Climate Change: from personal ethics to national policies - can we make a difference?

Hiroshima, 8 August 2007

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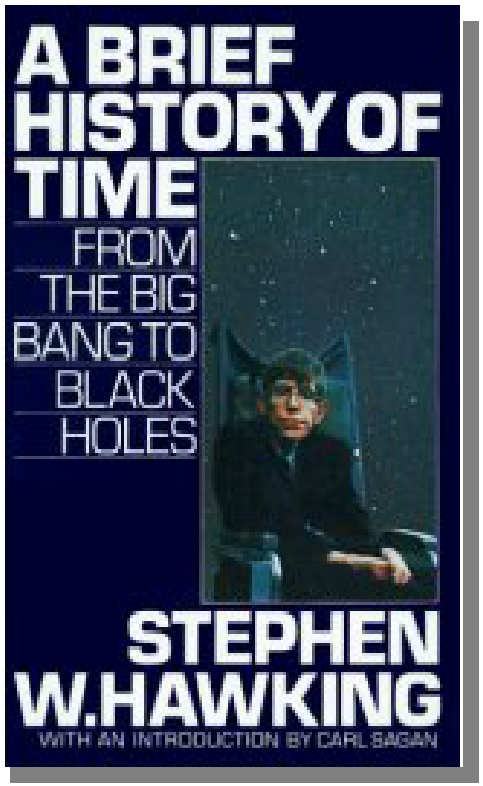
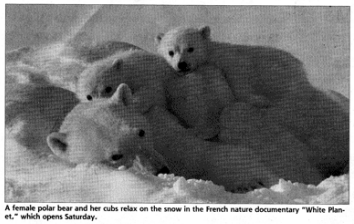


SCIENCE/NATURE



A female polar bear and her cubs relax on the snow in the French nature documentary "White Planet," which opens Saturday.

French director focuses on threatened 'White Planet'

By Saori Kan
Daily Yomiuri Staff Writer

The growing concern over global warming has led to the production of an increasing number of nature documentaries featuring dramatic polar wildlife that is threatened by rising temperatures. Among them are the 2006 French film *La Marche de l'Empereur* (Japan title: *Kotei Penguin*) and *La Planete Blanche* (*White Planet*), also French, which opens Saturday in Japan.

Thierry Piantanida

Starting with a heart-warming scene of a polar bear mother clasping her two newborn cubs to her chest in the snowy den where they spend the winter, *Planete Blanche* showcases the little-understood and poorly recognized wildlife of the Arctic, while introducing its seasonal transitions and the lives of many other species, including musk oxen, sea lions and Arctic terns.

One extraordinary scene features a number of beluga whales slowly swimming in the deep blue sea. Another scene shows narwhals, known as "sea unicorns" for their single, long hornlike tusk, engaging in a "sword fight" on the surface of the water.

Thierry Piantanida, one of the film's two directors, told The Daily Yomiuri during a recent visit to Japan that he was particularly excited when he succeeded in filming the migration of caribou herds comprising tens of thousands of adults and calves in the northern area of Quebec, Canada.

The animals move 1,000 kilometers across the tundra in summer, spending about 100 days heading for their destination, where there is sufficient food to allow them to breed.

"I was just overwhelmed seeing, with my very own eyes, the huge group lining up for kilometers," Piantanida said. "That's what's actually happening on the same planet where we live."

Piantanida had spent several years as a publicist for Jacques-Yves Cousteau (1910-1997), the legendary French oceanographer known for his 1956 Cannes-winning marine documentary *Le Monde du Silence* (*Chinmoku no Seiiki*). As an environmental journalist working on TV programs, Piantanida spent the last 10 years making documentary films about science and nature.

"I want to be an interpreter between scientists and the public to help them understand wonderful wildlife," Piantanida said.

The Arctic, where temperatures fall to minus 50 C in winter, covers parts of Alaska, Canada, Greenland and Siberia. The weather is too severe for humans to live in, which helps protect the wildlife there, he said.

However, the Arctic environment is apparently changing. According to a recent study released by the Arctic Council, an intergovernmental body, the temperature of Alaska rose by 3 C to 4 C over the last 50 years. It also showed that the total area of sea ice in the Arctic Ocean seen in summer has decreased by 15 percent to 20 percent over the last 30 years.

Due to the decreasing sea ice, polar bears are finding it increasingly hard to hunt seals. The number of polar bears will decrease by more than 30 percent over the next 45 years, according to the World Conservation Union (IUCN), which put the species on its Red List of Threatened Species in 2006.

But the French director rightly chose to have the Arctic's simple, natural beauty speak for itself to make a plea in favor of this fragile part of the world, rather than using preachy narration. "Through the movie we just want to show people the reality—the animals' wonderful lives—not to blame people for the environmental problems."

Bird flu shot protects ferrets; human vaccine seen possible

By Maggie Fox
Reuters

WASHINGTON—A lab-engineered bird flu vaccine protected ferrets against several strains of H5N1 avian influenza, offering the possibility of making a vaccine ahead of any pandemic, U.S.-based scientists said last week.

But it may be tricky to test it in humans, reported Elena Govorkova and her colleagues at St. Jude Children's Research Hospital in Memphis, Tenn.

The animals were protected even though they did not show the usual antibody response—a measure of immune system reaction often used to gauge vaccine effectiveness.

The findings suggest it may be possible to stockpile a vaccine ahead of a pandemic of H5N1 influenza, the researchers report in last week's issue of The Journal of Infectious Diseases, something that experts believed was not possible.

"Possibly the greatest significance of Govorkova et al.'s study is the demonstration of a significant cross-strain protective effect even in the presence of minimal antibody levels," Alan Hampson of the Australian Influenza Specialist Group at Australia's Monash University wrote in a commentary.

H5N1 avian flu outbreaks have been confirmed in more than 48 countries and territories, according to the World Organization for Animal Health.

The virus almost exclusively infects birds but it has killed 128 people in nine countries and has infected at least 225.

Experts say a pandemic of some kind of influenza is inevitable and that H5N1 looks closer than any other virus to causing such a global wave of disease.

A vaccine would provide the best protection. But flu vaccine technology is slow and unwieldy and a new vaccine has to be formulated every year to match the current circulating strains.

Vaccine experts fear that they would have to wait until H5N1 changes into a human pandemic strain before they can make a vaccine against it. By then it could have infected millions.

But Govorkova's team re-created the H5N1 virus in their lab, using a strain from Hong Kong. Unlike some other experimental H5N1 vaccines, which use bits of its DNA, they made it with a whole virus.

It protected the ferrets against strains of the same virus.

"To determine the extent of cross-protection induced by [our] vaccine, we challenged vaccinated ferrets with H5N1 viruses that were antigenically and genetically distinct from the vaccine strain," they wrote.

"All four unvaccinated ferrets inoculated with [a different H5N1] virus survived but showed signs of disease," they added. These included fever.

Yet the ferrets did not produce large amounts of antibodies, they found. "H5N1 vaccines may stimulate an immune response that is more cross-protective than what might be predicted by [laboratory tests] and, thus, hold potential for being stockpiled as 'initial' pandemic vaccines," the researchers concluded.

This may be difficult to test, as people cannot be deliberately infected with a virus to see whether a vaccine works. Usually, scientists look at antibodies in the blood to see if their immune systems have been primed by the vaccine.

Making a bird flu vaccine is potentially big business. The International Federation of Pharmaceutical Manufacturers and Associations says 31 pandemic avian influenza vaccines made by 15 companies in Australia, Austria, Britain, Canada, France, Germany, Italy, Japan, the Netherlands, Switzerland and the United States are in human, or clinical, trials.

Hawking: Humans need space as refuge

HONG KONG (AP)—The survival of the human race depends on its ability to find new homes elsewhere in the universe because there's an increasing risk that a disaster will destroy Earth, world-renowned physicist Stephen Hawking said.

Humans could have a permanent base on the moon in 20 years and a colony on Mars in the next 40 years, the British scientist told a news conference on Tuesday.

"We won't find anywhere as nice as Earth unless we go to another star system," added Hawking, who came to Hong Kong to a rock star's welcome June 12. Tickets for his lecture Thursday were sold out.

Hawking said that if humans can avoid killing themselves in the next 100 years, they should have space settlements that can continue without support from Earth.

"It is important for the human race to spread out into space for the survival of the species," Hawking said. "Life on Earth is at the ever-increasing risk of being wiped out by a disaster, such as sudden global warming, nuclear war, a genetically engineered virus or other dangers we have not yet thought of."

The 64-year-old scientist—author of the global best-seller *A Brief History of Time*—uses a wheelchair and communicates with the help of a computer because he suffers from a neurological disorder called amyotrophic lateral sclerosis, or ALS, also known as Lou Gehrig's disease.

One of the best-known theoretical physicists of his generation, Hawking has done groundbreaking research on black holes and the origins of the universe, proposing that space and time have no beginning and no end.

However, Alan Guth, a physics professor at the Massachusetts Institute of Technology, said Hawking's latest observations were something of a departure from his usual research and more applicable to survival over the long term.

"It is a new area for him to look at," Guth said. "If he's talking about the next 100 years and beyond, it does make sense to think about space as the ultimate lifeboat."

But, he added, "I don't see the likely possibility within the next 50 years of science technology making it easier to move on Mars and on the moon than it would be to survive on Earth."

"I would still think that an underground base, for example in Antarctica, would be easier to build than building on the moon," Guth said.

Joshua Winn, an astrophysicist at MIT, agreed. "The prospect of colonizing other planets is very far off, you must realize," he said.

Hawking's "work has been highly theoretical physics, not in astrophysics or global politics or anything like that," Winn added. "He is certainly stepping outside his research domain."

Hawking's comments Tuesday were reminiscent of the work of American astrophysicist Carl Sagan, who was a believer in the existence of extraterrestrial intelligence.

Sagan, a Cornell University professor and NASA-decorated scientist who died in 1996, noted that organic molecules, the kind that life on Earth is dependent on, appear to be almost everywhere in the solar system.

Sagan played a leading role in the U.S. space program, helping design robotic missions and contributing to the Mariner, Viking, Voyager and Galileo expeditions.

But his work also focused on the search for habitable worlds and intelligent life beyond the solar system, as well as theories about life's origins, ideas popularized in his best-selling 1985 novel, *Contact*, which was made into a movie starring Jodie Foster.

At Tuesday's news conference, Hawking said he too was venturing into the world of fiction. He plans to team up with his daughter, 35-year-old journalist and novelist Lucy Hawking, to write a children's book about the universe aimed at the same age group as the Harry Potter books.

