

Portfolio

MATTHEW I. SLAVIN, PH.D.

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- White Papers, Case Studies, Newsletters & Marketing Communications
- Proposals, Technical Studies & Regulatory Filings
- Matthew Slavin, Sole or Principal Author
- Cleantech Energy, Utilities & Resilience
- No and Low Carbon Transportation Technologies
- Housing, Sustainability & Built Environment



matt@mislavin.com

www.mislavin.com

Application for Federal Assistance SF-424

* 1. Type of Submission:

- ☐ Preapplication
☐ Application
☐ Changed/Corrected Application

* 2. Type of Application:

- ☐ New
☐ Continuation
☐ Revision

* If Revision, select appropriate letter(s):

* Other (Specify):

* 3. Date Received:

4. Applicant Identifier:

5a. Federal Entity Identifier:

5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:

8. APPLICANT INFORMATION:

* a. Legal Name:

* b. Employer/Taxpayer Identification Number (EIN/TIN)

d. Address:

* Street1:

Street2:

* City:

County/Parish:

* State:

Province:

* Country:

USA: UNITED STATES

* Zip / Postal Code:

e. Organizational Unit:

Department Name:

f. Name and contact information of person to be contacted

Prefix:

Middle Name:

* Last Name:

Suffix:

Title:

Organizational Affiliation:

I've secured \$100 million plus in winning federal grant funding, demonstrating both my technical expertise and grant writing prowess.

Grant applications I've recently written include • USDOE GRIP grants for modernizing utility transmission grids • USDOT SMART grant applications to install leading-edge AI-video intelligent transportation technology (ITS) • Bureau of Reclamation WaterSMART drought resilience grants in Arizona and Utah • Highly competitive SBIR technology innovation and commercialization grants for Cleantech entrepreneurs • U.S. FAA FAST grant to build an advanced technology low carbon intensity (CI) sustainable aviation fuel (SAF) refinery • DOE grant to build plant for manufacturing isotopes for utility scale Vanadium Reflux long term storage batteries • USDA REAP grants for commercial rooftop solar and storage • EPA Clean School Bus Grants • HUD CDBG and GRRP

Largest winning grant is \$40 million for utility transmission grid modernization

Journalism, Blogs & Newsletters

DJC Oregon

Oregon's Building Connections

\$2 | VOL. 256, NO. 234

Machine-assisted consensus building in the age of AI

The challenges of making decisions in the face of globalization, Big Data, growing stakeholder diversity, and blurred boundaries created by multiple goal complexity are compelling forward-looking organizations to emphasize consensus when making important decisions.

John Keith, co-founder of Portland-based Lucid, which offers consulting and technical services to help organizations optimize meeting effectiveness, contrasts consensus to two other major types of decision making models. One is command and control, intuitive to most people as a decision-making where leaders make top-down decisions without consulting their teams. The other is collaborative decision making, where designated leaders still make the important calls, albeit based upon interlocution with others team members possessing relevant information.

Consensus is a more democratic and dynamic form of decision making. It aims not simply to foster trade-offs and compromise within a group but upon making important decisions within a structure that a whole team can buy into and take ownership of and, optimally, be accountable for throughout implementation.

There's no shortage of decision support software on the market with features useful to facilitate command and control and collaborative management, including applications that help integrate Big Data and produce predictive analytics, business intelligence and competitive intelligence, mapping, and visualization. But according to research and advisory firm Gartner, software platforms incorporating algorithms dedicated to generating consensus are still in their infancy.

Ideally, an application dedicated to support consensus would integrate the following functions:

Labelling and visualization for easy under-



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Algorithms to establish areas of stakeholder agreement and disagreement;

Predictive modeling of competing and complementary scenarios;

Iterative voting, weighing and ranking of proposals among stakeholders;

Near consensus alternatives when full consensus is not possible;

Clear and concise reports mapping out decisions, the grounds upon which they are based, and the steps needed to move forward; and

Capability for stakeholders to revisit and revise their agreements as necessary during implementation.

This looks like a big ask, but in the age of artificial intelligence, maybe not so much. AI is likely to continue its inexorable march toward replicating the cognitive performance of people. As machines learn more about how humans think and express themselves, they will better be able to parse stakeholder ideas and perspectives and mold these into "shared thought" embodying common interests suited to consensus.

Under any circumstances, there will be limits upon what AI-driven consensus building apps can achieve. Most prominently, these applications will only be as reliable as the commitment of involved stakeholders. Optimization will thus depend upon stakeholders who bring the following attributes to the table:

An ability to embrace a common goal and commitment to collectively achieving a desirable outcome by recognizing that the overall success of the group is preponderant;

self-seeking manipulation.

Other factors are likely to pave a path forward for machine-assisted consensus. In addition to business, government — which often looks for consensus when making contentious decisions — looks like a prime market for adoption. For example, earlier this spring the Washington State Legislature let out a request for proposals for a contractor to facilitate consensus making among competing parties for development of recommendations for statewide regulation of car sharing services. Building consensus will be a tough row to hoe, as the stakeholders include Uber, known for vehemently resisting regulation. Maybe automation would help.

Another factor is increasing adoption of "we work" groups — loosely federated groups of people, pulled together in an ad hoc fashion as needed for specific endeavors — in place of static organizational team structures. This will attach increased importance to speed and nimbleness in interpreting and articulating the preferences and proclivities of shifting stakeholders as they populate the "we-work" ecosystem, an ideal role for machine learning.

