



Plug-Out Generator Capacity Planning

ConVerdant Vehicles offers the following information for estimating the size of a Plug-Out unit connected to your Hybrid car for emergency power supply to your home. Our list of appliances is not complete, nor can we know the specific watt rating for your appliances, but it covers most of the house appliances and gives a range of likely wattage values.

For emergency power capacity planning, first prioritize the appliances in your home for emergency use, then find out the voltage and wattage ratings for those appliances and total them up, then estimate the surge power rating of the same appliances and total them.

Note: Most appliances have surge ratings that are 2-3x the continuous rating, and motors [wash machines, pumps, power tools, etc.] have a startup surge need that is 4-5x the appliance's power rating. Plug-Out inverters support surge draws up to 50% more than the unit's rating.

Then decide on the distribution method. If this process is not well understood by you, get a certified electrician to help you and avoid costly errors.

Wattages: Appliances are grouped by low-medium-high range..

Low Wattage:	Watt Range	Typical	
CFL lights	15-25	150	few
Incandescent lights	40-200		
Device Battery charger	5-50	100	few
Laptop computers	40-50	100	two
Desktop computer	50-100		
Printer - ink	20-40	30	one
Printer - laser	100-200	x	
Home Network Router/wifi	20	20	
TV - CRT	50-100		
TV - plasma	100-300		
TV - LCD, LED	50-100	70	
 Medium Wattage:			
Refrigerator	100-450	300	
Freezer	100-400	=====	
		720w	
Non-electric heating - water distn	100-500	400	or
Non-electric heating - air distn	500-2000 [3x surge]		1200 [3600surge]
Non-electric water heater	50-100	50	50
Non-electric stove/oven	0-50	0	
Non-electric clothes dryer	100-1000		
Clothes washer	100-1000	=====	=====
		1170w [2x surge]	17970w [5000surge]

High Wattage:	
Microwave oven	900-1500
Coffee maker	900-1200
Hair dryer	500-1200 [3x surge]
Power tool -drill	300-1000 [4x surge]
Power tool - saw	500-1500 [4x surge]
Electric space heater	500-1500
Water well pump - <100ft	500-1000 [4x surge]
Water well pump - 100-300ft	1000-2000 [4x surge], 240v?
Sump/Sewage pump	500-1500 [4x surge]

Very High Wattage - [typically not supported]
 Water well pump - > 300ft
 Electric clothes dryer
 Electric oven/stove
 Electric house heating
 Central Air Conditioning

Many medium-high wattage devices can be manually controlled so you might control/time their use so they do not overlap. But be careful with this idea in a house with children, as mistakes can be costly.

Whenever possible, have a power meter conveniently located so that power usage can be monitored, especially when connecting additional appliances. Where there are automated/unmonitored appliances, leave sufficient spare power capacity to absorb any simultaneous device startups.

Typical Plug-Out choice for specified appliance loads:

- 1kw – refrigerator, CLF lights, TV-dvd, radio-cd, house network, computers, telephones
- 2kw – 1kw loads plus non-electric heating [gas-oil-wood] and hot water distn.
- 3kva – 1kw loads plus non-electric heating, and forced air distn [not AC] on one 1kw heat appliance at a time like coffee maker or microwave or toaster or hairdryer.
- 3-5kva/240v – 2-3kva loads plus 240v pump or air handler.

Distribution: One can run extension cords from the Plug-Out [car] into the home and then more cords to the individual appliances. In this case, the first cord[s] from the Plug-Out box into the house needs to be rated for 15 amps and should end with a power strip and power meter[s] to accurately gauge total power use so as to stay within the unit's power rating.

Where house wiring is to be used for distribution, one needs a generator outlet in the garage wired to the house power panel, and a transfer switch [and sub-panel?] at the house panel for power-source transfer and grid safety. We strongly recommend engaging a certified electrician to help you ensure safety, estimate the needed capacity, install the socket in the garage and transfer switch at the panel. DO NOT do this yourself. There are serious safety issues for yourself, the house, your appliances, and emergency utility workmen.