"It is a story for children, which explains the wonders of the universe," said Lucy Hawking. They did not provide further details.

NATURE IN SHORT

BY KEVIN SHORT

Learning the lessons of the fantastic 'Earthsea' world

The early summer rainy season seems to have settled in this past week, so I've been spending a lot of my free time indoors, sketching plants and reading. I'm concentrating my botanical field work on the local woodland trees, drawing their flowers as they come into bloom. And at the same time I'm rereading one of my all-time favorite stories: Ursula Le Guin's epic Earthsea fantasy series.

I think I first encountered these stories about 30 years ago, when the original trilogy was published. I was completely captivated by Earthsea, a very convincing fantasy world portrayed in vivid detail. Earthsea is a land of islands, peopled by a preindustrial society based on fishing, farming, herding and a well-developed maritime trade.

As in J.R.R. Tolkien's Middle Earth, there are regular people, and also people with various degrees of magical powers, from village witches and herbal healers to regional wizards and on up to mages and an Archmage, the spiritual leader of all Earthsea.

What I like about these stories is that the ultimate source of the magical powers is set out clearly. According to Earthsea folklore, the islands were raised up from the empty sea by a being called Segoy. All aspects of Earthsea, including plants, animals and other living creatures, as well as natural phenomena such as stones, winds and waves, were created by Segoy. This magnificent work of creation was accomplished simply by bestowing names on everything. A thing's true nature, or essence, is thus enshrined in its original name as bestowed by Segoy. All magic on Earthsea begins by learning the true name of various objects.

The highest grade of wizards study at an exclusive school on the island of Roke. A major part of their training consists of learning long lists of true names. To be able to effectively use a particular species of plant, for example, the students have to learn not only the true name for the plant itself, but the names for its petals, stamens and other individual parts as well.

My favorite character in this story is a wizard called Ogion. Although trained in the school at Roke, and so knowledgeable and powerful that he could, if he wished, be appointed Archmage, Ogion chooses to live in a simple shack high up on the cliffs of Gont Island. He tends to the needs of the local villagers, and spends most of his time wandering along lonely mountain paths. Ged, the hero of the story, is also a native of Gont, and receives his first training under Ogion. On one foray into the mountains, Ogion shows his pupil a little weed called fourfoil. Ged asks, "What is its use, Master?"

Ogion replies: "When you know the fourfoil in all its seasons root and leaf and flower, by sight and scent and seed, then you may learn its true name, knowing its being, which is more than its use."

Ged soon leaves Ogion to study at Roke. His innate powers are just too great, and his desire to advance too strong, for the slow pace of Ogion's lessons. If I were living in Earthsea, however, I would do everything in my power to apprentice myself to Ogion.

I like to think of my own fieldwork as striving to learn the true name of plants and animals, and of the landscapes that they inhabit and enliven. Unfortunately, even learning under Ogion, I don't think I'd ever progress any further than a village herb healer. Some people I know, especially those blessed with artistic, musical or poetic ways of seeing, seem able to grasp the essence of a landscape or living creature almost instantaneously, in highly intuitive flashes of inspiration and enlightenment. For me, however, understanding always comes slowly, the result of repeated experiences accumulated over a long period of time.

Eventually, however, I do feel like I come to know the true name of some types of living creatures, especially trees, which remain in one place and are thus easy to encounter and observe time and again. I feel I'm beginning to know a tree when I can recognize it by the look or even the feel of its bark alone, or by its silhouette against the evening sky. This feeling deepens when I have closely examined the tree's flowers, and understand how they are pollinated, and how the seeds are dispersed, whether by wind or water or bird or squirrel.

For me, making a simple sketch is a vital step in the knowing process. In the movement of pen and pencil over paper, the subtle shape of a leaf and the unique pattern of venation, as well as the manner in which leaves and flowers or fruits are arranged on the branch, become indelibly imprinted in memory.

In Ogion's philosophy lurks a hint of what people today call Deep Ecology. In the above episode, it turns out that Ogion knows of no particular use for the fourfoil. "What, after all, is the use of you? Or of myself?" He ponders. "Is Gont Mountain useful, or the Open Sea?" Here we see a way of thinking in

Sketch by Kevin Short

This is the kind of detailed sketch that helps me get to know the tree's true name.

which the intrinsic value of an object or living creature is not dependent on its economic value to humans. This is the very core belief of Deep Ecology, which eschews the anthropocentric notion that all creation exists only for the convenience of the human species.

The Earthsea stories are widely recognized as classics in the fantasy genre. Over the last decade or so, several new stories have been added to the original trilogy. The entire series is readily available in bookstores and on the Internet, both in English and in Japanese translation. (The series title in Japanese is *Gedo Senki*.) And next month, Studio Ghibli will release an animated film adaptation of this classic.

Royal Institution lectures to prove you are what you eat

The Daily Yomiuri

We eat every day, and nowadays many people are eager to know more about a healthy diet. But what do you know about what our ancestors ate? Can you say what makes food taste good or bad?

These and other questions will be answered by Sir John Krebs, a world-renowned British scientist who is also the principal of Oxford University's Jesus College, during the annual Royal Institution Christmas Lectures to be held in Tokyo next month and in Tottori Prefecture in August.

Based on the lectures he presented in Britain last December, Krebs will give lectures on the themes: "The Gourmet Ape" and "You Are What You Eat" on the first day, and "When Food Goes Wrong" and "The Future of Food" on the second day at each venue.

Krebs is a former chairman of Britain's Food Standards Agency, a government department set up in the wake of the bovine spongiform encephalopathy (mad cow disease) crisis to deal with food safety and nutrition.

His lectures will take place in Tokyo at Bunkyo Civic Hall in Bunkyo Ward on July 28-29, and in Yonago, Tottori Prefecture, at Yonago City Bunka Hall on Aug. 2-3. Krebs will try to explain complex scientific issues in an informative and entertaining manner through simple experiments on the stage that even children can understand.

The British Council and The Yomiuri Shimbun, which jointly organized the Japanese version of the lectures, are inviting 1,000 people to attend each day. The lectures are aimed at middle and high school students, but people of all ages are welcome.

Admission is free, but reservations are required.

The audience will hear a simultaneous translation of the speech into Japanese, but English speakers can listen to Krebs in English using wireless handsets, which up to 200 participants can borrow for free at the Tokyo venue.

Those interested in attending should send a self-addressed stamped postcard to either: Tokyo Christmas Lectures-kakari or the Tottori Christmas Lectures-kakari, Yomiuri Shimbun Jigyo Kaihatsu-bu, Kyobashi 2-9-2, Chuo Ward, Tokyo, 104-8255 to arrive no later than June 30.

Applicants should specify the venue and date they wish to attend the lectures, along with their name, age, address, postal code and phone number.

Only one name should be included on each card, but each successful applicant is allowed to take one other person with them. Those wishing to attend more than one lecture should send separate applications.

Internet applications in Japanese are also accepted at http://info.yomiuri.co.jp/event/forum/.

Internet applications must arrive no later than June 30.

For more information, call (03) 5159-5886.

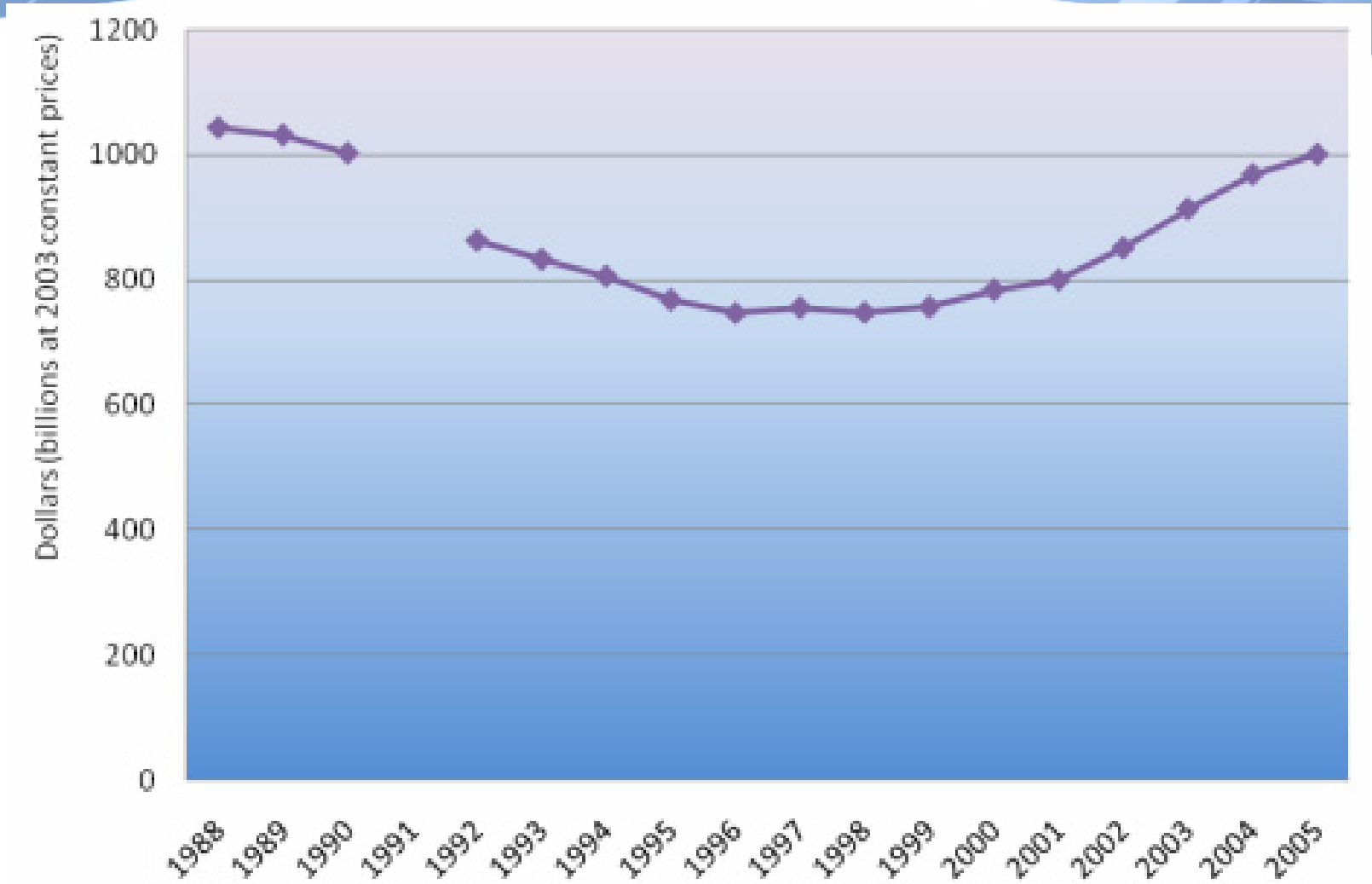
The Yomiuri Shimbun

Sir John Krebs explains the sense of taste during the 2005 Royal Institution Christmas Lectures in London.

