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Resurrecting the Auto—Electric

By Annette Prozialeck

You may ask yourself, “Why would an architectural firm include an article about electric vehicles?” In researching the information in this article, I asked myself the same question. We strive to educate and enlighten our readers with products and practices that can make our homes, our lives, and our planet a more healthful place for us all. The products that we place inside of our built environments are just as important a factor as our built environments themselves. Passing through “tax season”, with all of the tax incentives available for energy efficient living, and heading into the abyss of summertime gasoline hikes...I believe that there is no time like the present to discuss alternative means of transportation.

To begin, the following list of abbreviations will be helpful as a guide while reading:

BEV:
 Battery Electric Vehicle – a vehicle which uses only batteries and one or more motors to provide the force that makes it go.



*SMART Car—
 Mercedes Benz is the
 American Distributor*

EV: electric vehicle- any vehicle that uses electric power to provide some or all of its propulsive force.

FCEV: Fuel cell electric vehicle – an electric vehicle which uses a hydrogen fuel cell as its source of electric power.

HEV: Hybrid electric vehicle, a car or truck that uses both an ICE and an electric motor.

ICE: Internal combustion engine – the powerplant of choice for the dirty, inefficient vehicles of the 20th Century.

PHEV: Plug-in hybrid vehicle – a hybrid

vehicle with a battery pack that can be charged from a wall socket.

History of the Electric Vehicle

Electric vehicles have played an integral role in the history of modern transportation. Many of the “firsts” accomplished by the automobile were done so with electric power, not gasoline.

In 1834, Thomas Davenport invents the battery electric car using un-rechargeable batteries. It was several decades later, in 1859, before rechargeable lead-acid batteries were invented by Gaston Plante.

Thomas Edison designed and built an electric vehicle in 1889 using a nickel-alkaline battery, soon after, the electric car was perfected to travel farther distances and at faster speeds. By 1890 an electric vehicle was built that could travel for 13 hours at a speed of 14 mph.

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The first American automobile race was won by the Electrobat II. Yes, you guessed it...an electric car! The first land speed record, the first distance record, the first power steering...all of these were made by electric powered cars. Even the first speeding ticket was given to a driver of an electric vehicle back in 1903. The electric auto industry was taking off. At the turn of the century, roughly a third of the automobiles were electric, another third were gasoline, and the remainder steam driven.

Then in 1930, technological progress of electric vehicles comes to a rapid stop. What happened? The introduction of Mr. Ford's gasoline fueled, internal combustion engine Model T, virtually wipes out the electric vehicle industry.

Almost 100 years later, in 1990, California passed a state mandate requiring that two percent of automakers' sales had to be zero emission vehicles (ZEVs) by 1998, (this percentage was scheduled to rise to 10 percent by 2003). Electric vehicles represented the only way for automakers to meet the California mandate. While the auto companies protested vigorously, they also began leasing electric vehicles to California drivers. In 2003, under legal pressure from General Motors and Daimler Chrysler, the State of California relaxed its zero emissions requirement to 4%. Now auto companies can meet the mandate by selling gas-electric hybrids, such as the Toyota Prius or the Ford Escape hybrid.

According to *The New York Times*, there were about 10,000 electric vehicles leased in California between 1996 and 2003. Toyota, Honda, General Motors, Ford and Nissan all built limited production runs of battery-powered vehicles. For a variety of reasons; some say lack of advertising from the original equipment manufacturers, others say the lack of purchase (they were only available by closed-end leases); still others say that the limited production runs kept costs too high to make them available to the average buyer – the cars were largely collected at the end of their lease – and destroyed – despite the protestations of willing buyers. The California Air Resources Board (CARB) charter was not necessarily intended to drive up the production of electric vehicles, but rather to reduce air pollution. The manufacturers successfully argued for changes to the rules. The CARB specifications were modified from zero emissions to an equivalent emission reduction by the mandated production of very low emission vehicles, SULEVs (Super Low Emission Vehicles) – vehicles producing about one tenth the previously mandated emission levels.

Why have an electric vehicle?

