Green:Net 2010
The Green Conference for the Internet Technology Industry
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Executive Summary
Many technologies developed in the information technology (IT) industry are going to drive innovations in the cleantech/greentech industries. Smart Grid will be a driving force in energy conservation and management. However, just as in the tech industry's dot-com bomb ten years ago, there will be a cleantech/greentech bubble and resulting victims. This shouldn't discourage us from addressing global warming concerns, despite those who question these or live in denial.

The Oil Conundrum
The United States is addicted to oil which drives its foreign policy. The BRICS[1] countries, which are lot more dependent on the Middle East oil, lead in alternative energy sources. The PIIGS[2] countries, despite the economic crises they are currently facing, are ahead of the U. S. in innovations. Spain leads in wind power and has the world's largest installed base of solar power, and South Africa leads in synthetic fuels, as Iceland does in geothermal.

So the Smart Grid Will Be Huge – Now What?
The smart grid market is forecast to grow to $210 billion over the next five years, and the U. S. government has funneled close to $4 billion into smart grid utility projects so far in this year alone. What will be the infrastructure used to deliver the efficient grid services that utilities need? Is the infrastructure debate over? What characteristics does the industry need to promote innovation?

What is smart grid? It is the accelerated modernization of the electrical network. Thanks to the Internet, information networks in most parts of the world today are unregulated, but telephone and electrical networks are not. Smart grid is happening and is not a bubble, although there will be some bubble victims. The use of IT and communications in the electrical grid is inevitable. Open standards will bring the grids together and interconnecting of the grids will be crucial, eventually leading to an appliance that can communicate and alert the user of energy usage. At the same time, people thinking that a geek sitting at his terminal all day will suddenly jump up and go turn off his fridge, washer, or dryer are smoking something that is green.

The first requirement to effect this is building scalable networks. The second component is finding new ways of generating power. There will be more pressure on utilities to generate more power to meet increasing needs of a growing population—80% of China will be urbanized by 2050. The third requirement, as we have learnt from the Internet, is open and interoperable networks. Energy management has been in place for non-residential applications for over 50 years. It's time to extend that concept to homes.

Greentech and the California Economy
This was a Q&A session with gubernatorial candidate, former California Governor, former Oakland Mayor, and current Attorney General of California Jerry Brown. He has been a longtime supporter of clean power and energy efficiency since his stint as California's Governor between 1975 and 1983. Following is a paraphrased version of his answers. Keep in mind, being a politician, his views have political undertones.

Look for innovation in the private industry, creativity happens outside of the government, and eventually gets regulated. California is always on a roller-coaster. I succeeded a Republican actor (Reagan) as a governor during a deep recession—following the oil embargo and energy crisis of 1973-74. Now we have deep recession and a Republican actor (Governator) as a governor. Just like then, we'll come out of the recession. In 1976 we were ranked the 47th worst state to do business and had a state GDP of a little over $400 billion. Since then, we have created millions and millions of jobs and now boast a GDP of $1.7 trillion—eighth largest

[1] Brazil, Russia, India, China, South Africa
[2] Portugal, Iceland, Ireland, Greece, Spain

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economy in the world. California continues to be center of innovation although, unfortunately, we have cut back on education drastically.

Back in the 1970s, we introduced lots of credits for energy savings, established energy-efficient standards for appliances, and emission standards for cars—even exceeding the U. S. EPA standards. Automobile companies sued us and lost and, eventually, many other states and even the EPA embraced our standards. Thanks to our legislations and educating the public, per capita consumption of energy in California has been constant since the mid-70s, whereas it has doubled in the U. S. (Figure 1).