Science/Nature page
The Daily Yomiuri, 19 June 2006

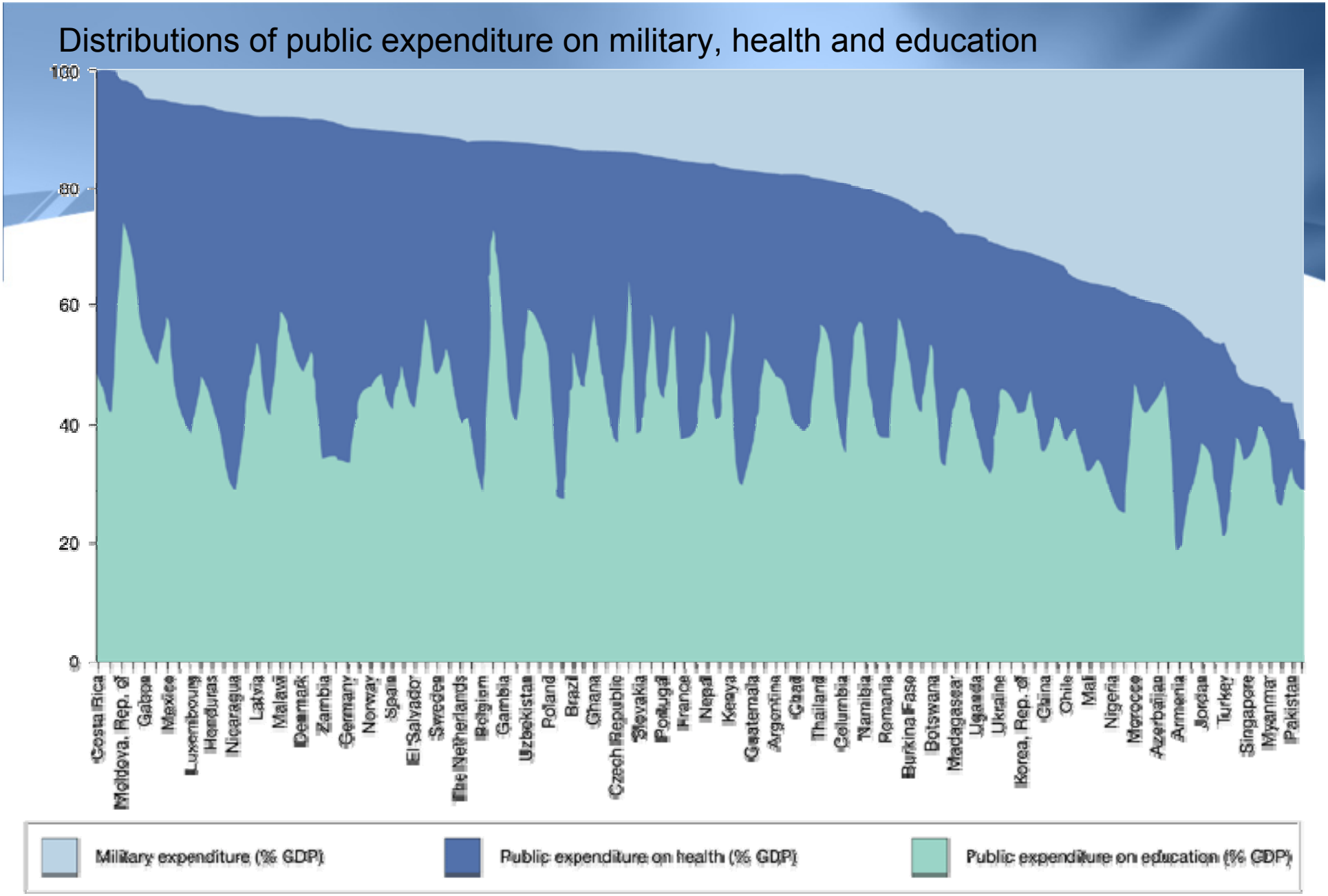
World military expenditures, 1988-2005

(conventional weapons)



Source: Stockholm International Peace Research Institute (SIPRI)

Distributions of public expenditure on military, health and education



Source: Human Development Report 2002 (United Nations Development Programme, 2002)

World primary energy consumption (Btu), 1992-2004

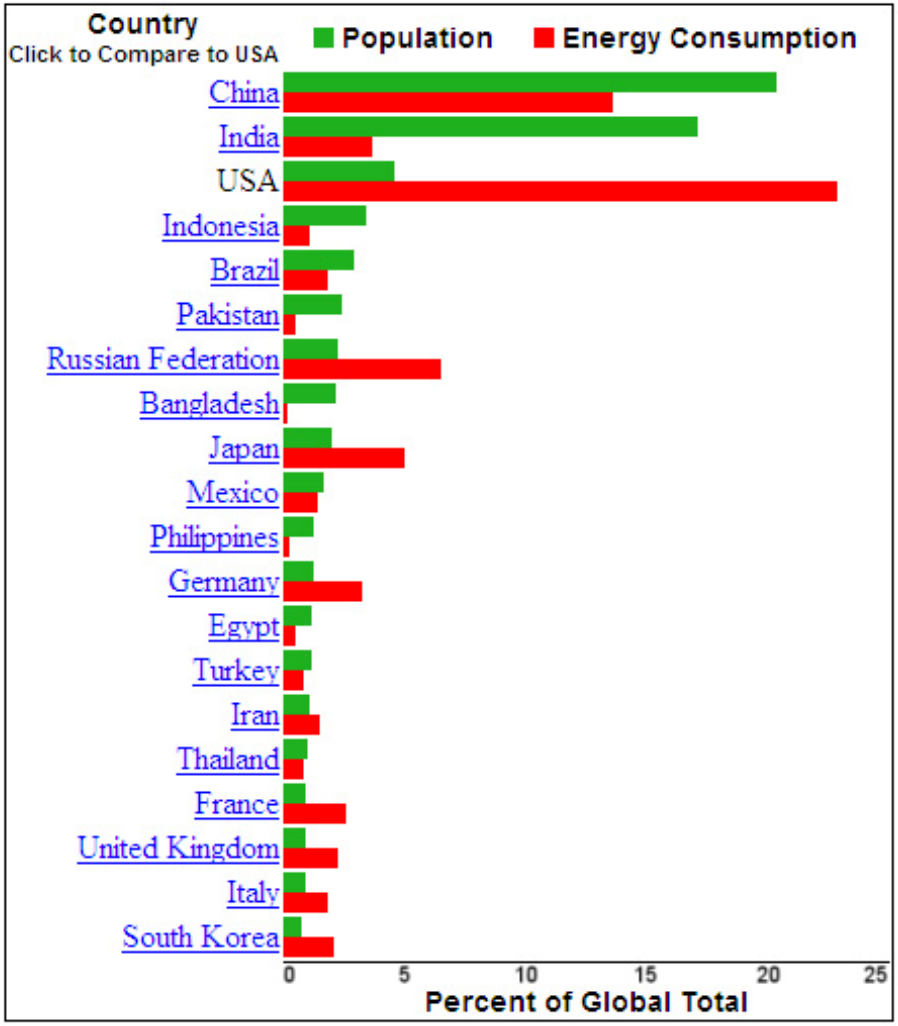
(Quadrillion (1015) Btu)

Region/Country	1992	1995	1998	2001	2004
Mexico	5.12	5.31	5.93	6	6.61
United States	86.05	91.5	95.34	97.05	100.41
Chile	0.6	0.77	0.94	1.06	1.26
Colombia	0.98	1.1	1.24	1.13	1.21
France	9.41	9.54	10.18	10.52	11.25
United Kingdom	9.33	9.6	9.77	9.81	10.04
Australia	3.8	4.09	4.57	4.97	5.27
Bangladesh	0.29	0.37	0.42	0.51	0.68
Japan	19.14	20.83	21.43	21.92	22.62
Malaysia	1.14	1.47	1.68	2.27	2.52
World Total	**350.43**	**368.25**	**383.09**	**403.92**	**446.44**

Btu-the British thermal unit.

Source: EIA, Official energy Statistics from the US Government, http://www.eia.doe.gov/