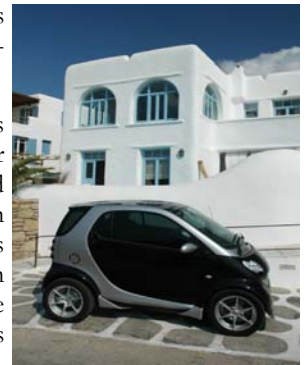
The biggest proponents of electric vehicles are those

who have obtained and used them. Owing to the fact that electric vehicles have not been actively promoted by the major manufacturers in the United States, this is a self-selected group, so their enthusiasm may be misleading. However, the following information about electric modes of transportation may explain to the rest of us just why they are hooked.

- According to the Bureau of Transportation statistics, Americans drive an average of 29 miles a day, which means that most Americans could drive for several days without needing to charge an electric car.

- Electric cars provide less wear and tear than their gasoline counterparts.

- Fueling at home requires but seconds to plug in for overnight charging followed by a few extra moments in the morning. Some find this to be more convenient than driving to obtain gasoline whose availability and cost is less predictable.



- The homeowner can install on-grid solar photovoltaic rooftop power or residential wind generation and so produce most of the energy required for personal transportation with zero pollution. Since the vehicles can be charged during low demand times (at night) the photovoltaics provide a larger societal benefit by helping to satisfy local peak demand, greatly reducing overall pollution and reducing transmission line loads. Additional benefits can also flow to the user through time sensitive pricing/payback schemes, significantly reducing the cost of a system that will support transportation needs. Once a commitment to producing power is made it becomes an easy decision to commit to producing all household and local transportation power needs. Thus there is a societal benefit from electric vehicles beyond transportation.

- Electric vehicles are quiet. Even if not completely silent, they do not produce the low frequency rumble that can easily penetrate household walls and windows.

U Owners take pride in the non-polluting nature of their vehicles. Some point out that knowing that your vehicle is non-polluting quickly leads to a realization how stinky and noxious even modern, well tuned non-electric vehicles actually are – something that tends to be ignored when you are part of the problem.

Some EV fans, albeit with a left of center political bias or of an extreme “green” inclination, claim that when combined with household photovoltaics, electric vehicle users are not assisting (through their fuel purchases) despotic governments in oil-rich countries, nor the terrorist practices supported by such governments. Many electric vehicle owners and operators express great satisfaction in this

“Electric vehicles have played an integral role in the history of modern transportation. Many of the “firsts” accomplished by the automobile were done so with electric power, NOT gasoline.”



"IT AIN'T EASY BEING GREEN..."

During a recent interior products research assignment. We sent our friend and business associate, Kathy Neal, of Eco-Deco Designs, on a mission to compile a list of "green" interior finish products to assist our clients in finding more healthful alternatives in our local marketplace. We quickly learned that it is a vastly expanding sector of the interiors market, and a daunting task. The following is the conclusion that Kathy came to.

Green resources for finishes are changing quickly as everyone jumps on the bandwagon – a big YEA for the environment, but a headache for anyone trying to choose the "best" products out there.

A good place to start is by asking yourself some hard questions;

1. What does green mean to me? Reuse? Reduce? Recycle? Salvage?
2. Sustainability?
3. Simple manufacturing, labor intensiveness?
4. Local so shipping is reduced?
5. Green because of health (i.e. off-gassing, etc.)
6. Quality?

Questions about "what is really green" and "what does that mean to you" need to be asked because the whole area is full of conflicting decisions: Do I want an appliance that saves energy up front, but has to be replaced every 5 – 7 years instead of every 20? Do I want wool carpet from sheep grown where and how humanely? Or is recycled petroleum carpet better because it uses old pop bottles that otherwise would end in the landfill? Do I want cement or tile anything when the firing uses so much energy? There are trade-offs with every decision.

I initially investigated venues believing that having a simple list of products and beginning price points (so that contractors could bid at least base pricing for "plain vanilla" green choices) would simplify the process.

This seemingly simple task immediately became complicated. For example: I discovered a bewildering array of wood flooring choices all green in different ways. The customer would need to decide what is

most important to them: sustainability based on Forest stewardship council certification? Green foreign produced and harvested giving people work and keeping the rainforest protected? Salvaged, recycled wood? Is it better to get wood from the local salvager in Ashland –very custom because who knows what he'll find next. Or from a bigger salvager farther away? Or maybe the flooring from Lowe's that is grown in the US with good timber practice and hand-planed by the Amish is good enough. My head began aching, and I hadn't even gotten to Bamboo! Bamboo is beautiful, super-sustainable and very trendy but not always the best choice for radiant floors as moisture of any kind will cause warping – under-flooring must be under 2 % moisture.