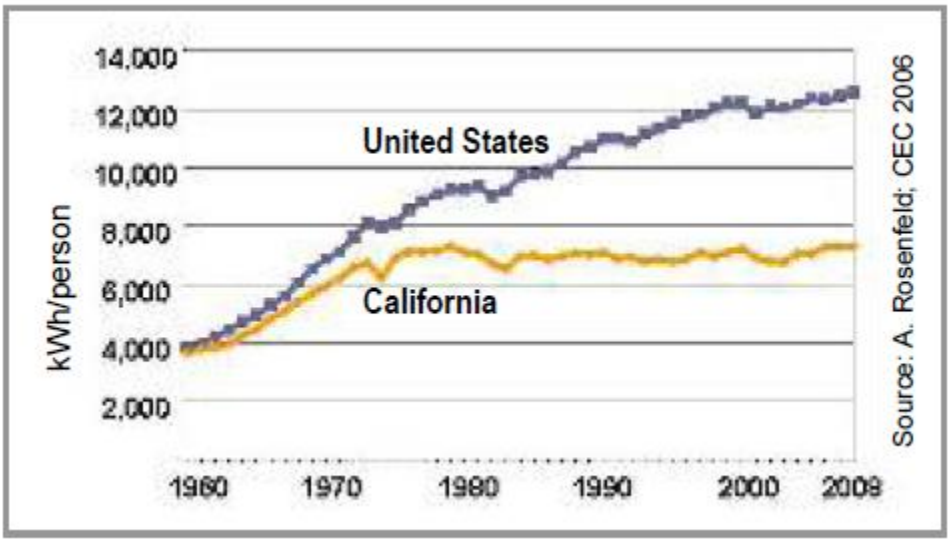

Figure 1. Per Capita Energy Consumption

We need a government policy that spurs growth and innovation. During my tenure as Mayor of Oakland, over 10,000 people moved back into downtown Oakland after serious efforts, starting small businesses, and fighting lawsuits and environmental issues. California is in the forefront and we should roll forward and not back by reducing bureaucracy. It shouldn't take seven years to build a transmission line. Innovation and creativity are what are driving our country. We have two parties in Washington that can't seem to agree on anything, the same thing is true on California. California has to change tax and regulatory laws.

California will come back, and we'll have an economy of many trillion dollars. Continuity, creativity, and innovation will change California. I often get stigmatized as Gov. Moonbeam, but I'm used to bad press, howls of execration; and most ex-Governors of California are unpopular. What do I think of Meg Whitman (expected to be his Republican opponent gubernatorial race later this year)? I don't like to think about Meg Whitman. What we need are breakthroughs, not breakdowns. The Federal government should not deprive the states of territorial authority to exceed Federal laws. There are multiple sources of opposition; you need a strong leader and an executive to lead California.

Progressive Utilities and Grid-Connected Cars

Utilities are getting ready for the coming influx of electric vehicles that will reshape the power grid and the relationship with customers. Meanwhile entrepreneurs, startups, and investors are building the next-generation of technology for electric vehicle charging. NRG Energy wants to become clean and sees Houston as an experiment. (One of NRG's companies, Reliant Energy, is headquartered in Houston.) Why Houston? Houston is oil capital. Why EV there? Well, Houston is the fourth largest city in the U. S., and everybody has 220V power supply, and a significant number of people drive 15-20 miles to work each way every day.

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Can we provide EVs and more efficient homes? EVs will need Level 2 charging stations and 220V power supply in homes. Fortunately, most homes already have washer/dryer that run on 220V. Someday you'll be able to drive coast to coast in the U. S. in an EV with thousands of charging stations on the way. (This is what A Better Place is working on.) But can we have one network like the Internet or the ATM network and get one bill?

The Future of Greentech from the Viewpoint of an IT Pioneer
Steve Jurvetson Managing Director, Draper Fisher Jurvetson
DFJ has a plethora of portfolio of companies in cleantech—power generation, distribution, storage, efficiency, fuels and chemicals, and resource management. Google will keep innovating in core—search. Nonlinear technologies will change the world, just as Hotmail, ICQ, and Skype did, because they are the sources of market disruption. Similarly, some companies in cleantech/greentech will change the world. Electric cars are 45% efficient, while internal combustion engines have an efficiency of 15%.

Some of DFJ's portfolio companies include:

- Power Assure, which encourages datacenters to migrate from "Always On" to "Always Available", reduces energy consumption by 50%, and has software that can adjust cooling systems to further reduce energy consumption.
- Miartech that manufactures chips for power line communication at a fraction of the cost of current chips on the market and show 3-4 times better communications performance.
- Intematix which manufactures LEDs that consume $1/10^{th}$ the power of incandescent and last 50 times longer. Lighting consumes 24% of all electricity and a total conversion to LEDs could save 20% of all electric consumption and one billion tons of CO_2 per year.
- Tesla Motors, which needs no introduction.

Conclusions
Global warming is for real, despite denials by the contrarians. Our addiction to oil has to stop and unless the U. S. takes a lead developing alternative energy sources, it will be left behind and following the likes of China, Denmark, India, Israel, Spain, and others.

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