Optimizing software apps for consensus leadership may require reassessment of organizational cultures. To many, the word consensus conjures a time-consuming recipe for "kicking the can down the road." But this should become less of a concern as automation again promises to speed up the consensus-making process.

In general, command and collaborative leadership is best suited for situations requiring reliability and certainty and where the variables are known, whereas consensus best suits scenarios defined by ill-defined problems with that require creativity and departure from norms. Consensus is unlikely to ever supplant more hierarchal approaches to decision making. But boosted by new apps and AI, it may see much

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Racing to catch up to autonomous vehicle technology

The Oregon Legislature has established a task force to make recommendations for regulating operations of autonomous vehicles (AVs) on state roadways. Composed of government, industry and consumer stakeholders, the task force is to report in September on policies and rules that can form the basis for enacting legislation during the 2019 session.

At least 47 states, including Oregon, have enacted or are considering laws, executive orders or other actions to regulate self-driving cars and trucks, according to the task force. It's a critical move. Public skepticism has been aroused by collisions involving AVs, but McKinsey & Co. analysts and other leading experts continue to see a growing market for AVs accompanied by auto electrification, connectivity and shared mobility as inevitable and disruptive.

There's a lot of ground for the task force to cover, and it's divided into committees. Here are some issues they'll deal with:

First, any laws need to make a distinction between vehicles categorized among three different levels of automation:

- Level 3 conditional automation: automated systems perform all of the aspects of driving, with the expectation that a human driver takes over if necessary

- Level 4 high automation: entirely automated driving within pre-programmed geographic



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tion might lull drivers to inattention with collisions resulting has led the industry to want to emphasize bringing Level 4 vehicles to market in the current cycle.

A high-profile issue that will need to be addressed pertains to following distances between trucks operating in a "platoon," which generally is defined as a group of motor vehicles traveling in a unified manner in the same lane utilizing vehicle-to-vehicle communications technology to coordinate movements.

Like cyclists in the Tour de France, a connected line of trucks faces less air resistance and can accelerate and brake together over closer truck lengths, producing fuel savings that grow as more trucks are platooned over longer distances. A platoon exemption is a priority for the logistics industry and has generally proved non-controversial elsewhere because of savings efficiencies and environmental benefits.

Another big issue is insurance. Exactly how AVs will alter insurance markets remains unclear,

that the safety premium generated by automated systems will reduce collisions, most of which are due to human errors, not technological ones. Currently, liability insurance rates are based upon drivers, but none of the occupants would be driving a vehicle operating completely driverless, which is the mode of operating insurers would assume to cover risk. So AVs create an imperative for insurance companies to shift liability risk from vehicle occupants to the vehicles themselves in some way.

Another consideration: states that enacted AV laws early generally freed or otherwise provided some legal protection to autonomous vehicle makers, because the AV technology was an after-market retrofit and because they wanted to get in the front seat of the AV revolution. Now, with GM and Ford and others having acquired their own automation technologies, state laws are being amended as necessary to address liability attributable to vehicle makers and the com-

step before truly driverless cars can hit the road. At this point, Oregon may not go as far as California did earlier this year when it announced elimination of the requirement for AVs to have a person in the driver's seat to take over in the event of an emergency. New California rules also require licensed companies to be able to operate any Level 5 vehicles remotely. Think a pilot remotely operating a drone aircraft, only terrestrially. These are issues that require a thorough thinking through.

The task force and the Legislature need to keep in mind that Congress has its own ideas about how AVs should be regulated. Vehicle makers, technologists and end users do not want to have to face a mishmash of state rules and regulations, which would trip up the market.

A bill passed by the House of Representatives would pre-empt state AV laws and regulations in favor of federal laws. The bill was on the fast track, but the desire of some very influential senators to better study the issues led the Senate to slow the bill's progress. Still, a pronounced federal role that likely involves some manner of pre-emption will be needed for AVs to take hold. So some or all of what Oregon comes up with may prove moot at some point.

To follow the task force's work, google "oregon autonomous vehicle task force."

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\$2 | VOL. 258, No. 37

Bioscience is moving the economic needle in Oregon

A new kid on the block is carving out space in the Oregon economy's pecking order. Bioscience is a diverse array of establishments spanning industry, education and health care entities. It can be sorted into agricultural feedstock and industrial bioscience, drugs and pharmaceuticals, medical devices and equipment, research, testing and medical labs, and bioscience-related distribution. The latter is categorized as delivery of pharmaceuticals, medical devices and agricultural bioscience products that often require specialized technologies including cold storage and regulated product monitoring, for example.

An economic impact report released earlier this year showed Oregon's 800-plus bioscience establishments to have contributed \$6.5 billion to the state's economy in 2017, with \$3.9 billion in exports. These establishments supported more than 47,000 jobs directly and indirectly. A 2018 report from the Biotechnology Innovation Organization, the national trade association, shows Oregon having particular specializations in agricultural and pharmaceutical products and research and testing.

Major league players are here, including Lilly, Genentech and Amgen. But about half of the state's establishments have four or fewer employees,



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become the Oregon Bioscience Association's (OBA) executive director.

Signs of confidence are readily found. One is \$363 million in basic bioscience research funding obtained by Oregon hospitals and universities.