Other flooring – cork, for instance – cork is "cool", long lasting (25 – 100 years!) and can handle wear and tear like kids and dogs, but pretty hard to lay – must have a real pro do it and do it right. Good ole Linoleum has always been green and is popular again, made from linseed oil, wood flour and limestone dust – very sustainable and long lasting.

Tile and stone are beautiful choices and "natural", but how green is something that is resource intensive (high temperature firing) and mined? There are some green tile choices – harder to find and sometimes expensive.

Carpet – another ball of worms – or is that can of wax? Wool is better than petroleum products, or is it? How were the sheep treated? How was the wool processed and by whom? The recycled pop bottles (PET) carpet looks pretty good and is a lot cheaper than wool. Hmmmmm.

Paints of the No-VOC variety are now available through specialty and mainstream venues with more coming out every week it seems.

There is just no way to keep up with the new stuff coming on line – green is BIG and everyone wants into the market – a great thing, of course, but a full-time job keeping up. My conclusion:

"There's just no way around conscientious clients doing their own homework - too many choices and trade-offs now"

Continued on Page 4



PROJECT COMPLETION

Please join us in congratulating Kerry & Barbara Bott on the completion of their beautiful new home in Sisters, OR. They are moving in and to make the transition to the space which they worked so hard to create.

Construction was done by Brad Nicholson Construction, also of Sisters, OR.

We welcome the Botts to Central Oregon and wish them much happiness in their new home.



IT AIN'T EASY BEING GREEN...continued from page 3

unless you want to set up a showroom and restock it monthly, you are better off sending your clients to Environmental Building Supply or smaller (but good places) like Sky and Earth (opening a satellite store downtown), so that they can get the latest info, touch and feel everything, and make choices. The people there live and breath green.

I can suggest some online sites and periodicals like Treehugger.com, Dwell magazine, and Oregon Green Living. Non-green focused rags are coming on board with lots of good useful research. Their info is lively, current – at least for a few months – and attractively displays edited lists of choices.

This has been an education. There are no solid answers because everything has its pros and cons. There is just no way around conscientious clients doing their own homework – too many choices and trade-offs now. As Kermit the frog said, “It ain’t easy being green”. ■

The Green Checklist

Is it...

- ◆ Rapidly Renewable (like fast growing bamboo)
- ◆ Responsibly Grown (wood from a socially and environmentally managed forest, for example)
- ◆ Reusable (can be recycled after use)
and/or
- ◆ Biodegradable
- ◆ Durable
- ◆ Safe—No Off-Gassing
- ◆ Relativity (meaning a Prius may be better than an SUV but not as good as an electric car or a bicycle)
- ◆ Consider Good Manufacturing Practices (wind powered factories, fair labor conditions, etc.)
- ◆ Vintage Counts

- excerpted from Domino magazine, March 2007



UNDER CONSTRUCTION

- ◆ Aspen Title & Escrow—Andy Johnson Construction Company
- ◆ Baccetti Residence - Owner/Gen
- ◆ Bowerman Building—Lee Fischer Construction
- ◆ Redmond Foursquare Office Bldg - Central Oregon Builders
- ◆ Garrigan Residence - Windriver Builders
- ◆ James Residence - Owner/Gen
- ◆ Lantis Remodel/Addition - Cobble Creek Construction
- ◆ McColgan Residence - Owner/Gen
- ◆ McFarlane Residence - Brad Nicholson Construction
- ◆ Place Residence—Windriver Construction
- ◆ Plaza Condominiums - Dalke Construction
- ◆ Price Residence - Owner/Gen
- ◆ Ruitter Duplex - Owner/Gen
- ◆ Sampson Residence -
- ◆ Shaker Residence - Danny Dark Quality Construction



