

Nuclear Energy in Context

by

Bill Garland, 2004.11.24

“One's view can get badly distorted if there is nothing to provide scale and perspective.”

- Hans Tammemagi, Power and Passion (draft)



What is the situation?

❖ **If our world were a village of 1,000 people, what would its ethnic composition be?**

Well, in the village there would be:

- 564 Asians
- 210 Europeans
- 86 Africans
- 80 South Americans
- 60 North Americans

❖ **Of these people:**

- 60 persons would have half the income
- 500 people would be hungry
- 600 would live in shanty towns
- 700 would be illiterate

Source: From Freres Sans Frontieres, quoted in World Development Forum, Vol. 8, No.7.

HUNGER: DO YOU KNOW THE FACTS?

- ❖ It is estimated that 10^9 people in the world suffer from hunger and malnutrition.
 - That's 1 out of every 6 people on earth.

- ❖ Death rate due to hunger is roughly 10^7 each year.
 - About 24,000 people die every day from hunger or hunger-related causes.
 - That's 1000 per hour or 1 every 3.6 seconds.
 - This is down from 35,000 ten years ago, and 41,000 twenty years ago.
 -So there is hope!
 - Three-fourths of the deaths are children under the age of five.

- ❖ Famine and wars cause about 10% of hunger deaths
 - The majority of hunger deaths are caused by chronic malnutrition.

- ❖ Families facing extreme poverty are simply unable to get enough food to eat.

Source: <http://www.thehungersite.com/cgi-bin/WebObjects/CTDSites>

I wonder...

- ❖ How would we treat those less fortunate than us if we all lived in the same village?
- ❖ How much would the world condition be improved if a fraction of the energies we now expend on self-interested bickering were channeled to the betterment of all?
- ❖ You and I are in a position of relative privilege and power compared to the rest of the world, compared to 99% of the 6 billion souls that populate this earth.
 - It is, thus, unlikely that the decisions that we make to optimize our own patch are the right global decisions.
- ❖ It is worthwhile taking a step back and reflecting on the bigger picture once in awhile because the nuclear option, like all options, cannot be judged in isolation.

.....And there may be a very good self-interested reason to address the global scene.....

Where does energy fit in?

- ❖ The simple fact is that we are here. And there are a lot of us - some 6 billion in the year 2000 and our population is destined to hit 10 billion in a few generations.
- ❖ On the premise that life is worth living (and most of us think that way, otherwise our population wouldn't be growing), it follows that we should make the best of the situation.
- ❖ Quality of life is, thus, a worthy and meaningful pursuit. To achieve and maintain a reasonable quality of life requires energy.
- ❖ **It's a fact that the standard of living is directly correlated to an adequate supply of energy**
- ❖ Access to energy is an enabling force, empowering society and individuals.
- ❖ In short, it is fundamental to our existence.
- ❖ Energy is not a panacea for the strife of life, to be sure; but without it, there would be no life at all.

Who speaks for the poor?

- ❖ There is a very thought-provoking speech entitled "Who speaks for the poor?" (<http://www.nuc.umn.edu/~ans/poor.html>), also found at the "Nuclear Facts and Opinions" page (<http://nuceng.mcmaster.ca/refer/facts.htm>) along with other similar links. Some quotes:
 - *“The main opposition to nuclear power is centered among the educated, well-nourished and financially secure middle and upper middle class.”*
 - *“When was the last time you saw a hungry looking anti-nuclear protester - a poor man in a lesser developed country protesting against the establishment of a nuclear power program?”*
 - *“Since it is not the poor speaking out against nuclear power, then how can the well fed of the world feel justified in opposing programs that can only help their fellow man?”*
 - This is a **must read** for everyone.
- ❖ The speech makes it painfully clear that we must provide energy for the world masses in the interests of world stability and in the interests of simple humanity.
 - We need a lot of energy if we are to bring the world's poor up to even a modest fraction of our standard of living.

How much energy do we need?