Then there's two adjacent buildings to be built in Portland's Central Eastside Industrial District. Dubbed the NIR Center, for New Industrial Revolution, it will provide 347,000 gross square feet of space – including bio-safety level 2 wet lab space. Bozinovic says these are the first facilities designed specifically to cater to bioscience needs to be built in Oregon exclusively with private money.

"It will help remedy one of the biggest barriers to growth of Oregon's bioscience sector, which is the lack of lab space," she said.

Construction of the NIR Center will follow renovation of a three-story warehouse to create a fourth floor. That building, also in the Central Eastside Industrial District, is named the Eastside Innovation Hub. Summit Development Group is the developer of both projects. Of the Hub's 40,000 gross square feet, 18,000 will be oc-

a product of cell damage, and measuring them can indicate the presence of diseased cells.

The plan is for the NIR Center to house graduates of the Oregon Bioscience Incubator. Operated by the nonprofit Oregon Translational Research and Development Institute (OTRADI), the OTRADI incubator opened its doors in 2007 in the South Waterfront District.

Many key players wear multiple hats. Take immunotherapist Dr. Bernie Fox who, with his son Bernard Fox III, founded UbiVac. They are developing drugs to enable immune system cells to recognize and attack different types of cancers. Current drugs don't work in people whose immune systems do not recognize different types of cancers. Perfected, the market for these types of drugs is in the billions of dollars. As for other hats, the elder Fox holds an endowed chair in cancer research at Providence Cancer Center and also teaches at OHSU.

Many bioscience products are regulated by the FDA and other federal agencies while the patents' underlying innovations are often litigated in state and federal courts, making engagement with government a core priority for OBA.

"Regulations with the best of intentions can have unintended consequences that obstruct the innovation and production cycle," Bozinovic said, adding

and to incentivize outside investment in startups and early stage companies," said Nancy Lime, an OBA board member and senior vice president at device and diagnostics company Sedia Biosciences. This fall, OBA will hold its first Legislative Academy – a day and a half of briefings, forums and visits to company worksites to educate lawmakers on what it takes to continue to grow the state's biosciences sector.

One more thought: diseases that proliferate in warm climates will become much more widespread due to climate change. Those include malaria as well as dengue fever, Zika, chikungunya and West Nile virus – and North America won't be exempt. By the same measure, warmer weather will unleash diseases that destroy crops.

CDP, formerly the Carbon Disclosure Project, has reported that executives at big pharmaceutical companies expect huge demand for medicines to deal with the climate-induced proliferation of disease. Linking Oregon's reputation as a leader in the fight against climate change to its growth in bioscience could serve as another area where Oregon bioscience could produce both economic gains and better human health in a hotter future.

There's a lot happening with bioscience in Oregon. Let's keep moving the needle.

CNG Rising: What You Need to Know About the New Dominant Refuse Fleet Fuel

Refuse fleets are at the forefront in ushering in growing use of CNG as a transportation fuel. In doing so, they are reducing their operating costs, lowering emissions, improving efficiencies and bolstering their competitive position.

■ By Matthew Slavin and Matthew Tomich

Diesel's long dominant position as a refuse fleet fuel is being usurped by compressed natural gas (CNG), a lower cost and cleaner, quieter burning fuel. In 2003, fewer than 700 natural gas fueled refuse and recycling trucks were operated in the U.S. Play it forward and, today, the number has risen seven-fold or more, with between 5,000 and 7,000 in service (estimates vary by source). 6,000 to 7,000 new refuse trucks are shipped annually in the U.S., and more than 50 percent¹ that entered service in 2014 are powered by CNG, up from 44 percent in 2013².

Ten years ago, virtually all of the nation's CNG refuse trucks were based in Southern California. Today, CNG refuse trucks are operating in at least 20 states, according to the publication *NGV Today*. All indications suggest purchases of CNG refuse trucks will continue to climb, reaching 60 percent or more of collection trucks sales by 2016, maybe sooner. Here's what you need to know about the inroads being made by CNG as a fuel of choice for refuse and recycling fleets.

CNG truck fueled with renewable natural gas produced from bio-digested food waste in Sacramento, CA.
Photo courtesy of Atlas ReFuel and Clean World Partners.





Best-Value DBOM Contracting Optimizes CNG Infrastructure for Transit Fleets

There is no one size fits all for CNG infrastructure solutions, because different transit fleets face different needs, capabilities and constraints. But, transit agencies can capture significantly higher performance at lower costs and in less time by using best-value DBOM contracting when compared to using a traditional least-cost DBB model.

BY MATTHEW I. SLAVIN, Ph.D.

Transit agencies face complex decisions when converting their fleets to buses that run on compressed natural gas (CNG), a cleaner, lower cost fuel than diesel. Acquiring the bus rolling stock is central. But, equally important is the best approach to contracting for the infrastructure needed to fuel a CNG bus fleet.

Some transit agencies elect to have their CNG infrastructure delivered using the construction procurement practice known as Least Cost (or low cost) Design-Bid-Build contracting, or DBB. But use of Best Value Design, Build, Operate and Maintain procurement methods, known as DBOM, has grown rapidly. There is no one-size-fits-all for CNG infrastructure solutions, because different transit fleets

strains. Transit agencies can capture significantly higher performance at lower costs and in less time by using best-value DBOM contracting when compared to using a traditional least-cost DBB model.