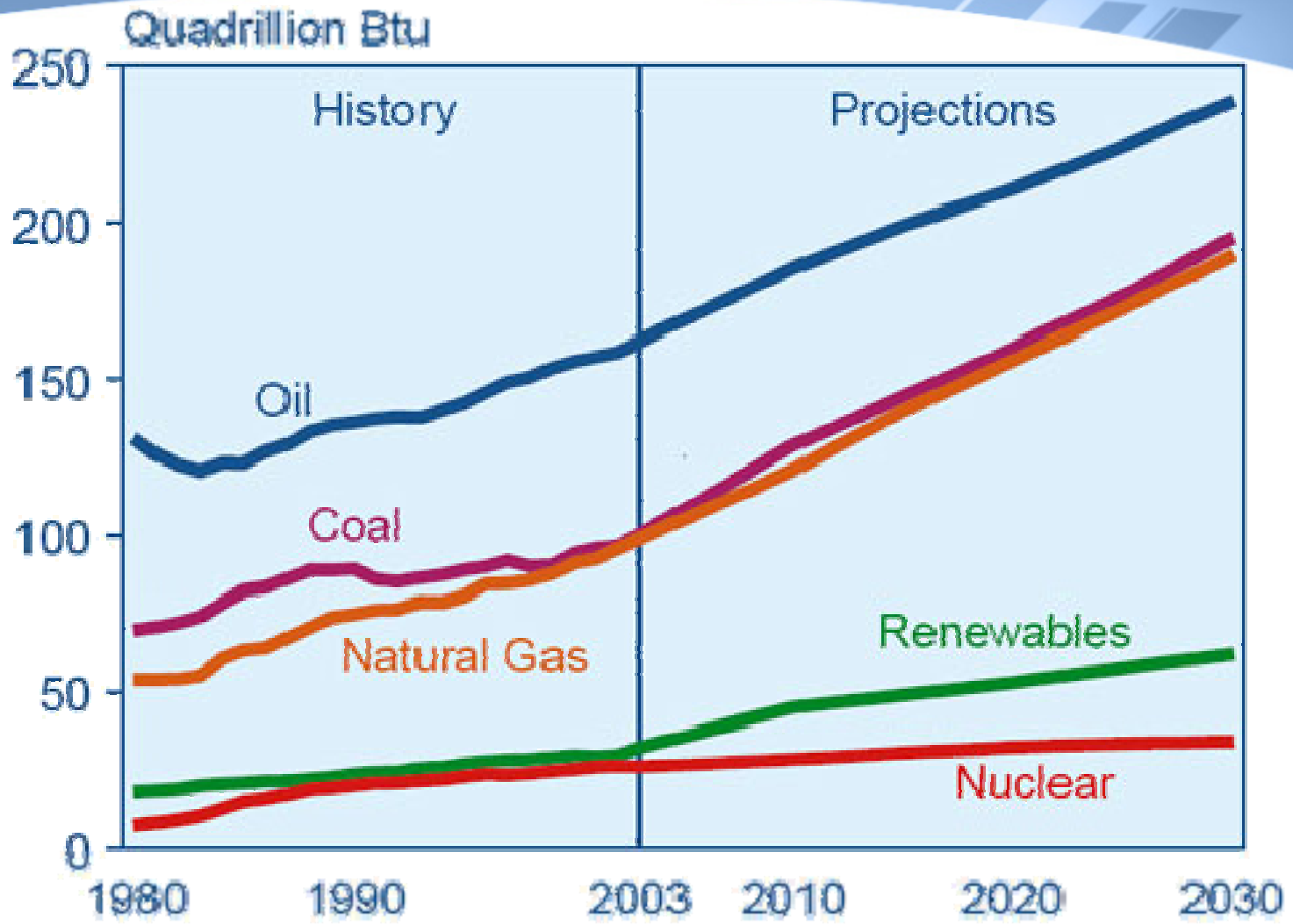
Population and energy consumption 2004



Source: Data of BP, "Statistical Review of World Energy 2005;" and United Nations, "World Population Prospects: 2004 Revision". http://www.worldpopulationbalance.org/pop/energy/

Future sources of energy

(predictions by fuel types)



Source: Energy Information Administration (EIA) Official Energy Statistics from the US Government, System for the Analysis of Global Energy Markets (2006). www. eia.doe.gov/iea/

Oil consumption of countries (top 20)

Rank	Countries	Amount (top to bottom)
#1	United States:	20,730,000 bbl/day
#2	China:	6,534,000 bbl/day
#3	Japan:	5,578,000 bbl/day
#4	Germany:	2,650,000 bbl/day
#5	Russia:	2,500,000 bbl/day
#6	India:	2,450,000 bbl/day
#7	Canada:	2,294,000 bbl/day
#8	Korea, South:	2,149,000 bbl/day
#9	Brazil:	2,100,000 bbl/day
#10	France:	1,970,000 bbl/day
#11	Mexico:	1,970,000 bbl/day
#12	Italy:	1,881,000 bbl/day
#13	Saudi Arabia:	1,845,000 bbl/day
#14	United Kingdom:	1,827,000 bbl/day
#15	Spain:	1,573,000 bbl/day
#16	Iran:	1,510,000 bbl/day
#17	Indonesia:	1,168,000 bbl/day
#18	Taiwan:	965,000 bbl/day
#19	Netherlands:	946,700 bbl/day
#20	Thailand:	900,000 bbl/day

Source: CIA World Factbook, 14 June, 2007 via NationMaster
http://www.nationmaster.com/red/graph/ene_oil_con-energy-oil-consumption&b_printable=1

Electricity consumption (per capita)

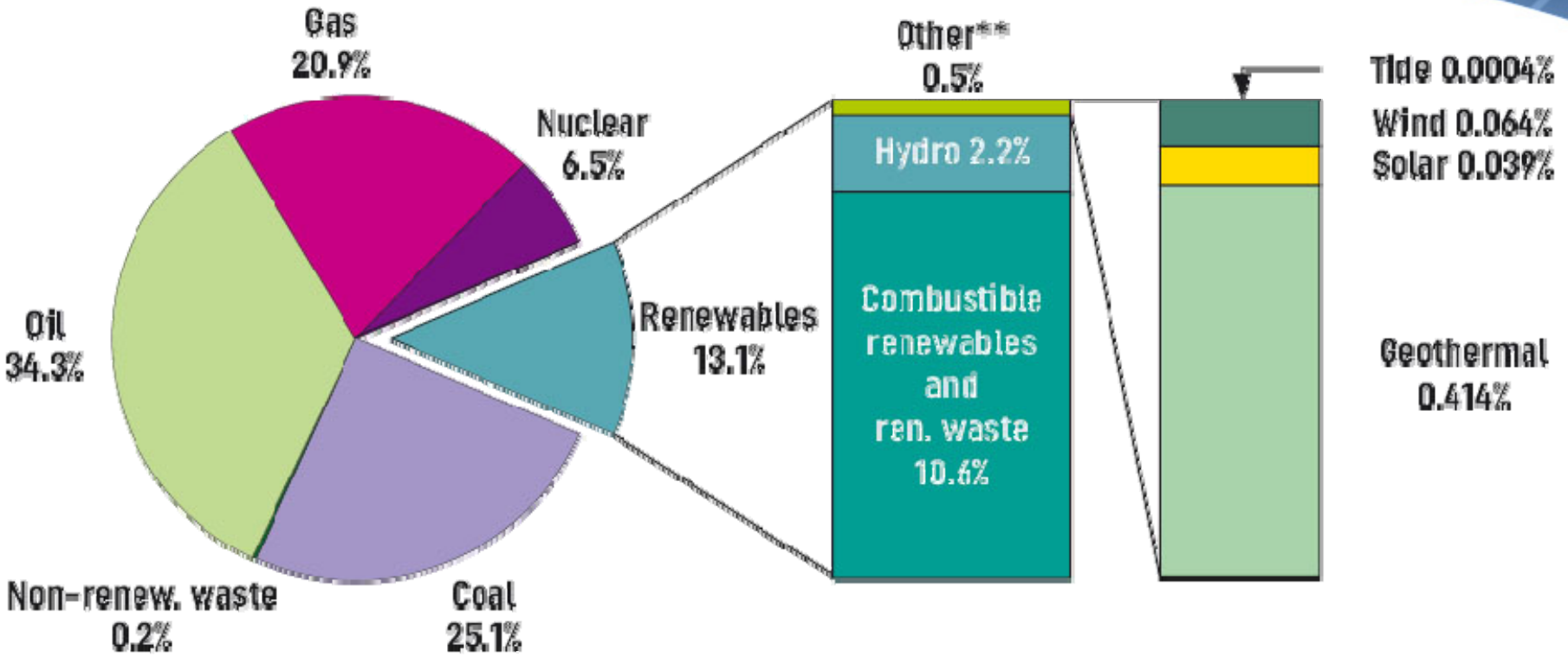
Rank	Countries	Amount (top to bottom)
#1	Iceland:	26,101.99 kWh per capita
#2	Norway:	24,373.769 kWh per capita
#3	Canada:	15,645.337 kWh per capita
#4	Finland:	15,422.471 kWh per capita
#5	Sweden:	15,258.405 kWh per capita
#6	Kuwait:	14,982.685 kWh per capita
#7	Luxembourg:	12,785.753 kWh per capita
#8	Qatar:	12,709.029 kWh per capita
#9	United States:	12,343.098 kWh per capita
#10	United Arab Emirates:	10,362.261 kWh per capita
#11	Australia:	10,252.432 kWh per capita
#12	Bahrain:	10,229.01 kWh per capita
#13	Guam:	9,460.612 kWh per capita
#14	Bermuda:	9,320.92 kWh per capita
#15	New Zealand:	9,286.231 kWh per capita
#16	Virgin Islands:	8,404.028 kWh per capita
#17	Cayman Islands:	7,982.833 kWh per capita
#18	Austria:	7,951.43 kWh per capita
#19	Belgium:	7,929.966 kWh per capita
#20	Taiwan:	7,668.795 kWh per capita

Source: CIA World Factbook, 14 June, 2007 via NationMaster
http://www.nationmaster.com/red/graph/ene_oil_con-energy-oil-consumption&b_printable=1

Reasons for energy consumption growth…

- Industrial growth;
- Growth of population;
- Climate conditions: the use of air conditioning during summer months. Highest consumption per capita is in most northerly countries - Norway, Iceland, Sweden, Finland etc., where electrical heating is based on low cost electricity produced by hydropower;
- Growth of energy consumption in the services sector, due to increasing levels of energy service demand;
- Increases in real incomes, living standards and the increased use of electrical appliances result in high electricity consumption (see Japan);
- Other…

