



## Too Late to Stop Humanity's Collapse?

by Chris Clugston

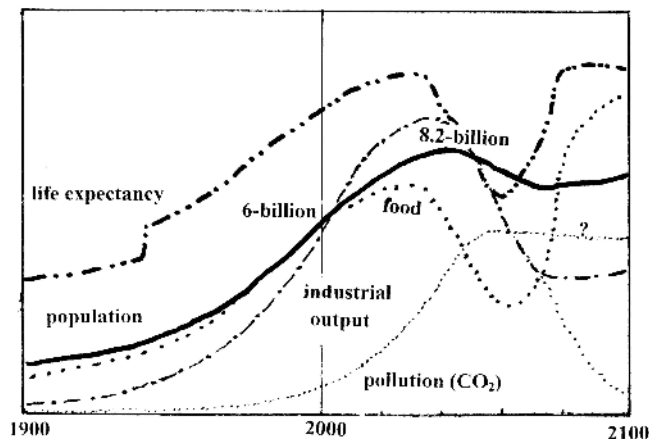
*As a consequence of our dependence upon non-renewable natural resources (NNRs)—finite and non replenishing fossil fuels, metals, and non-metallic minerals that enable our industrialized existence—we are both the hapless victims of our self-inflicted predicament and the tragic perpetrators of our self-inflicted demise. (Continued next page, “Enablers of our high population”)*

*Editor's note: Predictions of the future are almost always wrong. One well-known prediction of the future of the human race is “Limits to Growth,” the book commissioned by the Club of Rome, and written by Meadows, Meadows and Rand in 1972. However, it was so wrong that when the same authors, twenty years later, came out with a corrected and improved set of predictions in “Beyond the Limits,” the predictions were ignored.*

*“Beyond the Limits” showed us that we must tackle all our problems at once, from food production, through pollution abatement to new forms of energy production. If we didn't, catastrophe would overtake us probably by the year 2030, give or take, say, 15 years.*

*Well, we did nothing, of course, and “Beyond the Limits,” in scenario 12, forecast what would happen in that event. So far the predictions seem to have been accurate. Here are the predictions of Scenario 12 in graphic form:*

Scenario 12



*Environmentalists now tell us that we cannot avoid the catastrophes that taking no action will cause us. Little was known about climate change in 1992 when “Beyond the Limits” was published, but climate change could be considered a form of “pollution”—except that even in Meadow’s et al.’s worst predictions, we would have done something about pollution by 2015. And we have done something on a local scale, but almost nothing globally. So I have extended the line for “pollution” in the above graph to more realistically portray today’s situation.*

*Environmentalists see a means of reining in climate change, belatedly, by converting energy production from non-renewable energy sources (oil, coal, gas) to more sustainable renewable resources.*

*In the article below, Chris Clugston argues that production of energy with renewable resources will not solve our energy problem, not because of technological difficulties, but because of—well, read the article to find out.*

*At the end of his article, Clugston asks readers to suggest solutions to what he sees as an insoluble problem. I make the same request, and within space limits (articles of 700 words or less are best; all submissions may be edited) will print suggestions I receive. Let’s hear from you!*

### INSIDE

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## Enablers of our high population levels and living standards

The historically unprecedented population levels and material living standards associated with our modern industrialized existence are supported almost exclusively by our utilization of enormous and generally increasing quantities of non-renewable natural resources.

Non-renewable natural resources serve as:

- the raw material inputs to our industrialized economies;
- the building blocks that comprise our industrialized infrastructures and support systems;
- the primary energy sources that power our industrialized societies.

Non-renewable natural resources play three essential roles in enabling our industrialized way of life.

