech’ and identifies its five characteristics: frankness, truth, criticism, danger (as risk of death), and duty. He writes:

More Precisely, parrhesia is a verbal activity in which a speaker expresses his personal relationship to truth, and risks his life because he recognizes truth-telling as a duty to improve or help other people (as well as himself). In parrhesia, the speaker uses his freedom and chooses frankness instead of persuasion, truth instead of falsehood or silence, the risk of death instead of security, criticism instead of flattery, and moral duty instead of self-interest and moral apathy.

///COUNTER is Parrhesia.
Counter is productive
Counter is fundamental
Counter is polemical
Counter is metaphorical
Counter is analogical
Counter is imperative
Counter is everyday
Counter is constructed
Counter is structuralist
Counter is evolved
Counter is temporal
Method: Revealing Critique & Transformative Dialogue

To reveal the hidden relations between actors in a socio-economic system is a central role of much critical art. In the early works of artist Hans Haacke, the public unveiling of associations between members of large business and cultural institutions is, of course, largely a critical act by the artist. In his piece *Solomon R. Guggenheim Museum Board of Trustees* (1974), Haacke presented a series of seven panels under glass, framed in brass, one listing “BOARD OF TRUSTEES”; another “GUGGENHEIM FAMILY MEMBERS AMONG TRUSTEES,” and five listing “CORPORATE AFFILIATIONS OF TRUSTEES.”

In Haacke’s method, the process of critique occurs simultaneously in the collection, organization, and display of information, without the need for subjective commentary. In a free exchange of thoughts between Pierre Bourdieu and Hans Haacke in 1993, Bourdieu remarks to Haacke:

I think your work represents a kind of avant-garde of that which could be the action of intellectuals. It could serve as a critical analyzer of the moment of transmission of knowledge in relation to the moment of the conception and of the research itself. Everything makes me think that
intellectuals are not at all concerned about the moment of performance, and that they do not make it an object of research. At it is to a large extent for this reason that they are so little effective. I think they should take inspiration from research like yours or that of Andrea Fraser in order to give full symbolic effectiveness to their unveiling of social mechanisms, particularly of those who rule the world of culture.⁵

The amplification of all available information to unveil hidden social mechanisms as a critical process is revealing critique. It is the initial step in //COUNTER’s process of engaging an issue, followed by transformative dialogue.

Transformative dialogue is rooted in my interest in the field of conflict resolution (the processes of negotiation, mediation, and diplomacy) and applicable to a broad set of problems that lie at the intersection of art and commerce. As an artistic concept transformative dialogue is embedded in Joseph Beuys’ and Heinrich Böll’s Free International University for Creativity and Interdisciplinary Research. In their 1973 manifesto for the school, they write:
In the school we shall research into the numerous forms of violence, which are by no means confined to those of weapons or physical force. As a forum for the confrontation of political or social opponents the school can set up a permanent seminar on social behavior and its articulate expression.

Here research, confrontation, and articulate expression overlap, and the processes of creativity and critique are not separated from the processes of problem solving. The implication is that artistic dialogue can be applied beyond art and transformative to society at large.
1. The Cultural Corporation
A Model of Sustainable, Goal-Oriented Activity
(Co-Written with Jason Rockwood. See Relevancy Rhizome in Appendix)

The Cultural Corporation models an approach to commercial and other goal-oriented activity, such as profit generation, that balances the benefits of a proposed solution and strategy with the goals of the specific communities and cultures in which their activity is undertaken. Though such a model might sound naïve at first, we believe that it holds the key to sustainable long-term growth that ultimately benefits everyone the commercial activity touches. Short-term profit tactics such as polluting, stealing, cheating, or exploiting have only been seen in the industrial economy because of the decentralized (but not distributed) nature of communication flow in which the end users (laborers, consumers, suppliers, etc.) could be unaware of what was happening in or to other places, communities, and cultures.

Today it is increasingly difficult to use tactics with a negative outcome at any point in the system without someone finding out: in a network economy, we are all
living together in McLuhan’s global village and word of bad behavior travels fast. We live in a collective petri dish, where there is no escaping the negative outcomes of your own behavior. Bluntly, you can’t “shit where you eat.”

The usefulness of this perspective lies in the fact that we are transitioning out of the old industrial economy. In an agrarian economy, value lies in the earth. In an industrial economy, value lies in the factory. In a network economy, value lies in the relationship. Collectively, relationships form culture. Success in a network economy is positively correlated to the strength and health of the cultures where business is conducted. Therefore invest not in factories, but in people, and you will see your business thrive.

The Cultural Corporation model is a way of seeing this theory in action. In the cultural corporation, investment of information and resources in people is the backbone of business; internally to your associates, vendors, and executives; externally to your customers and society. This maps as four broad areas of business activity: training (internal investment of information); labor relations (internal investment of resources); marketing (external investment of information), and products and services (external investment of resources). By investing
information and resources in these four areas, the quality of the relationships between the company and its customers and associates and thus society will be strong and healthy, leading to a compounding of positive network and commercial activity.

A company can then monitor itself and its actions by incorporating the four values of a cultural corporation into its best practices: non-hierarchy, transparency, accountability, and relevance. Each of these four cultural values should be measured to assess the integrity of every relationship.

The relationships that aggregately form culture(s) are sustained by a collectively held worldview that inspires and animates the culture. If your associates don’t share your worldview, they will leave—likewise your customers. It is through those two interlocking relationships that the company accesses society. By working with customers and associates to create a collectively formed, shared, and held cultural worldview, and by investing information and resources to help achieve that worldview, the cultural corporation becomes relevant—otherwise no company can long survive.
Counter is explicit
Counter is expressive
Counter is inclusive
    Counter is revolutionary
Counter is evolutionary
Counter is additive
Counter is divisive
Counter is subtractive
Counter is manipulative
Counter is useful
Counter is digital
Counter is analog
Counter is efficient
Counter is apprehensive
Counter is mechanical
Counter is objective
Counter is fair
2. COGEN

Cooperative Power Generation

The project uses the language of corporate propaganda to advertise a product line of human-powered generators that can contribute energy to the urban power grid. This is ///COUNTER’s original—and fictitious—manifestation as a cultural corporation that seeks to use the human body for its mechanical properties. The exploitive use of the body for labor is presented as a positive contribution to culture. ///COUNTER’s opening letter of the the propaganda brochure reads:

The future can seem pretty intimidating: Our known reserves of oil and natural gas are expected to be depleted by 2045, the climate is changing, and more than a billion people lack clean water. At Counter, we believe some of the world’s most pressing challenges present an opportunity to do what we do best: imagine and build innovative solutions that benefit our customers and society at large.

As a global leader in energy, technology, manufacturing, and infrastructure, Counter is uniquely suited to help solve environmental challenges, today and for generations to come. Our customers want a more prosperous, cleaner
future. By harnessing our most abundant renewable resource - the imagination of our people - we can create that future with them. We are taking a new approach to solving some of our customers’ toughest environmental problems. At Counter the future begins with its people.

The design philosophy of our COGEN power generation systems considers our cities as the economic and cultural engines of society that are the ideal spaces for cooperation and collective action. COGEN is your solution to energy generation where all citizens are given the opportunity to contribute a portion of their own energy towards our collectively utilized urban electricity grid. COGEN is cooperative power generation, COGEN is 100% revolution.
3. A Free Exchange

In February and March, 2009 I wrote three opinion pieces on the civil war in Sri Lanka for The MIT Tech, The MIT Alumni Association’s online What Matters column and The Harvard Crimson. While these pieces were not written with any kind of direct reference to art, they were produced as part of the larger framework of critique in which I was operating at the Visual Arts Program, as well as an intervention under the umbrella of ///COUNTER. These pieces are referenced within countercorporation.com as exemplifying the critical approach of ///COUNTER.

As my opinion, these writings advocate the right to self-determination for the Tamil people and condemn the government of Sri Lanka’s genocidal intentions in the 25-year-old civil war there. The pieces are intended to counter the popular view that the war on the island is one against “terrorism,” rather than actually the subjugation of a minority group troublesome to the majority rule. The editorials were undertaken as initiative practice for a longer-term political engagement with minority issues using ///COUNTER as strategy and support.
The op-eds have been republished in both print as well as online by various media in Canada, India, Europe, Australia, and other countries. The following are examples of attention and commentary that followed in response.
The Crisis Within and the Voice Abroad
Published On 2/10/2009, MIT Tech
By JEGAN J. VINCENT DE PAUL

Even here at MIT, with so many students and faculty interested in finding solutions to the great problems of our world, very few have knowledge of the humanitarian catastrophe currently unfolding on the island of Sri Lanka.

In fact, Asia’s longest running civil war is hardly known in most parts of the world. Western attention has been manifestly disproportionate to the loss of more than 70,000 lives during 25 years of fighting between the separatist Liberation Tigers of Tamil Eelam (LTTE) and the Government of Sri Lanka. Even with the beginning of 2009 marking the height of the war with hundreds of Tamil civilians dead and hundreds of thousands internally displaced, the world remains silent.

The minority Tamils — both civilian and LTTE — have their dedicated, but limited, voice and support.

Since late January, the global Tamil diaspora have held countless protests in the form of hunger strikes, human chains, and mass gatherings. On January 29, more than 10,000 French Tamils demonstrated in Paris protesting the killings and urging foreign nations to stop military aid to the Sri Lankan Government. Over the next few days, 45,000 Canadian Tamils and 100,000 British Tamils gathered to express solidarity and to plead that the international community deliver aid, recognize the LTTE, and encourage a ceasefire. Well into February, the call for immediate international intervention remains unheeded.