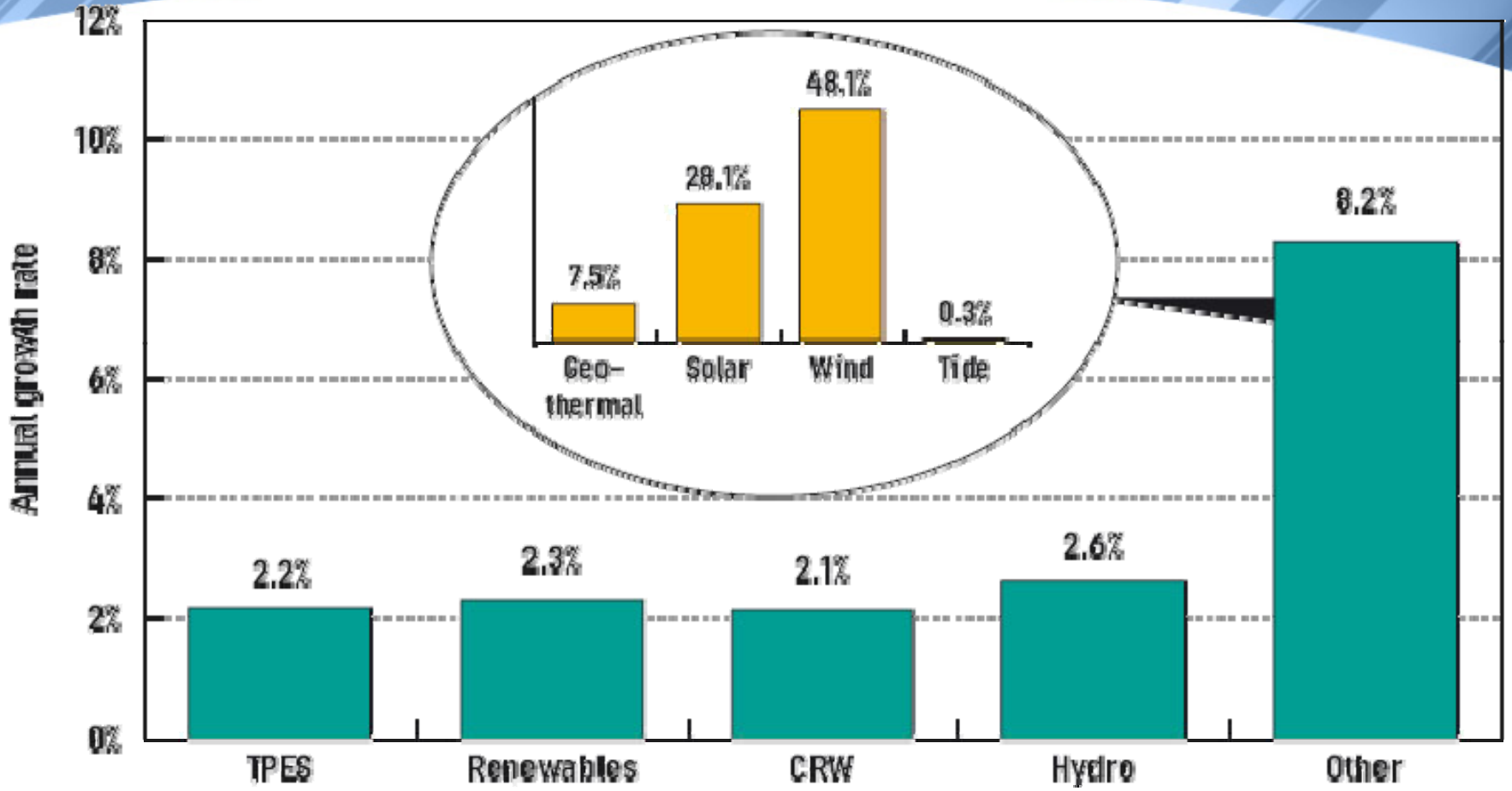
2004 fuel shares of world total primary energy supply



**Geothermal, solar, wind, tide/wave/ocean

Source: International Energy Agency (IEA), Renewables in global energy supply, an IEA fact sheet, January 2007

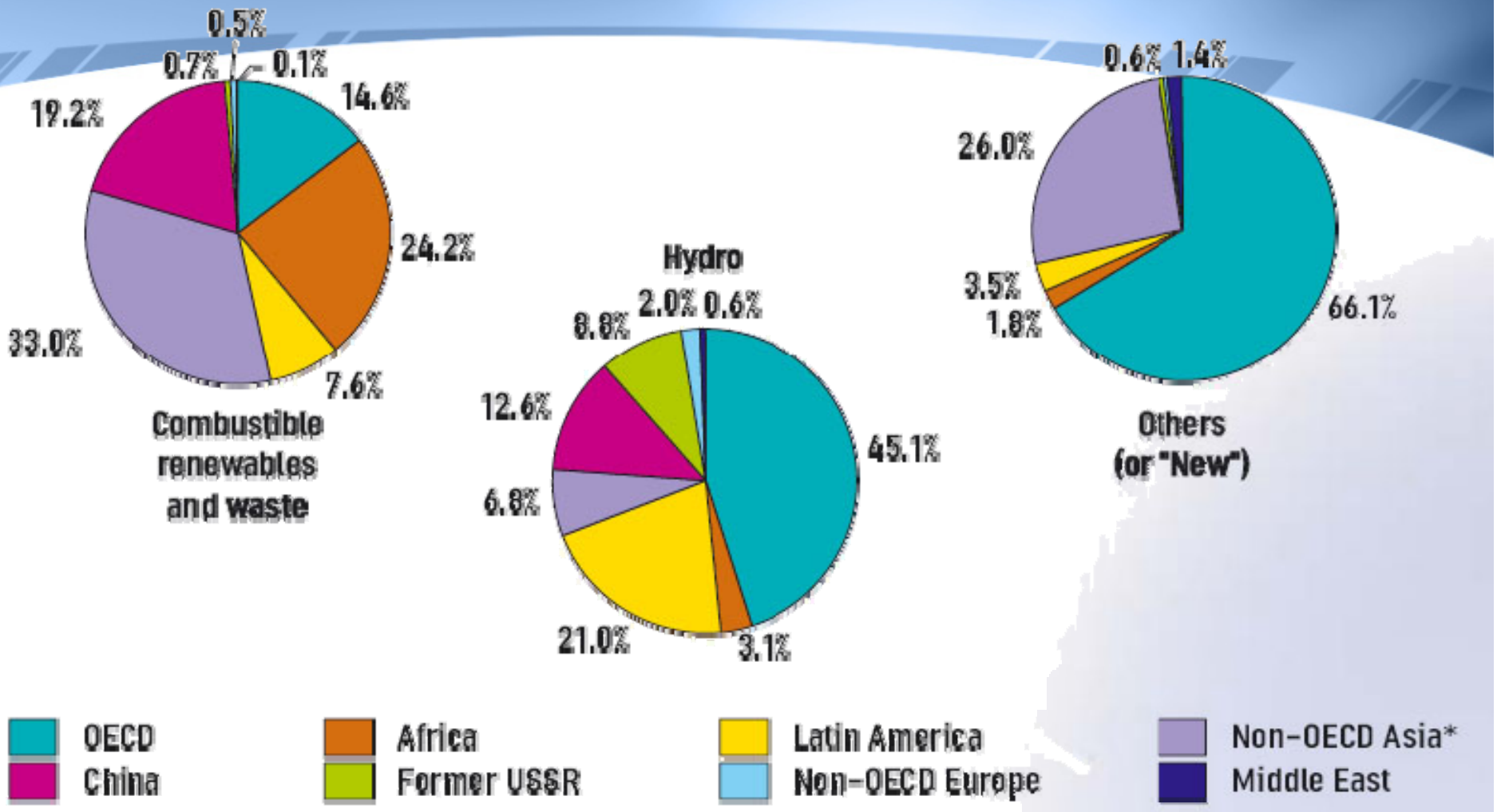
Annual growth of renewables supply from 1971 to 2004



TPES- Total Primary Energy Supply;
CRW- Combustible Renewables and Waste.

Source: International Energy Agency (IEA), Renewables in global energy supply, an IEA fact sheet, January 2007

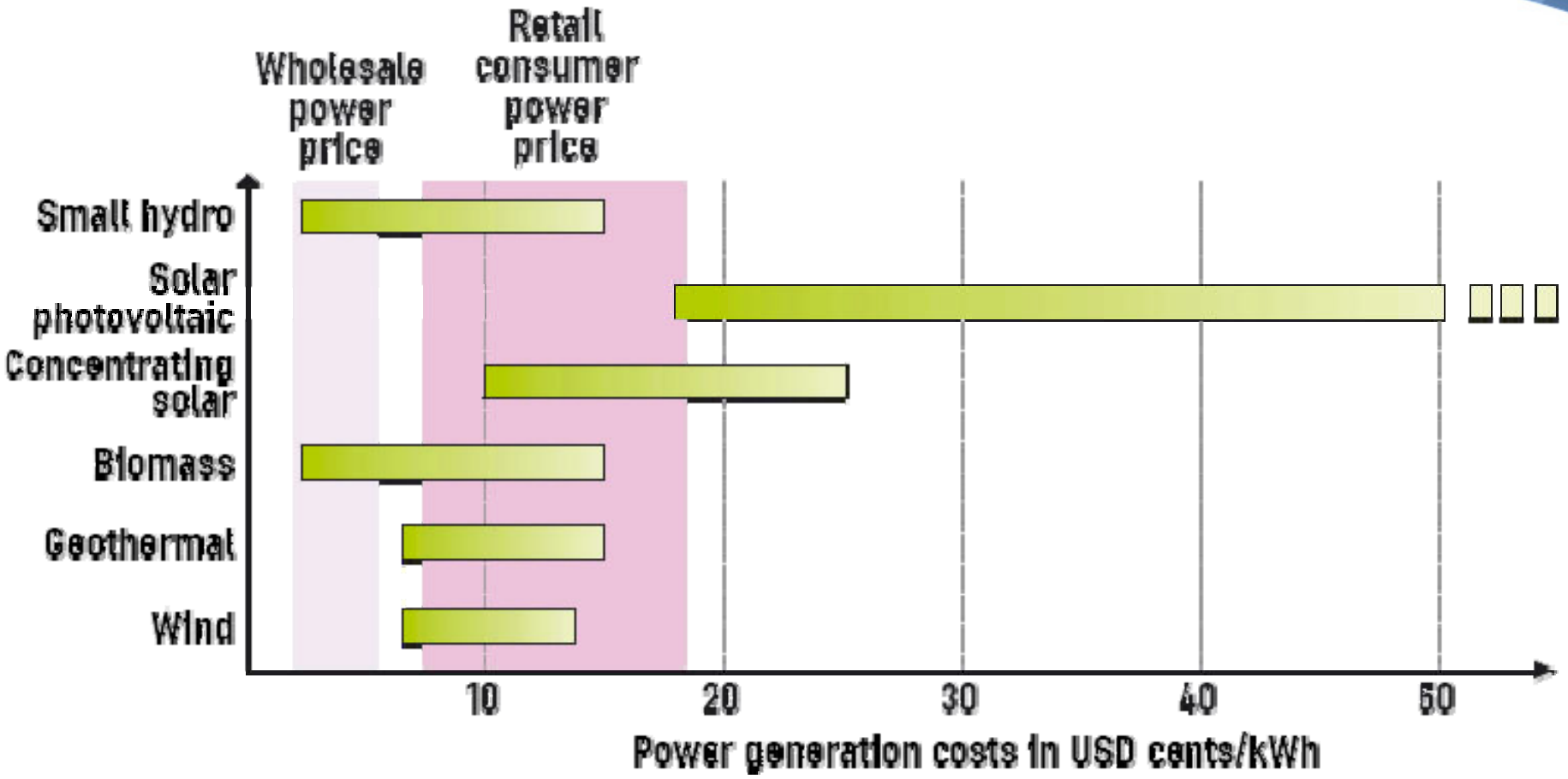
2004 Regional Shares in Renewables Supply