- ❖ In today's industrialized world:
 - *“It takes the energy equivalent of one-half glass of diesel fuel just to put a glass of milk on the table.”*
 - *“Two pounds of coal to produce a one pound loaf of bread.”*
 - *“Three pounds of coal to produce one pound of hamburger.”*

- ❖ *“Making a car uses the energy equivalent of 1.3 tons of oil; running it for a year, another 1.3 tons.”*

- ❖ *“Each day, transportation in the U.S.A. consumes 836 Olympic-sized swimming pools of petroleum fuel.”*

- ❖ *“In the midst of these riches, it is easy to forget that the world's population increases by one million every four days... 177 people every minute, and such growth is expected to continue for another 120 years.”*

- ❖ *“By 2010 there will be 520 million extra car loads of people in South Asia, one million extra car loads in Europe and there will be one million extra car loads in just one Indian city... just one.”*

- ❖ *“By the end of the next century, five billion more people will be added to our present population of 5.5 billion.”*

What access to energy means to the poor

- ❖ *“Most of them will be in underdeveloped countries where they will be crammed into ramshackle, dirty cities or left to struggle in rural wastelands. More people will almost certainly mean more pollution as they strive to power their lives with the nearest means at hand... fossil fuels.”*
- ❖ *“Giving these additional five billion even a halfway decent standard of living means giving each of them adequate housing, food, transportation and 1,000 kilowatt hours of electrical energy per year.”*
- ❖ *“Ignoring the energy needed for the basic necessities of life 1,000 kilowatt hours per person means 742,000 megawatts of new electrical generating capacity. Multiply that by the amount of carbon dioxide produced by burning fossil fuels and you will find the answer falls off your calculator.”*
- ❖ *“In poverty-stricken places, water is unsafe to drink. Making it safe - by boiling water for drinking and washing food - is a matter of economics: Many families lack the money to buy kerosene. Boiling one liter of water for 20 minutes can use an entire day's supply of fuel.”*

