Photovoltaic Cells vs. Biofuels

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Economic (expenses, jobs, opportunities, and demands) and environmental effects of Photovoltaic Cells vs. Biofuel produced from biomass
Photovoltaic Cells
Photovoltaic Cells

“As of 2011, the cost of PV has fallen well below that of nuclear power and is set to fall further.”

http://en.wikipedia.org/wiki/Photovoltaics#Economics

In 2008, the cost of nuclear power was 1.87 €/kW

http://www.world-nuclear.org/info/inf02.html
**Photovoltaic Cells**

**Silicon Photovoltaic Cells:**
- Low life cycle environmental impact compared to most conventional forms of energy such as coal and natural gas.
- The greatest carbon emissions caused by the use of PV panels are those associated with module production.
- Energy Payback Time: ~3-6 years
  - Input weighs up to Output

**Resources Used**
- Silicon: 8th most common element in the universe by mass and typically found in its sand form which is then refined.
- Aluminum, glass, copper—abundant or recyclable species.
Photovoltaic Cells

How will the mass production of PV cells benefit economies?

→ In my opinion, it will produce jobs and learning opportunities in this new field allowing all different types of engineers as well as many other professions.
Biofuels

**Economic Effects**
- Input < Output in terms of money and energy

**Environmental Demands**
- 1.6 c/kW
- About ten times more land area would need to be devoted to growing biomass for biofuel conversion than would be needed to power the world using PV cells
- Industry limited due to land availability and climate demands
- Brazil: production may begin to interfere with Amazon
- "we would need to devote 10.8 million square miles to growing biofuel" – approx. ten more times the area that would be needed by PV cells

**Industrial Results**
- If the industry continues to grow it may have the ability to shut down or severely diminish the oil industry which will put many people out of income, but if done effectively, it will also produce new job as the industry grows

http://www.ecoworld.com/energy-fuels/solar-power-biofuel-vs-photovoltaics.html
Comparison

- Efficiency
- Locale
- Environment
- Key Points from “The Nonsense of Biofuels”
  - Input vs. Output

Key Points:
- Photosynthesis efficiency is low (.1%)
- Biofuel energy yield low (~ .1% - .3%)
- Photovoltaic cells have ~15% efficiency which can be stored in batteries
- Improving photosynthesis, bio- hydrogen production, micro-algae production
- Biomass: conversion into valuable chemical syntheses (especially the clearing of the rainforest)
Conclusion

Best option for a sustainable future:

“Biofuel makes compelling economic sense, but today at least, biofuel doesn’t show nearly the potential of photovoltaics to efficiently turn sunshine into energy to power human civilization.”

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GO ELECTRIC!