*Excluded China

Source: International Energy Agency (IEA), Renewables in global energy supply, an IEA fact sheet, January 2007

Cost-competitiveness of selected renewable power technologies



Source: Renewable Energy: RD&D Priorities, OECD/IEA 2006

Japan: energy and resources

- Japan imports 80 per cent of its primary energy needs
- It began a nuclear power programme in 1954. Its first commercial reactor, a 160MWe model imported from Britain, came on line in 1966
- The “oil shocks” beginning in 1973 exposed Japan’s economic vulnerability, leading to an expansion of the nuclear programme
- Japan is involved in designing new reactors to be used domestically and exported overseas
- The Japan Atomic Energy Agency was established in 2005 from the merger of several other bodies. It employs 4,400 people and has an annual budget of 161 billion yen (£640 million)
- Japan’s 55 normally active reactors generate about one third of the country’s electricity. This is planned to increase to 41 per cent by 2014

Source: JAEA; Uranium Information Centre

Japan energy supply… outlook for total primary energy supply

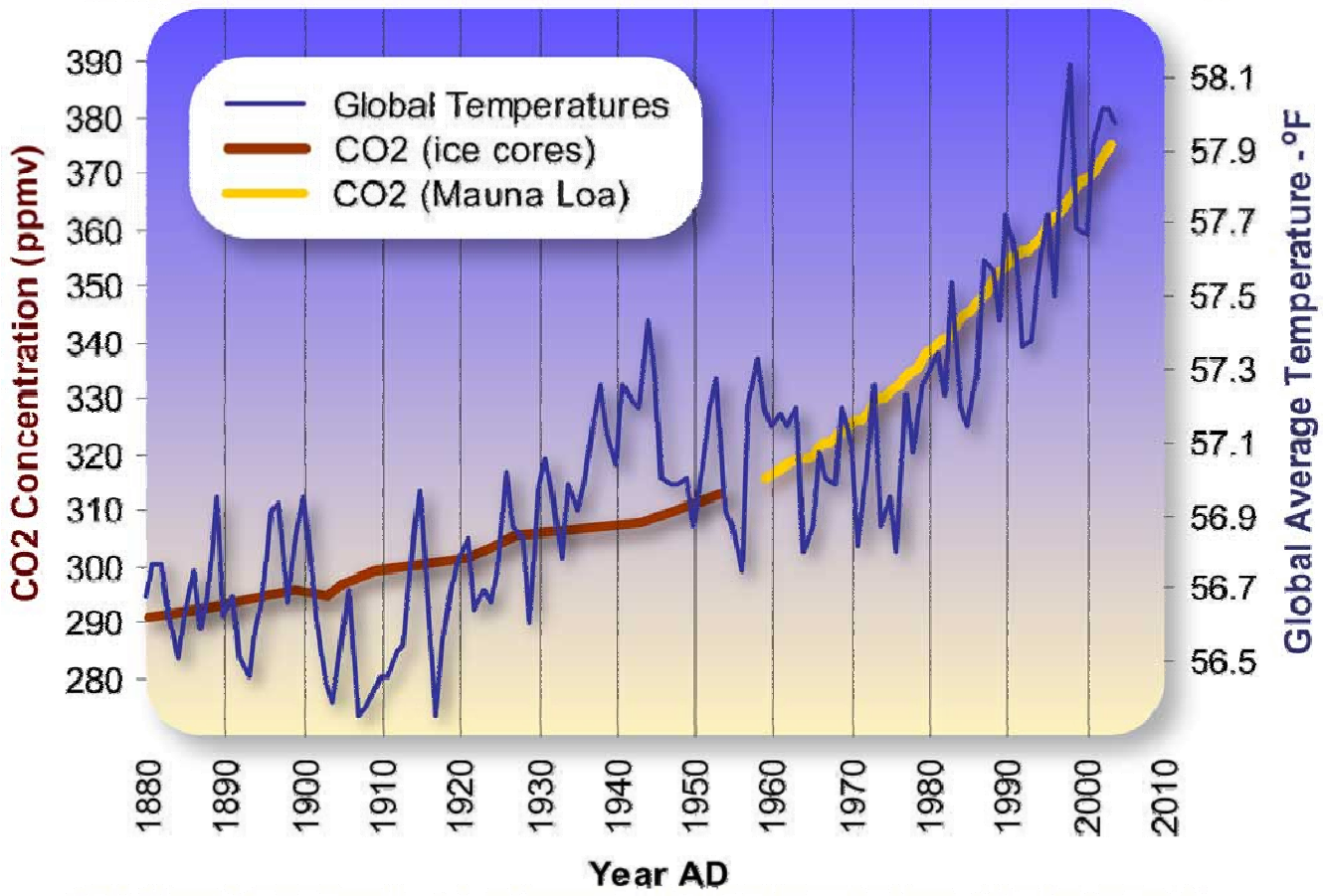
(10^{10} kcal=1,000 TOE)

	Actual		Forecast		Annual average growth rates (%)		
	1990FY	2000FY	2010FY	2020FY	2000 /1990	2010 /2000	2020 /2010
Coal	80,752 (16.6)	100,223 (17.9)	107,786 (18.7)	110,871 (18.9)	2.2	0.7	0.3
Oil	283,559 (58.3)	289,205 (51.8)	278,652 (48.4)	265,943 (45.4)	0.2	-0.4	-0.5
Natural gas	49,284 (10.1)	73,398 (13.1)	85,618 (14.9)	92,747 (15.8)	4.1	1.6	0.8
Hydro	20,512 (4.2)	19,253 (3.4)	19,314 (3.4)	19,360 (3.3)	-0.6	0.0	0.0
Nuclear	45,511 (9.4)	69,241 (12.4)	75,444 (13.1)	86,818 (14.8)	4.3	0.9	1.4
Geothermal	465 (0.1)	964 (0.2)	1,023 (0.2)	1,059 (0.2)	7.6	0.6	0.4
New energy	6,226 (1.3)	6,491 (1.2)	7,909 (1.4)	9,498 (1.6)	0.4	2.0	1.8
Total	486,310 (100.0)	558,651 (100.0)	575,747 (100.0)	586,296 (100.0)	1.4	0.3	0.2
Real GDP (billions of dollars, 1995 prices)	469,781	535,690	624,248	696,995	1.3	1.5	1.1
Energy input per unit real GDP (1990=100)	100.0	100.7	89.1	81.3	0.1	-1.2	-0.9
CO2 emissions							
(MtC)	287	316	325	323	1.0	0.3	-0.1
(FY1990=100)	100	110	113	112			

Note 1: Numbers in parenthesis () indicate percentage share.
Note 2. “New energy” consists of photovoltaic, wind, etc.

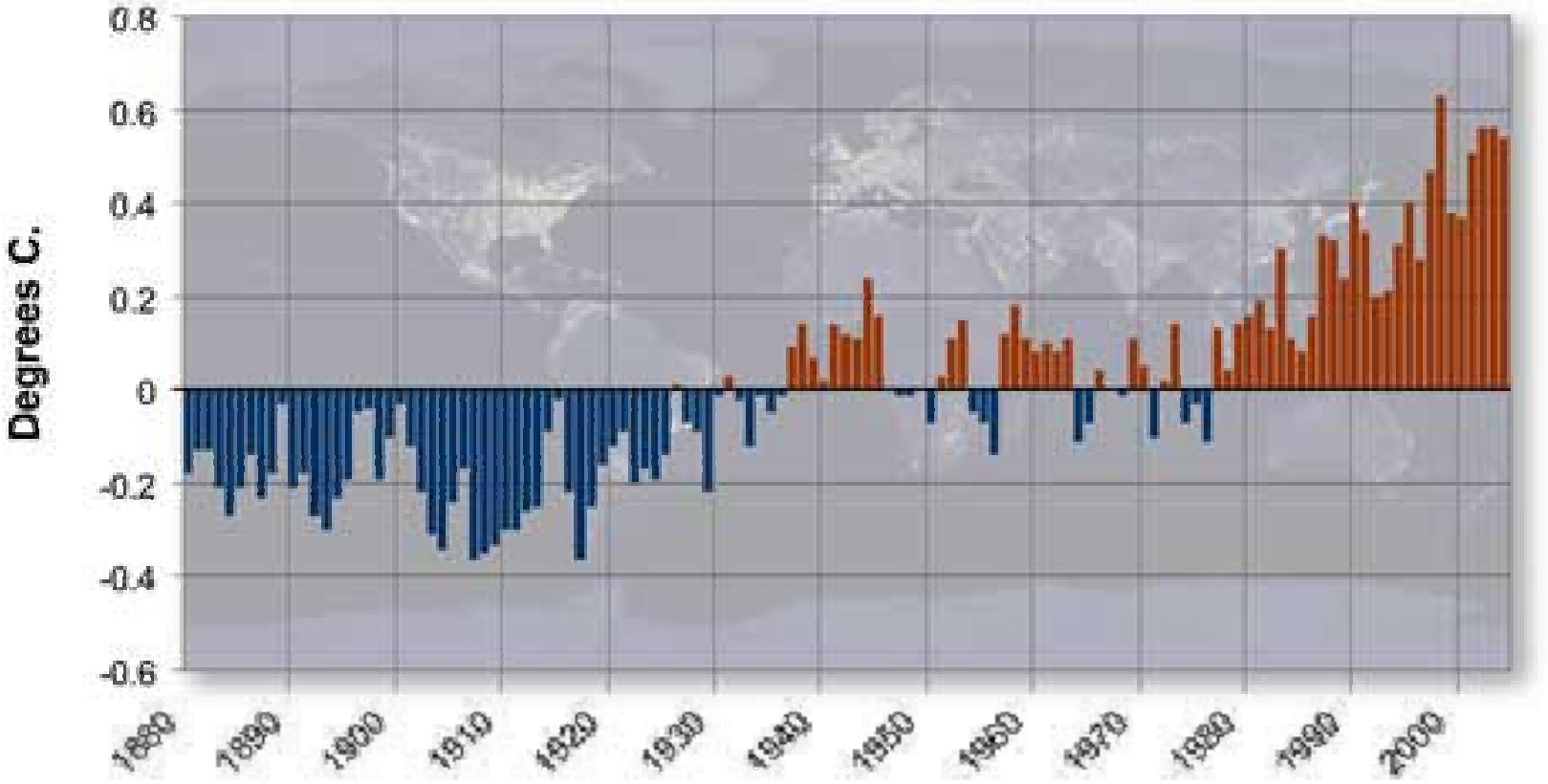
Source: Resource and Energy Administration, IEEJ, Comprehensive Energy Statistics (Japan)

