



**SAE 2018 新能源汽车国际论坛 - 第六届**  
**NEW ENERGY VEHICLE FORUM**

9月11-12日 上海 安亭 颖奕皇冠假日酒店

September 11-12, Crowne Plaza Shanghai Anting, Shanghai, P.R. China

Keynote Address – 11 September 2018

**Paul V. Sheridan**  
**DDM Consulting**  
**Dearborn, Michigan USA**

# Paul V. Sheridan DDM Consulting Dearborn, Michigan USA

After a career with OEMs, Paul Sheridan specializes in transportation safety and efficiency. While at Chrysler Corporation, Sheridan led the original prototype development of the world renowned Dodge-Cummins Diesel Pickup truck, and later designed and managed the engineering programs for that award-winning product. One of only three recipients of the Lee Iacocca Chairman's Award, Sheridan is also the only person in history to win the Civil Justice Foundation National Champion's Award for work in transportation safety. With a testimony that ranges from the local/federal courts, the United States Senate, to the highest court, the United States Supreme Court, Sheridan has been credited with numerous technological and regulatory advancements in safety under his adage:

***"First and foremost, safety is a management issue."***

With degrees in physics, mathematics, and computer science (BS), and a Master's in Business (MBA) from Cornell University, Sheridan concentrates on the safety and efficiency of electric mobility. Environmental protections offered by EVs will demand and **drive** energy sources that demonstrate true sustainability.

**Proposal:** Formerly a nuclear reactor operator, a long-term perspective is proposed which recognizes the incremental electrical energy requirements of the EV paradigm. To maximize the benefits of EVs, deployment of modern grid technologies, fortified by the reliability and predictability of third and fourth generation nuclear power plants, will be required . . .



Paul Sheridan is the only person to win the Civil Justice Foundation National Champion's Award for work in transportation safety; now concentrates on the safety and efficiency of electric mobility.

# The Electric Vehicle Paradigm: EVs as a Driver of Grid Modernization and Sustainable Nuclear Power

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Unit 1 of the Haiyang plant (Image: Westinghouse)

**The Electric Vehicle Paradigm:  
EVs as a *Driver* of  
Grid Modernization and Sustainable Nuclear Power**

**Three-Fold Context – Basis of Proposal**

- A. Proposals that involve (or allege to involve) protection of the environment must ensure that goal comprehensively. The natural beauty and ecology of a region must not to be diminished, or subjugated to the compromises of alleged “sustainability.”
- B. The attitudes and lack of a long-term foresight in many public officials, regarding energy plans, specifically as such relates to the incremental electrical power demanded by a long-term vision of electric mobility, must be addressed/corrected.
- C. It has already been determined that transport bus conversion to full EV constitutes the greatest and quickest of comprehensive benefits; the proverbial ‘low hanging fruit.’

# Do Wind Farms and/or Solar Farms Fulfill 'True Sustainability and True Environmental Protection' ?



Question posed to the California Energy Commission (CEC) :

“ It has just been announced that the last of California’s nuclear power plants, Diablo Canyon, will be shut down. That means that the only nuclear power available to California will be imported from sites such as Palo Verde. What is the CEC plan to replace that power given its concerns about the incremental power needed for electric mobility? ”

Answer: “ **Well . . . I’m not the nuclear guy.** ”

# Do Wind Farms and/or Solar Farms Fulfill 'True Sustainability and True Environmental Protection' ?

## California power grid urges consumers to conserve energy in heat wave



Reuters · July 23, 2018



(Reuters) - California's power grid operator on Monday issued an alert to homes and businesses to conserve electricity on Tuesday and Wednesday when a heat



wave is expected to blanket the state.

