Can we learn from history?

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The popular saying “history does not repeat itself” does not mean that nothing may be learned from history. As a matter of fact, quite a lot can be learned from history, such as not repeating the mistakes of the past. Already the Romans said two thousand years ago that it was human to make mistakes once in a while, but that repeating the same mistake was unforgivable.

The newly founded research field of energy history[1] provides several examples of past experiences from which we might learn today. Before discussing a few such case stories, a brief overview of energy history will be given, using the North European country presently named Denmark as proxy. Figures 1 and 2 give the per capita energy use (rate of energy converted) and population size as they have unfolded over the past 125 000 years. It is seen that energy use over long periods of time has been stable or modestly increasing (e.g. during the early period of introducing agriculture and its draft animals), but that the last 100 years have been very unusual, with exponential growth during the period 1950-1970 and again 2000-2010, plus a growth during the first half of the 20th century that was higher than in the preceding centuries (except for the World War II interruption). Generally speaking, one would expect the historical stable energy use to be replaced by growth only as a consequence of some break-through in technology or in social organisation. Such a break-through happened during the early 20th century in Denmark, due to industrialisation, and again during the mid-century decades, due to the development of the Scandinavian welfare economy. It is clear from Figure 1, that compensation for the wartime unavailability of imported fuels cannot explain the unprecedented growth. Later, the oil supply crises 1973/74 and 1979/80 abruptly stopped the growth in energy use, due to introduction of at the time already known energy efficiency measures neglected during the exceptional growth period. The energy growth after 2000 is entirely due to increase of a single activity: worldwide international shipping by the company Maersk (being even more impressive when considering that ships are the most energy-efficient form of transport).

The development in Danish population size, shown in Figure 2, helps understand the development of energy usage. The growth of a population is resulting from birth rates exceeding death rates. Birth rates were high all the time until 1970, but so were often death rates: Figure 2 shows the effect of introducing agriculture some 7000 years ago (allowing a higher population growth), it shows the effect of the emigration of farmers about 1000 years ago, notably to England and France, in the wake of the Viking raids to these places, and of the bubonic plague 650 years ago, followed by the negative effects of lost wars and social decay under incompetent kings, and finally it shows the positive effects of increased medical insights and the associated decline in death rates over the last 200 years.

A recent example of consumer behaviour after the 1973/74 oil supply crisis illustrates the type of lesson that history may teach us. The price of oil had not changed over the preceding 96 years (when corrected for general inflation)[2], but the cost of energy had become a smaller fraction of the cost of products and services like space heating or transportation, due to the higher salaries earned during the period of exceptional economic growth. Therefore energy efficiency measures that were economically viable had not been carried out, being considered to save too little to warrant the effort. For this reason, several measures could be implemented during the years following first doubling and then quadrupling of the oil price, without noticeable reduction in economic revenue. The cooperative sentiment of individual citizens even caused a number of measures to be implemented, e.g. in adding insulation to detached dwellings, that were only marginally economic, with payback times of over 20 years[3]. However, such efforts were not extended to apartment houses, because the tenants did not own their apartment and the owner did not see the payback time

as attractive. Also in industry, only efficiency measures with a payback time under 1-2 years were carried out.