BEST-VALUE VS. LEAST-COST

“Least-cost contracting can be very effective for purchasing routine services and materials. But a CNG station is a complex system that should be designed and operated as a whole in order to function correctly, reliably and successfully,” says **Jennifer De Tapia**, director of market development for **Trillium CNG**. Trillium has built more than 130 CNG stations over the past 20 years and manages CNG infrastructure for over 25 transit prop-

Calif.’s **San Diego Metropolitan Transit System** and the **Orange County Transportation Authority**, Va.’s **Greater Richmond Transit**, and Colo.’s **Roaring Fork Transit Authority**.

Under the traditional DBB model, a transit agency issues separate solicitations for design and construction of CNG infrastructure, including the all-important compressors and CNG storage vessels, gas dryers, controls and monitoring equipment and CNG dispensers (see diagram on pg. 32). And, the construction solicitation cannot start until the first solicitation and subsequent design is complete. The agency might also issue solicitations for a contractor to operate and maintain the infrastructure, or, alter-



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MARCH 04, 2015

LEADING NEWS

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LNG tax equalization bill approved by Senate Finance Committee

The U.S. Senate Finance Committee has approved [S 344](#), a measure designed to eliminate the federal excise tax penalty imposed on LNG when sold as a transportation fuel in the U.S. Sponsored by Sens. Michael Bennet (D-Colo.) and Richard Burr (R-N.C.), the measure is modeled on a companion bill introduced in the House of Representatives by Reps. Mac Thornberry (R-Texas) and Rep. John Larsen (D-Connecticut), HR 905, the *LNG Excise Tax Equalization Act of 2015*.

Federal Excise Tax on NatGas and Petroleum Fuels		
	Now	With Change
LNG/DGE	\$0.413	\$0.243
Diesel/Gal	\$0.243	\$0.243
CNG/GGE	\$0.183	\$0.183
Gasoline/Gal	\$0.183	\$0.183

Currently, the federal government taxes LNG based on the volume of fuel sold, measured in gallons. The federal excise tax on diesel is also assessed volumetrically. Both fuels are taxed by the federal government at a rate of 24.3 cents per gallon sold. But because LNG has lower energy content than diesel – It takes 1.7 gallons of LNG to produce the same amount of energy as a gallon of diesel fuel – current federal law results in a gallon of LNG being taxed at an effective rate 70 percent higher than that at which a gallon of diesel is taxed.

Enacted into law, S 344 and/or HR 2202 would revise the federal excise tax on LNG so that it is levied on the basis of LNG's energy content, at a rate of 24.3 cents per energy equivalent of a gallon of diesel, equalizing the excise tax on LNG with that of diesel. Federal law already taxes CNG on an energy content basis, at a rate of 18.3 cents per the energy equivalent of a gallon of gasoline. So the bills would also harmonize the way the federal government

Texas NGV incentives generate almost \$500 million in economic output, support 3,000 jobs by 2018

The growing number of NatGas fueling stations being built is allowing the industry to get a better hand on the economic impacts of deploying NGVs, developing NGV infrastructure, and the incentives that state governments offer to help underwrite NatGas fueling station development and fleet deployments of NGVs.

A case in point is a study recently completed by the Institute for Economic Development at the University of Texas at San Antonio (UTSA). The study examined the economic impact of fleet deployment and NatGas fueling station [incentives offered under three programs administered by the Texas Department of Environmental Quality \(TCEQ\)](#). The Institute concluded that \$52.9 million in grants awarded by the three TCEQ incentive programs generated \$79.1 million in gross state products and supported 927 full-time jobs in Texas in 2014. According to the analysis, the incentive programs are generating significantly rising economic and job impacts on a year-over-year basis (see table page 2).

The three TCEQ incentive programs are the Clean Transportation Triangle (CTT) Pro

I've published and edited newsletters, including for three years, this online industry leader

(continued on Page 2)

Home / [How to Install an EV Charger at Home](#)

March 14, 2023

How to Install an EV Charger at Home

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7 Min. Read

With the ever-increasing demand for electric vehicles (EVs), the importance of EV home charging has become even more significant. While public charging stations can often offer conveniently fast charges, charging an EV at home offers several advantages, including the convenience of an overnight charge, cost-effectiveness, and peace of mind that a charger will be available when you need it most.

In this article, we will discuss the benefits of home charging, the advantages of Level 2 chargers, whether you will need an electrician to install your charger, how long it takes to install one, how much it costs, and the incentives that are available for homeowners who choose to install EVSE in their homes.

Whether you will be operating your vehicle for work, a regular commute, or pleasure, the most convenient and affordable solution is to install an EV charger at home. With roughly 80% of EV charging happening at home, [installing a charger](#) just makes sense.

Here's what you need to know about charging at home.

The Advantages of Home Charging

Charging your EV at home offers convenience, allowing you to connect your vehicle to [electric vehicle supply equipment \(EVSE\)](#) directly at your residence. Your equipment may be mounted inside your garage, to a pedestal, on an exterior wall near your driveway, or in a carport, among other places.

If your EV happens to be part of a light fleet, your company may offer depot charging. Still, this method necessitates leaving the vehicle at the central facility and taking separate transportation to your home.

You might also wonder if public charging stations are suitable for your EV. The number of public EV charging stations is growing, but convenience can suffer if an unoccupied charger is unavailable upon your arrival. Publicly accessible Level 3 fast charging is helpful when a quick, urgent charge is needed; however, frequent fast charging will decrease your EV battery life.

