



Welcome to the 31st Annual WNA Symposium

*Queen Elizabeth II Conference Centre
London
7 September 2006*

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Ladies and gentlemen, I join our Chairman in offering you a warm welcome.

We thank you for being here, and we are gratified that your participation in our Symposium has not been impeded by current difficulties in international travel.

The geopolitical turmoil that has given rise to today's terrorist danger certainly constitutes a challenge to security and progress in our era. But that you are here nonetheless in record numbers is both encouraging and fitting. For as disturbing and disruptive as current events may be, the world's nations cannot allow themselves to be diverted from confronting another, longer range conflict that is even more threatening and profound.

This larger conflict is not between people of different nationalities, ideologies, and religious beliefs. Rather, is a new form of conflict, unprecedented in all of human history. It is an existential conflict between humankind and the very planetary environment that enabled civilization to evolve.

In these first early years of the 21st century, this new form of conflict has come increasingly to be recognized as nothing less than a global emergency – an emergency that will require, if catastrophe is to be averted, a worldwide transformation to clean forms of energy. This revolution – led by nuclear power, and using technology of which you and your colleagues are the world's custodians – must be achieved if humanity is to prosper and prevail.

The fact of this global crisis should no longer be a matter of psychological or political denial. For our best Earth-system scientists now warn, with ever increasing certainty, that greenhouse gas emissions, if continued at the present massive scale, will yield consequences that are – quite literally – apocalyptic: increasingly radical temperature changes, a worldwide upsurge in violent weather events, widespread drought, flooding, wildfires, famine, species extinction, rising sea levels, mass migration and epidemic disease that will leave no country untouched.

If these predictions hold true, the combined effect would be the death of not just millions but of billions of people – and the destruction of much of civilization on all continents.

Precisely because we face dangers that go beyond what we have been acculturated to think about and to fear, the spectre of global warming still remains, for many people, too nebulous to contemplate. But what is not nebulous is the human condition that lies behind global

warming. This condition is well documented, and sobering indeed; and the conflict we must reconcile is between the demands and needs that arise from this human condition and the necessity to preserve our Earthly environment.

To set this stage for our Symposium, I would like to show you just a few slides, taken from a much more comprehensive WNA presentation on the global need for nuclear energy. These slides serve to calibrate the human dimensions of the global crisis we face.

This crisis originates not in human evil, but in human success: humanity's accumulating, accelerating success in acquiring, disseminating, and applying science-based knowledge. It is this success – taking form in agriculture, industry, commerce, and medicine – that has spawned the growth in human population.

Viewed through history's eye, this success has come in a sudden burst. Through virtually all of the 50,000 years since humans first appeared, world population never exceeded 10 million. Then, at some point within the last 2,000 years, something happened. To take a phrase from nuclear science, humanity's technological inventiveness reached critical mass, and advance led to advance at increasing speed.

Within the last 2,000 years – as shown here – these gains in knowledge brought amazing enlightenment and prosperity to hundreds of millions of people. But the surge of world population also carried an ominous consequence. Before, humanity's effect on Earth and its ecosystems was as a flea on a camel – wholly inconsequential.

Now, in just the 200 years we call the Industrial Age – the time frame pictured in this slide – humanity became an influence on Earth's fundamental mechanisms. Now this impact – this anthropogenic impact – threatens to ruin the very environmental conditions that enabled human success.

Here is a map sequence that illustrates humanity's growth over the past two millennia.

Note that it took 50,000 years for population to reach one billion, a little more than a century to reach two billion, 33 years to reach three billion, 14 years to reach four billion, 13 years to reach five billion, 12 years to reach six billion.

Today we are at 6.4 billion people, with 9 billion projected by the year 2050.

To underscore for you the suddenness of this surge, I will run these quickly again.

Viewing this population through an economic lens serves to describe the human condition. What we find is a world of extremes.

At one end of the scale are the OECD countries, where global prosperity is centred. We represent a mere one-sixth of humanity. At the other end are the world's poorest. Here an equal number of people – 1.1 billion – live in destitution with constant hunger, no clean water, the death of a child every 3 seconds, and virtually no income or prospect of improvement.

Back at the wealthier end of the spectrum, if we add the 300 million semi-prosperous population of the former Soviet bloc, we find that 1.4 billion of the world's people – just over 20% – account for 80% of global economic consumption. This means that 80% of the world's people subsist on 20% of world production of goods and services.

The 80% of humanity in the poor and developing world continues to increase. The rate is 20,000 per day. Think of it as the birth of a new city of 6 million people once each month. Our problem is not shrinking.

The poorest 1.1 billion people are categorized as being in “extreme” poverty. Another 1.6 billion are classified as being in “moderate” poverty – just a small step above abject misery. They have little sanitation and virtually no money. They survive amidst pollution and disease.

The energy dimension of poverty is fundamental. Conditions of poverty correlate so closely to the absence of electricity that access to electricity is the best single barometer to gauge a person's standard of living. In today's world of 6.4 billion, a full 2 billion people have no electricity, and 2 billion more have only limited access. In other words, fewer than 40% of the world's people can easily switch on the lights.

Numbers on the same scale apply to clean water. Today, world water tables are falling under the demands of expanding human consumption. As this crisis emerges, we can expect the growing shortage of potable water supplies to produce thirst, disease, and water wars – in other words, a deadly combination of human suffering and human strife. As a remedy, we have one available tool: worldwide desalination of seawater, an energy-intensive process that will compound global energy demand.

Finally, we have the great mass of humanity positioned between poverty and prosperity. This population, poised for advance, will be the engine of our world's future economic development.

In terms of future energy use, the human condition divides us into three categories: those with energy access who will continue to use it, those with none who desperately need it, and those poised in between, whose drive for economic advance is already producing an expanded use of energy and, with it, an intensified outpouring of greenhouse emissions.

The growing environmental impact of this central group cannot be overstated. In about a decade from now, annual greenhouse emissions from developing nations will exceed emissions from the countries we now call developed.

The challenge humanity faces can be quantified directly in terms of the global nuclear renaissance. Already, a substantial worldwide expansion of nuclear power in the years ahead seems all but certain.

But the rate of this expansion must be steep and sustained if our world is to have any hope of meeting its human needs without disrupting – and perhaps destroying – the environmental conditions on which humanity's future depends. Throughout this century, the global nuclear industry must gain steadily in size, strength and proficiency if humanity is to prosper.

Achieving that growth will depend on a nuclear professional cadre that must grow in numbers and be led by men and women of vision. This is why your Association is devoting considerable energy to actions within the partnership known as the World Nuclear University.

Today we have on the drawing boards a diversity of WNU projects. Our flagship is the Summer Institute, our first major WNU endeavour, which we have used to test and prove the unique value of the WNU partnership as an innovative force.

The Summer Institute aims to identify, to teach, to inspire – and to bond into a global professional network – a cadre of tomorrow's future nuclear leaders.

In this, the Summer Institute's second year, 89 WNU Fellows from 34 countries spent five weeks in Stockholm, hosted by the Royal Institute of Technology, and one week on an intensive tour of nuclear facilities in France.

By all evidence, the entire class of WNU Fellows found the event immensely rewarding – not because it was a pleasant summer interlude, but precisely because they found it to be an intellectually demanding challenge designed to build knowledge, global perspective, and international bonds of value to their future as nuclear professionals.

I would like to introduce you to four of those WNU Fellows as representatives of the class of 2006. I have asked them to convey to you their own perspective about the leadership-development experience from which they have just emerged.

Their names are Matt Dreyfuss, Sudha Cheruvathur, Feng Li, and Robert Bergkvist. I think you will enjoy meeting them.