The Tamil diaspora started forming soon after Sri Lanka gained independence in 1948 and Tamils, as the ethnic minority, became relegated to second class citizenry. By the 1970s, the LTTE had formed and began its guerilla movement against the government — made of the Sinhalese ethnic majority — to reclaim the Tamil homeland in the north and east of the island.

With increased fighting between the forces, the 1980s saw a large number of Tamil refugees — including my family and I — immigrate to India, Europe, and North America. Even as the country constantly collapsed into periods of turmoil, no one could have expected the crises to unfold into what they have become within the last month. In December, the New York-based Genocide

Responses to:
The Crisis Within and the Voice Abroad

Vincent. Your views are no different from many other members of the Tamil diaspora living in Canada. You are now at MIT and have undoubtedly a terrific career ahead of you. I do remember my days at Harvard Square enjoying a pint and many a conversation with the academic elite at The John Harvard brewery. I must say that at time there was never in my mind a single thought of returning to Sri Lanka nor of its ethnic problems. Yet now that I have exuberant youth behind me here I (a Canadian Tamil diaspora member as well) am years later back in Colombo and very much interested in Sri Lanka again. I do urge you to spend more time away from the Tamil diaspora and their single minded message. You need to speak with all sides of Sri Lanka. Talk to the common man both Sinhalese and Tamil. Talk to the elite Sri Lankans, both Tamil and Sinhalese. Talk to members of power, both in the government if you can get the opportunity. Times are very different from the days of Bandaranayake and particularly, the true supporter of Tamil genocide, JR Jayawardene. It has been 26 years since the terrible Pogrom which changed yours and your families’ life forever as you have indicated, but a lot has changed. Your statement which says “today, the LTTE continues its
Prevention Project listed Sri Lanka on the top eight “red-alert” countries experiencing or at risk of genocide.

Adopting and re-enforcing the “war on terror” doctrine in early 2008, the Sri Lankan Government officially withdrew from the Norwegian-led 2002 ceasefire and began an expanded military campaign to eliminate the LTTE at all costs, including risking the safety of a massive civilian population that over the past decade has been integrated into the civil society built and governed by the LTTE.

The town of Kilinochchi, the civic pride of the LTTE, was captured in early January by the Sri Lankan Army and is now desolate, with the vast majority of its people displaced within a shrinking patch of jungle. The International Committee of the Red Cross declared a major humanitarian crisis with over 250,000 civilians caught in the midst of an increasingly unstable war zone with little or no foreign aid allowed to reach them.

The plight of the trapped Tamils is expounded across the sea in the southern Indian state of Tamil Nadu. Since late January, the state’s students have carried out an entire series of demonstrations in desperate bids to draw attention to Sri Lanka’s war, calling on India to negotiate an immediate ceasefire. On January 29th, a Tamil Nadu journalist burned himself to death after writing a statement condemning Indian inaction and military support to the Sri Lankan Government. His death triggered an 8 km long funeral procession and increased protests supporting the Tamil cause.

Nothing can easily be done. Sri Lanka has very little geo-political importance in the world, and the government stands convinced of its military campaign and strategy for success with regards to the ethnic conflict.

In early February, Sri Lanka’s Defense Secretary Gotabaya Rajapaksa warned that all foreign agencies “will be chased away [if they try] to give a second wind to the LTTE terrorists at a time the security forces, at heavy cost, are dealing them the final death blow.”

In regards to media access during the civil war’s most violent moment, the Sri Lankan government is sticking to its words against international diplomacy. All independent journalists are banned from the Vanni region in the northeast — the epicenter of the atrocities.

justified fight for Tamil Ealam” shows that you have a lot to learn and please take my advice and try to get yourself out of a single minded influence and open yourself up to all Sri Lankans as I have attempted to do in the past year and a half. (response in www.srilankaguardian.org)

February 23, 2009

Vincent. Your views are no different from many other members of the Tamil diaspora living in Canada. You are now at MIT and have undoubtedly a terrific career ahead of you. I do remember my days at Harvard Square enjoying a pint and many a conversation with the academic elite at The John Harvard brewery. I must say that at time there was never in my mind a single thought of returning to Sri Lanka nor of its ethnic problems. Yet now that I have exuberant youth behind me here I (a Canadian Tamil diaspora member as well) am years later back in Colombo and very much interested in Sri Lanka again. I do urge you to spend more time away from the Tamil diaspora and their single minded message. You need to speak with all sides of Sri Lanka. Talk to the common man both Sinhalese and Tamil. Talk to the elite Sri Lankans, both Tamil and Sinhalese. Talk to members of power, both in the government if you can get the opportunity. Times are very different from the days of Bandaranayake and particularly, the true supporter of Tamil
UN High Commissioner for Human Rights Navi Pillay announced that the conflict had reached a “critical” stage, noting that “while the government has made military gains on one hand, the rule of law has been undermined on the other.”

More than twenty years ago, well before today’s escalated violation of Tamil civilian rights, my mother foresaw the lack of opportunity and danger that awaited her Tamil children if they remained in Sri Lanka; she took us out of the country to claim new identity as Canadians — in Canada we were no longer Sri Lankans. For the Tamil civilians that stayed behind, life became increasingly difficult with tens of thousands of extrajudicial killings and disappearances orchestrated by the Sri Lankan government.

Today, the LTTE continues its justified fight for Tamil Eelam — a sovereign Tamil state with an identity distinct from that of the Sri Lankan state. The Sri Lankan government’s military campaign has degraded Tamil Eelam into a less than 300 square-kilometer patch of jungle, dismantling its civic identity and territorial autonomy; repetitive bombings of hospitals and civilian areas by the Sri Lankan Army continue to this hour.

The situation is even more dire because the Sri Lankan Army — whose every member is Singhalese — has ethnic motivations behind its use of violence. The Sri Lankan government’s strategic labeling of the LTTE as a terrorist organization — re-coding the ethnic conflict as one of a legitimate state against a criminal actor — has only served to undermine long-term peace and diplomacy both on the island and abroad.

Communication between Velupillai Pirapaharan, the leader of the LTTE, and Sri Lanka’s President Mahinda Rajapaksa is non-existent today. Sri Lanka’s problem is no longer an internal conflict — it can only be solved through a change in policy and the voice of the international community. It is not inability, but unwillingness, that prevents the UN, the United States, and other nations to immediately bring the war to an end, supporting Tamil statehood as the only solution.

February 23, 2009

You just have to look at the name, vincent de Paul, and you see that he is not a tamil even by name - may be a tamil by descent, but then again, not a Hindu.

He should get his facts right. This article does not mention that this terrorist organization is banned in the USA and in most of the civilized countries. Due to the race riots that took place in the 1970s, many Tamils like myself supported the Tamil United Liberation Front (TULF), but I have never supported violence - the modes operandi of the Tamil tigers. This article does not mention what is in the CIA fact book about Sri Lanka - that there are about 5-8% of Tamils, and that most of us live in the Western province, Hill country, and the east, in a multi-ethnic setting with the Sinhalese and...
75% and the Moslems of Arab origin, and other smaller minorities.

The separatists are militants who in 1949 claimed parts of the country as their “traditional homelands” and attempted to “drive out the Sinhalese and the Moslems” from these so-called “traditional homelands” using terror. They wanted to create pure Tamil racist enclaves. The separatists use child soldiers, suicide killings and targeting of civilians to cow them with terror. The Tamil tigers have killed dissenting Tamil leaders and dissenting Tamil civilians, journalists, and public servants, the prime ministers of India, Sri Lanka etc. The government has wavered too long, indulging in “peace negotiations”. Now at last, the government has said, enough is enough.

Tamils like us who live in near Colombo want to live in peace, and have no truck with these terrorists. This writer is one of those kids who has grown up brain washed with tiger propaganda. He does not mention that even Amirthalingam, the leader of the Tamil United front, was assassinated by the Tamil terrorists. Ncent de Paul also has the blood of Amithlingam, Kanagaratnam, Duraiappah, Tiranagama and hundreds of other Tamils killed by this Fascist organization banned by the USA, Canada, EU and other civilized counties, by becoming an apologist for them.
By now, many of us know that something is wrong on the island prominently referred to as Sri Lanka. The 25-year-old civil war between the separatist Liberation Tigers of Tamil Eelam (LTTE) and the Government of Sri Lanka is at the height of its crisis. Keeping the LTTE cornered inside a few hundred square kilometers of jungle, the real war of the Government of Sri Lanka is waged on the Tamil people.

While the entire world is preoccupied with condemning the LTTE as terrorists, the Singhalese-dominated Government of Sri Lanka is busy planning and executing the final stages of a systematic genocide against the Tamils. In the past month alone, thousands of Tamil civilians have been killed and severely injured with hundreds of thousands forced from their homes often directly into zones where military violence is occurring. Current displacements of people are worse than that seen in Kosovo.

The real measure and extent of the murder of Tamil people underway is impossible to know. The Government of Sri Lanka, after its official withdrawal from the 2002 Norwegian-led cease-fire in early 2008, has expelled virtually all aid agencies, foreign journalists, and international monitors as the first step in conducting an illegal war. Its operations are now unfolding in complete media and diplomatic blackout.

In December, the New York-based Genocide Prevention Project listed Sri Lanka on the top eight red-alert countries experiencing or at risk of genocide. Two months later, genocide is nothing short of obvious with no plans for intervention by the international community, with the exception of meaningless suggestions to a cease-fire.

