Some history

The United States is blessed with abundant sources of energy of all sorts, and the legislation about it has been minimal and were mostly price control, in the states, until 1945.

The first important legislation was the Atomic Energy act of 1946. It was recognized that civilian government control could prevent excessive military control. The act established the United States Atomic Energy Commission (AEC), a civilian agency with sweeping powers over all military and civilian aspects of nuclear energy. Manhattan Project assets were transferred to the Atomic Energy Commission at midnight, December 31, 1946. The AEC exercised governmental control over military, regulatory, and developmental aspects of the atom until 1975 when the agency was disestablished. In its place, Congress created the Nuclear Regulatory Commission to oversee the nuclear power industry and other civilian uses and the Energy Research and Development Administration (ERDA) to coordinate energy development including nuclear power. The AEC's weapons program was folded into ERDA. In 1977, ERDA and the energy programs from a number of other agencies were brought into the new Department of Energy. From 1946, the Congress exercised oversight with the Joint Committee of Atomic Energy (JCAE) on which sat members from both the house of representatives and the Senate. As far as I know JCAE was unique.

Under this legislation nuclear power became a viable energy source. There is a lot of talk about subsidies in this period, but they were primarily indirect. Support for nuclear engineering departments throughout the USA with many research reactors. Encouragement in general for building up an infrastructure and generally building up optimism for nuclear energy among the American people.

During the Presidencies of President Eisenhower, President Kennedy and President Johnson, the theme was to provide plentiful cheap energy. Admiral Strauss expressed this in a very over optimistic manner when referring to nuclear fusion. “Electricity will be too cheap to meter” Many others have argued the importance of having affordable energy including Benjamin Franklin over 200 years ago (his words are on the energypmp website). In the USA and the developed world we can afford other incentives. But many people would oppose putting coping with global warming ahead of raising the living standards of the poor in China and India.

This began to change in 1973. It became clear in spring 1973 that the American demand for oil was outstripping supplies in the western hemisphere, and this gave economic power to the rapidly developing countries of the middle east. They exercised that power in oil embargo in late 1973 and America was shocked. President Nixon reacted by proposing an energy bill with the aim of “energy independence” - to provide emphasis on domestic resources. Interestingly, as expressively stated by Michael Lubell of the American Physical Society, congress received this and other energy legislation until 1990 with a giant yawn. Simultaneously the environmental movement got under way starting on earth day April 22, 1970..

By steady rhetoric which a few of us struggled to counter, the US environmental movement had basically stopped nuclear energy by 1975 after which no nuclear power plants were proposed that were
completed. Nuclear energy was a logical candidate for assisting energy independence but there was no agreement on this either in the administration, congress or the environmental movement and the infrastructure built up and nurtured by Chairman Glenn Seaborg in particular under Kennedy and Johnson was largely dismantled.

But in about 1990 another issue arose in the public consciousness. This issue was and still is largely pushed by non-American sources. The International Program on Climate Change was created and the first report of note was IPCC3. This came to a dramatic head in the Kyoto conference in December 1997. The academic world had been slowly pushing the idea that carbon burning would be a source of global warming. Originally a “pork barrel” project of the University of California at Davis the National Institute for Global Environmental Change (NIGEC) was started in 1990 with 4 centers at Davis, Tulane, Harvard and Indiana and I had the honor of directing the NE center. Still Congress was slow and continued the bipartisan yawn and ignored the executive branch proposals on energy whether democrat or republican till about 5 years ago.

Ever since King Croesus invented money, it has been a very effective way of understanding commerce, and control of money gives guidance to millions of individual decisions. The energy system of the USA is big enough that there is not enough money to change it by subsidizing what we want, it has to be by banning or taxing what we do not want. But to achieve efficiency it is necessary to have an educated populace. Microeconomists, particularly Jorgensen of Harvard and Manne of Stanford had calculated that if there was a tax on carbon with the funds going in to the general treasury as reduction of other taxes, it would be stimulating to the economy. I invert that argument and argue that if we try to take funds out of general taxation to subsidize non-carbon technologies, it would dampen the economy. This was done to a small extent in the Clinton administration but fortunately only to a small extent.

Indirect Legislation and Controls

Electricity came into wide use a century ago electric utility companies used marketing tactics to encourage its use. In UK in 1930, it was correctly assumed that everyone would switch from gas light to electric light as soon as possible. The charge for electricity for lighting was high, but the charge for other uses such as heating was 1/3 as much! Although modern legislation stops this, it seems unwise to assume that an electricity company will try to stop people using its product. It has only partially worked.

Encouraging efficient use by legislation follows two paths. The first adopted 35 years ago by Massachusetts and California alike was to legislate that information be available. A customer must be able to know how much the electricity to operate an appliance will cost him. California went further and has led the country in mandating efficiency standards for all products sold there. I have argued with Art Rosenfeld about this both in Erice and elsewhere over the years. Art estimates that even with information people will normally only make decisions based on 2-year running costs. But this remains a matter for study.