McColgan Residence—Remodel, Bend, OR



The view from the McFarlane residence at Eagle Crest



Aspen Title & Escrow to break ground mid-May 2007



ON THE DRAWING BOARDS



The Shire in Bend, Oregon



Palmer Homes Rowhouse Project Bend, OR



The Brown Residence at the Ridge at Indian Ford

- ◆ Badger Community Development Project - Redmond, OR
- ◆ Brown-MacIntosh Residence - Sisters, OR
- ◆ Hamilton Construction Residence—Caldera Springs, OR
- ◆ Diestel Residence—Wyoming
- ◆ Hatfield Ranch—Brothers, OR
- ◆ Hodgert Fishing Lodge—Bend, OR
- ◆ Kambak-Kostelecky—Yoga Studio, Prineville, OR
- ◆ Maul Residence—Bend, OR
- ◆ McColgan Residence—Bend, OR
- ◆ Palmer Homes Townhomes—Bend, OR
- ◆ Port Orford Condo/Mixed Use Project - Port Orford, OR
- ◆ Rice Residence - Tumalo, OR
- ◆ The Shire –Phases I & II—Bend, OR
- ◆ Troike Residence - Sisters, OR



aspect of electric vehicle use, even while acknowledging that this use can have only little effect on these matters unless adopted more widely and produced in greater quantities.

Why convert or purchase a converted ICE to get an electric vehicle?

In Europe, and some parts of Asia, vehicle buyers have the choice of ICE or electric – it is actually possible to obtain reliable, well engineered electric vehicles and to have them maintained by a dealer. This is not possible in the United States for economic, political, and market-restraint reasons. Nor is it possible for a person to easily import a new electric vehicle from Europe or Asia. Certain restrictive safety regulations (such as the requirement for safety glass rather than tempered glass in windshields, airbag requirements, lighting regulations, plus the destructive testing by barrier collisions all operate to inhibit the use of offshore manufactured vehicles. In contrast there are few restrictions on the personal conversion of an ICE vehicle to BEV (battery electric vehicle). This anomaly is distinctly cultural in North America and is emblematic of a dichotomy in the American political psyche: On the one hand, social and political pressures force the government to protect consumers in the marketplace from exploitation by corporations and large corporations prefer legislations that restricts the entry of new players into the marketplace, while the preservation of individual freedom to tinker in one's garage or workshop is considered sacred, being in the spirit of great inventors such as Edison and the Wright brothers.

Note that battery technology is rapidly improving in cost/performance ratios due to the use of batteries in ICE-electric hybrid vehicles. The EV that is converted today will be upgradable by future battery (and perhaps charger) replacement.

Operating Costs

The direct operating costs will generally be confined to expenses for tires, battery replacement, battery water (where required), and electricity for recharging. Although the cost of electricity for charging these vehicles is generally much less than the cost of fuel for ICE vehicles, the cost of battery replacement can be very high. In general, the overall cost per mile for an EV – including periodic battery replacement, may be greater or less than for a conventional ICE vehicle of similar size and performance, depending largely upon the battery type used. For example, if the cost of electricity is (US) \$0.12/KWH, the battery pack costs \$1200 to replace (a low cost based upon the lowest cost technology), and lasts approximately 20,000 miles, and the

vehicle uses 400 KWH/per mile, the combined cost per mile will be \$0.11/mile ($960 + 1200 / 20,000$), compared to an ICE vehicle getting 25 MPG at a cost per gallon of \$2.75. This does not include avoided costs such as engine oil changes, smog inspection and various repairs required to maintain smog certification. With higher fuel cost, the electric conversion vehicle is favored in the long run.

ICE-Electric Conversions

A professionally built conversion will often be designed to be ignored, being engineered, constructed, and tested to survive with only minor maintenance on the operator's part and regular charging, combined with a regular professional performed maintenance schedule.

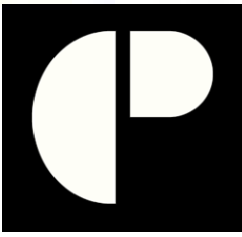
While some conversions of ICE vehicles have been performed by major automobile manufacturers in the United States, all such programs have been terminated due to (to quote the manufacturers) "lack of consumer demand" for these vehicles. A few specialty rebuilders offer new or remanufactured conversions to satisfy a rather limited demand. The demand is low primarily due to the costs of completed vehicles, which are up to twice that of a comparable ICE vehicle. Some of these are built on new vehicles, purchased from the original equipment manufacturer but without the various ICE components.