In this backdrop, the government’s strategy to exploit the global ‘war on terror’ and weaken the LTTE paid off. The intense shelling and aerial bombing were said to be to counter terrorism. The government’s approach to achieve its objective has some similarities with LTTE’s. It

Responses to What is Wrong With Sri Lanka:

by Dr. S. Narapalasingam, Former Additional Deputy Secretary to the Treasury, Sri Lanka and UN Advisor, Development Economics/Planning.
(How united Ceylon became divided Sri Lanka? What next? in federalidea.com, 03/06/06)

Jegan Vincent de Paul in the guest opinion column ‘What matters’ of the Alumni Association of MIT, Massachusetts, Cambridge, USA has opined: “The LTTE has been condemned the world over, because its tactics of war have concurrently been appropriated by ideologically driven religious groups to attack the West. The identity of the LTTE has been consequently corrupted with its stated goals for nationhood systematically subverted and recoded to neatly align with a fabricated global ideology of terror—one being actively constructed by the United States and fully exploited by the Government of Sri Lanka”.

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What is Wrong With Sri Lanka
Published On 2/25/2009, MIT Infinite Connection News
By JEGAN J. VINCENT DE PAUL

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The president of Sri Lanka, Mahinda Rajapaksa, has dismissed calls by a few willing nations to negotiate peace as an attempt to violate the sovereignty of the Sri Lankan state. The president of East Timor and Nobel Laureate Jose Ramos-Horta’s recent request to assist in any capacity to end the conflict was unwelcome by Rajapaksa, who views the subjugation of people and voice as the solution to six decades of racial tension.
With Sri Lanka’s independence from the British in 1948, all power of government was handed over to the majority Singhalese. The newly founded Singhalese government seized the opportunity to institute its hegemony over the entire island, appealing to mythic Buddhist Mahavamsa accounts of an ethnically pure island. This denied the minority Tamils their precolonial independent state of Tamil Eelam, constituting the north and east of the island.

Starting with the Citizenship Act of 1948 and the Sinhala Only Act of 1956—which denied citizenship to over one million Tamils and mandated Singhalese as the only official language of Sri Lanka respectively—Tamils were constitutionally discriminated against culminating in the 1983 state-sponsored Anti-Tamil Pogrom where over 3,000 Tamils were murdered and thousands of Tamil-owned businesses and houses destroyed.

Within this context, Sri Lanka saw the rise of numerous Tamil revolutionary groups forming the LTTE as the de facto organization fighting to reclaim Tamil Eelam’s sovereignty. Today, discrimination of Tamils and full-scale destruction of their civic structures is the domain and primary occupation of the Sri Lanka Security Forces.

Under the U.S. Genocide Accountability Act of 2007, former U.S. Deputy Associate Attorney General Bruce Fein—representing Tamils Against Genocide—recently filed a 12-count genocide indictment against Sri Lanka’s Defense Secretary Gotabaya Rajapaksa and Sri Lanka’s Army Commander Sarath Fonseka—one a U.S. citizen and the other a green-card holder. The indictment report chronicles 3,750 extrajudicial killings, approximately 30,000 Tamils suffering serious bodily injury, and more than 1.3 million displacements since the time both members assumed their positions in the Government of Sri Lanka in December 2005.

Sri Lanka is a failed state by any account. No persons of the Sri Lanka Security Forces or any other branch of the Government of Sri Lanka have ever been prosecuted or punished for crimes against Tamils. The International Federation for Journalists has listed Sri Lanka as the second most dangerous place for journalists after Iraq. Freedom of speech—the cornerstone of democracy—is completely eroded and only anti-Tamil or anti-LTTE demonstrations occur without incidence.

has been successful on two fronts besides the capture of territory. The support of the Sinhalese electorate to the government has jumped sky high, despite the economic hardships endured by them. The government has also been successful in its propaganda campaign. Curtailing media freedom without formal censorship was possible to some extent using selectively the emergency regulations and the Prevention of Terrorism Act. With the assassination and arrest of many journalists, Sri Lanka is considered by international organizations as the most dangerous place after Iraq for journalists. There was a time when the LTTE forced the closure of journals published by Tamils that criticized their extreme militant activities. Like the LTTE the government too conceals negative or unfavourable facts. The public does not know the total losses incurred by both sides since the war resumed in early 2006.

April 7, 2009 (transcurrents.com)

Jegan, This is a nice try but who is conning whom? This kind of false preaching does not help people trapped between LTTE’s tyranny and GOSL army guns at all. Wake up and check out the facts.
Recent electoral victories of the Rajapaksa government—during the country’s worst offensive against the Tamil people—confirms that Sri Lanka’s disdain of Tamils is not limited to the ideology of state, but is the sentiment held by the majority of citizens. The Singhalese state is paradigmatic of the ultraconservative practice of building solidarity and nationalism through a shared and systematic abhorrence of a minority.

The significance of the deeply rooted ethnic tension between the Tamils and Singhalese over hundreds of years is overlooked by foreign nations, with attention paid only to the physicality and immediacy of war. This practice has misleadingly positioned the LTTE as a criminal actor because of its initial use of guerilla tactics to wage an asymmetrical war.

It is true that the LTTE has a history of condemnable acts, which receives a lot of attention from the international press, but the Government of Sri Lanka has been much worse, including the deliberate targeting of civilians with heavy force, the use of cluster bombs, and an officially tolerated practice of rape, among other crimes.

The LTTE has been condemned the world over, because its tactics of war have concurrently been appropriated by ideologically driven religious groups to attack the West. The identity of the LTTE has been consequently corrupted with its stated goals for nationhood systematically subverted and recoded to neatly align with a fabricated global ideology of terror—one being actively constructed by the United States and fully exploited by the Government of Sri Lanka.

The aim and constitution of the LTTE is rooted in secular principles and the right to self-determination—in practice, taking up arms as the last resort. America’s founding fathers were not terrorists but revolutionaries. The decision of the United States to label the LTTE as a terrorist organization while maintaining its military and political support of the Government of Sri Lanka is a contradiction of its own ideals and history.

What remains of the LTTE after the end of this so-called “conventional war” should only be supported and the organization fostered into a legitimate political entity with the right to strengthen Tamil sovereignty and defend Tamil Eealum. The extent to which the LTTE becomes embroiled in violence again cannot be separated from Sri Lanka’s insistence on the occupation of Tamil Eelam.

April 8, 2009 (transcurrents.com)

Jegan J. Vincent de Paul I am glad you have a good grasp of the real issue in SL since 1948. For a young person like you to go back in history and understand the real issue gives hope for the long subjugated Tamils under different masters. sadly the Sinhalese masters, Anglo-Saxon masters from US and Europe and Indian masters are seeing the Tamils as twerrorists if you do not go along with their agenda. Hope the younger generation from the Tamil Diaspora will make use of the International Institutions to bring justice to Tamils. Keep up your good work on issues of the underdogs in which ever parts of the Globe they may exists.

April 9, 2009 (transcurrents.com)

Really? I suppose the writer would have us want to believe that this is a war between a “legitimate state” and a “terror group”? If this war is not between a terrorist group and a legitimate state then please will the writer explain why a large number of Tamilians do not buy into it. If they are not heard, it is only because they have been silenced by the writer’s implied version of the “legitimate state”.
Right now, with increasing impunity, the Sri Lankan military continues its indiscriminate bombings of civilians who are outside its designated “safety zone”—a sham of a demarcation within which thousands of Tamils are further killed, starved, degraded, and antagonized with no freedom of movement or proper medical treatment. What’s worst, the Government of Sri Lanka recently announced the use of “welfare villages”—its brand of concentration camps—within which internally displaced Tamils must remain for a minimum of three years supposedly for rehabilitation purposes. Testimonies from these barbed-wire camps report crimes as disturbing as forced abortions for Tamil women.

In such a climate, the immediate safety and the long-term livelihood of the exhausted Tamil people can only be secured by the international community. Any realistic policy toward the conflict needs to recognize violations by both parties and must not be relegated to the rhetoric of terrorism and counterterrorism. Ensuring the coexistence of Tamil Eelam and Sri Lanka on the island could be a successful model for post–war-on-terror resolutions of global conflict.

The common misconception is not that the war is between a terrorist group and a legitimate state. The common misconception is that the war is a civil war when more than 50% (as much as 90% by some estimates) of the people the state is supposed to be at war with neither live in the separate “homeland” nor want to live in it even in the unlikely event separation is achieved.

A tiger doesn’t change its stripes when it emerges from the shadows. In the meantime, it may hold all creatures big and small in its immediate vicinity in thralldom. Yet those who remain afar can see it for what it truly is... unless of course they are idiotic enough to hero worship its nefarious exploits and go parading on the streets. ... and there is no such thing as a “minority Tamils homeland”. The minority Tamils live elsewhere. Always have. What is left in the north of Sri Lanka is a minority of a minority. They are also known as ‘Tamil Tigers’.

The sooner they are eliminated the better it would be for both minority and majority alike.
Responses to The Endless War

April 7, 2009
To The Harvard Crimson, I am surprised that valuable space was given to publicize opinions from terrorism supporter, Jegan J. Vincent De Paul in the article The Endless War, published On Sunday, April 05, 2009 10:05 PM. How can the Crimson not know that this article espouses a group that is banned as a terrorist group in this country and countless other countries in the world?

