The Oil Drum
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

Busy Bees and Biofuels

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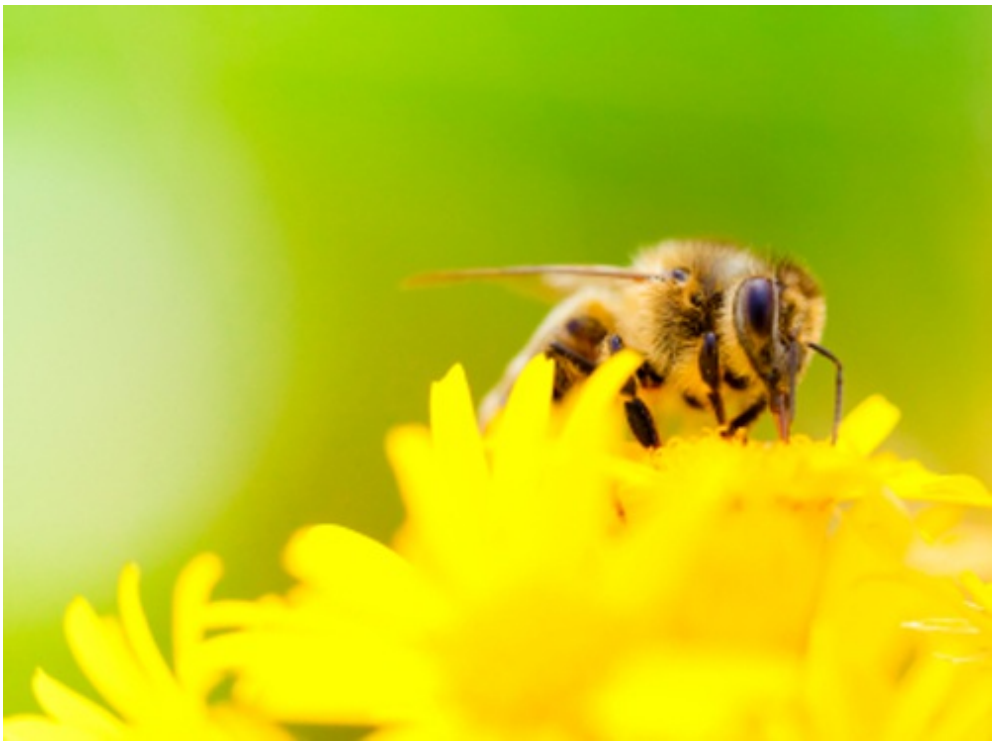
My partner and I have been reading the interesting if somewhat unusual book "Meditation and the Art of Beekeeping" by Mark Magill. One particular paragraph in the book struck me as a compelling analogy for the difference between biofuels and oil. It beautifully captures the incredible amount of work bees perform to harvest energy from plants. If only we valued a teaspoon of ethanol as much as we do a drop of honey!



The Effort in a Drop of Honey

It's easy to say 'busy as a bee'. Are bees busy?

Consider that each drop of honey represents about 80 drops of nectar. Once the watery nectar is deposited in the honeycomb cells, the bees have to evaporate nearly all of the moisture before it becomes honey.

A strong working hive can contain close to 90kg (200lb) of honey. What remains is only 20 per cent of the nectar the bees originally carried in, drop by drop. **Even a teaspoonful represents thousands upon thousands of flights of foraging**

bees.

Honey as an analogy for biofuels

Consider the similarities between honey and harvesting corn and other crops to produce biofuels.

Tens of thousands of bees in a hive scout and then collect nectar from up to 5 miles away to bring back to the hive. For biofuels, we have to sow, tend and harvest the crop and then transport it tens or even hundreds of miles to the nearest biofuel facility. All biofuels, whether third, fourth or tenth generation suffer this same handicap of harvesting low energy density crops over a large area and bringing them back to a central facility.

But the work doesn't end there. Just as the hive of bees fan the nectar with their wings to evaporate the bulk of the moisture from the nectar, so conventional biofuels have to be boiled to distill the alcohol from the water. This process demands huge inputs of energy and severely limits the energy return of conventional biofuels. No wonder people are looking at alternatives, but cellulosic ethanol still looks like damn hard work compared to drilling for oil.

Drilling for oil is more like sticking a straw into the beehive and collecting the honey into jars. Somebody else has already done the work of harvesting and concentrating the energy for us. Indeed, the geological processes that lead to the formation of oil have done exactly this. Vast blooms of algae were deposited on the seabed, buried to great depths by layers of sediment piled on top of them. As the temperature and pressure increased the deeper they were buried, eventually they got 'cooked'. In their new liquid state, the great pressures forced the oil up to the surface through fissures in the rocks. But in some places it was trapped by impermeable barriers above, thereby forming reservoirs of oil underground, just waiting for us to come and collect the spoils.

With all due respect to the engineers in the industry (I was one of them), we can compare their role to that of a beekeeper. It's not something everybody could do, it has its risks and occasionally you might get stung. But ultimately it's a big reward for the amount of effort required. On the other hand, biofuels are sheer hard work. On a good day, you get out a little more than you put in.

One calculation has it that 450g (1 lb) of honey represents visits to two million flowers.

So the next time you're spreading a teaspoon of honey on your toast, think about the visits tens of thousands of bees made to a hundred thousand flowers, just to bring you something you can devour in a couple of mouthfuls.

And the next time you put a gallon of gas in your tank, think about just how much effort and energy is required to replace it with a gallon of biofuel grown, gathered and processed from crops.