

# COMMENT

**EVOLUTION** A deep exploration of the honeybee colony and its organization **p.296**

**NEUROSCIENCE** A cautionary account of how brain-scan results can be abused **p.298**

**CONSERVATION** Brazil should spend oil royalties on biodiversity **p.299**

**OBITUARY** Christian de Duve, discoverer of the lysosome, remembered **p.300**

TYRONE TURNER/NATL. GEOGR. SOC./CORBIS



Residents of Greensburg, Kansas, rebuild their community with energy-efficient homes after a tornado destroyed the town in 2007.

## Positive energy

To change attitudes towards energy scarcity and climate change, focus on transitions and solutions, not danger and loss, says **Chris Nelder**.

“I’m sometimes asked if I’m optimistic or pessimistic about energy,” economist Daniel Yergin admitted in 1979, when he was a lecturer at Harvard Business School in Cambridge, Massachusetts. Concerned that the United States was doing little to maintain its oil production, which had dropped since 1970, he declared himself a pessimist. He was referring to ‘peak oil’: the idea that global oil production will peak and then decline. The United States was mired in an energy crisis with no easy way out.

That is still true today, but Yergin is now one of the loudest voices telling world

leaders a tale of future oil abundance. In a 2011 editorial<sup>1</sup> in *The Wall Street Journal*, he asserted that advances in technology continue to make new volumes of oil viable, and that the peak “is still not in sight”.

Such messages of abundance are the norm in the media and in policy circles. The fact that predictions of rising oil production have been consistently proved wrong does not dim their appeal. Oil pessimists have offered more accurate guidance since peak oil was first predicted in 1956 by M. King Hubbert, a geologist who worked for Shell Oil in Houston, Texas, and for the US Geological Survey.

Why has their story gained no traction?

I believe that people simply want to hear a positive message. Too often, scientists and analysts invite indifference and resistance by framing energy and climate-change debates in terms of danger and loss. It does not help that these complex topics can only be understood with a grasp of highly technical definitions and concepts, and mitigated only through arcane policy measures.

Telling an optimistic story, by using the language of solutions, transitions and resilience, is more persuasive and more likely to promote useful action. A small rural ▶



Transition towns such as Groningen in the Netherlands use local initiatives to produce renewable energy and to make their communities less dependent on oil.

▶ town is unlikely to build a wind farm to fight climate change, but it might support such a project if it is seen as a way to create jobs and to improve the local economy, while empowering the community and enhancing its self-reliance.

### TALES OF ABUNDANCE

Agencies such as the International Energy Agency (IEA) in Paris and the US Energy Information Administration (EIA) in Washington DC, as well as big banks and the media, are constantly reassuring us that energy supplies will meet future demand, and that technological advances will bring energy at an acceptable price. The boom in US tight oil (from shale formations) is touted as a ‘game changer’, with the United States purportedly poised to surpass Saudi Arabia as the world’s leading oil producer by 2020 (ref. 2).

In reality, it is becoming increasingly difficult to deliver fuel at a reasonable price. Global production of conventional oil stopped growing at the end of 2004. From 2004 to 2012, investment by the oil industry doubled to US\$600 billion a year, and oil prices nearly quadrupled. But average annual production increased by only 4.3%. This has acted as a brake on the global economy.

The EIA’s “highly uncertain” estimate for unproved, technically recoverable (but not necessarily economically viable) tight-oil resources in the United States is 58 billion barrels — enough for only 8.6 years’ worth of US consumption<sup>3</sup>. And it is commonly asserted by the media and the energy industry that the United States has a 100-year

supply of gas, but proven dry-gas reserves will last only 12.5 years at the 2012 rate of US consumption.

Even the American Petroleum Institute in Washington DC, the US oil industry’s main lobbying group, admits that world oil supplies “have been struggling to keep up with rising demand”. In 2010, the EIA’s review of its own forecasting history found that it had badly underestimated the prices for oil, natural gas and coal for more than a decade<sup>4</sup>.

The IEA anticipated that Middle Eastern oil supply would double between 2000 and 2030, with another 10% added by Canadian tar sands, heavy oil from Venezuela and gas-to-liquids, a process in which natural gas is converted to liquid fuels. And a few years ago, biofuels were seen as a solution. These predictions now seem absurd.

Ethanol turned out to be an expensive way to make low-quality fuel, driving up food prices and sparking ‘tortilla riots’ in Mexico in 2007. Oil production from Canadian tar sands reached 1.6 million barrels a day in 2012, just over half of what was projected in 2006. Heavy oil and liquid fuels processed from coal have yet to scale up affordably. The ‘hydrogen economy’, touted in 2005 by policy-makers and industry representatives as a transformational vision, faded without an epitaph.

Such abundance stories are generally based on econometric models that chart a path to economic growth. They are not based on actual resources and make assumptions that may be biased. Many are flawed (see [go.nature.com/3bjdu3](http://go.nature.com/3bjdu3)).

Scientists and economists with decades of experience in oil-and-gas companies and energy agencies expect the global supply of liquid fuels to start declining before 2020. These forecasters seem closer to the mark, and include Jean Laherrère of Total in Paris, BP geologist Colin Campbell, geologist and social entrepreneur Jeremy Leggett, former IEA oil analyst Olivier Rech, and economist Michael Kumhof of the International Monetary Fund in Washington DC. Yet few people have heard of them, and the media generally disregard them. Meaningful public debate over energy policy has been stifled in the process<sup>5</sup>.

### CHANGING BEHAVIOUR

Scientists must to learn how to tell a compelling story about energy, climate change and resource scarcity as advertisers or lobbyists. For a person to relate to a story, it must be consistent with what their community believes<sup>6</sup>. As psychologist Dan Kahn has noted: “People endorse whichever position reinforces their connection to others with whom they share important commitments.”<sup>7</sup> This explains, for example, why groups at either end of the political spectrum can hold identical views on issues as disparate as same-sex marriage and climate change.