April 14, 2009
Thank you Jegan for giving voice to a suppressed race that has undergone enormous sufferings in the hands of Sinhala supreme Sri Lanka. As a person personally affected in many ways but failed to convince many, found the proscription of the rightful fighters of Tamils who have the right of self determination, is only a currency of political bargain with India. But now Tamils around the world have risen as ripples in a disturbed water, which will raise as waves that will wipe out the unscupulous genocidal desire of FEW INDIAN politicians against Tamils. One question I got to raise to the readers, if Sri Lanka and the world has nothing to hide that their hands are clean why dont they let the free reporters and International humanitarian organizations to work freely in

The Endless War
Published On 4/5/2009, Harvard Crimson
By JEGAN J. VINCENT DE PAUL

Last December, the government of Sri Lanka held a day of national festivities to commemorate the defeat of the Liberation Tigers of Tamil Eelam. In April, intense fighting continues between government and LTTE forces. However, the escalating humanitarian crisis of the Tamil civilians remains unheeded by the international community.

The war on the island of Sri Lanka is one of disparities on a number of accounts. It is commonly misunderstood as one between a terrorist group and a legitimate state, and its status as Asia’s longest continuing civil war—lasting 26 years—with deeply rooted ethnic tensions is not properly considered by the United Nations, the United States, or any other nation.

The proscription of the LTTE as a terrorist organization by the U.S.—followed by the U.K., the EU, and others after September 11—has created a diplomatic imbalance on the island, legitimizing the Sri Lankan government’s indiscriminate military attacks on areas populated by civilians without impunity. Since the government’s official withdrawal from a ceasefire agreement with the LTTE in 2008, its military campaign has internally displaced over 200,000 Tamils in the northeast of the island, killing and injuring thousands.

With its proclaimed goal of rooting out terrorism, the Sinhalese-dominated government of Sri Lanka has systematically destroyed and taken control of nearly all of Tamil Eelam. This is the minority Tamils’ homeland, rightfully defended and governed by the LTTE following the 2002 Norwegian-led ceasefire agreement.

Caught in the midst of the Sri Lankan army’s continued offensive against the LTTE, the displaced Tamil civilians are currently subject to moral degradation, hunger, and numerous acts of genocide. In the name of security, the government continues to effectively exploit the LTTE’s terrorist designation to confine Tamil civilians to “welfare villages,” a euphemism for internment camps surrounded by barbed wire.

In early March, 38 members of the U.S. Congress sent a joint letter to Secretary of State Hillary Clinton highlighting the fact that Sri Lanka is one of eight
Sri Lanka? Should the world rely on the words of the fox or the cry of the suffering sheep?

April 22

This writer probably never went to Sri Lanka after 1977 perhaps. This is the deep rooted problem in Sri Lanka, the singalese say and believe in quite the opposite to what Tamils say and believe. The solution is simple. Divide the country and let the singalese eat their cake and the Tamils eat theirs rather than watching in fear regardless of where they live. Their mouth is well shut and in open prison condition. If any reason open their mouth, there comes the white van and you will never see that Tamil again. There are two way people can live their life; one is live as you are told with your mouth shut and the second is live with freedom and pride. I wonder which way Mr Mahela would prefer.

Along with writing comments, readers have used the space as a platform to write their own opinion pieces on the situation, pleas to politicians, links to other articles and websites, etc.

Dear Veteran Senators, MPs and Politicians, I am writing to you to make an urgent appeal to act immediately on the escalating humanitarian crisis faced by the Tamils in Sri Lanka in the hands of Sri Lankan security forces. Today, a silent tragedy unfolds in Sri Lanka as the plights of Tamil civilians are disregarded by the International Community (IC).
August computer model of eWheel as a bicycle wheel
Counter is cross-cultural
Counter is phenomenal
Counter is accountable
Counter is arithmetic
Counter is operative
Counter is dynamic
Counter is decimal
  Counter is hexadecimal
Counter is functional
Counter is derivative
  Counter is per formative
Counter is inherent
B. The Human Grid as a Model

Electrical & Cultural Energy

1. eWheel to Human Grid: Iterations

2. The Human Grid:
   Closing the Gap in Rural Electrification

The basic structure of ///COUNTER stems directly from my investigations into small-scale energy access initiated by the eWheel Project and further developed through the Human Grid Project. After much research, I realized that the primary concern of providing energy access to rural areas in developing countries lies not in the generation of energy, but in its distribution. I therefore moved away from the technical problem of designing an energy-generating device and towards the far more complex socio-economic problem of designing an energy network; my focus thereby shifted from the eWheel as an object to the Human Grid as a process. This was a significant moment of truth in the sequence of events leading to the future formation of ///COUNTER as a system-oriented transmitter of cultural energy.
In developing the Human Grid Project, I learned:

I. Energy in the form of electricity is increasingly important for social development and cultural activity.

II. Electrical energy can be extracted from prevalent “free” sources, notably solar and wind.

III. This extracted energy can be contained and transmitted through a network of human activity to assume value (transactional) and usability.
Model

The network of electrical energy described by The Human Grid Project is not merely metaphorical to ///COUNTER, but is a scientific model, for which scientific modeling is generally defined as the process of generating abstract, conceptual, graphical, and/or mathematical models. The process of extraction and transmission of cultural energy can be understood in the same way as analogous to that of electrical energy within the human grid.

Scientifically, energy is operationally defined as the ability to do work. As a quality, energy is real as potential or kinetic, and as a quantity, it can be measured, transferred, and used, but is non-existent otherwise. In the process of conceptualizing the human grid, I realized that energy, including electricity, is relational and useful only in the process of transfer from one medium to another (transduction). Framing energy as fundamentally transactional in nature, while knowing it could also be stored in portable vessels in small amounts (potential), had a significant implication outside physics and engineering to the social realm: Energy has exchange value and could be used as a form of currency.
With energy serving as currency within the human grid, cultural energy in the form of work and labor also overlaps and flows identically with that of electrical energy. At any given moment during the process of transmission, the two forms of energy cannot be distinguished or separated from the concept of the other. Without the personal and economic transaction between two or more members of a community, electrical energy does not flow and is therefore practically non-existent. The same principle holds for cultural energy.

**Human Grid as Social Sculpture**

When Joseph Beuys made his first trip to America during the energy crisis in 1974, he brought with him an *Energy Plan for the Western Man* which was not exactly a “plan” for energy, but a project for dialogue between Beuys and his anxious and curious American audience. This plan produced an active, month-long event consisting of a series of talks and performances based on his vision: expanding the sphere of art to include all aspects and members of society. Beuys’ resulting “Energy Plan,” while referencing the energy of electricity and oil, pointed to the energy of creativity and social change set within a cultural dimension.
In the political sphere, even in 1920, Lenin’s national economic recovery and development plan for Russia was based on the central role of electrification to the success of socialism. In advocating the *GOELRO* or State Commission for Electrification of Russia, Lenin had stated, “Socialism is Soviet power plus the electrification of the whole country.”¹² Lenin’s vast network of electrical energy flow across Russia was not intended as merely a pre-condition to economic development, but a deeply embedded symbol and component of the cultural activities and processes of socialism.

The thematic association of electrical energy with cultural energy is prevalent throughout Beuys’ work and has been heavily influential in my conception of a human grid and consequently with ///COUNTER as an artistic system. Beuys’ works such as *Battery* and *Honey Pump* – where energy storage and flow are underlying themes – are relevant conceptual models for thinking of ///COUNTER as a kind of active sculpture in both receiving and transmitting multiple forms of cultural energy.
The idea of energy flow within Beuys’ conception of art moves beyond sculpture as object into sculpture as a social system. The flow of cultural energy as the producer of change is implicit in Beuys’ theory of Social Sculpture:

My Objects are to be seen as stimulants for the transformation of the idea of Sculpture or of art in general. They should provoke thoughts about what sculpture can be and how the concept of sculpting can be extended to the invisible materials used by everyone.

THINKING FORMS – how we mold our thoughts or SPOKEN FORMS – how we shape our thoughts into words or
SOCIAL SCULPTURE – how we mold and shape the world in which we live:
SCULPTURE AS AN EVOLUTIONARY PROCESS;
EVERYONE AN ARTIST.
That is why the nature of my sculpture is not fixed and finished. Processes continue in most of them: chemical reactions, fermentation, color changes, decay, drying up. Everything is in a STATE OF CHANGE.
1. **eWheel to Human Grid: Iterations**

*The eWheel (Iteration 1): Image of Labor*

My original image of a child pulling an “electric wheel” was intended with some irony and absurdity - but for a brief moment I thought otherwise. During this moment, I looked at the technicalities of an electric wheel being dragged by a human to generate energy and came to the conclusion that it is not sustainable nor appropriate for the human body.

*The eWheel Project (Iteration 2): Prosthetic*

The eWheel Project is a critical investigation into the small-scale production of energy where there is little or no access to a power grid but the need for electricity is high. This concept originated within the context of the MIT Visual Arts Program, and developed using the resources of MIT’s technological and socially responsible programs and departments. The project considers the research, development, and deployment of an “eWheel”: a simple device that can be used to generate small outputs of electricity using human muscle power as the primary source.
In its current state, the eWheel is attached as a replacement to the front wheel of a standard bicycle, increasing both mechanical efficiency and allowing for energy to be generated (and stored) using the bicycle’s ordinary movement from one location to another.

This device is not unlike existing hub dynamos, with the addition of an integrated energy storage/retrieval unit. The challenge and innovation of the project is to develop a prototype in which the wheel, generator, and storage unit are all considered as a single, efficient, and lightweight portable system. The eWheel is designed for use with similar units capable of consolidation as an overall physical and economic system of use and exchange. Even this recent and more progressive version is not a conclusive response, and so our investigation continues.

