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**From:** Mark Roest < >  
**Sent:** Tuesday, September 24, 2019 3:15 PM  
**To:** Climate Change@EPA  
**Subject:** Re: A practical California vision for global warming and poverty (starting w transportation)

I would like to share more about how we see the big picture, and transitions to the future we hope for. Along with that, I would like to explore ways in which California can assist us in adding funding and people to expedite the plans I have briefly touched on.

Regards,

Mark Roest

On Tue, Sep 24, 2019 at 3:09 PM Mark Roest < [REDACTED]@gmail.com > wrote:

Regarding the previous comment,

Quick response to question about asphalt: Ultra-High-Performance-Concrete can make our roads last for many decades between major maintenance -- and it can use desert sand instead of increasingly scarce river sand.

This applies strongly to the question of increased road repair costs. The material costs about \$0.70 per pound when used at scale. It can be used to repair both road surfaces and bridges. It was designed after reverse-engineering the Roman concrete used to build the Pantheon and the aqueducts that are still standing, over 2000 years later. The medium- to long-term financial picture is of massive savings compared to business as usual today.

Going back to batteries, our non-lithium technology is made primarily from clay and metal oxides, and is 95% or more recyclable. We are avoiding both toxins and scarce, expensive materials as inputs. Once in production they will be highly profitable, enabling rapid scaling to being a global standard. We expect cycle life in volume production go improve from around 5,000 initially, to 10,000 within a few years, and increasing toward 20,000 cycles at 80% or more depth of discharge.

We also have disruptive solar, wind, and wheel motor technologies which can combine to create huge savings in materials, costs, and environmental impacts.

Regards,

Mark Roest

On Tue, Sep 24, 2019 at 1:25 PM Mark Roest < [REDACTED]@gmail.com > wrote:

Quick response to question about asphalt: Ultra-High-Performance-Concrete can make our roads last for many decades between major maintenance -- and it can use desert sand instead of increasingly scarce river sand.

We can use UHPC and advanced structural geometries to make a dense (<1/2 mile to a line from any densely urbanized location) network of elevated, bidirectional, ultra-light, solar-powered, autonomously-controlled Group Rapid Transit. Above the GRT line, on the same columns, we can place fast and slow bicycle lanes, above them pedestrian and misc. mobile devices such as scooters, skateboards, roller skates, Segways, unicycles, etc.; that is protected from sun and rain by a solar canopy that powers the GRT below, and may also support neighbors.

## **Introduction**

### **Post-War Japan as an example for California today**

Japan re-industrialized, after near-total destruction in WWII, with the help of Edwin / Edward Deming, who encouraged highly integrated team efforts in which every member is valued, the product must be perfect, and anyone can stop the line when there is a defect. He also taught statistical quality control, as a tool for company teams to be able to create perfection over time. Multi-industry trading companies, known as kairetsu, managed the integration of hundreds of smaller companies which provided the components for complex systems like cars, ships, and consumer electronics. All these elements together enabled Japan to emerge as the original Asian Tiger economy.

### **California's Path**

It's time for California to lead the way to the new American and global economy, that affords prosperity to all humanity, without insult to Nature. The first major step is the switch away from fossil fuels in transportation and electricity generation, with an initial focus on economically disadvantaged and pollution-impacted communities. Our network has the critical technologies, and design & production skills, to profitably achieve this goal by 2030, surfing Tesla's wave.

Governor Newsom's Executive Order directing that California's government use a \$700 billion budget flow to expedite the shift should lead to underwriting finance, and purchasing that creates critical mass, to establish California as the technology and production leader in these fields. That can concentrate jobs where they are most needed. It will also enable us to support transfer of new technologies to countries whose economies we have damaged, strengthening their job-creation and business-formation capacities. Once the products and practices are in place and saving money globally, people will be able to pay off the financing in a few years with those savings. From that point on, the free electricity will release 5% of the US economy and 10% of the global economy for other uses. Electric vehicles that last for decades, including perhaps 60% of the fleet that is worth converting from ICE to BEV, will probably end up saving another 10%.

Those savings can finance transitions to sustainability in city design and location, construction, and food. By involving everyone who is willing in creating those changes, and benefitting from them, we will bring most of the nation out of poverty, and into political alignment with the remaining tasks necessary to heal our world, our bodies, our souls and our psyches.

This revitalization, or renaissance, can lead most of us back to being Makers, creating things that interest us, growing much of our food in organic gardens, and participating deeply in our communities. It can simultaneously free us from the alienating, hypnotic trance of consumerism. As we change our circumstances and actions, we will attract an ever-growing share of the people to join us; this will marginalize and reduce the numbers of people who cast their lot with the enemies of life and humanity. As this happens, we will be able to take back and restore our institutions, even better than they were before they were put under constant political attack. The farther we go, the stronger we will be, and we will be able to repair some of the damage to billions of individuals in millions of communities that have been colonized, from 1492 to 2019.

## **The switch from fossil fuels in transportation & electricity generation**

### **Batteries**

Prices have fallen to the \$130/kWh capacity range. We will be coming out with breakthrough non-lithium batteries soon, though we need more funding to complete the work. Cycle life is growing fast enough that you can already get much better levelized cost of storage than last year.

### **Solar & Wind**

Prices have fallen through the floor for utility-scale (beats coal and natural gas), and to less than a dollar a Watt for many residential and commercial installations, while performance and working lifetime continue to climb past 30 years.

### **Energy Efficiency & Energy Management**

Miniaturized hardware and whole systems approaches to software are ushering in a revolution in accuracy and effectiveness; they now can look ahead for variations in sun and wind to prepare, and can sell at peak demand times to get the most return for electricity sold to the grid.

### **Smart Microgrids & Mini-grids**

This is the state-of-the-art in community and block-scale energy management.

### **Electric Vehicles**

Sales are booming for Tesla, and growing significantly for some others. The future includes ultra-lightweight, yet safe, vehicles with phenomenal efficiency & range, and great handling.

### **Solar PV on Rooftops & Solar Canopies over parking, driveways, sidewalks**

This is a revolution! It makes it possible in most homes, businesses and institutions, for both buildings and all the vehicles associated with them, to get all their electricity from the sun most or all of the year. Community Choice Aggregation (CCA) agencies can help us get there, and bring in electricity to make up shortages.

These industries can be profitable enough to finance their customers' purchases, once they reach mass production levels, while still giving 2- to 4-year payback, when all benefits are included.

I have breakthrough technology available for each of these industries within our network. I am happy to provide more details as you wish.

Regards,

Mark Roest

Director of Marketing & International Development

Sustainable Energy Inc. <https://SustainableEnergyInc.com>

Advisor, Powers Design International, American Transit

Vehicles, Inc., Bosch Structural Geometries, Asante' UHPC.

Board member, Green Fleets Group