# Do Wind Farms and/or Solar Farms Fulfill 'True Sustainability and True Environmental Protection' ?

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**P** **Patrick** 15 hours ago ⋮  
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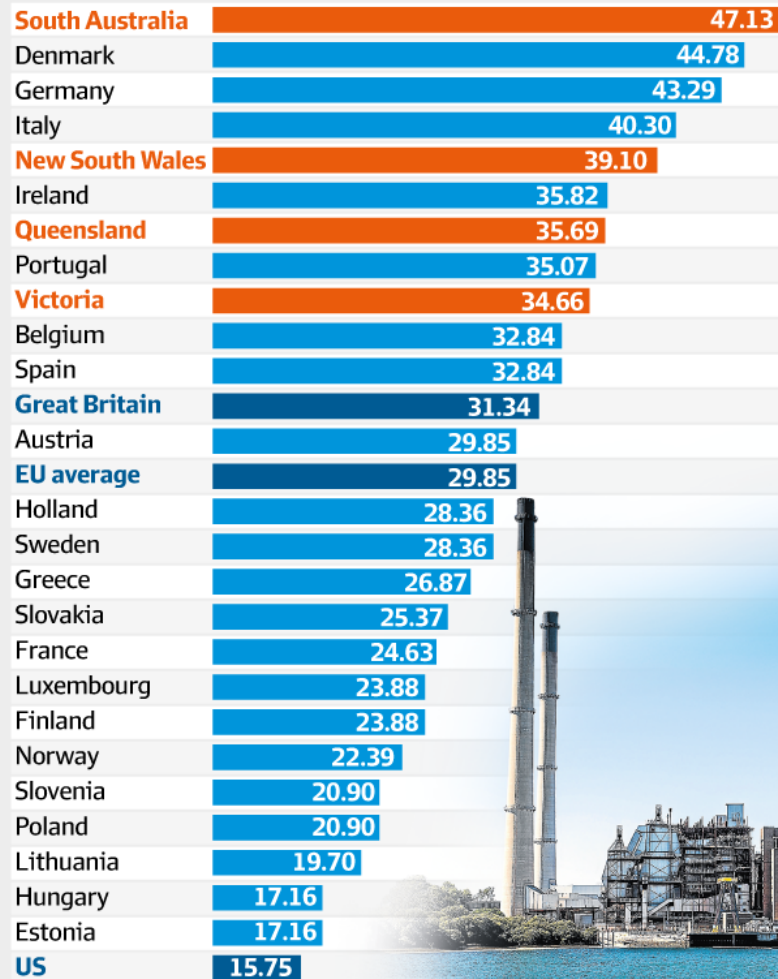
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So how's all that renewable energy working out?  
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# Do Wind Farms and/or Solar Farms Fulfill 'True Sustainability and True Environmental Protection'?

Retail electricity prices of NEM states, including taxes, compared to selected countries (¢ per kWh)