**The eWheel Project (Iteration 3): Towards a System**

A Human-Scale Response to Energy Access: An Integrated Solution for Generating, Storing, and Distributing Small Amounts of Energy
The United Nations Development Program estimates that “more than 2 billion people suffer from energy constraints that limit their opportunities for economic development and improved standards of living.” The global problem of energy access is dynamic and multidimensional, so that any proper response should be equally as complex and layered to offer reliable power to rapidly growing populations in the developing world. The process of initiating and expanding the energy infrastructure into isolated and remote areas is, however, a slow one. During this transitional period, a considerable number of communities in rural areas typically become economically marginalized and impoverished from lack of proper access to electricity sources basic and vital to the functions of daily life.

The eWheel Project is designed to address this “transitional moment” as ongoing in rural areas by bridging the gap between available technologies and the lack of energy to make use of them. As an intermediary solution to larger-scale energy networks, the eWheel Project is an integration of the broad range of human movement within rural areas by means of an innovative technological object.

The project first considers the existing network of cycling-
How can 1 kWh be conveniently stored?

1 kWh of energy could be stored using an ultracapacitor. With a projected energy density of 1 MJ/kg, an ultracapacitor weighing less than 3.6 kg could store as much as of 3600 kJ of energy.

Current ultracapacitor technology exists only in limited forms, however, research on ultracapacitor trends conservatively suggests that within 3 to 5 years, the estimated energy density of ultracapacitors will be three times that of Lithium-ion batteries at nearly half the price. The evidence for this trend materializing sooner, rather than later, is evidenced by the replacement of Li-ion batteries in hybrid cars by manufacturers such as EEStor. While these replacements are currently only in testing stages, the results are promising. What makes the Human Grid Project optimistic is that the energy needs of an electric car are far beyond levels necessary for basic rural needs, and so the project anticipates capitalizing on research developments far earlier than the industries for which they were originally designed.

1 kWh = 3.6 kg

Based transportation common to so many rural areas to be an untapped source of usable energy. With this observation, the project proposes an “eWheel”: a simple device that can be attached as a replacement to the front wheel of a bicycle to generate and store a considerable level of energy in the course of the vehicle’s normal movement from one location to another.

The eWheel’s process of generating potential energy by integrating, or piggy-backing, onto the prevalent and familiar movement of bicycle-type vehicles, has multiple advantages. Most important of these is the creation of a micro-scale system of energy distribution by and for members of a small rural community. The energy stored within the capsules of the eWheel becomes a kind of local currency—a type of bank account—created and backed by the user’s labor.

The eWheel Project (Iteration 4): Transition to Human Grid

Promoting Small-Scale Energy Access

In areas without wire-based power infrastructures, the social and economic implications of stored energy to
create positive change are huge. The convenience of “stored electricity” is multiple, the most important being portability between locations and transferability between people.

The eWheel program is thus most importantly the distribution of energy storage cells that can be recharged by locally available solar- and wind-powered generators as well as by specially designed bicycle-based energy wheels powered by the rider.

Within the coming five to ten years, global market-driven innovations in ultracapacitor technology as an economically feasible and reliable method to store and retrieve portable electrical energy will far outpace the building of large-scale energy infrastructure in the poorest parts of the world. The market, however, will not address what is not potentially profitable. The eWheel Project considers these facts on their face as a compelling reason to promote the development and implementation of an intermediary solution for developing rural areas that can be made feasible by operating on a human scale.

The method introduced by The eWheel Project seeks to increase energy access while promoting and sustaining
What is an eCell?

An eCell is a modular energy storage vessel engineered to be lightweight, durable, cheap and easily mass produced. The main component of the eCell is an ultracapacitor capable of storing 1kWh of electricity and weighing about 3.6 kg.

Using ultracapacitor technology, an eCell has:

- High calender-life
- Extremely low charging time (several seconds)
- Virtually unlimited use, without degradation

An eCell represented as a 12-inch, 3.6 kg disk with electrical terminals on top and bottom.

the economic and social growth of underserved rural communities. In designing a feasible method for the production, storage and distribution of small-packet energy in emerging rural areas, the eWheel Project is the design of a program that will:

A. Increase energy storage as well as decrease redundancies and inefficiencies in energy production.

1. Increase the distribution of energy created by centralized and local solar and wind generators;

2. Use existing bottom-up projects such as stationary bicycle-based generators more effectively as potential chargers;

3. Allow energy from solar to be used at night, as well as wind energy on non-windy days.

B. Implement a ‘wireless’ system of energy distribution by means of portable and modular storage cells.

1. Operate a socially coordinated system of sharing energy through exchange and transfer;
2. Promote income generation and use of stored energy as a substitute currency to money;
3. Create a new service for exchange (money or barter).

C. Introduce and promote the production and storage of energy using existing bicycles in motion.

1. Store energy produced during existing bicycle movement – taxi, delivery, personal transportation, etc.

2. The process of delivery and generation of energy combined in a single process.

3. eWheel as a catalyst and exemplar of a device that can be used with common bicycles to reliably generate and store energy while in motion.

D. The Storage Cell – Emergent Technology of the Ultracapacitor

The Project looks towards the highly researched and promising technology of ultracapacitors as a replacement for traditional lithium-ion batteries. Currently, ultracapacitors are already in use in numerous industrial and commercial applications to supply power to electric vehicles. Companies such as EEStor are already at

December online platform for eWheel research
the stage of producing low-cost, high-energy density ultracapacitors with energy densities of 1MJ/Kg. These are electrical energy storage units. Even operating at its lowest technological potential, the benefit of such a system of storage can be multiplied and adapted to meet a range of energy needs.

As in capacitors, ultracapacitors store energy in an electrical field between two closely spaced conductors, or plates. When voltage is applied, an electric charge builds up on each plate.

E. The technology is highly applicable to rural use, with a list of benefits:

1. Transportable
2. Reduced charging time
3. Durable
4. Countless charge cycles; even when charged numerous times per day, there is no degradation in quality.
5. Advantage of available surface area vs. weight, with nearly the same minimal proportions as a book or laptop.
6. Charging in a matter of minutes:
7. Availability of charging: users could charge at a
centralized wind-powered station, not unlike filling up a bucket at a well.

As modular lightweight units, the cells can be stacked on top of each other to obtain the required power for varying needs, as well as easily transported from one location to another.

F. Conclusion

More than anything else, labor and time are two resources abundant in virtually any rural developing community.

The design encourages the increased use of solar, wind, and existing bicycle-based power generation (both stationary and mobile), as well as other sources of available power.

The project in essence is then to incentivize the flow of energy using modular and portable storage vessels.

The eWheel/Human Grid Project (Iteration 5): Energy KIT

IAP Winter 2009 with Rachel Cheney and Jennifer Tran (Paid UROPS – Funded by Deans Grant IAP)
The Energy Kit, or eKit, is the most recent and hands-on development of the eWheel Project. It is a kit of parts to be used with a standard bicycle to generate and store small amounts of electrical energy. The use of energy kits by a community is intended to initiate the process for a larger-scale ‘wireless’ energy network as described by the Community Grid Project.

The energy kit, above all, is an idea and not a specific product. Much like a medical kit, the exact make and type of components of the energy kit can vary depending on availability, power requirement of appliances, country of use, etc. An in-progress “proof of concept” for an energy kit includes the following off-the-shelf components:

1. A small generator
   The generator is a widely available standard bicycle dynamo: Tung Lin (manufacturer) Dynamo - 12 volts, 6 watts.

Within the concept put forth by the Community Grid Project, the bicycle dynamo as a generator will be complementary to the more powerful wind generator, solar panel, and grid power.
2. A storage cell
The energy storage cell is a Maxwell Technologies (manufacturer) Boostcap Ultracapacitor - 15 volts. The use of an energy storage cell to store energy for later use is the single most important idea of the energy kit – and is the subject of further interest and research.

3. Supporting Components
The supporting components are a carrying case that can easily be attached to a bicycle as well as a set of 12V male/female adapters to connect to small appliances.

*The eWheel/Human Grid Project (Iteration 5): Energy KIT*

IAP Winter 2009 with Rachel Cheney and Jennifer Tran (Paid UROPS – Funded by Deans Grant IAP)

The Energy Kit, or eKit, is the most recent and hands-on development of the eWheel Project. It is a kit of parts to be used with a standard bicycle to generate and store small amounts of electrical energy. The use of energy kits by a community is intended to initiate the process for a larger-scale ‘wireless’ energy network as described by the Community Grid Project.
The energy kit, above all, is an idea and not a specific product. Much like a medical kit, the exact make and type of components of the energy kit can vary depending on availability, power requirement of appliances, country of use, etc. An in-progress “proof of concept” for an energy kit includes the following off-the-shelf components:

1. A small generator
The generator is a widely available standard bicycle dynamo: Tung Lin (manufacturer) Dynamo - 12 volts, 6 watts.

   Within the concept put forth by the Community Grid Project, the bicycle dynamo as a generator will be complementary to the more powerful wind generator, solar panel, and grid power.

2. A storage cell
The energy storage cell is a Maxwell Technologies (manufacturer) Boostcap Ultracapacitor - 15 volts. The use of an energy storage cell to store energy for later use is the single most important idea of the energy kit – and is the subject of further interest and research.
3. The Human Grid

Closing the Gap in Rural Electrification
(co-written with Jason Rockwood as an entry to the Lemelson-MIT Student Prize)

In the developed world, the idea of empowerment likely connotes social imperatives such as advancing the rights of women or minorities, or improving oneself through self-help or coaching. The idea of empowerment isn’t likely to elicit thoughts of electricity. In the developing world, however, where access to a stable energy grid remains out of reach for most, the idea of empowerment is both abstract and concrete. Human development and electricity are intertwined, and the reality is that the lack of one declares the lack of the other.