Overall, the convenience and lower cost of charging at home are unmatched. [Recent survey data](#) indicates about 80% of EV owners charge their vehicles at home. Charging at home gives you peace of mind knowing that your charging station is available when you want it, regardless of when others want to charge. You will also spend less per kilowatt-hour than at public charging stations, where operators tend to charge various fees.

The Advantages of Level 2 Chargers

For a home installation, choosing a [Level 2 charger](#), which operates at 240V (as do certain common residential appliances, such as clothes dryers), is wise because it is a great option for overnight charging. With a maximum power rating of 19.2 kilowatts, a Level 2 unit can typically restore an empty battery in [4-10 hours](#). Level 2 chargers generally [cost between \\$500 and \\$2,000](#), not including installation costs, with the brand and power rating accounting for the difference. There are various models of [Level 2 chargers](#) on the market.

[Level 1](#) chargers, sometimes called "trickle chargers," operate more slowly, taking [40-50 hours](#) to charge an EV battery fully. Level 1 charging cords can conveniently be plugged into a standard 110V/120V outlet. While a convenient option for those who rarely drive, this level of charger may not be convenient for anyone with regular trips, travel, or daily errands.

Level 3 chargers (DC fast chargers, or DCFC) are found in public venues but are unsuitable for home charging due to costs and energy demand. They operate at particularly high power levels, which can significantly shorten the EV battery life of your electric vehicle. After 40 charging cycles using DCFC, the battery can degrade to [60% of its designed capacity](#). DCFC units are also [much more expensive](#) than Level 2 chargers.

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INSIGHT

[ISLAND COMMENTARY]

ENERGIZED!

Time-of-day pricing and solar panels are smart ideas under Hawaii's sun

BY MATTHEW I. SLAVIN

Recent passage by the U.S. House of Representatives of the Clean Energy and Security Act is a reminder of the threat posed to Hawaii by climate change: more frequent, stronger tropical storms threaten to erode beaches, submerge beachfront properties, and alter Hawaii's tourism and agricultural economies. Fortunately, Hawaii can do its share to combat global warming and in the process, help ameliorate its dependence upon imported oil for electricity generation.

Hawaii depends upon the burning of imported oil to generate over 80 percent of its electricity, far more than any other state. Tightening oil markets are raising household and business costs and in any event, oil supplies will be insufficient to satisfy global demand in 50 years time or less.

Fortunately, Hawaii is endowed with tremendous resources with which to successfully manage its energy future. The answer lies in increasing energy efficiency and tapping Hawaii's prodigious renewable energy resources.

On energy efficiency, a positive step being taken is time-of-day pricing (TOD), under consideration by the state public utilities commission. Under TOD, a higher electricity rate is charged during peak early-morning and mid-evening hours than during off-peak hours. This accords with the need for electric utilities to generate more expensive power during peak than off-peak periods.

TOD encourages households to shift appliance use for laundry, dishwashing and other chores to off-peak hours. This is a very effective method of reducing peak energy demand.

More progress arrives next year, when all newly constructed homes will need to have rooftop thermal solar panels installed. The water these heat reduces the need to burn oil to generate electricity. Taking this to the next level, existing homes could be required to install these panels when they are sold, since preexisting homes will continue to account for the overwhelming majority of the islands' building stock for many years to come.

Commercial office, hotel, retail and apartment buildings utilize one-third of electricity consumption in the U.S. and generate an equivalent amount of greenhouse gas emissions. Honolulu already requires new publicly owned buildings to be built to high performance LEED standards. LEED (Leadership in Energy and Environmental Design) can reduce buildings' energy consumption by up to 50 percent and greenhouse gas emissions by up to 70 percent.

LEED in private buildings could be encouraged by enacting a fee-bate system similar to that being considered in Portland, Ore., under which buildings that exceed certain LEED standards would receive a rebate on their building permit fees.

At the end of the day, however, Hawaii will still need to confront its dependence upon oil for electricity generation and here again,

progress is forthcoming. The Hawaii Clean Energy Initiative seeks to generate up to 70 percent of Hawaii's electricity from renewable wind, solar, marine and geothermal energy resources. Hawaii can attain this goal, but it will require investments to upgrade and expand electrical transmission systems, including waterborne transportation of electricity from islands where renewable energy potential is greatest to Honolulu, where most of the demand is.

Wind turbines are easily interspaced upon agriculture land, but large-scale solar farms require expansive footprints. Concerns about interrupting view corridors and NIMBY attitudes on islands that would export their renewable energy to Honolulu are problems. One solution lies in HECO's application to the Public Utilities Commission for permission to install up to 16 megawatts of photo-voltaic cells on the roofs of flat-topped warehouse buildings.

Hawaii is doing the right things. Continuing down this path can help ensure that as the tide of global warming washes ashore, Hawaii is positioned to have its boat lifted and become the most energy independent state in the nation.

Matt Slavin is a Portland, Ore., based sustainability and clean energy consultant. He recently visited Hawaii to research his book "The Triple Bottom Line: Sustainability Principles, Practice, and Perspective in America's Cities," to be published next year.

Solar panels atop the Keeaumoku Wal-Mart are shown by Sam's Club manager Keith Cronin, left, and SunEdison Hawaii President Mitchel Cohen. CRAIG T. KOJIMA, JANUARY 2008



THE LAST WORD

"I feel very lucky because there is certainly a lot of good female officers in the Army Reserve."