Electric utilities historically encouraged increased consumption and sales. Public information and legislation to encourage efficient use may well be necessary. Interestingly the report by Revelle, Singer and Starr in a much-maligned paper called for such strategies in 1991. Sc also is Carmen Difiglio’s talk. I like Carmen’s discussion and particularly like his change of title. A “no regrets strategy” implies that someone (undefined) will do the regretting.
A number of indirect legislative and legal actions, both at the national level and the state level have undone the encouragement and infrastructure put in for nuclear power in the time of Glenn Seaborg. In nuclear waste, for example, the proposal in 1970 to put high level nuclear waste in a salt bed in Lyons, Kansas, was stopped by state action, and the present proposal at Carlsbad New Mexico is much hampered and delayed. Even low level waste sites have been stopped at the state level in spite of supportive reports by the National Academy of Sciences. But the recent actions at the federal level are probably more damaging. Starting in the late 1970s the federal proposed a national site. In the 1990s the congress chose a site in Nevada. Although Nevada had originally suggested that their state would have such a site, they now changed their minds and it was opposed in the US Supreme court who insisted that a study be done to determine if it would be safe for a million years. $10,000,000,000 was spent on such studies and remarkably scientists can say something sensible even at that time. But now President Obama has pulled out the rug, presumably to help Senator Harry Reid. But I am reliably informed that both the secretary of energy (Dr Steven Chu) and the President's Science Adviser, (Dr John Holdren), informed him that there is no scientific reason for rejecting the site and the crafty words were used that “it is not feasible”.

As I emphasized in my report last year, these attitudes must change for a nuclear revival to take place.

Another indirect approach is mandatory changes such as fuel efficiency standards for automobiles. Again this is, in a sense, a way of persuading the public to do something that they will not do by price alone. The arguments against them were described in the first version of Ginzton’s NAS report in 1977, which he scrapped because he realized that they did not correspond to the nation’s will. To achieve a high fuel efficiency means the car will cost more in other ways (usually a capital cost) and someone who drives only 5000 miles a year is relatively penalized.

"Washington should make greater use of a powerful policy tool that it has largely neglected: public-sector procurement. Procurements by the US Department of Defense (DOD) and other agencies were the foundation for major waves of innovation after the Second World War, including those in jet propulsion, Earth-orbiting satellites and so on.”
Nature Vol 466 | 15 July 2010
I note that 30 years ago the largest cogeneration plants were US military bases.

Small local decisions

The only energy legislation of any importance has been a number of small, local decisions, often empty decisions because the local government has no effective authority. The most obvious are the “nuclear free zones” ostensibly for stopping military activities, but of which the only operational significance has been the hindrance of the development of nuclear energy in a rational way. An obvious example is the ban in New London, Ct This ban has no effect on the nuclear submarines in the base across the river but stopped nuclear fuel, both fresh and spent fuel, coming from Brookhaven National Laboratory by the ferry from Orient point.

There are many other local decisions, that may have no legal impact but are “road blocks” for nuclear power. These include, for example, the decision to oppose the Shoreham Nuclear power plant after its’ NRC license was issued by the Governor of NY State, the abandonment of the Yucca Mountain nuclear waste site, the decision of the Bureau of Indian Affairs (BIA) and the Bureau of Land management to block the temporary waste site on the Goshute reservation in Utah just as NRC was prepared to issue a license and opposition to wind turbines off cape Cod. These mostly involved with nuclear power and
increase the costs of these non-carbon alternatives.

But no local community has enacted legislation to restrict the use of oil for transportation, or for reducing the heating and cooling costs in stores and public buildings. Yet these are places where there are huge inefficiencies. So on balance I argue that the myriad of local regulations have done little so far to address the basic problems and cannot make a major improvement but as noted below a careful attention to local conditions can make inroads.

The Stern report

Meanwhile Europeans were pushing ahead. I refer in particular to the report by Sir Nicholas Stern, (now Lord Stern) reporting to the US Treasury. The executive summary is on the energy PMP website. Although there were of course other reports this seems to have had a major influence on the European Union. In it Stern accepted that global warming was happening. He estimated the economic consequences thereof and argued that some action was immediately necessary. As adopted there were several aspects

Carbon dioxide emissions were to be controlled in some but not all users of carbon. There was to be a cap and trade system with each industry setting a historical cap to start with. There were to be incentives for some, but not all, low carbon energy technologies. But in spite of specific recommendations by the WFS energy PMP and a number of other organizations carbon sequestration and nuclear energy were not included.