This duality of empowerment permeates my life and work as a designer, artist, and architect. When I was a child in Sri Lanka, my family shared a radio among several neighbors, which we powered by pedaling a dynamo attached to a bicycle. Unlike in America, where the electricity flows into the radio from an unknown, unseen place, our electricity came from our own muscles. What was in America a simple act of leisure was for us a sweaty, breathless endeavor.
In the 1980s, a civil war broke out, and my family fled Sri Lanka. When I arrived in Toronto as an eight year old refugee, I was overwhelmed by the abundance of electricity. Even if my family was the poorest in Canada, it didn’t matter to me. We had the greatest luxury imaginable: unlimited access to electricity. The transition from Sri Lanka to Canada was one of the most profound events of my life motivating me to understand technology as a force for human development. I explored this relationship in detail as an architecture student at the University of Toronto.

When my studies at U of T ended, I worked as an architect at the design firm LO-TEK, converting shipping containers into mobile retail stores. While those projects were not inherently social, the experience taught me valuable leadership skills necessary for working in interdisciplinary teams. Because the containers were both public and mobile, I was responsible for ensuring that the designs met numerous complex code requirements for safety and transportation. This process required me to coordinate the efforts of a variety of designers, fabricators, and public representatives in achieving the vision set forth by the client.

How are Power Stations used?

Power Stations are set up as exchange services where empty eCells can be traded for charged ones for a monetary fee. Charged eCells could be readily available or dropped-off and picked-up at a later time. The station may be part of another business or service.
I came to MIT's Visual Arts Program because of the unique opportunity to study art and design in a technical environment. The transdisciplinary approach of the VAP led me to create the “eWheel Project”, a design for a self-contained unit for generating, storing, and distributing energy. The eWheel combines a wheel, a generator, and an ultracapacitor that I call the “eCell.” In the absence of energy in any form, the eWheel provides a complete solution for basic electricity.

It wasn’t long before I realized that the miracle of the eWheel Project was not in the way the eWheel generated electricity, rather, it was in how the eCells created discrete physical units of energy which could be exchanged, transported, and consumed as needed. The eCell is like the invention of the coin; its value is not in itself, but in the complex social and economic system which grows up around it. Depending on whether the eCell is empty or full, charged by physical labor, the grid, or an independent solar/wind station, the eCell can function simultaneously as a good, service, or unit of exchange. The eCells can be traded, sold, loaned, purchased, or bartered, backed by real value in the absence of money. The eCell is a vessel, carried from the community to a grid or power station then charged and carried home. This process of investing
human labor and time to transport physical containers of electricity is what I call The Human Grid, an innovative model for closing the gap between energy grids and under-served populations.

My inspiration in conceptualizing the implementation of this program is Muhammad Yunus, who won the Nobel Peace Prize for his work in microcredit. By offering poor people the slightest increase in monetary access, a chain reaction occurred which elevated standards of human development. Women, in particular, benefited from this system by being empowered to support themselves and their children. The eWheel Project extends the microcredit model by providing basic levels of access to clean, safe, and reliable energy, all of which are a necessary catalyst for industry and entrepreneurship.

An ideal location for testing the eWheel Project is Uganda. The average Ugandan lives on less than three dollars per day, and consumes around one kilowatt hour daily. Because of this extreme level of poverty, even a minor increase in energy access can potentially transform Ugandan lives. The most pressing concern is in reducing the use of burning biomass in the home for cooking and heating water, which causes thousands of deaths annually.

How are eCells used by a community?

eCells can be traded, sold, loaned, purchased, or bartered between members of a community. Empty eCells, for example, can be traded for charged ones for goods such as produce.
due to toxicity and smoke inhalation. The investment of time and energy required to transport eCells to grid or power outlets is a nominal trade off for energy which is clean, safe, and reliable. Additionally, I suspect that free-market micro-ventures will spontaneously develop to fill the needs of the emerging micro-energy economy.

The eWheel Project has been a powerful illustration of the collaboration that is possible when a research institution pursues social goals. This project has inspired the tireless participation of numerous students, collaborators, and consultants. In particular, the project has provided a venue for collaboration between graduate level students and young undergrads, via the UROP program. Like any technology, the vision I have outlined here is not inevitable. There is nothing inherently revolutionary in ultracapacitors; rather, the intentional development of a social strategy for these technologies must be cultivated over the next few years, so that they can be deployed the moment they are commercially viable. Fund raising, ultracapacitor research, and community organizing will all be necessary to see the Human Grid reach its full potential. It is for this reason I hope to win the Lemelson Prize; to gain support, publicity, and expertise for making this revolution a reality.
Counter is consistent
Counter is corresponding
Counter is diametric
Counter is reductive
Counter is adaptive
Counter is didactic
Counter is secure
Counter is fail-safe
Counter is concrete
Counter is consciousness
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Counter is acute
Counter is imaginative
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Counter is formal
Counter is interactive
Counter is potential
Counter is stable
Critique Into Action or Art As Service

Han Haacke’s role as an artist framing statistics and other information as an act of critique remains a significant precedent for my work. In their essay *Social Science and the Work of Hans Haacke*, sociologists Howard S. Becker and John Walton perceive Haacke’s artistic method to address sociological issues as more effective than those of sociologists themselves. While Haacke operates effectively towards the larger spheres of society in his art, his critiques are only directed towards individuals and organizations with ties to large corporations, rather than the corporations themselves. The effects of his critique, while provocative within multiple cultural spaces such as galleries and museums, remain minimal in addressing or changing the behavior of the corporations in question.

Years before Haacke’s work on social systems and Beuys’ notion of the social sculpture, artist and writer Jack Burnham at the Massachusetts Institute of Technology’s Center for Advanced Visual Studies had already suggested the importance and development of a “systems approach” to sculpture and the visual arts in general. Burnham suggested that sculpture as object was an inert artifact that would eventually be replaced by “systems consciousness” as a cultural expression. Burnham’s
system of cultural expression was, however, concerned only with the relation of art to technology and science, but not to the social sciences such as economics.

Mel Chin’s work in early 1990’s exemplified new developments of art’s more comprehensive relation to broader systems such as ecology and economics. Chin’s work, directly considering the environmental, political, and economic aspects of site, is effective not only as social commentary but also in producing direct change for the communities he works with. In the project *Revival Field*, working with scientists, Chin brings together sculpture and environmental technology to create a cleaning system—through “hyperaccumulators”—for areas contaminated by dangerous levels of heavy metals. Although such works are powerful at the moment of action, as long-term solutions they can easily become merely suggestive as subordinated by the prevalence of the very forces they resist.

*Art as Service*

While such works as Haacke’s, Burnham’s, and Chin’s continue to be influential towards my conception of art and future practice across multiple socio-economic
sites, their methods remain limited in directly engaging the hierarchically active structures of commerce. Both recent and contemporary artists fail to understand that corporations, by reason of their monopoly on economic activity, are nodes within a network to be visited, understood, and negotiated with, rather than only critiqued or slammed. The intention in creating ///COUNTER as a corporation is not to disengage from critical artistic practice, but to use the powerful structure of the corporation and the socio-economic network it is embedded in to act beyond social critique towards the sphere of cultural service.

Today’s creative agencies such the Global Business Network are implicitly critical and, while not considered a form of art, do carry out what I think are acts of art using the existing network of corporate and cultural relations. Its active members include various artists, journalists such as Esther Dyson, and theorists of social technology such as MIT’s Sherry Turkle. The Network states its goal as ‘helping organizations adapt and grow more effectively and more responsibly in the face of mounting uncertainty — whether it’s uncertainty about their future, the future of their industry, or the future of the world at large.’

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The Human Grid Project: Storage Cell

The Human Grid Project is a long term clean renewable energy plan for developing countries. It emphasizes electricity not only as a total component for development, but also as a small-scale, marketable product in rural communities, thus further concludes the spread of accessible energy, throughout poor and remote areas.

The main planned components of this project are electricity generation and storage cells. The generation should run on cheap or free resources (wind, solar, or biomass) and be composed of cheap accessible technologies. They will range in scale from community-level to individual supply. The electricity generated with these machines will be stored in uniform energy cells.

These cells are one of the unique aspects of the Human Grid Project. They should be sturdy, cheap, easy to use, easy to transport, quick to charge, and able to store a significant amount of electrical power. This report summarises the design and implementation of circuits to allow for the use of Ultracapacitors as a main energy storage component in the cells for the Human Grid Project. The following sections explain the theory of operation, the specific circuits implemented, and suggestions for future developments.

Theory of Operation

The first decision made in regards to the human Grid Cells is that of primary energy storage. Rechargeable batteries were discarded because they are expensive, slow to charge, generally toxic, and have a limited lifespan. Instead of batteries, ultracapacitors were chosen for their energy storage. The following design was an assumption that is certainly on the market. However, the adoption of the ultracapacitors in these cells required that they become cheaper and more readily available before the Human Grid Project is implemented in communities in developing countries. Ultracapacitors are lightweight, have a theoretically unlimited lifespan, and are quick to charge compared to batteries. If they were to become cheaper and more readily available, they would be the ideal candidate for use in the potential future large-scale production.