1. They enable use of renewable natural resources in ways and at levels needed to support our unprecedented population levels and material living standards. Examples include water storage/distribution systems (dams and pipes), and electricity generating/distribution systems (generators and power-lines). In the absence of these non-renewable resource systems, renewable resources of water and electricity could support only a fraction of today's human population.
2. Non-renewable resources enable the production and provisioning of infrastructure, goods, and energy that are inconceivable if we only used renewable resources. Examples include cars, airplanes, computers, skyscrapers, highways, gasoline stations, communication networks, wind turbines and nuclear power plants.
3. Non-renewable resources enable creation of enormous real wealth that supports our thriving middle-class population. This large

middle class did not exist in pre-industrial agrarian and hunter-gatherer societies dependent largely on renewable resources.

In sum, non-renewable resources enable the global economy and material well-being that underpin our high population levels. Non-renewable resources are critical in enabling our industrialized existence. They comprise approximately 95% of the raw material inputs to the U.S. economy each year.

In 2006, the U.S. used over 7.1 billion tons of newly mined non-renewable resources, which equated to nearly 48,000 pounds [22,000 kg] per U.S. citizen.

### Economic development dependent on non-renewable resource utilization

The tightly linked relationship between non-renewable natural resource utilization (earth resource input) is clearly demonstrated by America's ex-

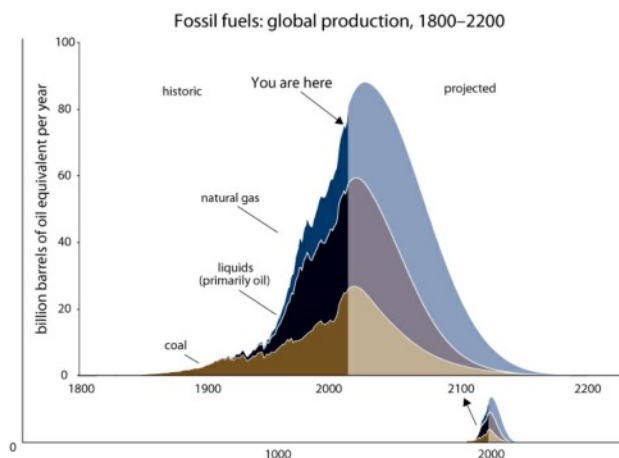
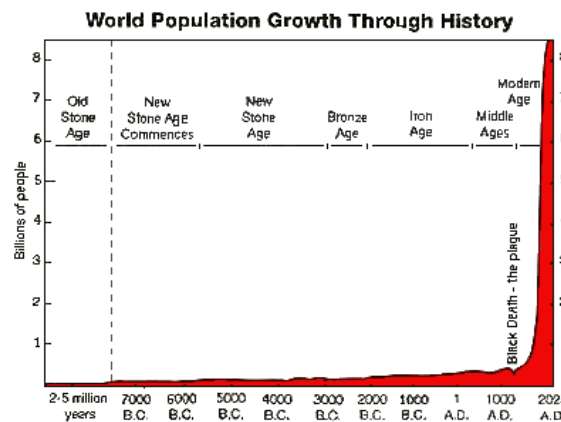
perience since the inception of its industrial revolution. Between the years 1800 and 2008, total U.S. non-renewable resource utilization increased by over 1600 times, from 4-million tons to 6.5-billion tons. As a result of this increase in non-renewable resource utilization, the size of the U.S. economy (Gross Domestic Product) increased by nearly 1800 times, from \$7.4-billion in 1800 to \$13.2 trillion in 2008.

Remarkably, the correlation between the increase in U.S. non-renewable natural resource utilization and the increase in U.S. economic output (GDP) during the past 200+ years is nearly one-to-one.

## Humanity's Self-inflicted Predicament

### Non-renewable Natural Resource Scarcity

Non-renewable resources are depleted almost exclusively through human exploitation. As their name implies, non-renewable resources are not replenishable; their persistent depletion results in scarcity. Scarcity results in high resource prices,



which in turn means non-renewable resources cannot meet the population's non-renewable resource requirements.

Episodes of temporary non-renewable resource scarcity have occurred during the “boom” periods of commodity “boom/bust” cycles since the inception of our industrial revolution over 200 years ago.

