Smartcar

By Carolyn Amon

Not so long ago telephones were hardwired devices that could only be used to make and receive calls. They had one function. Then they became wireless cell phones that were expensive and rare at first and ubiquitous soon thereafter. Today we have smartphones that can be used to listen to music, browse the Internet, read a book or newspaper, watch movies, provide GPS navigation and hold an electronic wallet. With over a million apps available, smartphones are also infinitely customizable.

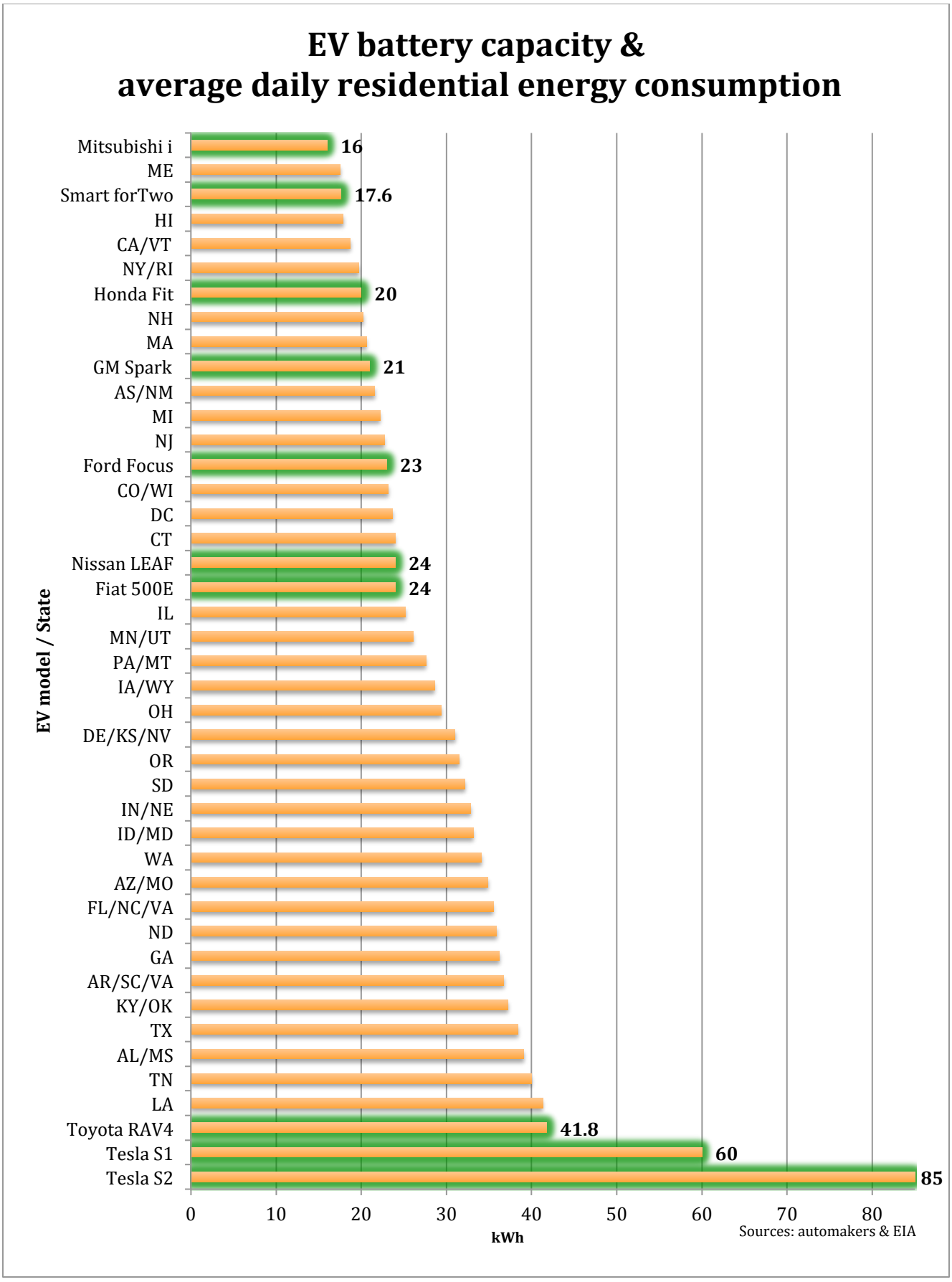
Today, cars are a means of transportation, but just like the shift to cell phones brought us the smartphone, vehicle electrification is the harbinger of the smartcar. Before long, smartcars might provide substantial advantages to utilities and customers alike:

1) Renewable energy enabler

The greatest challenge to replacing conventional energy sources with renewables is the latter's intermittency. Solar panels in the Southwest can collect over 7kWh/m2/day, but they are idle at night. The Dakotas have enough wind to power the whole country, but wind speed varies. Intermittency would not be a problem if renewable energy could be stored for later use in a battery... like the one in an EV. Several solar companies and electric automakers have already partnered to leverage the benefits of EV charging with solar and storing solar in EV batteries. Honda recently unveiled a Home Energy Management System, in which its Fit EV is directly connected to SolarCity panels attached to the home. The system also includes a smaller version of the Fit's battery that can either store solar power or provide DC-to-DC charging for an EV. This home runs entirely off of renewable energy and even produces a surplus.

2) Backup generator

Even without renewables, EVs have enough battery capacity to serve as backup generators in the event of a power outage. The chart below shows the average daily household electricity consumption in each state and the battery capacity of currently available all-electric vehicle models. In Maine a Smart ForTwo would have enough capacity to fully power the average home's 17.4 kwh/day. GM Spark's 21 kWh capacity would cover most Northeastern homes. And the RAV4 EV's 41.8 kWh battery could handle the average home in any state. The Tesla S is in a league of its own. Its 85 kWh model could power the average home in the state with the highest household electricity consumption, Louisiana, for over two days. All that is needed to transform a vehicle into a generator is a DC-to-AC converter such as Mitsubishi's Power Box for the i. The automaker started selling the converter in Japan in March 2012, one year after electric vehicles played a big role in Fukushima relief efforts due to gas shortages.


EV battery capacity &
average daily residential energy consumption
EV model / State
Mitsubishi i
ME
Smart forTwo
HI
CA/VT
NY/RI
Honda Fit
NH
MA
GM Spark
AS/NM
MI
NJ
Ford Focus
CO/WI
DC
CT
Nissan LEAF
Fiat 500E
IL
MN/UT
PA/MT
IA/WY
OH
DE/KS/NV
OR
SD
IN/NE
ID/MD
WA
AZ/MO
FL/NC/VA
ND
GA
AR/SC/VA
KY/OK
TX
AL/MS
TN
LA
Toyota RAV4
Tesla S1
Tesla S2
16
17.6
20
21
23
24
24
41.8
60
85
0
10
20
30
40
50
60
70
80
kWh
Sources: automakers & EIA

3) Source of passive income

The aforementioned features, which turn cars into a personal utility of sorts, would also make it possible for EVs generate revenue by selling its stored electricity. Most states already have net metering rules allowing people to sell their power back to their utility. EV owners could charge their vehicles when electricity prices are lowest and sell their vehicle's spare electricity back to the grid when rates are highest. Moreover, utilities might pay EV owners an additional fee for the option of drawing on their vehicle's stored power during periods of peak demand instead of firing up expensive peaking power units. The system would be even more profitable to EV owners if their vehicles could constantly be charging at no cost. Automakers are already working on this too. Ford has unveiled a CMax Solar energy concept car that could be fully charged by sunning rather than plugging: the car's battery could be fully charged by its rooftop solar panels if parked under a Fresnel lens canopy, with the car moving autonomously to maximize its sun exposure. Zero cost of ownership with profit potential is a value proposition that will be hard for ICEs to beat. Who wouldn't want to drive a smartcar?