Products needed for Making Electrification Easier

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It can all fit

• We need to help people right size several things:
  – EV charger circuit
  – Heat pump (inverter driven variable speed)
  – Water heater tank and circuit
  – Cooking (design, type, size and circuit)
  – Drying (separate machine or combined, moisture removal method)
Products needed

• Better water heaters
• Better cooking solutions
• Better drying
• Better heat pumps
• Better EVSE
• Better easier circuiting
Better Heat Pump Water Heater

• Water heater
  – High stratification
    • To deliver hot water and defer reheat
    • To excel on First Hour Rating test (gallons delivered)
    • Upper elevation delivery of useful heat
  – Techniques
    • Low velocity dip tube
    • High elevation useful heat injection
    • Small diameter condenser tube wrapped higher and lower
    • Or controls like intermediate semi expansion valve.
Cooking Solutions

• Same pot wattage cooktop
  – using high efficiency lower electric watt hobs
• 36” cooktop under 7200 W
• Better power sharing among elements
• Variable power oven that goes to equilibrium
• Better insulated oven with less thermal mass that swings (heats up faster)
Better Drying

• Better lint management (lint clogs thermal systems) better filters or easier access cleaning

• Better condensing dryer heat rejection
  – (would speed drying and save water)
  – Explore use of solid state heat pumps in dryers
    • Peltier chips or Seebeck chips
Better heat pumps

• Even Higher COPs
• Even Quieter outdoor units (compressors and fans)
• Low GWP refrigerants
• Central air handler learns from duct pressure and then looks at weather forecast, grid forecast and it plans its approach to comfort
Drop-in Replacements

• Replacement for Wall Furnace
  – Indoor unit fits in the wall furnace hole and line-set goes up vent stack to outdoor unit on roof.

• Replacement for floor furnace
  – Low pressure air handler replaces furnace and line-set goes up vent stack to outdoor unit on roof or on ground

• Replacement for fire place (fireplace lookalike)
  – Line-set goes up chimney to outdoor unit on roof.
Better EVSE

• Chargers with built in circuit that pauses charging if panel load exceeds 80%
• Chargers with solar PV self consumption logic built in.
• Chargers that look at the grid forecast (e.g. wind forecast) and they flex accordingly to fill higher before doldrums.
Easier circuiting

• Factory made electrification retrofit module.
  – Energy locker or retro circuiter
• Connects via meter collar
• Has built in main panel (old main panel is easily connected as a sub via 100A feeder )
• New main has four flexible outdoor rated conduit circuits for: cooking, heat pump, heat pump water heater and EVSE with pauser.
Retro circuiter continued

• Meant to make one-day electrification happen
• It can contain a battery and management software to use the battery and EV pauser together to meet more electrification without service upsize or old panel upsize.
• It could have right angle bends moldable into the conduit for neat wall penetrations.
• All circuits easily extended to devices with wires already in conduits.
Utilities might own the retro circuiter

- Utility could offer free electrification
- Utility could offer control packages to customer.
  - Eco gentle
  - Bill gentle
  - High power livin’ large
Energy Locker components

Meter Collar

Existing Service line  100 A

Energy locker

Built in new Main Panel 200A

Existing panel becomes Sub Panel

New 30A to Heat Pump

New 15A to Heat Pump water heater

New 50A to cooking

New 30A to EVSE with pauser

Battery