We must also adapt our communications to allow for the fact that most thinking is automatic and does not follow rational logic, as the behavioural scientist and Nobel laureate in economics Daniel Kahneman points out. We trust narratives that fit our emotions, associations and experiences, rather than

B. SCHMID/JAMANIMAGES/CORBIS

actively assessing the evidence. This is why the peak-oil story gained currency in the press in 2008, when prices for oil and gasoline shot up — it fitted in with our experiences. When prices fell, the story faded. A Google Trends query of news headlines displays a strong relationship between the search terms ‘peak oil’, ‘oil prices’ and ‘gasoline prices’ (see [go.nature.com/p3ihnm](http://go.nature.com/p3ihnm)).

Similarly, extreme weather events such as hurricanes and tornadoes capture the public’s attention in a way that decades of warnings about global warming have failed to do — notwithstanding that the connection between the two is complex. Hurricane Sandy, which devastated the east coast of the United States in October 2012, emboldened the governor of New York, Andrew Cuomo, to declare that “anyone who says there hasn’t been a dramatic change in weather patterns is in denial”. A Google search finds more than one million results that mention both ‘Hurricane Sandy’ and ‘renewable energy’.

A story must also be positive to be amplified in the press. Accuracy has become boring in the world of ‘link-bait’ journalism: editors and journalists want to publish stories that are popular. If we want action on energy transition and combating climate change, we must offer concrete and viable solutions — no money goes to problems, only to fixes. We should advocate solutions in an upbeat, tractable way, tailored to particular world views.

## TALES OF TRANSITION

R. Rex Parris, the mayor of the Mojave Desert town of Lancaster, California — a right-leaning, suburban, middle-class community where many people work at an Air Force base — has taken that positive tack in his push to

make his city the first in the United States to produce zero net carbon emissions.

“We can’t fix [climate change] top-down, but it’s easy to fix bottom-up,” Parris said at an energy conference in April. Instead of scaring his citizens, he has leveraged the authority of the city’s building and planning departments to encourage solar power. Lancaster now has the most solar energy production per capita of any city in California.

It has also become the first city in the state to require that developers of new homes build at least 1 kilowatt of solar capacity for every home they construct. The small California town of Sebastopol has followed suit, requiring solar photovoltaic systems on all new buildings, major additions and remodellings.

This bottom-up approach has also worked for the small farming town of Greensburg, Kansas. After a tornado destroyed most of the town in 2007, the residents came together and “right off the bat, they started talking about green buildings”, said the town’s mayor, Bob Dixson. They crafted a new mission statement that focused on “working together for future generations”, which required all new buildings to be certified by the Leadership in Energy and Environmental Design ratings system for sustainable buildings. The town’s new community wind farm, built through a public-private partnership, exports some of its 12.5 megawatts of power to other nearby towns.

Founded in the United Kingdom, the Transition Town movement is a grassroots network of communities organized in 2005 in response to the problems of peak oil, climate destruction and economic instability. I would argue that this initiative has done more to build resilience to these threats than peak-oil

modellers ever did. Transition towns, which include places as diverse as Tucson in Arizona and Groningen in the Netherlands, find ways to make their localities more sustainable, by creating community gardens, building solar-power systems and staging river clean-up events, among other things. The network now includes thousands of towns across the globe.

Why have these local approaches worked? People like feeling that they are part of the

**“Local measures must be championed to move us away from dependency on fossil fuels.”**

solution, instead of being hostage to intangible problems such as oil dependency and climate change. They seize on things that give them hope and optimism.

Capitalizing on these feelings should be a common objective of those who seek sustainable solutions.

I believe that these local measures must be championed to move us away from dependency on fossil fuels and towards renewable energies, and away from personal vehicles to public transport. Instead of agitating for indirect and punitive policy mechanisms such as carbon taxes, we should be advocating feed-in tariff schemes that encourage renewable energy, better rail networks, bicycle-friendly streets, local-food production, and improvements to the efficiency of our built environment (see [go.nature.com/jly7qv](http://go.nature.com/jly7qv)).

Increasing railway usage could reduce oil demand permanently and at scale. But we should highlight its lifestyle virtues: trains are a safer, cheaper, more relaxing and more productive mode of transport. Since the oil-price spike of 2008, several studies have shown that commuters prefer using public transport for these reasons.

Messages about climate change and energy that use fear- and threat-based tactics have not mobilized responses. Let’s try a positive tack instead. As the old sales saying goes: “Sell the sizzle, not the steak.” ■

**Chris Nelder** is an energy analyst and consultant based in Marin County, California. He blogs at [GetRealList.com](http://GetRealList.com). e-mail: [chris@getrealist.com](mailto:chris@getrealist.com)

1. Yergin, D. ‘There will be oil’ *The Wall Street Journal* (17 September 2011).
2. International Energy Agency. *World Energy Outlook 2012* (IEA, 2012).
3. US Energy Information Administration. *Technically Recoverable Shale Oil and Shale Gas Resources* (EIA, 2013).
4. US Energy Information Administration. *Annual Energy Outlook Retrospective Review: Evaluation of Projections in Past Editions (1982–2009)* (EIA, 2010); available at <http://go.nature.com/x1yett>.
5. Littlefield, S. R. *Energy Policy* **52**, 779–788 (2013).
6. American Psychological Association. *Psychology and Global Climate Change* (APA, 2009); available at <http://go.nature.com/54yxp3>.
7. Kahan, D. *Nature* **463**, 296–297 (2010).



A resident of Sebastopol, California, adjusts a solar panel. The town requires photovoltaics on new homes.

BEN MARGOT/AP