Needs and Wants- Suggestions for High Voltage and High Megawatt Applications

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Stack Voltage

Power plant voltage limits determined by stack electrical isolation design. Lower fuel cell stack voltage differential desired to:
- Minimize stack electrical isolation requirements
- Reduce fuel cell cost
- Simplify design

Higher fuel cell voltage (to 750V, 1000V?) desired to optimize Power Conversion:
- Reduce Inverter cost & size
- Enhanced Inverter efficiency
Need to evaluate trade-offs:

- Engineer stack and inverter configuration for optimal voltage output:
  - Cost
  - Performance (efficiency)
  - Reliability

One Option Being Considered: Series Connect Stack Pairs

- Minimizes Stack-to-Ground Voltage
- Maximizes Inverter Voltage Input
Common DC Bus or Dedicated/Segregated?

Inverter Input
DC Bus Approach

**Pros**

- Optimal KVA matching of inverters and stacks ($$$ savings)
- Capable of Part load operation with failed inverter

**Cons**

- No ability to bias individual stack currents.
  
  Less than optimal fuel flow – power output matching
- Custom DC bus-work $$$
- Power Diode Losses
High MW Application DC Bus Considerations

- How many inverters can be eliminated?
- In High Volume, would DC Bus Work costs be much less than Inverter savings?
- In High MW, Efficiency less of a constraint than capital cost reduction