MITIGATION

Gas or coal?

Climatic Change **108,** 601–608 (2011)

Coal, as every environmentalist knows, is the filthy fuel. However, a new study by Tom Wigley of the US National Center for Atmospheric Research in Boulder, Colorado, USA, finds that even though natural gas produces only half of the carbon dioxide of coal per unit of energy, a world where gas replaced coal would actually be warmer for many decades.

Some of the aerosols produced from coal combustion have a cooling effect and this, combined with the tendency of natural gas to leak out into the atmosphere — methane is a potent greenhouse gas — overrides the gains from smaller carbon dioxide emissions.

Wigley reports that unless methane leakage rates can be kept below 2%, completely substituting natural-gas power generators for coal ones will not reduce global warming. With no leakage at all, this change would still cause additional warming until 2050; with 10% methane leakage, Earth will get hotter than it otherwise would until 2140. *AP*

TROPICAL FORESTS

Hot and thirsty

Geophys. Res. Lett. **38,** L19704 (2011)

The two recent major droughts in the Amazon Basin, in 2005 and 2010, provided an opportunity to study the effects of drought on tropical forests and improve predictive impact models for the region.

Michael Toomey from the Department of Geography at the University of California, Santa Barbara, USA, and his co-workers analysed remote-sensing data of land-surface temperatures in the Amazon to investigate the contribution of heat stress to the observed changes in aboveground living biomass during the droughts, such as increased tree death.

They found that heat stress was a better indicator of biomass variability during the droughts than water stress — models that only incorporated precipitation patterns were 17% less accurate in predicting the biomass changes than those that only used heat stress. Models that incorporated both heat and moisture stress were the best, able to account for around 65% of biomass variability. Heat stress played an important role in both droughts, the authors conclude, adding that models to predict drought impacts in tropical forests should take account of this. *AB*

SOCIOLOGY

Jobs versus environment

Glob. Environ. Change **21,** 1215–1223 (2011)

Climate change will have a significant impact on economic production in various ways, including through changes to consumption patterns. This will affect workers, and is leading to a 'jobs versus environment' dilemma, which is already an issue for workers and their unions worldwide. For example, when a trades union is confronted with the option of either supporting construction of a new coal-fired power station with guaranteed jobs (and greenhouse-gas emissions) or fighting against construction in the hope of future green jobs (and greenhouse-gas mitigation), it faces a considerable dilemma.

Nora Räthzel from the Department of Sociology at Umeå University, Sweden, and David Uzzell from the Department of Psychology at Surrey University, UK, undertook extensive interviews with senior policymakers in trades unions to investigate the ways in which international trades unions are conceptualizing the relationship between jobs and the environment. They argue that such interpretations could provide an important basis for climate change policies.

Based on these surveys the authors identified four separate ways in which trades unions discuss and engage with the environment. All of these were found to imply a reinvention of trades unions as a social movement, representing more than just their members interests, but only one went so far as to see nature as a partner in human development. The authors argue that incorporating the idea of nature as a partner would enable a decisive shift from existing policy where nature is seen as subordinate to the economy. *AB*

STATISTICS

Blame it on the weather

Proc. Natl Acad. Sci. USA http://dx.doi.org/10.1073/pnas.1104268108 (2011)

Climatic shifts were the ultimate cause of humanitarian crises in pre-industrial Europe, according to a team of investigators based in China. The researchers analysed how 14 variables — describing agricultural production, demography and the economy — varied in relation to one another in early modern Europe, between 1500 and 1800. That period encompasses the region's 'golden' and 'dark' ages, as well as mild and cold phases of the Little Ice Age.

David Zhang of the University of Hong Kong, and his colleagues, used five criteria to assess the causal relationships between their many data sets. Variables such as agricultural production and per-capita food supply showed an immediate response to temperature changes, whereas social disturbances, such as war, migration and famine, tracked the per-capita food availability trend, but with a response lag of several years.

Some details of their project are startling. For example, the average height of Europeans closely followed the temperature, and the number of wars increased 41% in the cold phase of the Little Ice Age. The authors argue that many historical changes typically attributed to social factors actually have their roots in climate changes. *AP*

INORGANIC CHEMISTRY

Approaching photosynthesis

Science http://dx.doi.org/10.1126/science.1209786 and http://dx.doi.org/10.1126/science.1209816 (2011)

Researchers have long struggled to recreate photosynthesis in an industrial setting. Now, one group has found a method of reducing carbon dioxide (CO_2) to carbon monoxide (CO) using an electrical potential difference of less than 1.5 V, and another has managed to generate hydrogen gas by using light to split water molecules.

The first, led by Richard Masel, of Dioxide Materials in Champaign, Illinois, USA, employs a silver cathode to catalyse the formation of CO from an intermediate, $(CO_2)^-$, which reacts with H^+ ions in water. A number of improvements are required before this process can be copied on a large scale, however, including speeding up the reaction rate.

The second group has made cells containing a silicon-based photovoltaic and