While the electric car of today may not meet all of our current transportation needs. With business interests beginning to take alternative energy sources a bit more seriously, and as the American public raises its collective expectations for alternative fuel sources for transportation. The electric auto may soon be resurrected and find its way into our history books...for the long haul. ■

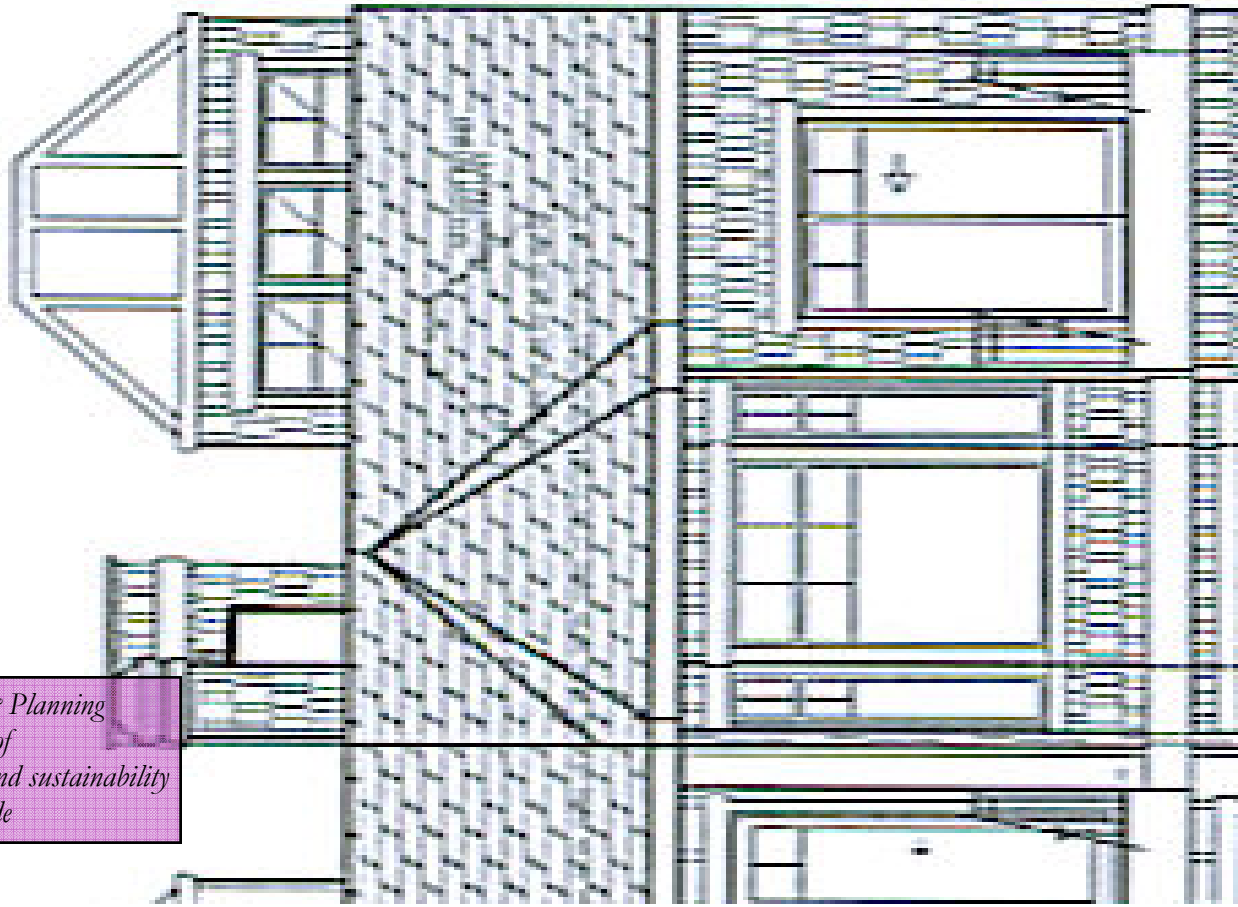
“Americans drive an average of 29 miles a day, which means that most Americans could drive for several days without needing to charge an electric car.”

*Bureau of
Transportation
Statistics*





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*Phillips Architecture & Planning
Is a supporter of
Green Roofs and the beauty and sustainability
that they provide*

Accomplished Under 40

**Please join us in Congratulating Chad Phillips for being selected
by Cascade Business News**

**For his Professional and Civic commitment to
The Central Oregon community.**

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