Operating Cost Data Comparison

Diesel TRU (DTRU) vs. ElectraCold (ETRU)

1. **Diesel Fuel Consumption – Class 8 Tractor Over-the-Road Pulling Reefer Trailer**
   - DTRU – 1 gal/hr (industry accepted average)
   - ETRU - 0.23 mpg = 0.4 gal/hr (see calculation below)
   - ETRU Advantage: 0.6 gal/hr x $4/gal = $2.40/hr x 10 hrs = $24/day x 300 = $7200/yr
   - This is a 67% Fuel Cost Reduction for down the road operations

A) ElectraCold electric units require 10 kW (maximum) to produce full BTU/hr capacity, which exceeds the capacity of all current production reefer units. Actual power consumption measurement of a test unit that's on a frozen seafood customer reefer in CA was 8.6 kW maximum when the trailer doors were open and the reefer unit was operating at maximum capacity. The typical average electrical requirement will likely be close to 6 kW for a full day, but the 10 kW number is a conservative "worst case" scenario.

B) It takes 2.3 HP to power 1 kW on a hydraulic driven generator. To produce 10 kW will require 23 HP (maximum) – this is a periodic peak load, not an average load as explained above. According to Caterpillar's published documents, adding a 90 HP load to a Class 8 truck engine increases fuel burn by 1 MPG. Adding 23 HP will increase fuel burn by .25 MPG. To convert that to GPH, use 60 MPH and 6 MPG (industry standard) as an over-the-road performance for a modern Class 8 tractor pulling a fully loaded 53 ft reefer trailer. 60 MPH @ 6 MPG = 10 gal/hr. 60 MPH @ 5.77 MPG = 10.4 gal/hr (w/ETRU at 10 kW load). The addition of an ETRU system will add a "maximum" of .4 (4 tenths) gal/hr if the reefer unit was running at full capacity at all times. The actual fuel consumption will likely be about 50% of "maximum"(0.2gal/hr). Actual over-the-road fuel savings could be at least $10,000 per reefer unit annually.

2. **Diesel Fuel Consumption – Overnight Truck Stop/Hotel (vehicle parked w/no plug-in)**
   - DTRU: 1 gal/hr + .3 gal/hr APU (auxiliary power unit) = 1.3 gal/hr
   - ETRU: .25 (1/4 gal) gal/hr + 0.6 gal/hr tractor engine at curb idle = .85 gal/hr
   - ETRU Advantage is 0.25 gal/hr x $4/gal = $1.00/hr x 10 hrs = $10/day x 300 = $3,000/yr
   - 15% Fuel Savings during rest periods w/APU & TRU engines running
   - DTRU + Idling Tractor: 1 gal/hr + 0.6 gal/hr = 1.6 gal/hr
   - ETRU Advantage is 0.6 gal/hr x $4/gal = $2.40/hr x 10 hrs = $24/day x 300 = $7200/yr
   - 45% Fuel Savings during rest periods w/tractor & TRU engines running

3. **DTRU Diesel Consumption vs. ETRU Electricity Consumption when Plugged In to Outlet**
   - DTRU: 1 gal/hr x $4/gal = $4/hr x 10hr/day = $40/day x 300 days = $12,000/yr
   - ETRU: 9kwh x $0.06/kwh = $0.54/hr x 10hr/day = $5.40/day x 300 days = $1,620/yr
   - ETRU Advantage: $12,000/yr - $1,620/yr = $10,380/yr (86% cost savings)

4. **Other Operating Costs**
    - Per Carrier Transicold, the Vector Hybrid TRU (diesel generator powering electric reefer) reduces lifetime maintenance costs by 30% just by eliminating belts, pulleys, and compressor drive shaft/seal (it still has diesel engine)
    - The diesel engine is the most expensive component to maintain. It's fair to say that savings of 50% of the maintenance/repair costs of the diesel engine would be realized.
    - Comparing an ElectraCold unit to a conventional DTRU, the owner could save as much as 80% of their maintenance/repair costs.
    - TK & Carrier dealers charge high labor rates. An ElectraCold ETRU can be serviced by any qualified refrigeration or hydraulic technician in any city at competitive rates, thereby saving money.
    - EPA and CARB have been instituting new regulations that require fleets to update or replace their diesel TRUs to meet more stringent emission requirements. These new regulations will not apply to the new ETRU.
    - A saving of up to 1500 lb. is realized by eliminating the diesel engine, diesel tank w/fuel and eliminating the APU. Trailers that are limited by cargo weight can increase their cargo haul by at least 1,000 lbs. The value of that extra product load, depending on the freight rates, could be at least $500 per trip. If the truck does 50 trips per year and is loaded to capacity on each trip, that's an additional $25,000 in revenue for that truck.

5. **Total ETRU Savings**
    - $7200/yr (over the road) + $7200/yr (rest area idling) = $14,400/yr or
    - $7200/yr (over the road) + $10,110/yr (plugged in) = $17,310/yr
    - $15,000 to $25,000/yr additional revenues due to weight savings/additional cargo capacity
    - Maintenance/repair savings ($1,000 +/year)

6. **ETRU Initial Cost Increment (projected)**
    - $27,900/ETRU (the savings start immediately)
    - $25,000/DTRU (Thermo-King or Carrier) (the costs just keep adding up)
    - Initial cost is easily paid back in less than 18 months
    - There is potential to pay for the ElectraCold unit in less than 1 year.
    - Enormous savings in fuel and maintenance costs will be accumulated over a 10-year period