**Assessment for AD Module 8: Power generation**

**8.1: Biogas energy content & introduction**

1. When the efficiency of internal combustion engines is taken into account, how much electricity can be produced by 1 cubic meter of biogas?

**8.2: Production of heat**

1. Should biogas be treated before being combusted in a boiler to produce heat?

**8.3: Combined heat & power (CHP)**

1. Why is it advantageous to locate CHP facilities close to their fuel and to energy users? Which type of power is hardest to move over long distances?
2. How does “distributed power” increase energy security?
3. At a quick glance, what would you see as the biggest impediment to the Obama administration’s plan to vastly increase the scale of CHP in the US?
4. Is the Vermont Tech Community AD facility an example of micro co-gen?

**8.4: Internal combustion engines**

1. Why is diesel burned along with biogas in “dual fuel” compression engines?
2. How much does biogas reduce power production in spark ignition engines?
3. What steps can be taken to reduce the effects of H2S on internal combustion engines?
4. What are the two sources from which heat can be recovered in internal combustion engines?

**8.5: Gas turbines**

1. What are the advantages of gas turbines over internal combustion engines?
2. What component of gas turbines accounts for their parasitic load (internal use of electricity)?
3. What is the electric production efficiency of microturbines?

**8.6: External combustion engines (Stirling motors)**

1. Why are Stirling engines more resistant to H2S than internal combustion engines?

**8.7: Fuel cells**

1. What is the essential difference in the way fuel cells and engines produce energy from chemicals?
2. How must biogas be treated prior to use in fuel cells?
3. What type of fuel cells has been tested at a farm anaerobic digester?

**8.8: Comparison of technologies & costs AND 8.9: Case studies**

1. What factor(s) or parameter(s) would you would like to know more about but were not considered in the comparison of power generating technologies presented?