

Richard Graves's comments on the Energy Technologies and System Report
for the Ford Energy Study 'Technologies Review Subcommittee' meeting on 12-18-14

1. **Resilience:** The memo focuses on the generation of on-site power as resilience. This scores on site combustion strategies equal ahead of renewable strategies. In addition, the scoring seems to be random across the heat pump strategies with a bias for on-site gas combustion. This ignores the security of supply of natural gas and other combustion fuels as well as the ability to store renewable energy using technologies other than the electrical grid. On site storage could present an area of potential innovation.
2. **Innovation:** Many strategies including on-site photovoltaic systems are labeled: "the system can hardly be seen as innovative..." In addition, the scoring seems very inconsistent with absorption chillers a 5, Anaerobic digestion a 4, and all solar technologies as 3s.
3. **Solar energy:** The memo states that solar systems only produce energy in summer during daytime. This is hopefully a typographic error with the words "in summer" to be deleted. Otherwise it is false.
4. **Assumptions:** We are verifying the energy demand assumptions at the CSBR.
5. **River water:** I believe it would be very difficult receive approval to use the river for cooling. Can this be floated in front of the approval agencies?
6. **Scenarios:**
 1. **SC1: All Gas:** This system should not be a 4 in resilience. I would recommend a 2.
 2. **SC2: Centralized Biomass CHP:** This system should not be a 4 in resilience. I would recommend a 2 or 3 with appropriate storage.
 3. **SC8: Individual All Electric:** This system should not be a 3 in resilience, but a 4 or 5 with appropriate and innovative storage technologies. This system should also be higher than a 1 in innovation. The Bullitt Center, the most sustainable building in the world for 2013 is an all electric solar building. In addition, the solar pv could be combined with heat pump heating and cooling for increased efficiency.
7. **Energy Modeling:** Some of the building scale systems could be energy modeled to verify their performance.