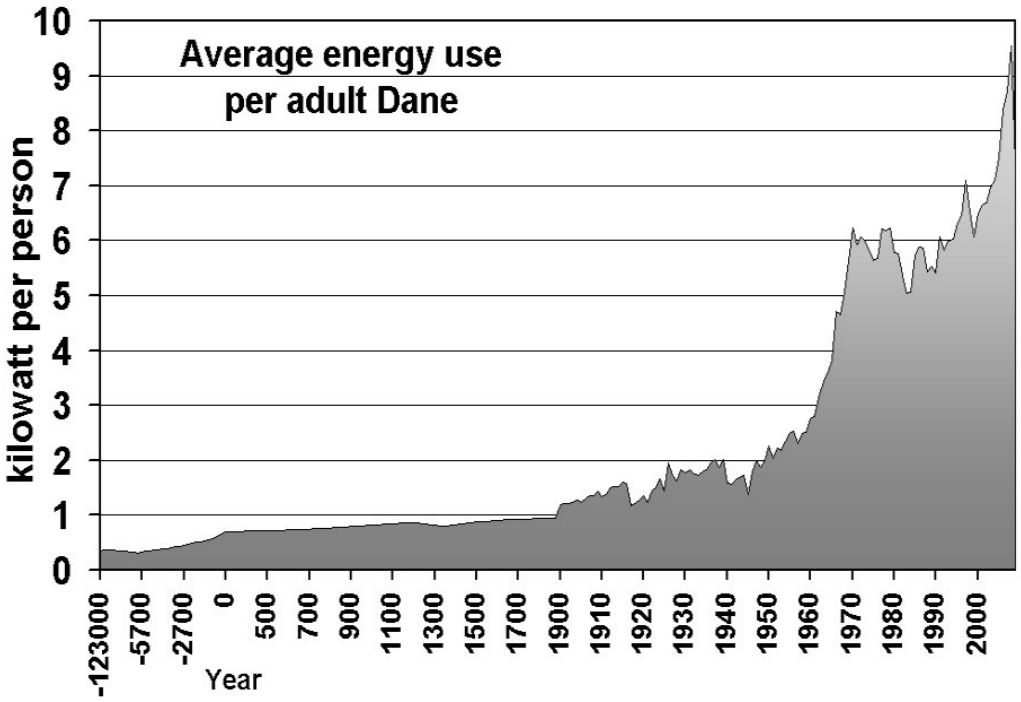

Figure 1. Average per capita Danish primary energy use (conversion per unit of time) over time[1].

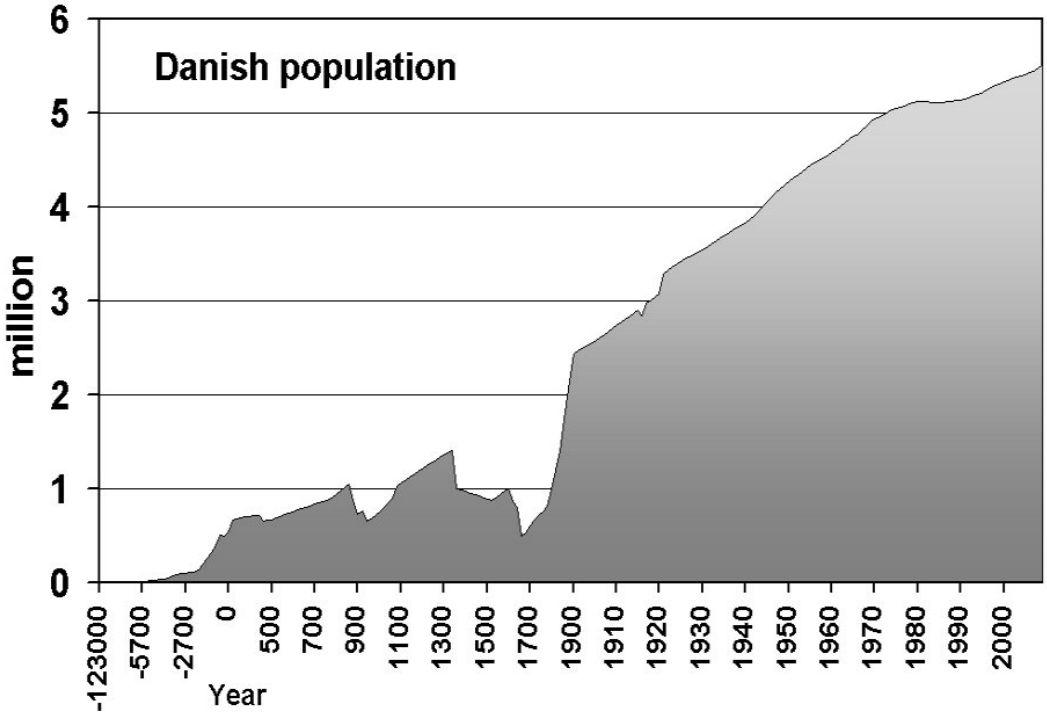

Figure 2. Danish population over time, adjusted to current size of territory[1].

Today, fossil fuels are seen as unacceptable for several reasons, including emission of greenhouse gases and other pollutants, as well as the increasing environmental cost of extraction, now that the easily accessible reserves have been used and only some shale-oil, tar sands and deep, mostly off-shore resources are left. The energy-efficiency investments that appeared marginal 30 years ago have proven highly profitable at current oil prices, and the Danish government presumably regrets that it only prescribed better energy standards for new buildings, because the motivation for people to invest in efficiency beyond what was imposed by law faded away after 1990. The average lifetime of buildings in Denmark is over 100 years, so this means that the majority of buildings standing today is gravely substandard in terms of energy needed for space heating. The lesson is thus to make use of occasional scary setbacks to implement long-lasting solutions, because waiting makes the consumer willingness and political support evaporate. The same can be said of the current financial crisis that should have led to a total reorganisation of the banking and financing business, but so far has just caused governments to throw taxpayer's money after the sector of the economy that caused the problem in the first place.

The energy efficiency case from the 1970ies is an example of decoupling between energy use and economic activity, where the latter continued to grow and energy use did not. Economic literature and advice from economic think tanks to governments had up to this time announced the coupling between economy and energy use as rigid and indisputable[4]. The energy crisis spurred the creation of a new paradigm and decoupling is currently seen globally and in nearly all energy-using sectors. Passenger cars have on average become 2.5 times more energy efficient between 1973 and 2012, while car prices have declined in real (inflation-corrected) terms. Similar efficiency improvements are achieved for electricity-consuming appliances, including household as well as computer-related equipment. In the latter case, miniaturisation has required a very high energy efficiency, because of the heat damage that would otherwise occur in the components. This means that in some sectors, energy efficiency needed only a small push to materialise, but in other sectors, such as the building sector, this is evidently not the case and concerted political action is required.