Brig. Gen. Michele Gillen Compton
About taking over the Army Reserve's 9th Mission Support Command at year's end



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CNG Rising: What You Need to Know About the New Dominant Refuse Fleet Fuel

Refuse fleets are at the forefront in ushering in growing use of CNG as a transportation fuel. In doing so, they are reducing their operating costs, lowering emissions, improving efficiencies and bolstering their competitive position.

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CNG truck fueled with renewable natural gas produced from bio-digested food waste in Sacramento, CA.
Photo courtesy of Atlas ReFuel and Clean World Partners.



CNG Refuse Truck Deployment: Simple Payback			
	Case 1	Case 2	Case 3
CNG Fleet Size	20	20	30
Fleet Owned Stations	0	1	1
CNG Price (\$/DGE)	\$2.22	\$1.78	\$1.78
Diesel Price (\$/Gal)	\$4.01	\$3.90	\$3.90
Tot. Vehicle Incr. Cost	\$760,000	\$760,000	\$1.1 mm
Fuel Station Cost	\$0	\$1.1 mm	\$1.1 mm
Total Capital Cost	\$760,000	\$1.86 mm	\$2.2 mm
Yearly Fuel Savings	\$251,000	\$296,000	\$444,000
Simple Payback (Yrs)*	3.0	6.2	5.0
* Incentives can further shorten payback period. Source: Office of Energy Efficiency and Renewable Energy, U.S. Dept. of Energy, Case Study: Compressed Natural Gas Refuse Fleets, February 2014. Assumes incremental cost of \$38,200 per CNG unit; 2.1 mpg fuel economy for CNG and diesel trucks; and trucks operating 14,500 miles annually. Case 1 assumes offsite fueling with third-party retailer; Cases 2 and 3 assume refuse fleet constructs own time-fill station at cost of \$1.1mm.			

Table 1

CNG Fueling Infrastructure

Most refuse fleets fuel their CNG trucks by building time-fill fueling systems. With time-fill, CNG is delivered directly from a compressor that pressurizes the gas into onboard fuel storage cylinders, with the vehicles being fueled over several hours overnight. In some cases, a fleet will decide to design, build, operate and maintain (DBOM) this infrastructure in-house. In other cases, the fleet may contract out all or some DBOM functions to a turnkey fueling infrastructure provider, a number of which are active in the market, including Trillium CNG, Clean Energy Fuels and TruStar Energy. The costs for building this fueling infrastructure will vary by the number of vehicles that need to be fueled—and the corresponding station size—but according to the previously cited Energy Department report, on average, the cost of building a time-fill CNG station to fuel a 30-truck refuse fleet averages about \$1.1 million. Some, mostly smaller, fleets decide to fuel their vehicles using infrastructure owned and operated by third-parties— independent fueling stations or stations owned by local government agencies; for example, where they may pay a higher retail fuel price than they would pay if they fueled at their own fleet-owned station.

Payback Period

The incremental costs of purchasing CNG vehicles and building fueling infrastructure are more than offset by lower fuel costs afforded by the price

diesel prices than those prevailing today, given recent declines in the cost of oil. Still, adjusting the calculations to reflect today’s average diesel price of \$3.60 per gallon generates a still appreciable payback period of six years for the same 30-truck fleet. Payback is accelerated if the vehicles are fueled at third-party owned stations, because the cost of fueling infrastructure is avoided (although the fleet will pay a higher retail price for purchasing fuel). Also—a critical consideration—CNG savings is generally a function of the amount of fuel consumed, called throughput. So the paybacks shown in Table 1 may be conservative, being significantly accelerated in practice as more CNG trucks are deployed and the vehicles drive more miles (Case 2 compared to Case 3 in Table 1).

Incentives Further Accelerate Payback

Incentives, in the form of tax credits, grants, rebates and voucher-based vehicle price buy-downs, can further accelerate payback period. California, Texas, Colorado, Florida, Indiana and Pennsylvania offer particularly robust incentive programs for purchasing vehicles that run on CNG. Florida offers rebates for up to \$25,000 per CNG truck purchased or leased. For example, while Texas offers grants that can offset up to 90 percent of the incremental cost of purchasing or leasing heavy-duty CNG trucks, other states offer incentives as well, and some states offer incentives for building CNG fueling infrastructure. The federal government has for several years

I played a Principal role in planning, developing and marketing these sustainable mixed-use properties

2.0 PROJECT VISION AND DEVELOPMENT PROGRAM

2.1 VISION

EcoVerde

“a form and flavor unlike that of other places”
– John Nolen, 1923

John Nolen offered this quote in 1923, upon setting out to develop “St. Petersburg Today, St. Petersburg Tomorrow”, the first general plan proposed for the rapidly growing City of St. Petersburg. One of the nation’s preeminent urban visionaries of the first decades of the 20th century, John Nolen’s prescience describes in full our redevelopment vision for Tropicana Field.

Our vision embraces the transformation of Tropicana Field into EcoVerde, a globally recognizable community knitted into the City’s fabric as a socially, economically and environmentally sustainable, mixed-use community of distinctive districts populated by retailers, restaurants, lodging and entertainment venues, commercial office uses, and unique multi-family residences. As a highly visible “gateway” location to St. Petersburg, EcoVerde reinforces the City’s goals for an exciting, cosmopolitan and sustainable, 24-hour Intown environment to complement Downtown’s remarkable waterfront, and materially connect to and strengthen the surrounding neighborhoods. EcoVerde is a place where people of all ages, incomes, and lifestyles will come together to live, work, shop, and play in a vibrant urban atmosphere.