Historically, these non-renewable scarcity episodes culminated in sufficient economically viable non-renewable supplies being brought online to reduce prices to more affordable levels.

Since the beginning of the 21<sup>st</sup> century, however, we have experienced an episode of global non-renewable resource scarcity that is unprecedented during our modern industrial era in terms of its scope, magnitude and duration.

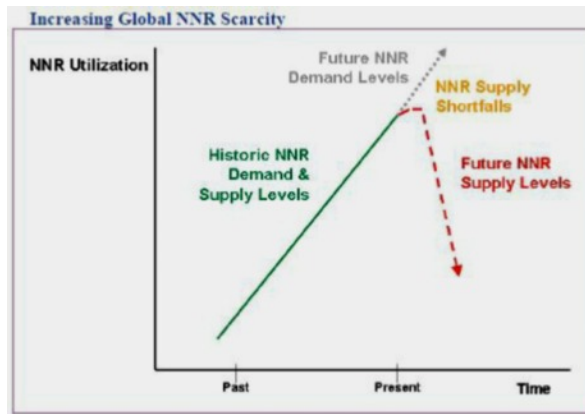
### Pre-recession Non-renewable Natural Resource Scarcity

Our persistent utilization of finite non-renewable resources, especially at levels required to perpetuate our industrial lifestyle, is unsustainable by definition. Epidemic global non-renewable resource scarcity is therefore inevitable.

The inevitable occurred in 2008 immediately prior to the Great Recession, when 63 of the 89 non-renewable resources that enable our modern industrial existence were scarce globally. These resources included aluminum, chromium, coal, copper, gypsum, iron ore, magnesium, manganese, molybdenum, natural gas, oil, phosphate rock, potash, rare earth minerals, titanium, tungsten, uranium, vanadium, and zinc.

Our quest for universal prosperity through global industrialization during the decades preceding the Great Recession had hastened the onset of the epidemic global non-renewable resource scarcity by causing a fundamental shift in non-renewable resource demand/supply.

- On the “demand side,” approximately 1 billion people occupied industrialized and industrializing nations during the mid/late 20<sup>th</sup> century. By the be-



ginning of the new millennium, as a consequence of the industrialization initiatives launched by China, India, Brazil, and other emerging nations in Asia, Africa, and Latin America, that number had increased to over 5 billion.

As a result, our levels of global non-renewable requirements, demand, and utilization increased extraordinarily and nearly instantaneously during

the early years of the new millennium. (Interestingly, despite these historically unprecedented increases, early 21<sup>st</sup> century non-renewable resource demand/utilization levels among the newly industrialized nations represented only small fractions of their longer-term requirements.)

- On the “supply side,” owing to persistent increasing exploitation since the inception of our industrial revolution, the quality associated with Earth’s non-renewable resources has been decreasing—i.e., remaining non-renewable resource deposits are generally few in number, smaller in size, less accessible, and of lower grade and purity.

Increasingly, the cost advantages derived from non-renewable resource exploitation, extraction, and processing technologies are failing to keep pace with the cost disadvantages attributable to exploiting the Earth’s lower quality deposits. The result is diminishing returns on non-renewable resource-related investments—i.e., each incremental dollar invested in non-renewable exploitation yields smaller quantities of economically viable non-renewable resources.

The unfortunate consequences associated with these shifting global non-renewable demand/supply dynamics and the resulting episode of epidemic global non-renewable resource scarcity was the Great Recession.

### Post Recession Scarcity

Since 2009, the industrialized and industrializing nations of the world have



attempted repeatedly to recover from the Great Recession through a seemingly endless barrage of fiscal stimulus (un-repayable debt) and monetary stimulus (money printing and interest rate suppression) programs.

Nascent economic recoveries failed in 2010, 2011, 2012, and 2013, however, as global non-renewable resource demand/utilization was throttled by persistently high and/or increasing non-renewable resource prices. Faltering global prosperity has become the new reality.