A second example that reaches much longer back in history is the development of well-being or welfare. A proxy for measuring the status of health and fulfilment of genetic disposition is body height. Low height may on average signal insufficient nutrition or lacking food components, related to poor social conditions or to inappropriate lifestyles caused by bad habits or by insufficient knowledge of the underlying mechanisms. Figure 3 shows the changes in body height over time, as derived from uncovered Danish skeletons[5].

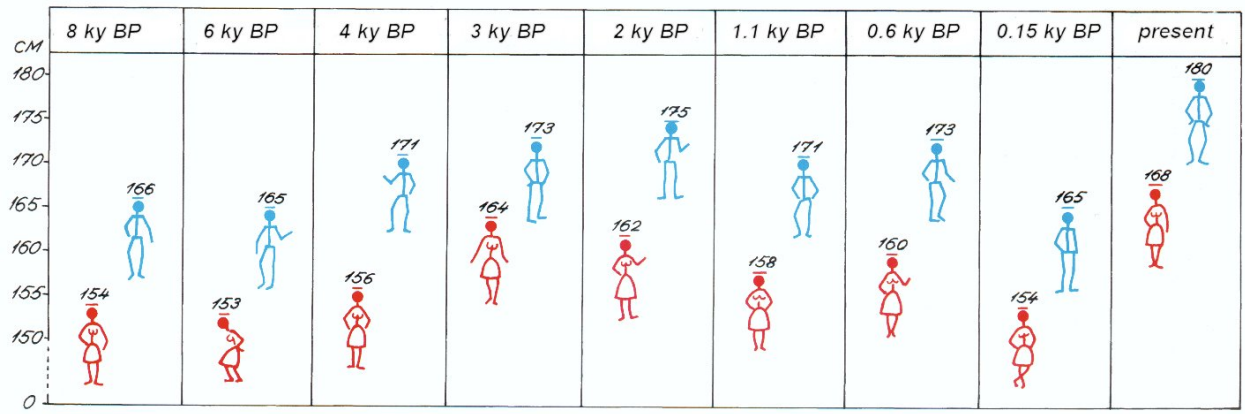

Figure 3. Body height of Danish males and females, from middle Stone Age to the present[5]. The unit ky BP is 1000 years before present.

The decrease in variability of food intake at the time of introducing agriculture is seen to imply a small decrease in body height, but was soon more than compensated for by the addition of milk to the diet, from livestock. After the relative maximum in height, about 2000 years ago, body height again decreases. A possible cause is the stratification of social structure, with introduction of slavery (presumably the idea came from trade contact with Mediterranean countries). The decrease is halted at the start of the Renaissance, where the Danish society opened up for new ideas of social organisation and emphasis on science and public debate. Later, the introduction of industrial production methods created a working class with limited means to acquire healthy nutrition, as demonstrated by the body height reaching its lowest level in 6000 years. However, the 20th century welfare concept and new medical insights on nutrition and lifestyle changed this, now showing average body heights larger than ever before.

Here is a new opportunity to learn from history. The return to 18th century liberal economic ideas that has characterised the yuppie ("young urban professional") generation from the 1990ies has lead to new increases in social stratification. Solidarity is decreased and the emphasis on the success of each individual increased, which will eventually lead to more social tension and less social stability, a situation known from history that it is not in our interest to resurrect.

A final example is furnished by the many examples of war activities characterising the Danish history (as well as the history of most other European countries). From Medieval times, Danish kings repeatedly without being provoked joined most wars breaking out on the European continent and nearly always lost, leading to a progressive shrinking of the Danish territory and more importantly to periods of intense suffering by the Danish people, of course most pronounced in those wars where foreign troops entered Denmark and where fighting and occupation hit the entire civil population, such as during the Swedish wars in the 17th century and the wars with England and Germany in the 19th century. The latter was initiated, not by a king but by the new, democratically elected government. Presently, after a century of keeping out of wars, the Danish government again joins one war after the other (Afghanistan, Iraq, Libya, Mali), without any threats to Denmark proper involved. Certainly opposing fundamentalist terror is necessary, but military intervention may not be the best way. One problem with fight against Islamic fundamentalism (and, not long ago, against centralised communism) is that Europe over its history has committed many similar acts of terrorism (crusades, inquisition, colonising), and that religious fundamentalism is not very foreign to e.g. our present North American ally. History should have taught us not to respond militarily unless our country itself is being attacked, and at least not to participate in foreign wars unless a clear United Nations mandate solicits assistance. All warfare marks those involved, and many soldiers returning from distant wars have shown substantial difficulties to reintegrate into a civil society. History tells us that what has worked in the past is solidarity and respect for basic human rights. No arguments suggest that we throw this evidence away.

Literature

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