SOURCE: MARKINTELL, US ENERGY INFORMATION ADMINISTRATION



**Do Wind Farms and/or Solar Farms  
Fulfill ‘True Sustainability and True Environmental Protection’ ?**

**The “Footprint” Issue**



**Do Wind Farms and/or Solar Farms  
Fulfill 'True Sustainability and True Environmental Protection' ?**

**The "Footprint" Issue**



# Do Wind Farms and/or Solar Farms Fulfill 'True Sustainability and True Environmental Protection'?

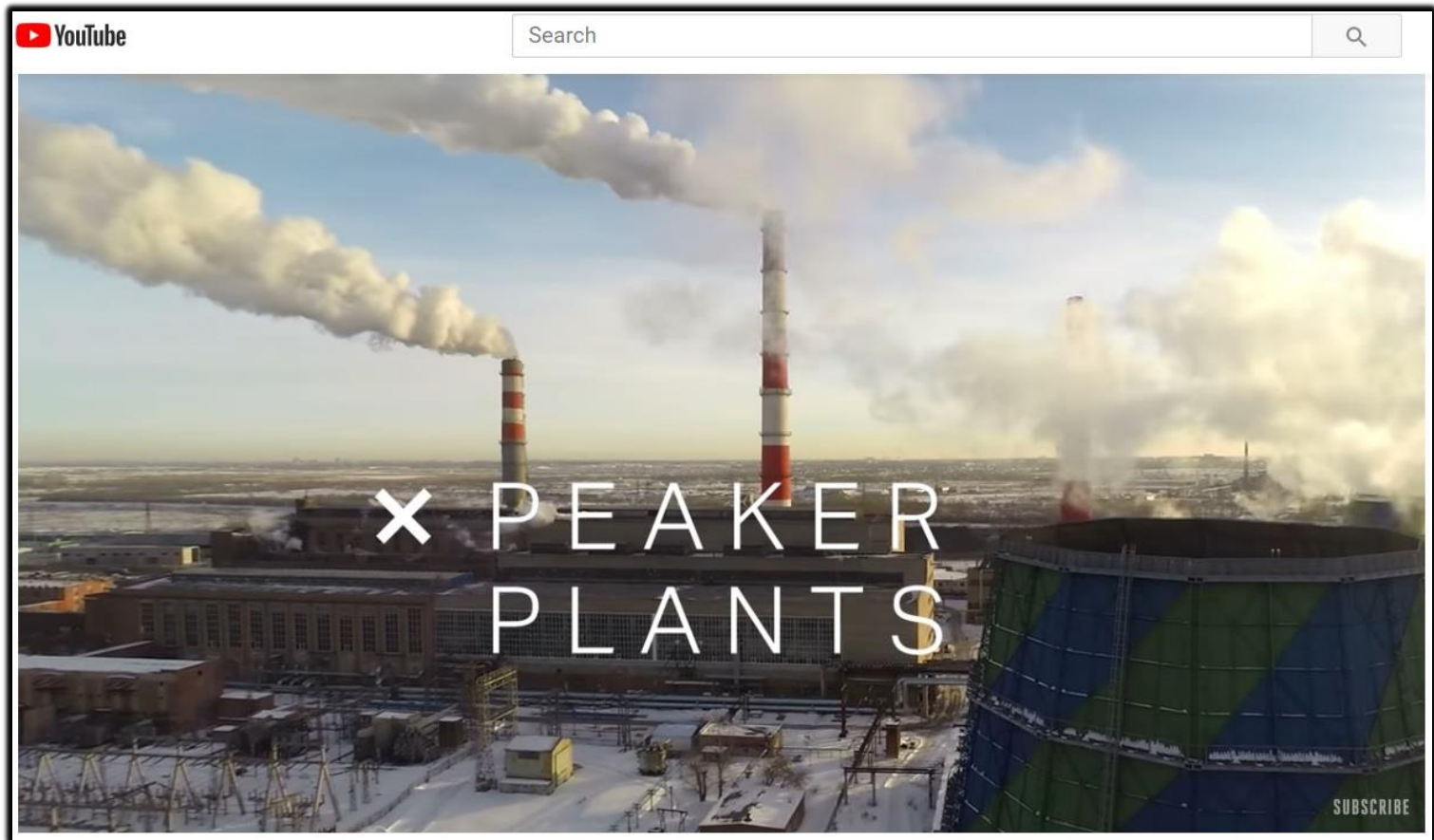
## The "Footprint" Issue



<https://www.youtube.com/watch?v=ZH4m-Cs-u3Y>

**Do Wind Farms and/or Solar Farms  
Fulfill ‘True Sustainability and True Environmental Protection’ ?**

**The “City Sized Battery” Proposal**



**Do Wind Farms and/or Solar Farms  
Fulfill 'True Sustainability and True Environmental Protection' ?**

**The "City-Sized Battery" Proposal**

"So, traditional plants aren't super efficient. But they're consistent and therefore predictable.

Renewable energy can be another story. Solar and wind power is cheap and clean and plentiful.

But only when the sun is shining or the wind is blowing.

So inconsistency is the big worry. That, you know, it'll be a cloudy day, or it will be a still day, and all of a sudden your appliances won't work. And that's something that no one really wants."

<https://www.youtube.com/watch?v=8ge3ah1G8ok>

**Do Wind Farms and/or Solar Farms  
Fulfill ‘True Sustainability and True Environmental Protection’ ?  
The “City-Sized Battery” Proposal**



**Pictured above is the environmental/poisonous disaster facing Puerto Rico after the winds from Hurricane Maria in 2017 spent less than 30 minutes merely in the vicinity of the Humacao solar farm.**

**Do Wind Farms and/or Solar Farms  
Fulfill ‘True Sustainability and True Environmental Protection’ ?  
The “City-Sized Battery” Proposal**



Reacting to this obvious fate of solar farms in ‘severe weather zones,’ Michael Shellenberger, a former advocate of ‘sustainable energy,’ asks:  
**“If Solar Panels are so clean why do they produce so much toxic waste?”**

<https://www.forbes.com/sites/michaelshellenberger/2018/05/23/if-solar-panels-are-so-clean-why-do-they-produce-so-much-toxic-waste/#66c7816c121c>

<https://www.nationalreview.com/2017/06/solar-panel-waste-environmental-threat-clean-energy/>

# Do Wind Farms and/or Solar Farms Fulfill 'True Sustainability and True Environmental Protection'

Versus Hurricanes and versus the [Nuclear Option](#) ?