The design explored in this report uses ultracaps for two different energy storage modules. This is an artifact of the initial assumption that the cell would be charged using mobile bicycle generators, which offers output of a fixed maximum certified 12V voltage. The energy buffs circuit holds the high power supply voltage at 15V and allows the primary storage to charge to 12V. Once a steady supply voltage has been established the primary energy storage capacitor is allowed to charge to its maximum, 15V. The voltage is achieved using a boost converter. Controlling means ensures that the capacitor is never overcharged.
In his essay *Attractors: Notes on Aesthetics and Network Form*, research theorist Brett Stalbaum suggests the corporation become a future-systems-based art:

As autocatalytic art attractors form new, mutually beneficial networks of heterogeneous elements, they do not constitute a radical challenge to homogenizing art hierarchies. Rather, they are producers of new materials to be sorted or meshed into increasingly novel forms that are compatible with the arts precisely because they emerge from adaptive non-linear processes. In short, this analysis can do much not only to explain the emergence of new fine art media, such as video and network, but to perhaps predict future systems-based art forms, such as legal art, genetic engineering art, and the corporation as art.19

Within an emerging network society, artists as critic and cultural producer can no longer be considered independent of the very network of people and organizations they are critical towards. The sovereignty of much current art work can be questioned while at the same time, the capacity for the artist to direct action towards social service can be strengthened.
The founder of the International Committee of the Red Cross, Henry Dunant, had a major impact on Beuys’ vision of the role of art. This realization makes me wonder if art, functioning as a symbol of conflict, could provide emergency service to relieve a global array of wounded social bodies.
Counter is unlimited
Counter is high-tech
   Counter is electronic
Counter is low-tech
   Counter is ancient
Counter is freedom
Counter is modern
Counter is generative
Counter is notational
Counter is referential
Counter is specific
Counter is broad
   Counter is defensive
Counter is cumulative
Counter is aggressive
Counter is odd
Counter is even
Counter is demanding
Counter is eventful
Relevancy Rhizome: A Model of The Cultural Corporation

Appendix
Counter is secular
Counter is scientific
Counter is participatory
Counter is public
Counter is democratic
Counter is contemporary
Counter is lucid
  Counter is exploratory
Counter is coherent
The Human Grid Project: Storage Cell

The Human Grid Project is a long term clean renewable energy plan for developing countries. It emphasizes electricity not only as a vital component for development, but also as a small-scale marketable product in rural communities; this will further incentivize the spread of accessible energy throughout poor and remote areas.

The main planned components of this project are electric generators and storage cells. The generators should run on cheap or free resources (ie wind or sunlight) and be composed of cheap accessible materials. They will range in size from community-wide to individual-supply. The electricity generated with these machines will be stored in uniform energy cells.

These cells are one of the unique aspects of the Human Grid Project. They should be sturdy, cheap, easy to use, easy to transport, quick to charge, and able to store a significant amount of electrical power. This report summarizes the design and implementation of circuits to allow for the use of ultracapacitors as a main energy storage component in the cells for the Human Grid Project. The following sections explain the theory of operation, the specific circuits implemented, and suggestions for future development.

Theory of Operation

The first decision made in regards to the Human Grid Cell is that of primary energy storage. Rechargeable batteries were disregarded because they are expensive, slow to charge, generally toxic, and have a limited lifespan. Instead of batteries, ultracapacitors were chosen for main energy storage. The following designs use an ultracapacitor that is currently on the market. However, the adoption of the ultracap in these cells requires that they become cheaper and more easily available before the Human Grid Project is implemented in communities in developing countries. Ultracaps are lightweight, have a theoretically unlimited lifespan, and are quick to charge compared to batteries. If they were to become cheaper and more readily available, they would be ideal candidates for use in the potential future large-scale production.

The design explored in this report uses ultracaps for two different energy storage modules. This is an artifact of the initial assumption that the cell would be charged using mobile bicycle generators, which often output a 5V maximum rectified DC voltage. The energy buffer circuit holds the logic power supply voltage at 5v and allows the primary storage to charge to 5V. Once a steady supply voltage has been established the primary energy storage capacitor is allowed to charge to its maximum, 15V. This voltage is achieved using a boost converter. Controlling logic ensures that the capacitor is never overcharged,
thus protecting the expensive ultracapacitor and increasing its lifespan. The circuits overviewed here are explained in more detail in the following section.

**Circuits Implemented**

This section explains in greater detail the circuits implemented and the importance of these circuits to the operation of the Human Grid Cell.

**Full Wave Rectifier**

The full wave rectifier is the interface between the Human Grid Cell and the generators used to charge it. This circuit would be necessary for cells charged directly by either a bicycle generator or another low-voltage alternating current generator. For alternating current generators with greater signals, a transformer would be required to step down the voltage before it reaches this circuit in order to protect the later components. For direct current generators, this circuit should be foregone completely, since the diodes will cause some unnecessary loss in this case.

The full wave rectifier turns the alternating current output of the bicycle bottle generator into a direct current signal appropriate for powering logic chips. A schematic for this circuit is shown in Figure 1. This rectifier assumes a one or two phase alternating current source, though it can be easily altered to allow for a multiphase source by adding more diodes.

This circuit was designed and tested on a commodity bicycle bottle generator. Once it was established that it worked and that the capacitors were able to steady the 5V output enough to safely run logic chips, it was not used in later testing. This is because of the inconvenience of turning the bottle generator without a dedicated testing motor.

![Figure 1](image.png)

*Figure 1.* The full wave rectifier circuit takes an alternating current input source, then charges up a bank of 5V capacitors to create a DC power source for the logic chips used in other circuits. The diodes used are 1N4001 and the capacitors are 2F, 5V (Maxwell PC-5.5).
**Boost Converter**

The boost converter is the interface between the buffer energy storage and primary energy storage modules. It allows a small DC input voltage to charge up the 15V primary storage capacitor. A schematic for the circuit implemented is seen in Figure 2 and a schematic for the control circuit is seen in Figure 3.

![Figure 2](image.png)

*Figure 2. The boost converter is a canonical DC-DC switching power converter. In a boost converter, Vout>Vin. In this case, Vout=15V and Vin=5V. The ultracapacitor used was the Maxwell BPAK0052P015. The two MOSFETs are connected in parallel in order to spread the heat generation that occurs with only one MOSFET. Another solution would have been to change MOSFETs to decrease the on-state resistance or to add a heat sink to protect the device. These solutions were not implemented because the parts were not available.*

This circuit runs on the assumption that the input voltage was a steady 5V, but simple changes can be made in order to allow for greater or lesser input voltages as long as they are between 0V and 15V. If the input voltage is greater than 15V, an entirely different converter topology, such as a buck converter, is required. Additionally, if the input voltage is assumed to be changing from less than to greater than 15V while the circuit is running, a buck-boost or similar topology would be superior. Another improvement may be the reduction of the switching frequency, which would decrease the power lost through the MOSFETs with each switching cycle, but would also require a larger inductor.

The control circuit that commands the behavior of the boost converter uses an analog timer chip to generate a pulse width modulation (PWM) signal that commands the output voltage of the converter. As the duty ratio of the PWM signal increases, so does the output of the boost converter. The duty ratio is chosen with the potentiometer connected to pin 3 of the LM555; the duty ratio is approximately 0.33, so that the inverted signal that is sent to the gates of the MOSFETs allows the output to be 15V. This duty ratio is enforced so the maximum possible voltage across the capacitor will not cause overcharge damage. The nonlinear feedback controller essentially turns off the converter once the capacitor is fully charged.

While the control circuit allows for absolute safety in regards to overvoltage protection, it also increases the time required for the capacitor to fully charge. A current controller with a proportional-integral-derivative (PID) compensator might be a better choice since it would allow for different input and
output voltages if required. The tradeoff with this type of controller is the complexity of the circuits required in implementation.

![Diagram](image)

**Figure 4.** The boost converter control circuit uses an analog pulse width modulation generator and simple logic. This design implements a very simple feedback scheme: when the output voltage is less than 15V, the control circuit generates a PWM signal that would allow the converter to output 15V to a resistive load and when the output voltage reaches 15V, the circuit turns off. This keeps the 15V ultracapacitor from damage due to overcharging, but it also increases the time required to charge the capacitor since the voltage the converter attempts to generate across it is limited at all times.

### Human Interface

The human interface circuit allows the user to see the current state of the capacitor. A schematic of the human interface circuit is shown in Figure 5. Light Emitting Diodes (LEDs) light up to inform the user that the primary energy storage module is either being charged (yellow LED is on) or is already fully charged (green LED is on). These LEDs give the user confidence that the cell is working as it was intended to do. This interface is efficient, only telling the user what the most important status updates. One downside of such a simple interface is that it does not allow the user to command the storage cell. There might be a switch or dial incorporated into the human interface that allows the user to select a type of generator or different modes of control.
Figure 5 shows the schematic for the human interface circuit. Once $V_{out}$ reaches 1V, the yellow LED turns on, indicating that the cell is charging. Once $V_{out}$ reaches 15V, the green LED turns on, indicating that the cell is fully charged.