Global average temperature and carbon dioxide concentrations, 1880-2004

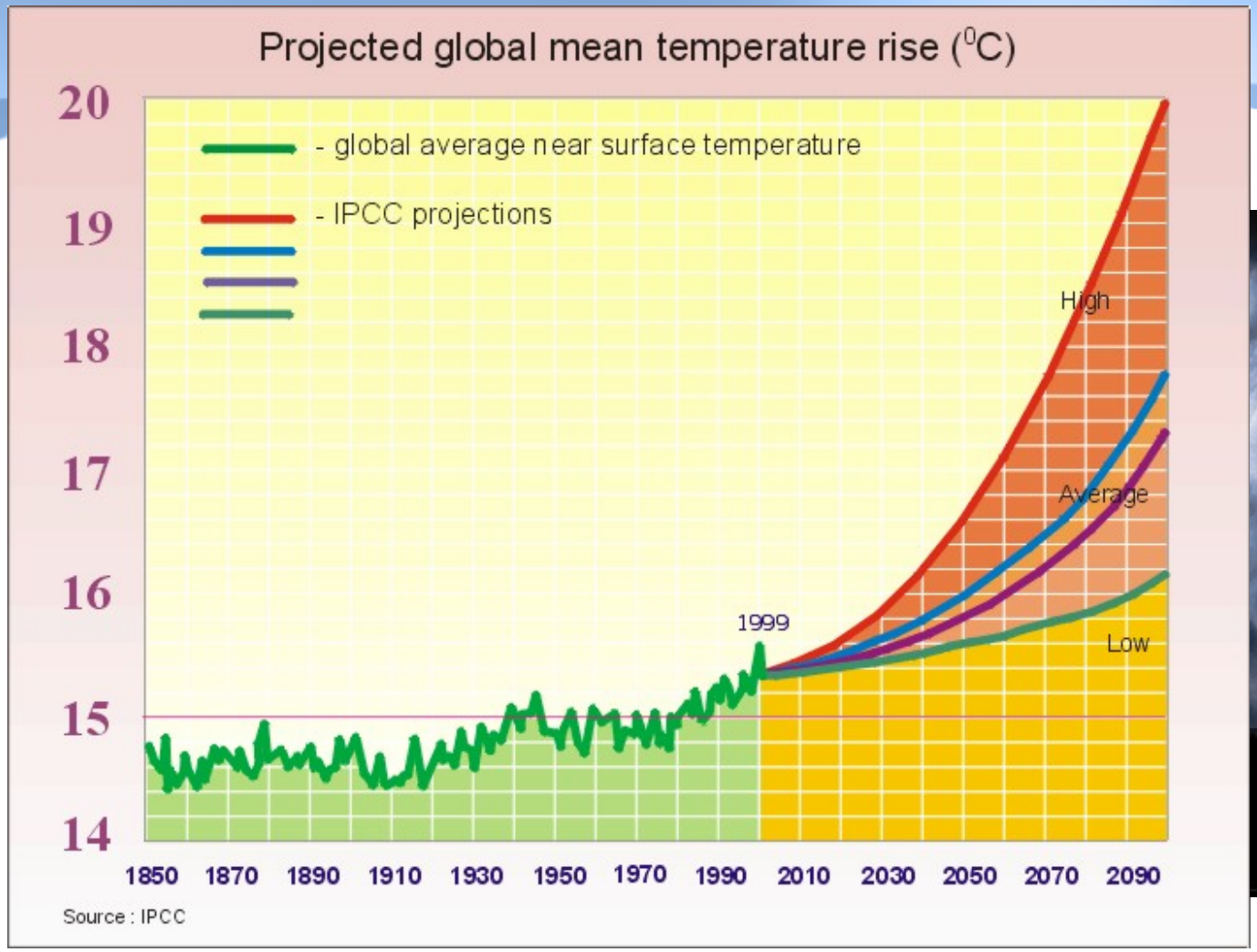


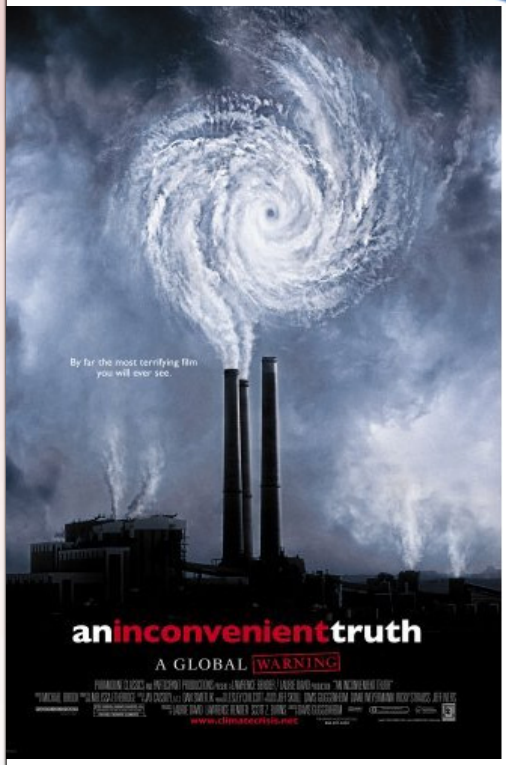
Global Temperature & CO2 Concentration Since 1880.
Source: NOAA's National Climate Data Center (NCDC) & Oak Ridge National Laboratory.

Annual global temperature anomalies 1880-2004



Global Temperature Anomalies (deviation from the 1880 - 2004 mean).
Source: the National Climate Data Center (NCDC).

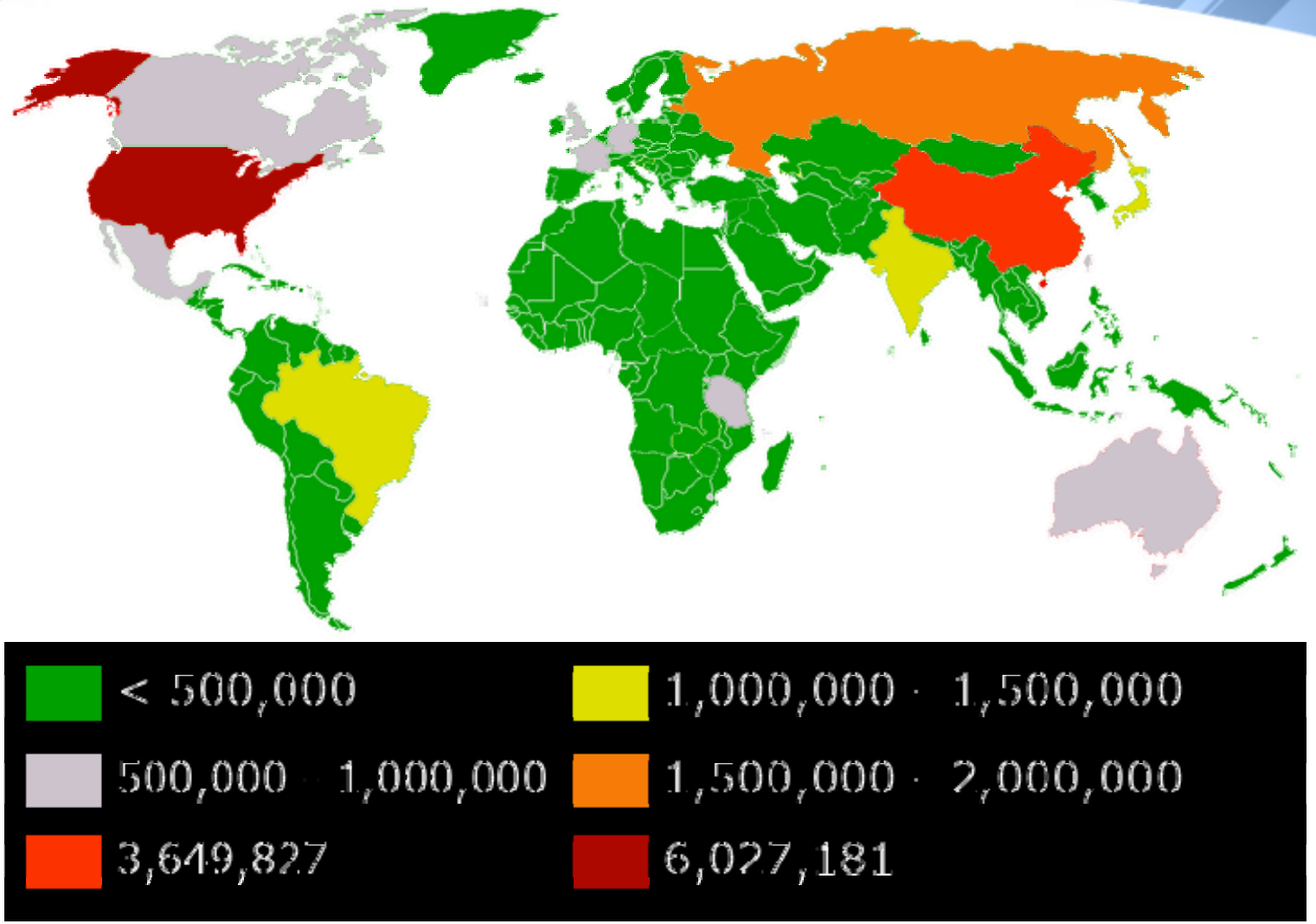




Source: Intergovernmental Panel on Climate Change (IPCC)

Total greenhouse gas emissions

(Metric tons carbon dioxide equivalent)



Source: National Energy Information Center (NEIC), http://www.eia.doe.gov/environment.html

Summary of potential outcomes

- **Rising Temperatures**
- **Sea Level Rise**
- **Intensification of the Hydrologic Cycle**
- **Health Effects**
- **Dramatic Effects on Ecosystems**
  - **Forests**
  - **Rangelands**
  - **Deserts**
  - **Cryosphere**
  - **Mountain Regions**
  - **Lakes, Streams, Wetlands**
  - **Coastal Systems**
  - **Oceans**
  - **Fisheries**
- **Food Production**

Source: adaptation of the analysis of potential outcomes of climate change delineated by the Intergovernmental Panel on Climate Change (IPCC)

Major problems associated with global climate change

- Predicted changes in rainfall patterns will increase the threat of drought & floods in many regions.
- Melting glaciers & thermal expansion of sea water may raise sea levels, threatening low-lying coastal areas & worst of all **small islands**
- Climate & agricultural zones may shirt towards the poles, which would result in reduced crop yields for mid-latitude countries such as the U.S.
- Ultimately, the Convention recognizes that climate change has the potential to produce “dramatic negative impacts on human health, food security, economic activity, water resources & physical infrastructure”.

