Re: A world−changing event

Source: http://sci.tech−archive.net/Archive/sci.energy/2005−08/msg00088.html

- *From*: cyril <meynier.cyril@xxxxxxxxxx>
- *Date*: Mon, 15 Aug 2005 00:49:06 +0200

On Sun, 14 Aug 2005 14:37:57 −0600, quibbler <quibbler247@xxxxxxxxx>
wrote:

>In article <ctfrf19070j2q01bc56m3n1o7tva580puc@xxxxxxx>,
>meynier.cyril@xxxxxxxxxx says...
>>
>> − SCE won't have to wait until 2011 to get some "juice" : electricity
>> will be injected into the grid as soon as the first dish is built.
>> This is a positive result of the modular conception.
>
>The same would apply to things like wind turbines.

yes.

>> − A dish stirlings produce twice as much electricity as a
>> solar−tracking flat PV pannel of the same size, and is cheaper.
>
>Yes, but the PV doesn't require concentrated sunlight and is far simpler
>than a mechanical stirling engine and reflector system.

PV can remains in race for small scale projects, especially where
diffuse light is important.

For multi−Mw projects in arid or semi−arid areas, concentrated solar
power is winner.

>> − They promise a cost of electricity of 0.06$/kWh for large projects.

also note that for now, the main source of electricity in California
is natural gas. And we all know what is happening with NG supply.

>> If they manage to do that, this is competitive : roughly the same
>> price than wind power, but production occurs at daytime (more valuable
>> electricity)
>
>But not the entire day time. Sun rise and sunset are barely usable.
>Peak energy demands continue into dusk hours. Heliostat power towers or
>solar chimneys have longer operating times after the sun sets.

I don't know whether some heat storage is intended. Seems no as easy
to fit in compared to solar towers (solar II, solar tres, phoebus) and
parabolic concentrators (like andasol project i, spain).

>> − Land occupied by suuch a "solar farm" is tiny compared to hydro :
>> for instance, the hoover dam flooded 247 square miles, and a "solar
>> farm" would need only 11 square miles
>
>True, but hydro can produce 24 hours a day and for about 2 cents/Kwh.

When i said "produce as much energy", i meant the same number of TWh
during the year, not the some peak capacity. Clearly hydro is a
usefull backup.

>> − This new energy technology could complement nuclear reactors, dams,
>> wind turbine and coal with CO2−sequestration to get a zero or near
>> zero CO2 electricity mix.
>
>I agree there. It's possible to have some very interesting mixtures of
>these power systems that combine advantages of each individual approach.

Yes : Today we have 5 CO2−neutral electricity sources. none of them
can be grown ad libitum − CO2 producing energy sources can't either of
course.

2 are major (>10% of world electricity) :

− HYDRO : cheap and realible, but only available in select places.
usefull side effects (like water for irriguation, flood prevention),
but destructive of ecosystems. Very little growth potential in north
america and europe, since almost all sites are gone. Significant
potential in sia and Africa.
Usefull for backup : one can limit the flow to the minimum when
demand is low and/or other sources of electricity are available, to
keep energy... But droughts cause low−production years, Brazil
suffered electricity shortage because of that some years ago.

− NUCLEAR : efficient, but very impopular in many countrys. uranium
supply is getting tight, but it's mainly a matter of investisment, not
reserves. Huge entry ticket, making it out of range for private
companies, except the leading one. A project need 10 years to be
built, so this energy source can't respond to market evolution :
france ended up with overcapacity because our nuclear projects were
sized accordingly to high economic growth forecasts that didn't
materialize.

3 are minor (<1%)

− WIND : very clean, quite popular. Still a little bit expensive.
requires available land with good winds, some conflits for land
occupation (vs tourism, fishing for offshore, and so on). Doomed to be

only a minor part of a grid because of non−shedulable production.

− GEOTHERMAL : it works very well, nut only in select places around the world. Can bring a few radioactive elements to the surface. Cost and efficiency depend of the geothermal sources.

− RENEWABLE THERMAL : cheap. reliable. CO2−nautral, but some air pollution (Nox, soots). Biomass−fired plants can be built where excess agriculture or forestry byproducts (wood chips, straw, bagasse) have no markets. Potential is quite limited. Biogas is a minor enegy source, but the only one to have a *negative* impact on global warming (avoiding methane emission)

Even combining those 5 sources can't provide CO2−neutral electricity for most of world's demand. We need more ones.

Two are coming almost for sure:

− concentrated solar power. fine for countries with deserted or semi−arid areas. can be made relatively cheap.

− Fossil fuels with sequestration. The most likely way is the conversion of coal to hydrogen and CO2, sequestration of CO2, and use of hydrogen as fuel.
This will probably be an quite expensive source of electricity (>0.06$/kwh), but CO2 tax may offset the premium with conventional thermal power.
This can be a usefull backup, and it can coproduce hydrogen and chemicals.

Other *may* be coming : waves, tides, photovoltaic ...

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- ***References***:
  - ♦ ***A world−changing event***
    - ◊ *From:* analyst41
  - ♦ ***Re: A world−changing event***
    - ◊ *From:* cyril
  - ♦ ***Re: A world−changing event***
    - ◊ *From:* quibbler

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