### Future Non-renewable Resource Scarcity

Some analysts contend that our current episode of global non-renewable resource scarcity is simply the result of a temporary, albeit protracted, commodity “super cycle.” They expect substantial quantities of high quality/low cost non-renewable resources to be brought online immediately and for the foreseeable future. This will suppress non-renewable resource prices and end our current episode of non-renewable resource scarcity.

Although it is unclear at this point whether our current episode of global non-renewable resource scarcity will prove to be temporary or permanent, it is clear that our early 21<sup>st</sup> century experience with non-renewable resource scarcity is a precursor of things to come.

While there will always be *plenty* of non-renewable resources in the ground (we will never “run out” of any of them)—and over the near term there will likely be *more* non-renewable resources of nearly every type supplied each year—in an increasing number of cases there are *not enough economically viable non-renewable resources* to completely meet our enormous and generally increasing global requirements.

### Humanity’s Predicament

Since the inception of our industrial revolution, we have been depleting—persistently and increasingly—the finite and non-replenishing non-renewable resources upon which our industrialized way of life depends. Ironically, this natural resource utilization behaviour, while enabling our industrialized “success,” simultaneously undermines our very existence—this is humanity’s “predicament.”

*The irrefutable implication associated with our predicament is that neither our natural resource utilization behaviour nor our resulting industrial lifestyle is sustainable.*

Humanity’s fate was sealed in the 18<sup>th</sup> century with the advent of industrialism; the non-renewable resource genie had been let out of the bottle and

could not be put back. We remained oblivious to our fate throughout the 19<sup>th</sup> and 20<sup>th</sup> centuries by misconstruing our windfall of temporary non-renewable resource abundance as permanent.

The episode of epidemic non-renewable resource scarcity that has occurred during the 21<sup>st</sup> century is a wake-up call to the fact that the modern industrialized way of life that we consider “normal”—i.e., our historically unprecedented population level and material living standards—is anything but normal. Our industrial lifestyle is a one-time non-renewable resource anomaly that is coming to an end.

### Humanity’s Self-inflicted Demise

As a species that has been conditioned over hundreds of years to expect “continuously more and more,” we *Homo sapiens* will not accept gracefully our new reality of “continuously less and less.”

### We Will Be Sustainable

Humanity’s transition to a sustainable lifestyle—a pre-industrial way of life within which a drastically reduced human population will experience subsistence-level material living standards enabled exclusively by renewable natural resources—is therefore inevitable. Our future is not about whether “we wish to be sustainable;” it is about how “we will become sustainable.”

One option is to fundamentally alter our unsustainable natural resource utilization behaviour and transition voluntarily to a sustainable lifestyle during the next several decades. In the process, humanity would have to cooperate globally in utilizing remaining accessible non-renewable natural resources to orchestrate a relatively gradual—but horrifically painful, nonetheless—transition, optimizing our population level and material living standards both during our transition and at sustainability.

Alternatively, we can squander Earth’s increasingly scarce non-renewable resource supplies in a futile attempt to perpetuate our unsustainable industrial lifestyle, perhaps for a few decades at most. In the process, we would deplete remaining non-renewable resource reserves to levels at which globally available economically viable supplies become insufficient to support our industrial way of life, thereby causing an involuntary transition to sustainability through global societal collapse.

(Note that scenarios within which we would reduce our global non-renewable resource extraction/utilization levels through some combination

of recycling, re-use, conservation, substitution, technological innovation, efficiency increases, productivity improvements, or any other means are merely extended versions of our involuntary transition alternative. By opting for any such scenario, we would simply deplete remaining non-renewable resource reserves more slowly and collapse at a slightly later time.)

### **Humanity's Destiny**

We will not consider a voluntary transition to sustainability. In today's cultural and political climate, global humanity could not possibly agree upon methods by which to allocate equitably Earth's increasingly scarce natural resources, and to reduce gracefully our global population level and material living standards during the course of a voluntary transition.

