SPECIAL REPORT

Saving time

Politicians in the United Kingdom and United States have launched efforts to extend daylight-saving measures — hoping to save lives, cut power use and combat carbon emissions. But energy experts say that it's not that easy. **Michael Hopkin** reports.

The UK bill to bring the clocks forward could change the face of London's time.

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On 26 January, the British parliament will vote on whether to turn its back on a cherished piece of the country's heritage: Greenwich Mean Time, long the standard against which the world's clocks were set. Under the proposal, Britons would set their watches forward an hour year-round, putting them on the same time as the rest of Europe, and never on Greenwich time.

If adopted, the measure would give Britain an extra hour of daylight in the evening. Backers argue that the proposal could cut automobile accidents, saving more than 100 lives per year, and slash demands on the country's power grid, saving carbon emissions equivalent to those generated by 70,000 people in a year.

British clocks would still go forward an hour every spring and back again in autumn, just as they have almost every year since 1916, when the country adopted British Summer Time. Under the new scheme, which would be trialled for a period of three years, clocks would be set an hour ahead of Greenwich in the winter, and two hours ahead in summer — a regime called 'single-double summer time'.

But history shows that such seemingly simple changes are not made easily. A similar experiment in the late 1960s failed, mainly because of parents' complaints about children going to school in the dark and the grumblings of farmers and other outdoor workers.

Energy experts say that it's not so easy to calculate the true benefits for the environment. The move comes as US citizens prepare for a longer summer, by pushing their clocks forward on 11 March — three weeks earlier than usual. US politicians have claimed that the country will save 100,000 barrels of oil per day, but will wait until the scheme is underway to gather detailed data on changes in energy use.

Both the British and US policies are extensions of the current scope of daylight-saving time (DST), which is practised in roughly 70 countries, almost all of which are at temperate latitudes. DST artificially shifts the time of dawn and dusk forward by an hour during the long summer days, providing an extra hour of light in the evenings. As the winter days draw near, the clocks are put back again so that mornings don't become unbearably dark.

But the DST scheme can be taken further, argues Elizabeth Garnsey, an innovation researcher at the University of Cambridge, UK, who has evaluated the probable effects of the proposed changes to the British system. "Countries are starting to realize that their daylight-saving policies haven't really been saving daylight," she says.

Moving the clocks forward yet another hour would produce a slew of benefits, she says. The reduced need for lighting in the afternoons could save around £485 million (US$957 million) a year, as well as 170,000 tonnes of carbon dioxide. Preliminary calculations cited by the proposal's backers suggest that domestic lighting bills could dip by 0.8%, whereas commercial spending could be cut by 4% as more working days finish during daylight. And because the late afternoon is also the time of peak power demand, analysts at National Grid, which coordinates Britain's power supply,

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Turning back time

Daylight-saving time (DST) has a long and chequered history — popular in some time periods, not so in others.

1784 — The idea of shifting clocks to make better use of daylight hours is first proposed by Benjamin Franklin in a satirical letter to the *Journal of Paris*. He later whimsically suggests that people be taxed for having their shades drawn and candles lit during daylight hours.

1907 — The scheme is proposed in earnest by UK builder and businessman William Willett, in a pamphlet entitled *The Waste of Daylight*.

1916 — Germany becomes the first country to adopt DST, partly to conserve resources for its war effort. Britain follows suit three weeks later. The editors of *Nature* scornfully suggest that one might also alter thermometers to register 'warmer' temperatures in winter.

1917 — Newfoundland becomes the first North American region to adopt DST.

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1918 — The United States adopts DST (see left) and divides the country into time zones. This change is made despite the protestations of Congressman Otis Wingo that "while our boys are fighting in the trenches, we are here like a lot of schoolboys tinkering with the clocks". DST is dropped the following year.

1948 — Japan experiments with DST at the behest of the occupying Allied army. It drops the practice in 1951 and to this day is the only major developed nation without DST.

1966 — The United States formally reinstates DST after experimenting with it during the Second World War. The partial success of 'war time' had led to a disorganized system in which states and even individual counties were free to decide how and when to implement DST.

1968 — Britain begins its ill-fated attempt to abandon twice-yearly clock changes and observe 'summer time' throughout the year. The scheme collapses in 1971 under pressure from disgruntled early risers in the construction and farming industries.

predict that fewer power plants will be needed at any one time, so less efficient ones will be needed less often.

The problem is, however, that the science behind the numbers remains sketchy at best. For her calculations, Garnsey and her colleagues compared the energy consumption only in the weeks directly on either side of a clock change, as the gradual shifting of the day length over the year makes it very difficult to compare annual energy use on regular time versus DST. And so it remains hard to say what the overall year-round effect would be. "I don't think that any really exhaustive work has been done anywhere," Garnsey admits. "In terms of carbon emissions, I wouldn't say we really know yet. But in spring and autumn, there is quite substantial waste of electricity."

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Another main argument for pushing the clocks forward has been the estimated lives saved from automobile accidents. Lord Sainsbury, the former British science minister, has claimed that the earlier experiment, when the country remained an hour ahead of Greenwich time year-round between1968 and 1971, saved an average of 140 lives a year. That adds up to nearly 5,000 needless deaths over the past quarter-century as a result of adhering to Greenwich time in winter, says Garnsey. "That should be the deciding factor," she says.

Others point to the increased opportunity for the old and the young to pursue outdoor activities in the evening, and benefits to businesses of aligning themselves with continental Europe. "The quality of life of nearly everyone will be improved," says Tim Yeo, the member of parliament who is sponsoring the UK bill.

Previous experiments with daylight-saving changes have not exactly borne that out. In Australia in 2000, officials experimented with an early start to DST to save energy. But energy consumption in Sydney, the host city for the Olympic Games that year, did not really fall and the change was not made permanent.

And two of the largest developing countries in terms of energy — India and China — do not observe DST, even though they cover huge areas; China, in particular, spans four time zones yet has the same time across the country and all year round.

In the United States, Congress approved the shift in their DST last year. The clocks will be put forward in March rather than April, then back in November rather than October. The change gains Americans four extra weeks of DST, the first change in the system since 1966. Most of Canada will observe the same change.

Meanwhile, the outcome of the British legislation hangs in the balance. Yeo, the measure's most prominent supporter, is a member of the opposition Conservative party, and the Labour government has refused to back the idea. The issue is more about politics for popularity than sound policy, argues energy expert Mayer Hillman, emeritus fellow at the Policy Studies Institute in London. He has been calling for Britain to adopt single-double summer time since 1988. Although lighter evenings led to a drop in the number of road accidents, he notes that a popular myth persists that putting the clock forward is more dangerous, because a small spike was seen in the number of early-morning accidents after DST was introduced. "I can't tell you how maddening it is," he says.

And some might doubt that the precise hours of daylight really make a difference to people's behaviour anyway. A new survey of more than 21,000 Germans (T. Roenneberg, C. J. Kumar & M. Merrow *Curr. Biol.* **17,** R44–R45; 2007) suggests that, in rural areas at least, people naturally fall into synch with the different daylight hours as they vary with geographical location, rising and going to bed with the Sun irrespective of the time shown on their watch.

If the US and British proposals prove successful, then analysts can finally come closer to answering questions about the true importance of setting the clocks correctly. "It may be that in the middle of winter there's not really much benefit," says Garnsey. "But the reason the experiment is needed is to get the correct data. There hasn't been an extensive analysis — how much energy will you save?" ■

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