September 1, 2017 Forbes Magazine headline reads:

## Hurricane Harvey Makes the Case for Nuclear Power

Hurricane Harvey made land fall in Texas this week and the flooding was historic. What is shaping up to be the most costly natural disaster in American history, the storm has left refineries shut down, interrupted wind and solar generation, caused a constant worry about gas explosions, and caused a chain of events that led to explosions and fires at the Arkema chemical plant that is only the beginning. Over a fifth of the country's oil production has been shuttered. Natural gas futures hit a 2-year high as did gasoline prices at the pump.

**But the Texas nuclear power plants have been running smoothly.** (bolding added)

The two nuclear reactors at the South Texas Project plant near Houston were operating at full capacity despite wind gusts that peaked at 130 mph as the Hurricane made landfall. The plant implemented its severe weather protocols as planned and completed hurricane preparations ahead of Category 4 Hurricane Harvey striking the Texas Gulf Coast on August 25th. Anyone who knows anything about nuclear was not surprised. Nuclear is the only energy source immune to all extreme weather events – by design.

This nuclear plant has steel-reinforced concrete containment with 4-foot (1.2 meter) thick walls. The buildings housing the two reactors, vital equipment and used fuel have steel-reinforced concrete walls up to 7 feet (2.1 meters) thick, which are built to withstand any category hurricane or tornado. It can even withstand a plane flying directly into it.



**Do Wind Farms and/or Solar Farms  
Fulfill 'True Sustainability and True Environmental Protection' ?  
The V2X "solution"**



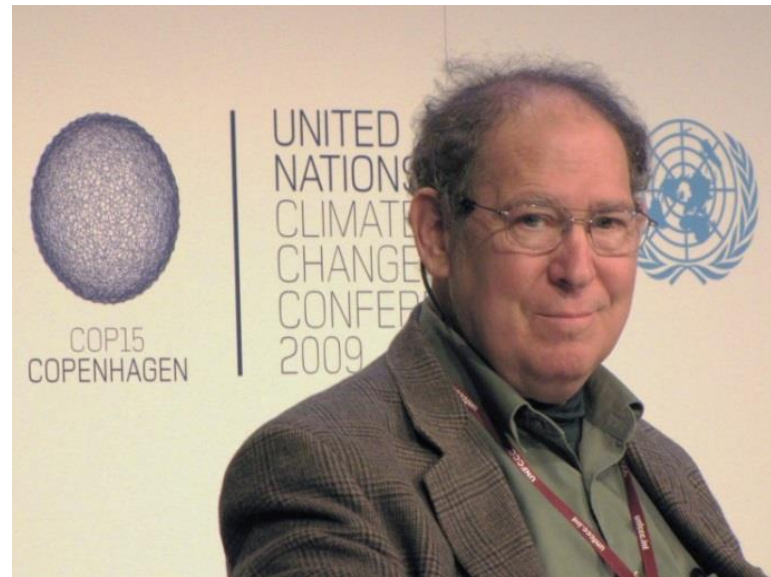
# The Electric Vehicle Paradigm: EVs as a Driver of Grid Modernization and Sustainable Nuclear Power

**Earlier Energy Studies Failed  
Because These Were Untimely; Characterized by and  
Contextualized by the “Climate Crisis”**

**“ On the one hand, as scientists we are ethically bound to the scientific method. On the other hand, we are not just scientists but human beings as well.**

**To do that we need to get some broad based support, to capture the public’s imagination. That, of course, means getting loads of media coverage. So we have to offer up scary scenarios, make simplified, dramatic statements, and make little mention of any doubts we might have.**

**Each of us has to decide what the right balance is between being effective and being honest.”**



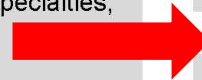
**“Father of Anthropogenic Global Warming” (AGW),  
Stanford University Professor Stephen Schneider**