The problem with a historical cap is that the industry sets its cap as high as they can justify which is often higher than is the truth. This occurred in Europe and made the system, at least initially, a failure. The problem with setting the cap on emissions, rather than on carbon as it comes out of the ground is two fold, as discussed at Erice many times. Firstly we do not know the emissions. But we do know the amount of carbon as it comes out of the ground. After all, that is what the customer actually pays for so it is known and reliable. Secondly each industry is treated separately and it a centralized command and control system that must decide which industry bears the brunt. Again Stern ignored the resolutions from the energy PMP which to my certain knowledge were sent to him,
The Waxman-Markey bill

This bill, all 1300 pages, is on the energy pmp website. It was passed by the US House of Representatives in 2009 but not picked up by the US Senate. It also proposes a cap and trade system with a historical cap, on emissions. It therefore has all the disadvantages of the Stern report plus a few more. To make it “acceptable” to powerful interests especial subsidies were proposed. The basic criticism is, therefore that it is a “pork barrel” bill with a slight veneer of climate change. A leading climate researcher and advocate for strong action is Dr James Hansen of NASA and adjunct professor at Columbia University. He has written (also on the energypmp website, that the bill is so bad that it should be abandoned and start over again. I agree with Jim. So it seems do many in the USS Senate. During this discussion, an energy company proposed 20+ new coal fired power plants in Texas, without carbon sequestration or gasification to make it more carbon efficient. The environmental community objected and the company finally, in a compromise agreed to only build 6. But to those of us examining the situation carefully 6 was all they actually wanted to build! Such deliberate over statements followed by a “compromise, is clearly what one can expect from any regulatory scheme for Carbon with a historical cap.

The Cantrell-Collins Bill.

This bill of a modest 49 pages, also available on the energy pmp website, concentrates solely on the issue of global warming and makes no attempt to legislate what the new energy structure of the US is going to be. Senators Maria Cantrell and Collins proposes to control carbon upstream at the mine, well, gas field or port of entry as the enrgy pmp had proposed. She also has a “cap and dividend” approach: a tax on the carbon that is repaid as a dividend to taxpayers in just the way Jorgensen and Manne had suggested. When this was submitted in March 2010 I was wildly enthusiastic. But it was too good to be true. It seems to be forgotten already in the senate

The Kerry-Lieberman bill,

I have also placed the details of this bill on the energypmp website. It seems to be a compromise. It is a draft for discussion. It has a lot of detail (perhaps a synonym for pork barrel) in its 987 pages. A main reason for the complexity is that it tries valiantly to address three issues at once.
(a) energy independence
(b) energy shortages
(c) climate change

As I read it it Kerry and Lieberman propose what seems to be a command and control system which I believe will be much more expensive than needed. But maybe this is a useful point to stop for discussion. It is unlikely that the bill will come up in 2010. Th oil spill in the Gulf of Mexico is far more politically important although it has killed no one in the public. I do note, however that everyone seems to agree that the well must be sealed and abandoned. As a physicist and professor I note that my former graduate student, Dr Arthurr Kuckes of Vector Magnetics is using his knowledge of electromagnetism to guide the drilling of the relief wells.
Suggested reasons for failure of the Kerry Lieberman bill.

A search of the internet suggests the following:

3) http://www.greencarcongress.com/2010/05/kerry-lieberman-20100521.html
5) http://news.yahoo.com/s/usnw/20100721/pl_usnw/DC38585
6) http://www.ucime.org/content/billions-new-nuke-giveaways-kerry-lieberman-bill-exposed

None of the first 5 seem sensible. The last two worry about any encouragement about nuclear power. But Michael Schellenberger and Ned Norhaus suggest that the cost gap is a more serious reason. Kerry Lieberman may surface in the next session. http://www.thebreakthrough.org.

My list of problems with existing cap and trade proposals

(1) The major scientific technical problem in discussing these bills is that there is a big gap between the cost of fossil fuels and the cost of most proposed alternatives. Moreover the portability and flexibility of using oil is hard to equal. I note that of the alternates nuclear power WAS cheaper than alternates in 1973. None of the legislative proposals address this clearly. I believe that cost is an issue we should discuss at Erice. As I have emphasized for 35 years nuclear power4ed electricity has been cheaper than coal and could be again. It is unclear whether that will happen. But it remains the only candidate in my view for a large scale substitution of fossil fuel by other sources.

(2) Too many pork barrel issues attached to the Waxman Markey and Kerry Lieberman bills

(3) Cap and Trade with a historical cap is an initial give away to Industry

(4) Setting caps separately on each sector is inefficient and reduces choice to the consumer

(5) The control is too late in the carbon cycle.

Numbers 2-5 would be avoided with a carbon tax such as in the Cantrell bill
If we had a carbon tax, this could be tested.

Some cheaper proposals

I believe that there is, as now, no good simple solution (other than nuclear without obstacles) for all locations. There should be much more emphasis on choosing a technology suitable for the location.

1) Solar water heating is cost effective in the front range of Colorado with clear weather and high UV content. But it is NOT in Massachusetts.

2) Small hydro, abandoned by big electric utilities 80 years ago may now be cost effective in some locations.