**Future Development**

These circuits fulfill their purpose in controlling the charging of the primary storage module in the Human Grid Cell. They could, however, benefit from further development. The increased complexity inherent in multilevel analog control could be circumvented in the case of the control of the charging ultracapacitor. Adding a microcontroller such as the Microchip PIC16F128 would decrease the part count and the hardware complexity of the control circuit. The PIC can be programmed in high-level coding languages, such as C; this allows more flexibility with fewer hardware alterations. The PIC also includes PWM hardware and sensors useful in the more complex feedback loops. The microcontroller would also allow for easy human interaction – more LEDs could give the user specific messages and a switch or dial interface would allow the user to interact more meaningfully with the cell, telling it how and what to charge. These improvements are fairly straightforward and would increase the benefits the Human Grid Cell might bring to its users. Not only will they make it faster, cheaper, and smarter, but also more interactive.
Notes

1. *The eWheel Project* considers the research, development and deployment of an “eWheel”: a simple device that can be used to generate small amounts of electricity using human and animal muscle power as the primary source. *The Human Grid* is the evolution of the *eWheel* into a process of investing human labor and time to transport physical containers of electricity as a model for closing the gap between energy grids and isolated rural communities.

2. This title is borrowed from *Free Exchange: Pierre Bourdieu and Hans Haacke*.

3. First of six lectures delivered at the University of California at Berkely, Fall 1983.

4. *Fearless Speech*, p.108

5. *Free Exchange*, p.108

6. *Framing and Being Framed*, p.61


8. Text appropriated from a General Electric product brochure. GE is replaced with ///COUNTER.


12. Lenin, *Collected Works*, vol. 31, page 516


14. *Framing and Being Framed*, p.65

15. *Art As Inquiry*, P.68

16. pruned.blogspot.com

17. www.gbn.com

18. wikimedia.org/wikipedia/commons/f/f6/ICRC_Logo

19. www.c5corp.com
Counter is to answer
Counter is to challenge
Counter is to contravene
Counter is to counteract
Counter is to match
Counter is to construe
Counter is to survey
Counter is to meet
Counter is to oppose
Counter is to return
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Counter is to react
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Counter is to articulate
Counter is to decipher
Counter is to translate
Counter is to reveal
Counter is to define
Counter is to refine
Counter is to map
Counter is to oscillate
Counter is to balance
Counter is to predict
Counter is not cryptic
Counter is not symbolic
Notes on Photographs 1-50

01. photograph of *Honest Labor*, Chris Burden
(Beyond the Limits, p.101)

02. “desperate for wood to burn, a couple chop up the roots of a felled tree”, by Tom Stoddart
(iWitness, p.99)

03. photograph of *When Faith Moves Mountains*
Francis Alys in collaboration with Cuauhtemoc Medina and Rafael Orteg
(Francys Alys, p.53)

04. “coal-picker” by Rob Gnant
(So Many Worlds: A Photographic Record of Our Time, p.204)

05. “African laborers moving boulder” by W.Eugene Smith
(Eugene Smith Photographs, p.2240)

06. photograph of *Paradox of Praxis*, Francis Alys
(Francys Alys, p.cover)

07. “Breaker Boys”, by Lewis Hine
(Documentary Photography, p.57)

08. “Artists at the Fourteenth Vienna Sezession exhibition”
photographer unknown
(Lives of the Great 20th-Century Artists, p.76)

09. “Untitled Film Still #3”, Cindy Sherman
(Cindy Sherman, p.154)

10. “at the ZIS factory”, by Henri Cartier-Bresson
(Documentary Photography, p.141)

11. photograph of “peasants celebrating land expropriation”, by Sebastiao Salgado
(Migrations: Humanity in Transition, p.305)

12. photograph of Standing Mitt With Ball, Claes Oldenburg
(Oldenburg: Six Themes, p.90)

13. photograph from Migrations, by Sebastiao Salgado
(Migrations: Humanity in Transition, p.178)

14. “Robert Morris with Carolee Schneemann”, photographer unknown
(Conceptual Art, p.69)

15. photograph of *B 36 Box Bolide 01*, Helio Oiticica
(Helio Oiticica: The Body of Colour, p.114)

16. “conscripts of the Chinese Nationalist Army walk through Chungking on a labor detail”, by Carl Mydans
(Carl Mydans, Photojournalist, p.75)

17. “Manufacturing No.17”, by Edward Burtynsky
(www.edwardburtynsky.com)

18. “Outburst”, by Jeff Wall
(Jeff Wall, p.181)

19. photograph of *Delay Delay*, Joan Jonas
(Joan Jonas: Scripts and Descripts, 1968-1982, p.38)

20. “work in progress at the repair wharf”, by Ara Guler
(A Photographical Sketch on Lost Istanbul, p.86)

21. “girl carrying water in gasoline can”, by Edwin and Louise Rosskam
(FSA: The American Vision, p.153)

22. photograph of performance, Mierle Laderman Ukeles
(Conceptual Art, p.141)
23. “Vladimir Tatlin and students constructing model of Monument to the Third International”, photographer unknown
   Lives of the Great 20th-Century Artists, p.113)

24. “building the dam wall, Oberaar”, by Jakob Tuggener
   (So Many Worlds: A Photographic Record of Our Time, p.195)

25. photograph of 7000 Oaks, Joseph Beuys
   (The Image of Humanity, p.205)

26. photograph of prison workers, by Bruce Jackson
   (Killing Time: Life in the Arkansas Penitentiary, p.100.)

27. photograph of Cremaster 3, Matthew Barney
   (Cremaster 3, p.34)

28. “Building a Stairway”, by Francis Benjamin Johnston
   (Documentary Photography (Rothstein), p.28.)

29. photograph of Cremaster 3, Matthew Barney
   (Cremaster 3, p.36)

30. “steel cable carrier in marble quarry”, by Anita Niesz
   (So Many Worlds: A Photographic Record of Our Time, p.202.)

31. “on a barge on the Seine”, by Henri Cartier-Bresson
   (ibid. p.203)

32. photograph of 20 Pieces of Road Measuring 100 x 100 cm Pulled Up From the Ground, Santiago Sierra
   (Santiago Sierra, p.80)

33. photograph of The Hard Push, Chris Burden
   (Beyond the Limits, p.95)

34. “Coopers fitting head of wine cask”, by Russell Lee
   (FSA: The American Vision, p.114)
35. “shipbuilding in the port”, Rene Burri
   (So Many Worlds: A Photographic Record of Our Time, p.179)

36. “Oskar Kokoschka at work”, by Lee Miller
   (Lives of the Great 20th-Century Artists, p.81)

37. “Jean Dubuffet sculpting a piece of polystyrene”, by Kurt Wyss
   (ibid. p.276)

38. “women refugees carrying all their remaining possessions arrive at Kibumba camp”, by Tom Stoddart
   (iWitness, p.125.)

39. “family making garters at home”, by Lewis Hine
   (Documentary Photography, p.62)

40. “David Smith at his Studio”, by Ugo Mulas
   (Lives of the Great 20th-Century Artists, p.289)

41. “Claes Oldenburg walking down the street with a monumental tube of toothpaste”, by Hans Hammarskiold
   (ibid. p.323)

42. “women carry water through the destroyed city of Anjar” by Tom Stoddart
   (iWitness, p.209)

43. photograph of Joseph Beuys, photographer unknown
   (The Image of Humanity, p.148)

44. “negro maid”, by Jack Delano
   (FSA: The American Vision, p.192)

45. “at one of the rolling machines in the Washington Tinplate-Company”, by Jack Delano
   (ibid., p.206)

46. photograph of Colossal Ashtray, Claes Oldenburg
   (Oldenburg: Six Themes, p.55)

47. photograph of Intersection, Richard Serra
   (Richard Serra: Intersection, p.80)

48. “oiling the gears of the huge drums that dry the coal after washing”, by John Collier Jr.
   (FSA: The American Vision, p.307)

49. “Robert Morris and visitors interacting with works in the initial installation”, photographer unknown
   (Conceptual Art, p.174)

   (Migrations: Humanity in Transition, p.406)
Counter is not dishonest
Counter is not trivial
Counter is not obtuse
Counter is not false
Counter is not morality
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Counter is not personal
Counter is not deceptive
Counter is not secretive
Counter is not confidential
Counter is not private
Sources

On Joseph Beuys


Thistlewood, David (ed.). Joseph Beuys: Diverging Critiques. Liverpool: Liverpool University Press and

On Documentary Photography


On Hans Haacke


Counter is not esoteric
Counter is not romantic
Counter is not monumental
Counter is not sentimental
Counter is not opaque
Counter is a verb
Counter is an adverb
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Counter is a machine
Counter is a person
Counter is an idea
Counter is a collective
Counter is a system
Counter is a language
Counter is a tool
Counter is a technique
Counter is a medium
Counter is a surface
Counter is a guide
Counter is a choice
Counter is a map
Counter is a record
Counter is a word
Counter is an abacus
Counter is a counter
Counter is a sign
Counter is a signal
Counter is a think-tank
Counter is an application
Counter is an operator
Counter is a computer
Counter is a calculator
Counter is an instrument
Counter is a measure
Counter is a device
Counter is a mechanism
Counter is a display
Counter is an evidence
Counter is an invention
Counter is an operation
Counter is a design
Counter is a relation

Select sources


General sources


Counter is a metaphor
Counter is a construction
Counter is a union
  Counter is a referent
Counter is an archive
  Counter is a museum
Counter is a default
Counter is an approach
Counter is a dictionary
  Counter is a mode
Counter is a method
Counter is a process
Counter is an engine
Counter is a memory
Counter is a spectrum
Counter is a path
Counter is an order
Counter is a means

Counter is not an end
Counter is not a tendency
Counter is not a trend
Counter is not a proposition
Counter is not an alternative
Counter is not a monument
Counter is not an presumption
Counter is not a myth
  Counter is not a fashion
Counter is not a style
Counter is not a belief
  Counter is not a movement
Counter is not an aesthetic
Counter is not an ideology