# Very Brief Review of World Leader in Electric Mobility : China

## China Is Leading EV Development in the World

### Huge total market with a large variety of segments

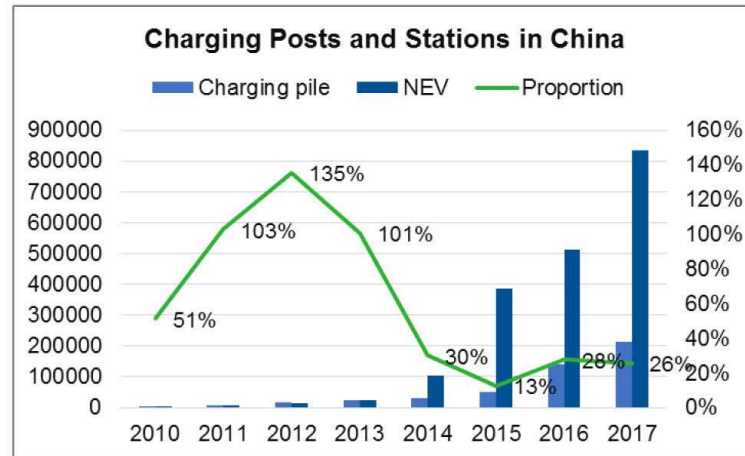
- Car-sharing in large cities vs. personal cars in the countryside;
- Light duty commercial vehicles with various specialties;
- Heavy duty E-trucks; etc.



### Worldwide NEV Sales in 2017

Ranking	Country	Total sales	Proportion
1	China	463369	53.70%
2	Japan	107740	12.49%
3	USA	104487	12.11%
4	Norway	33439	3.88%
5	France	32305	3.74%
6	Germany	27583	3.20%
7	England	22141	2.57%
8	Korea	13541	1.57%
9	Holland	8771	1.02%
10	Canada	8057	0.93%

Source: Marklines



Source: Perspective research institute

*“ Electrification is a done deal as several countries have announced a deadline for the sale of internal combustion engine cars to end. Electric vehicles are on the cusp of another boom.”* BYD Chairman Wang Chuanfu

## Very Brief Review of World Leader in Electric Mobility : China

AUTOS

BUSINESS

### China is banning traditional auto engines. Its aim: electric car domination



By RUSS MITCHELL AND JESSICA MEYERS | SEP 12, 2017 | 10:00 AM | BEIJING

**Does China intend to charge the batteries of the EV fleet by use of wind farms and/or solar farms ?**

**If China does ban the internal combustion engine (ICE) by 2030, what is the long-term solution to the enormous incremental electrical energy required to accommodate their new fleet of electric vehicles ?**

**Would it not be prudent to study the China approach, wherein capital that was previously squandered in “carbon sequestration” retrofits of coal-fired plants, is now deployed to the construction of modern highly reliable and truly sustainable nuclear power ?**

# Very Brief Review of World Leader in Electric Mobility : China

## Nuclear Power in China

(Updated August 2018)

- Mainland China has over 40 nuclear power reactors in operation, about 20 under construction, and more about to start construction.
- The government's long-term target, as outlined in its *Energy Development Strategy Action Plan 2014-2020*, is for 58 GWe capacity by 2020, with 30 GWe more under construction.
- The impetus for nuclear power in China is increasingly due to air pollution from coal-fired plants.
- China's policy is to have a closed nuclear fuel cycle.
- China has become largely self-sufficient in reactor design and construction, as well as other aspects of the fuel cycle, but is making full use of western technology while adapting and improving it.
- Relative to the rest of the world, a major strength is the nuclear supply chain.
- China's policy is to 'go global' with exporting nuclear technology including heavy components in the supply chain.

Most of mainland China's electricity is produced from fossil fuels, predominantly from coal – 73% in 2015. Two large hydro projects are recent additions: Three Gorges of 18.2 GWe and Yellow River of 15.8 GWe. Wind capacity in 2016 was 9.1% of the total installed generating capacity, but delivering only 4% of the electricity.

China's commitment to modern sustainable nuclear power, and its commitment to EVs are inextricably connected.

The former allows the latter to be not merely feasible, but robust: **These connected commitments resolve the pollution issues at both ends of the “well-to-wheel” life cycle.**

# Very Brief Review of World Leader in Electric Mobility : China



## Embarking upon Generation III plants

In September 2004, the State Council approved plans for two units at Sanmen, followed by six units at Yangjiang (two to start with), these to be 1000 or 1500 MWe reactors pioneering Generation III nuclear technology from overseas. The Sanmen (in Zhejiang province) and Yangjiang (in Guangdong province) reactors were subject to an open bidding process for third-generation designs, with contracts to be awarded in mid-2006 – in the event, mid-2007 – putting them clearly into the 11th Five Year Plan.



Unit 1 of the Haiyang plant (Image: Westinghouse)

## Advanced Nuclear Energy Concepts and the Nuclear Waste Issue: TerraPower and the Traveling Wave Reactor (TWR)



Global depleted uranium (“waste”) is a feedstock for the TerraPower TWR. The USA alone has stored (under EO-12192) over 772,000 tons.