Rather, we will perpetuate our industrial lifestyle until we can no longer do so—despite such a course leading to the more horrific of our two alternatives.

In the future, global competition for increasingly scarce renewable and non-renewable natural resources will devolve into resource wars leading to global societal collapse through an ecological/economic/societal chain of events driven by ever-increasing, geographically-induced, global non-renewable resource scarcity.

The chain of events might look something like this:

- Historically unprecedented global requirements for finite non-renewable resources coupled with non-renewable resource-supplies of continuously decreasing quality →
- Diminishing returns on investments in non-renewable resource exploitation →
- Persistently high/increasing non-renewable resource cost/price →
- Stagnating/decreasing non-renewable resource demand/utilization (Earth resources input) levels →
- Stagnating/decreasing economic output (GDP) [one result of which will be a decreasing ability to combat new life-threatening diseases] →
- Stagnating/decreasing material living standards →
- Increasing economic, political and social instability/unrest/conflict →
- Collapsing national economies followed by global social collapse.

Through industrialism, humanity set out to accomplish great things; and we have accomplished great things. Unfortunately, we are doing away with ourselves in the process.

## **Humanity's Unravelling**

### **Unintended Consequences**

It is certainly not the case that our incessant quest for universal prosperity through global industrialization and the natural resource utilization behaviour that enables our quest are inherently evil. We have simply applied our boundless ingenuity—i.e., our resourcefulness, innovation, technical prowess, efficiency improvements, and productivity enhancements—over the past several centuries toward dramatically improving our level of social well-being through ever-increasing non-renewable resource utilization.

However, we have been naive: although our predicament is an unintended consequence of our perhaps justifiable efforts to continuously improve the material living standards of our ever-expanding global population, economically viable non-renewable resource supplies are simply inadequate to sustain ever increasing numbers and prosperity.

### **The "Squeeze" is on**

If our unravelling were to commence in 1,000 years, or 500 years, or even 50 years, we could dismiss it as a concern for future generations and enjoy our industrialized way of life in the meantime. Unfortunately, our unravelling is occurring now.

In the future, increasing global non-renewable resource scarcity will exacerbate our economic malaise—i.e., our global economy will remain on its trajectory of slow starvation for lack of sufficient economically viable non-renewable resources, a scenario that will be especially problematic for the industrialized west.

The previously improving material living standards enjoyed by populations of industrializing nations will stagnate; and the previously stagnating material living standards associated with industrialized populations will degenerate toward those of industrializing populations.

Our circumstances will continue to deteriorate despite our incessant attempts to "fix" our geologically induced predicament with irrelevant economic policies, political edicts, social reforms, and environmental initiatives—none of which will work because such expedients cannot create additional economically viable non-renewable resources.

Non renewable resource scarcity will dissolve into increasingly severe temporary non-renewable resource supply shortages as globally available economically viable non-renewable resource supplies fail by increasingly wide margins to address our global requirements.

Through our ignorance, we will exacerbate our deteriorating situation by failing to understand that

“we” are the problem. We—all of us, but especially those of us in the industrialized West—have been the all-too-willing beneficiaries of the extraordinary material living standards temporarily afforded by our unsustainable lifestyle.

So “we” will blame “them”—politicians, corporations, foreigners, capitalists, communists, Christians, Muslims, the rich, the poor, the left, the right, anybody who is not “us”—for our deteriorating circumstances. And we will resort increasingly to conflict at the global, national, and ultimately local levels to obtain the non-renewable resources and derived goods and services necessary to perpetuate the lifestyle to which we feel entitled.

### No Happy Ending

Escalating natural resource wars will further reduce our declining economic output (GDP) and material living standards as war-related destruction disrupts our critical natural resource supplies and our critical social support systems such as water storage/ distribution, food production/ distribution, energy generation/ distribution, non-renewable resource exploration/ extraction, sanitation, healthcare, transportation, communications, defence, and law enforcement.