Source: United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int/

The United Nations framework Convention on Climate Change

The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The Convention enjoys near universal membership, with 191 countries having ratified.

Under the Convention, governments:

- gather and share information on greenhouse gas emissions, national policies and best practices
- launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries
- cooperate in preparing for adaptation to the impacts of climate change

The Convention entered into force on 21 March 1994.

Source: United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int/

A brief history of the climate change process:

- In 1979 the first **World Climate Change Conference** recognized climate change as a serious problem & called on all governments to address it.
- Between 1980-1990 a number of intergovernmental conferences focusing on climate change were held.
- In 1990 the IPCC issued its **First Assessment Report** confirming the scientific evidence for global climate change.
- In Dec. 1990, the UN General Assembly approved the start of treaty negotiations on the UNFCCC & a deadline was set for the June 1992 Rio “Earth Summit”.

Source: United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int/

History (Continued)

- The UNFCCC was signed by 154 states at the Rio de Janeiro Earth Summit.
- The convention **entered into force** on March 21st 1994.
- In February 1995, the **Conference of the Parties (COP)** became the Convention's ultimate authority/governing body.

Source: United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int/

Kyoto Protocol

- On December 11, 1997 the Kyoto Protocol was officially adopted at COP 3 in Kyoto Japan.
- In 1998 a new round of negotiations on Kyoto were launched at COP 4 in Buenos Aires.

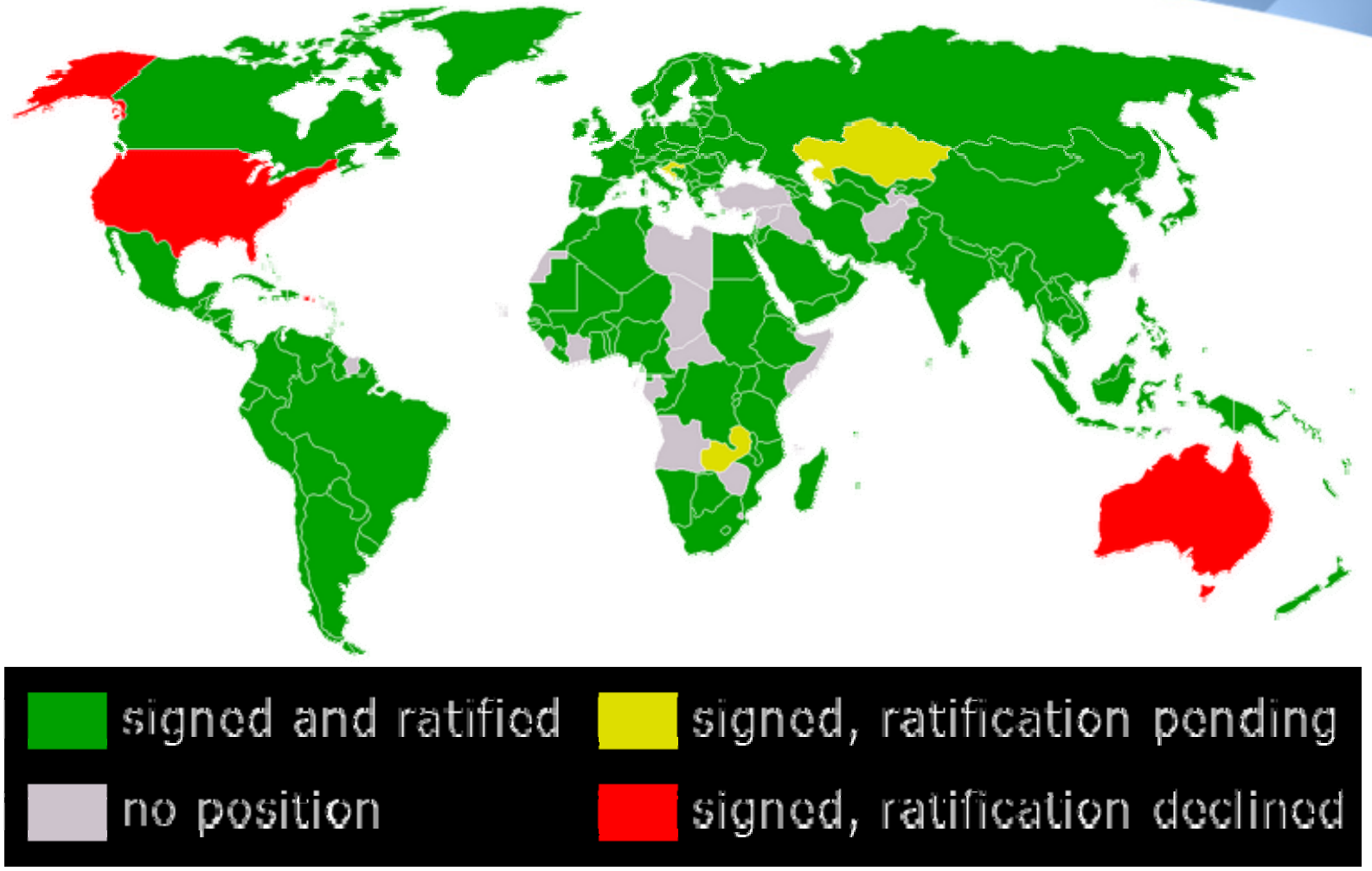
Source: United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int/

History (cont.)

- Negotiations on the rules of implementing the Kyoto Protocol resumed during COP 6 in Bonn, Germany, July 2001.
- Building on the *Bonn Agreements* negotiators at COP 7 (Marrakech, Morocco, October 2001) adopted a comprehensive package of decisions known as the *Marrakech Accords*…..

Source: United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int/

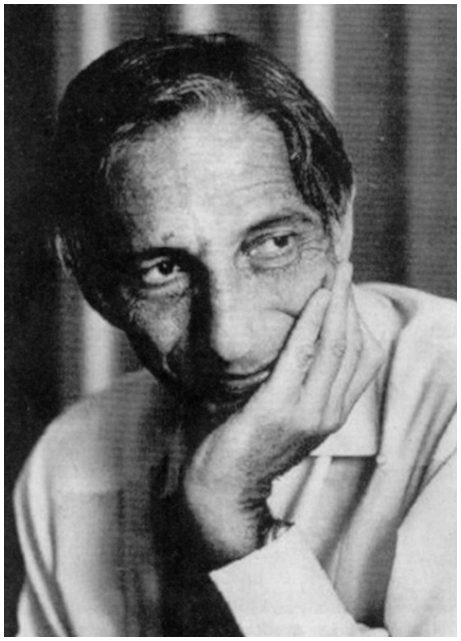
Kyoto ratification November ‘05



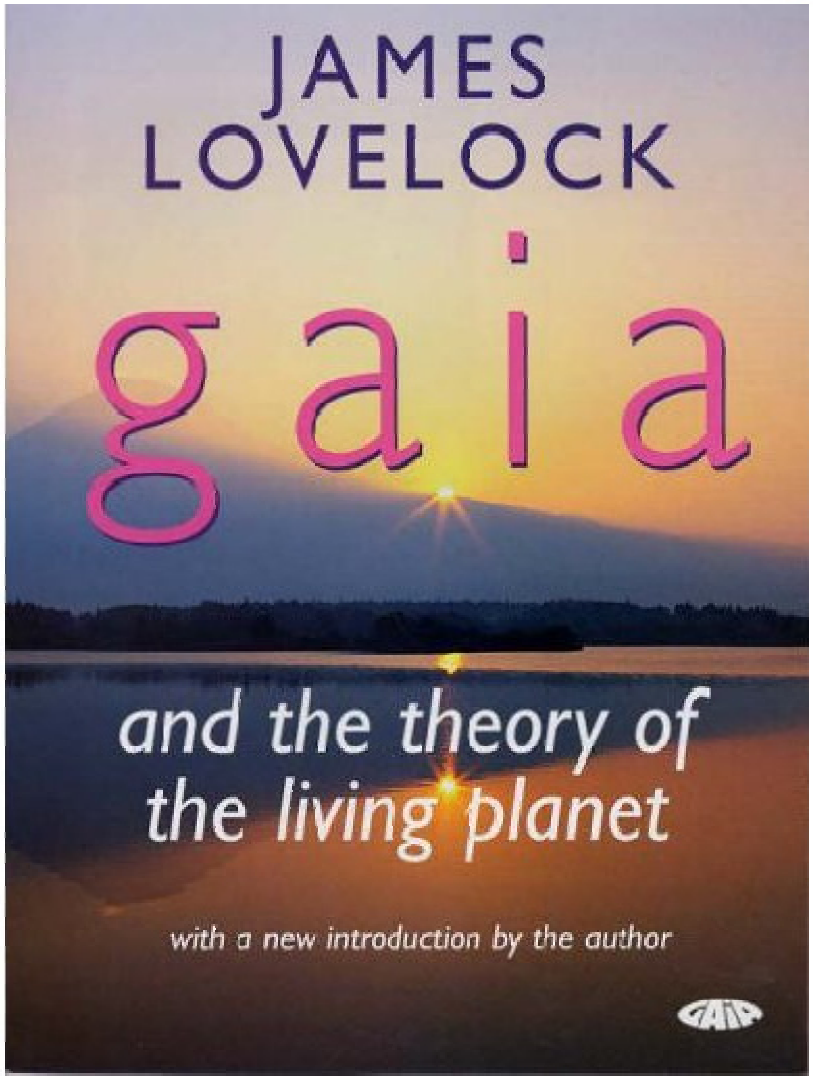
Source: National Energy Information Center (NEIC), http://www.eia.doe.gov/environment.html

Ivan Illich

(1926 - 2002)



In praise of bicycles…


JAMES
LOVELOCK
gaia
and the theory of
the living planet
with a new introduction by the author
GAIA

A personal view

- Sufism and Unity in Diversity
- Leonard Euler (Swiss mathematician, 1707-1783):

"The pull of the future is stronger than the push of the past"

THANK YOU FOR YOUR ATTENTION!