At the heart of our proposal, we embrace environmental stewardship with an outstanding EcoWalk along the banks of Booker Creek, that both respects its historic value as a natural amenity and leverages this value into a dynamic destination for mixed-use activities in Intown St. Petersburg. This highly magnetic area of EcoVerde will become an inviting place for humans and wildlife to co-exist in a carefully designed eco-system. Setting off along the naturally restored habitat at the northern

end of the site, EcoWalk allows for observation of indigenous wildlife including the area’s whooping crane population. Here, residents and visitors will find the Crane Interpretative Pond, a naturally restored water habitat neighbored by an Ecosystem (e-co-zee-um), highlighting St. Petersburg as a Green City, with interactive educational exhibits and learning programs on the natural habitat of the St. Petersburg region and sustainable solutions for adapting the human and natural environments to emerging ecological challenges. Walking south along EcoWalk invites an enjoyable transition to an intimate urban texture of tree-shaded walkways lined with eclectic dining, small shops, pocket parks, and public art that animate the space, with residential flats stepped back above. Emerging to the south is The Landing, a floating stage in an amphitheatre setting that will provide a year-round venue for City residents and visitors to gather and enjoy outdoor music and theatrical performances and exhibitions by the City’s artistic community.

To expand and diversify choice and availability of shopping opportunities for residents and visitors, strengthen connectivity with the commercial corridors that lead to the City’s waterfront and extend revitalization throughout the greater Intown and Midtown neighborhoods, we propose a well-balanced Galleria Main Street district at the eastern portion of EcoVerde. As an exciting gateway centered upon Galleria Plaza, this district seamlessly blends a mix of ground floor large, medium and small format retail establishments including an urban grocer, diverse entertainment choices including a movie cinema and bowling alley, and fine and casual dining, with offices and residential flats above.

The architectural character of Main Street will be a diverse mix of modern eclectic styles reflective of St. Petersburg’s heritage through textured variety, materials, and striking signage, with canopies, arches and arcades to protect against the mid-day sun. Our architectural vision includes Leadership in Energy and Environmental Design

ECOVERDE

AN INTOWN NEIGHBORHOOD WHERE EVERY ASPECT OF LIFE OCCURS

RESPONSE TO TROPICANA FIELD RFP



ARCHSTONE MADISON

DEVELOPMENT CONCEPT

Potomac River Green is an innovative mixed-use real estate development concept for transforming the 25 acre site now occupied by the Potomac power station and an associated Pepco substation.⁴

It features extraordinary water front access and an economically sound mix of eco-smart residential, commercial and civic buildings capped by a landmark new Energy Center building that will house a museum and new business center. The development will conform to LEED-ND[®] standards, and in many areas, strive to exceed these requirements⁵ Individual buildings will reflect LEED[®] standards and the Energy Center will be designed to approach net zero for carbon emissions.

The land use plan for Potomac River Green is designed to mesh with and enhance the current street grid for Alexandria while providing a new focal point for the City's northern waterfront. The street plans and buildings also align with the topography, taking advantage of natural water flows for storm water treatment and energy production.

The architecture for Potomac River Green has been chosen to reflect its proximity with Old Town Alexandria. It draws on federal 18th and 19th century architectural design, but from south to north transitions to 21st century design concepts across the project's three neighborhoods. The buildings at the south vary from four to five stories and blend with the adjacent predominantly brick and stone buildings. Just one block to the north, the style and materials take on a more contemporary look that includes metal and glass as well as brick and stone.

The architectural focus of Potomac River Green is the Energy Center (Figure 19). This building is also the hub



for certain on-site utility services (electricity, waste water treatment) that branch out from the building to provide sustainable services to nearby neighborhoods. The Energy Center is three stories, but includes an atrium space for natural ventilation that rises to 60 feet. The core masonry wall of this building will be built from the old power plant's exterior brink and salvaged concrete. This building will also use recycled wood beams, solarium glass and stone. Many of these elements will come to the site prefabricated.

The northern neighborhood steps down to three story energy-efficient townhomes. The neighborhood will use clean geothermal and solar energy systems. It will be built from efficient pre-fabricated components (e.g., wood panels and siding, metal panels).

Figure 19

⁴ As discussed in Section V. below, the Pepco electrical substation, which is now co-located at the PRGS and which plays an essential role in the local transmission and distribution grid, will be integrated into the development plan contemplated for PRG.

⁵ Leadership in Energy & Environmental Design (LEED) is an internationally recognized green building certification system, providing third-party verification that a building or community was built using strategies intended to improve performance in metrics such as energy savings, water efficiency, CO2 emissions reduction, indoor environmental quality, and stewardship of resources. LEED was developed by the U.S. Green Building Council (USGBC). LEED for Neighborhood Development (LEED-ND) provides a rating system for neighborhood planning and development based on the principles of smart growth, New Urbanism, and green infrastructure and building. LEED-ND places emphasis on the site selection, design, and construction elements that bring buildings and communities together into a neighborhood and relate the neighborhood to its landscape as well as its local and regional context.