As global non-renewable resource supply shortages become increasingly acute, non-renewable resource-dependent industrialized nations will no longer be able to generate the economic output necessary to fund their ballooning debt service, social entitlement, and social services obligations; nor will they be able to obtain sufficient credit to offset their declining real wealth generation capabilities. The world’s interconnected and independent national economies will experience cascading defaults.

As global non-renewable resource supply shortages become permanent, our bankrupt and war-ravaged global industrial mosaic will be unable to provide societal essentials—clean water, food, energy, and infrastructure—at levels sufficient to support our increasingly angry, confused, and desperate populations. Escalating social unrest will devolve into chaos.

It will become universally understood that the only way to “stay even” within a continuously con-

tracting operating environment—much less to improve one’s lot—is to take from someone else. Life will become a “negative-sum game” within the “shrinking pie” of continuously less and less.

All industrialized and industrializing nations, irrespective of their economic systems and political orientations, will collapse, taking the aid-dependent, non-industrialized nations with them.

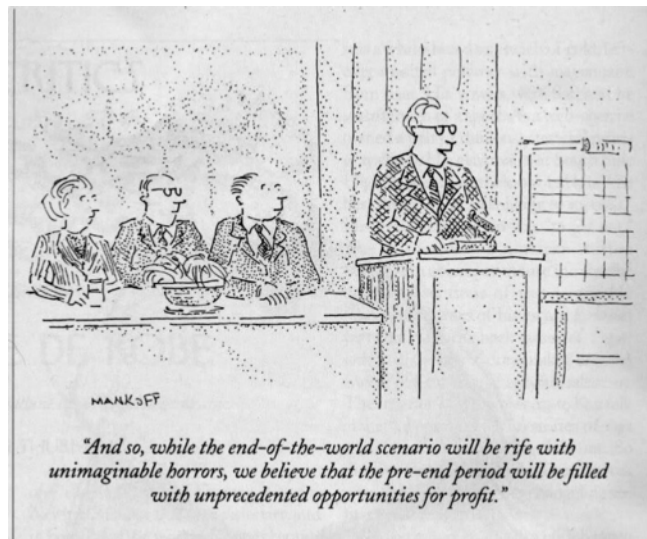
### A Question of *When* not *If*

Despite (and paradoxically, owing to) unparalleled human ingenuity during our modern industrial era, Earth’s non-renewable resource supply mix is shifting from “high-quality/low-cost” to “low-quality/high-cost.” Decreasing non-renewable resource quality in conjunction with our historically unprecedented and ever-increasing non-renewable resource requirements are causing increasingly prevalent global non-renewable resource scarcity and faltering global prosperity—i.e., diminishing global economic growth and material living standard improvement.

Over the past 50 years, as global non-renewable resource scarcity has displaced relative non-renewable resource abundance, global Gross Domestic Product (GDP) growth has plunged from a relatively robust 4-6% per annum during the 1960s to approximately 2% in 2013. Annual per capita GDP growth has decreased from a relatively strong 3-4% per annum during the 1960s to approximately 1.0% in 2013.

Should currently decreasing global prosperity growth trajectories persist, both future economic output and future global material living standards will peak and enter terminal decline prior to the year 2050. It is very likely, however, that increasingly severe civil unrest will cause our global economy and global society to completely unravel long before mid-century, in the event that these trends continue.

That is to say, barring continuous and enormous high quality/low cost non-renewable resource discoveries in our non-renewable resource utilization efficiencies—which would merely grant us a temporary reprieve in the extremely unlikely event that they were to occur—we will almost certainly bring about our global societal collapse by 2050.





## The Aftermath

Under the best-case scenario, a surviving global human population of a few million will remain to scavenge among the remains of decimated natural resource reserves and severely degraded natural habitats. Under the worst-case scenario, we will annihilate ourselves through global warfare.

Ironically, the more vigorously we strive to perpetuate our unsustainable industrialized way of life through ever-increasing non-renewable resource exploitation, the more quickly and thoroughly we will deplete non-renewable and renewable natural resource reserves and degrade natural habitats, thereby hastening and exacerbating our global societal collapse.

