

Engi 9614: Renewable Energy and Resource Conservation, Assignment #2, Nov. 28th 2013,
“Opportunities and challenges for a sustainable energy future”

1. Energy efficiency, energy conservation and carbon-free sources of energy
2. Transportation or mobile and stationary or fixed
3. Tribology is related to the close contact of surfaces that are moving and concerns the design aspects, the wear of the surfaces and their friction and lubrication
4. How to improve the materials that the composite tanks are made of is being researched and they are looking for higher surface area materials that will bond with the hydrogen and thus be able to contain the hydrogen at lower pressures than are required now
5. It means at very low temperatures
6. About 2% and 9%
7. They are 61% lower
8. IEA estimates onshore wind energy will cost \$90 MWh⁻¹ by 2020 and other experts estimate it will cost < \$60 MWh⁻¹ by 2020
9. Power towers and parabolic troughs
10. They need to consider the heat storage and how to access it quickly and research into materials able to withstand these temperatures and how these materials can be best used.
11. Solar thermal and solar photovoltaic systems might be combined and solar thermal and natural gas systems might be combined
12. Coal and natural gas power plants and cements and steel manufacturing plants
13. The initial installation dollar cost is about equal to the initial cost of the power plant and from 20% and 40% of the energy from the plant will be required for the CCS operations.
14. It is a plant for which the full costs of construction have already been completely paid
15. They recommend that the government put in place mechanisms that will promote research into new renewable energy options or improvements to existing renewable energy plants, and put in place financial incentives for the use and development of clean energy. They recommend that policies be developed that will require that the full life cycle costs and all externalized costs be accounted for. They also recommend that the scientists, financiers, public policymakers and the general public be engaged in the consultation.