TerraPower estimates that the Paducah stockpile alone represents an energy resource equivalent to \$100 trillion worth of electricity.

TerraPower estimates that TWR would enable stockpiles of nuclear “waste” to sustain over 80% of the global population at US levels of per capita energy usage . . . for a thousand years . . . **without emitting any airborne pollutants.**

<http://pvsheridan.com/Sheridan2TCAT-1.pdf> (Please see Attachment 9)

# Advanced Nuclear Energy Concepts and the Nuclear Waste Issue: TerraPower and the Traveling Wave Reactor (TWR)

## Taking the Next Steps for TWR Prototype Development

September 23, 2015

By: *Lee McIntire - Chief Executive Officer*



Yesterday in Seattle, we were honored to have an impressive crowd gathered at the Grand Hyatt Hotel to witness the signing of a memorandum of understanding (MOU) between TerraPower and China National Nuclear Corporation (CNNC). The audience brought together clean energy leaders such as China's Ministry of Commerce Vice Minister Zhang Xiangchen, as well as Washington's Lieutenant Governor Brad Owen, CNNC's President Qian Zhimin and Bill Gates. Their presence was a recognition of the incredible support and encouragement for TerraPower's efforts to innovate.



## Advanced Nuclear Energy Concepts and the Nuclear Waste Issue: TerraPower and the Traveling Wave Reactor (TWR)

ENVIRONMENT

SEPTEMBER 26, 2017 / 11:35 PM / A YEAR AGO

### China National Nuclear, Shenhua team up to develop gen-4 reactor

Reuters Staff

3 MIN READ

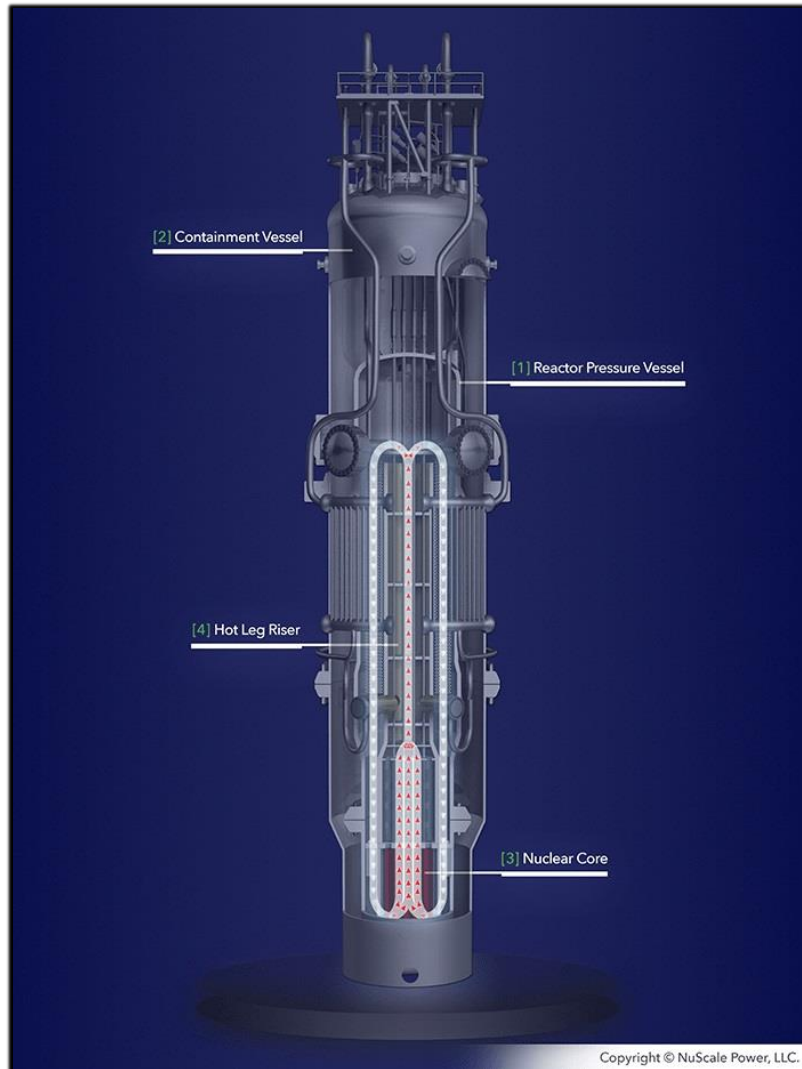


SHANGHAI (Reuters) - The China National Nuclear Corp (CNNC) has signed an agreement with the Shenhua Group, China's biggest coal producer, to promote the development of advanced "traveling wave" reactor technology, the state nuclear giant said.