“The ‘developed’ nations have been widely regarded as previews of the future condition of the ‘underdeveloped’ countries. It would have been more accurate to reverse the picture...” (William R. Canton Jr., “Overshoot”)

*Author’s note: This article is a call to action. Perhaps a reader will devise an intelligent response to our predicament, a course of action that has thus far eluded me.*

*Non-renewable resource scarcity is the most daunting challenge ever to confront humanity. If Homo sapiens sapiens is truly an exceptional species, now is the time to prove it.*

## References

Specific references have been omitted to conserve space. “The Most Endangered Species” is a synthesis of research and analyses presented in *Scarcity—Humanity’s Final Chapter?*, information about which can be found at [www.NNRscarcity.com](http://www.NNRscarcity.com); and three subsequent updates: “Whatever Happened to ‘The Good Old Days’?” (<http://goo.gl/xdYQhX>); “21<sup>st</sup> Century NNR Scarcity—Blip or Paradigm Shift?” (<http://goo.gl/qTCiKu>); and “Austerity—Our New Normal” (<http://goo.gl/3R9o7n>). Each of these works is extensively footnoted.

Chris Clugston holds an MBA/Finance with High Distinction from Temple University (Philadelphia, PA) and worked for 35 years in the high technology electronics industry. This article is an edited version of an article entitled “The Most Endangered Species,” in *Humanist Perspectives*, Summer 2014, Issue 189.



## CUSJ Annual General Meeting (AGM) 2015

T102, T Building, Algonquin College, Ottawa, Ontario

Monday, May 18<sup>th</sup>, 2015 from 8:30 am to 12 noon—register now at the cusj website ([www.cusj.org](http://www.cusj.org))

**Keynote speaker:** Bruce Campbell, Canadian Centre for Policy Alternatives:  
**THE SILENCING OF DISSENT**—and Its Impact on Democracy

Bruce Campbell, Executive Director of the Canadian Centre for Policy Alternatives, will address the issue of democracy in Canada, and in particular the chilling effect of funding cutbacks and CRA audits on charitable organizations engaged in dissent against government policy. What is the impact on a democracy when science and knowledge activities are cut back and dissent is discouraged? What steps must we take to revitalize Canadian democracy?



CUSJ AGM – Live streamed on the Web. For instructions, check [www.cusj.org/annual-general-meeting/](http://www.cusj.org/annual-general-meeting/)

8:30 am – Registration, Coffee, Meet & Greet

9:00 am – Chapter Conversations

10:00 am – AGM

11:00 am – Keynote Speaker: Bruce Campbell: **The Silencing of Dissent and its Impact on Canadian Democracy** followed by questions and comments from the floor.

12:15 pm – Lunch at the Chances R restaurant, across the street from the campus, for those who wish to stay.

CUSJ Dinner Saturday, May 16<sup>th</sup>, 6:30 pm at Salon D, D Building, Algonquin College

CUSJ Movie Night Saturday, following dinner

Standing on the Side of Love and Justice T-shirts at AGM 2015

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## STATEMENT OF PURPOSE

The CUSJ purposes are:

- to develop and maintain a vibrant network of Unitarian social action in Canada and elsewhere and to proactively represent Unitarian principles and values in matters of social justice and in particular
- to provide opportunities, including through publication of newsletters, for Unitarians and friends to apply their religious, humanistic and spiritual values to social action aimed at the relief of (1) poverty and economic injustice, (2) discrimination based on religious, racial or other grounds, (3) abuses of human rights whether of individuals or peoples, (4) abuses of democratic process, and
- to promote peace and security, environmental protection, education, and literacy in keeping with the spirit of Unitarian values.

These purposes are an integral part of the Constitution of CUSJ, adopted at the CUSJ Annual Meeting in Mississauga, ON, May 19, 1999, and amended at the 2003 AGM.

I agree with the above Statement of Purpose, and wish to  
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