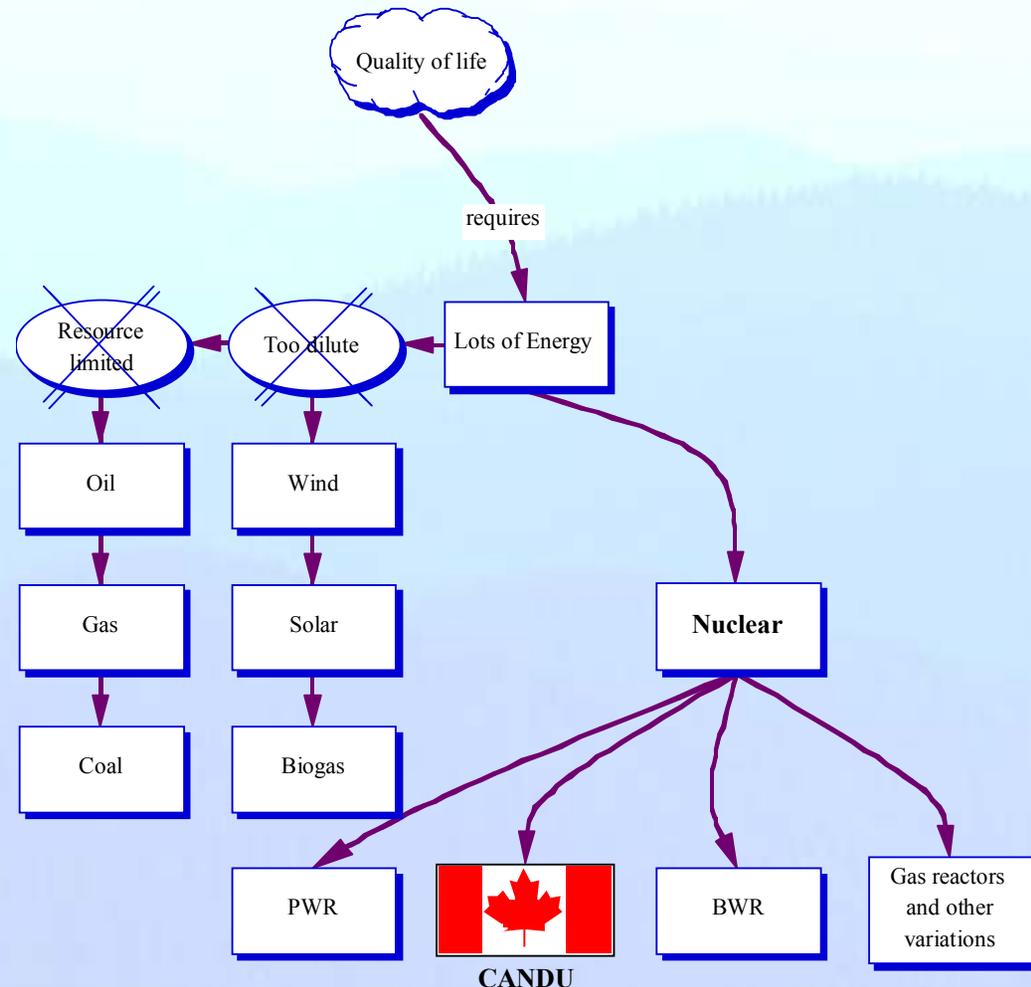
The Nuclear Option

❖ Nuclear power is the only existing option for large scale power production that transcends the limitations of nonrenewable alternatives (such as coal, oil and gas) and renewable alternatives (wind, solar and biomass).

❖ To be sure, there are many local, national and international issues that flavour the ultimate choice of energy source, but nuclear should not be dismissed.

➤ The consequences would be dire.

❖ We conclude, then, that nuclear should be part of the energy mix now and in the future, that is, **we have a functional requirement for nuclear energy.**



Is nuclear the answer?

- ❖ To be honest, I don't know.
- ❖ There is a Chinese Fable: *A Loss May Turn Out to Be a Gain* (<http://engphys.mcmaster.ca/~garlandw/teach/chinesefable.htm>), which reinforces the notion that the only thing I am sure of is doubt.
- ❖ So our best efforts might turn out to contribute to the problem. But the game is afoot and simply longing for simpler, better times (which never did exist) is simply wishful thinking and amounts to avoiding the issue.
- ❖ We must act!
 - Social inequity is ethically repulsive and leads to unrest.
 - Self-preservation alone dictates we take action even if we don't have a heart.

What is the individual to do?

- ❖ **The Passion's the thing!** It is what drives us and energizes us. You cannot ignore that for long and sustain a direction.
- ❖ **People are motivated when they feel a competence, relatedness, and autonomy.** People need their own needs satisfied first. It is hard to fill someone else's bucket when yours is half empty.
- ❖ So go with your dreams, etc. That is what will sustain you in the long run. Your passion will be contagious.
- ❖ But we are in a small world and it is getting smaller. The optimum solution for you is connected to the global solution.
- ❖ Caution: We in the developed world may be on the top of the heap but there are many obstacles in the way and we do not have all the answers.
 - Expect some failures but remember,
 - you don't often hit a target you are not aiming at
- ❖ My conclusion, follow your passion with an eye to making ethical choices when you have the opportunity (think globally, act locally...when you can).

Parting quote to contemplate

"When one isn't dominated by feelings of separateness from what he's working on, then one can be said to "care" about what he's doing. That is what caring really is, a feeling of identification with what one's doing. When one has this feeling then he also sees the inverse side of caring, Quality itself.

*I think that if you are going to reform the world, and make it a better place to live in, the way to do it is not to talk about relationships of a political nature, which are inevitably dualistic, full of subjects and objects and their relationship to one another; or with programs full of things for other people to do. I think that kind of approach starts it at the end and presumes the end is the beginning. Programs of a political nature are important end products of social quality that can be effective only if the underlying structure of social values is right. **The social values are right only if the individual values are right. The place to improve the world is in one's own heart and head and hands, and then work outward from there.** Other people can talk about how to expand the destiny of mankind. I just want to talk about how to fix a motorcycle. I think that what I have to say has a more lasting value."*

- Robert Persig, Zen and the Art of Motorcycle Maintenance, page 290-291, Bantam Books, 1974.