*"China by a very large margin is the largest market in the world for new power plants of any type. If we do not get our act together, the low-carbon energy business will be owned by the Chinese."*

Professor Charles Forsberg at the Massachusetts Institute of Technology (MIT)

## Small Modular Reactor (SMR) : The Right Time & Place in Energy History



**The convergence** of modern nuclear plant designs with the EV paradigm has greatly favored policy makers in China; they are poised at the right *'time & place'* in history.

But an emerging technology is equally poised, and represents another stunning example of American intellectual property : Small Modular Reactor (SMR).

## Small Modular Reactor (SMR) : The Right Time & Place in Energy History

### NuScale Power's SMR is First-Ever to Complete Nuclear Regulatory Commission (NRC) Phase 1 Review

"As opposed to an \$8 billion unit for a gigawatt or larger before financing, you're looking at a unit that may cost \$1 billion to \$1.5 billion to put that base plant in, with \$350 million to \$450 million per unit to add to it, allowing a utility to take bites at a time. That could break down significant barriers to nuclear generation at smaller utilities, and in countries with limited finances or smaller grids that do not need large-scale reactors. I think the implication is potentially dramatically opening up a market, a market that would never have materialized with large reactors. As valuable as large reactors still are, we simply have utilities that don't have the financial wherewithal and also are very excited about the design attributes."



Assistant Secretary for the US Department of Energy (DOE), Office of Nuclear Energy

<http://pvsheridan.com/Sheridan2TCAT-1.pdf> (Please see Attachment 8)

# Low-Hanging Fruit



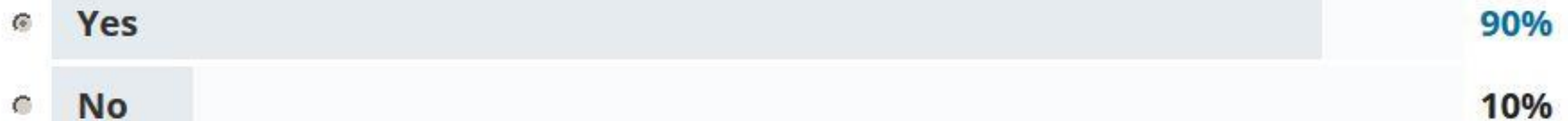
## Poll Question

[Bookmark this page](#)

### POLL QUESTION 1

Do you think all major cities across the world should have zero emission electric city buses by 2030?

### RESULTS



Submit

Results gathered from 676 respondents.

<https://www.edx.org/professional-certificate/delftx-electric-cars>

# **The Electric Vehicle Paradigm: EVs as a Driver of Grid Modernization and Sustainable Nuclear Power**

## **CONCLUSIONS – PART ONE**

In the context of the rapidly emerging EV paradigm and its wonderful vehicle products, and the rapid ongoing advances in nuclear power:

Conclusions regarding energy generation contextualized by the so-called “climate crisis” must be reviewed, recalculated, and many discarded.

Earlier energy studies failed because these were untimely; most never even considered the incremental energy required by the EV paradigm.

The ‘Low Hanging Fruit’ in terms of comprehensive benefits, and in terms of EVs as a ‘Driver of Grid Modernization and Sustainable Nuclear Power’ are the three main bus fleets:

**Low-Hanging Fruit**



**Municipalities**

**Grade Schools**

**Universities**

**The Electric Vehicle Paradigm:  
EVs as a Driver of Grid Modernization and Sustainable Nuclear Power**

**CONCLUSIONS – PART TWO**



<https://www.youtube.com/watch?v=tP06nZHS7KM>

<https://www.youtube.com/watch?v=MV43yUWI4yM>

*First and Foremost, Safety is a Management Issue*

Paul V. Sheridan - DDM Consulting

**The Electric Vehicle Paradigm:  
EVs as a Driver of Grid Modernization and Sustainable Nuclear Power**

**Keynote Address – 11 September 2018**



DDM CONSULTING  
The Safety and Efficiency of the Transportation Fleet

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