SECTION II. DEVELOPMENT CONCEPT



Figure 11.
Overview Map

- ① Energy Center Building
- ② Office Plaza
- ③ Hotel + Waterfront Plaza
- ④ Mixed Use Residential
- ⑤ Quiet Residential
- ⑥ Park Space

I led the planning team on this project.

About

Dr. Matthew Slavin is an accomplished consultant, writer, and researcher specializing in high-value federal grants and proposals. The founder of Net Zero Grant Writing, Matt has secured over \$100 million in funding for projects spanning energy, climate resilience, transportation, sustainable infrastructure, AI integration, and disaster recovery. Matt's expertise in navigating complex market, technology, and policy landscapes enables him to develop winning proposals that position clients at the forefront of next-generation advancements.

With a Ph.D.-level technical background and exceptional writing skills, Matt brings three decades of experience in high-profile roles across consulting, industry, and government. His success is rooted in a deep understanding of the strategic alignment between grant donor priorities and clients' needs, allowing him to unlock significant financial resources and drive transformative impacts. His 20 years of experience in Washington, D.C. furthered his ability to write winning grant applications and proposals for a wide range of clients, from Fortune 500 companies to start-ups and federal, state, and local government.

An active thought leader, Matt's insights have been featured in academic and business journals, news media, and university textbooks, in addition to a robust portfolio of client studies, reports, and marketing campaigns.

Dr. Matthew Slavin
Founder and CEO
Net Zero Grant Writing
503-619-5601
matt@netzero4grants.com



Business & Technical Writing & White Papers

Published in Renewable
Energy World based on a
study I completed

Where the Wind Blows and Sun Shines:

A Comparative Analysis
of State Renewable Energy
Standards

By Matthew Slavin, Ph.D.

America's state governments are at the forefront of efforts to expand the nation's supply of renewable energy. Renewable energy standards (RES) comprise the cornerstone of these initiatives. RES is by far the most widely used mechanism by states to expand renewable energy production and consumption. Fully 29 states have adopted some form of a mandatory RES. RES is also in place in the District of Columbia. And Vermont has a goal that so far has been voluntary, but which may become mandatory by 2013.

What follows is an assessment of how different states have structured

on five selected examples of state RES initiatives to highlight key features upon which these programs are founded. States use a number of different names for their RES programs including renewable energy portfolios. For simplicity, all will be referred to as renewable energy standards. A primer on how RES is supposed to work offers a useful point of departure.

How Renewable Energy Standards Work

State RES programs share a basic common thread. They place a mandatory obligation on electric utilities to generate a specified percentage of the electricity

generation and drives economies of scale that lower the cost of renewable production such that it is competitive with conventional fossil fuel generation.

RES mandates vary from state to state. Each state has designed its RES to account for a range of state-specific conditions and policy priorities. These include available wind, solar and other renewable energy potential in a state; reducing greenhouse gas emissions and mitigating other environmental externalities associated with fossil fuels; and lowering electricity costs to consumers. Other goals include diversifying the energy mix to protect against potential fuel interruptions and

Mandatory Renewable Energy Standards, 2010

Table 1

State	Year*	Goal**	Compliance
Arizona	2006	15% by 2025; distributed 30% of annual requirement	IOUs, co-ops
California	2002	20% by 2010; 33% by 2020	IOUs; munis must self-implement
Colorado	2004	IOUs 30% by 2020; 10% by 2020 for munis/co-ops	IOUs; munis/co-ops w/40k customers
Connecticut	1998	27% by 2020; technology minimums	IOUs, munis
Delaware	2005	20% by 2020	IOUs, munis, co-ops
D.C.	2005	20% by 2020	PEPCO, only serving utility
Hawaii	2001	40% by 2020; up from 205 in 2004	IOUs (Hawaiian Electric)
Illinois	2007	25% by 2025; 75% of requirement from wind	4 IOUs w/+100k customers and CES
Iowa	1983	105 MW	IOUs
Kansas	2009	20% by 2020	IOUs, some co-ops
Maine	1999	40% by 2017; 10% for new resources	All competitive electricity providers
Maryland	2004	20% by 2022; tiered, tier 1 most, tier 2 hydro	IOUs, munis, co-ops
Massachusetts	1997	15 % by 2020, additional 1% per year afterward	IOUs
Michigan	2008	10% by 2015 + for Detroit Edison and Consumers Energy	IOUs, munis, co-ops
Minnesota	2007	30% by 2020 for Xcel; 25% by 2025 for others	IOUs, munis, power districts, co-ops
Missouri	2008	15% by 2021	IOUs
Montana	2005	15% by 2015	IOUs only, others to show good faith
Nevada	1997	25% by 2015; 5-6% of requirement from solar	IOUs
New Hampshire	2007	23.8% by 2025	IOUs, co-ops
New Jersey	1999	22.5% by 2021 includes 5.3 GW solar requirement	IOUs
New Mexico	2007	IOUs 20% by 2020; Co-ops 10% by 2020	IOUs, Co-ops
New York	2004	30% by 2015	IOUs; LIPO and NYPA cooperating
North Carolina	2007	IOUs 12.5% by 2021; 10% by 2018 for munis/co-ops	IOUs, munis, co-ops
Ohio	2009	25% by 2025, includes clean coal and advanced nuclear	IOUs
Oregon	2007	Large utilities 25%, small utilities 5-10% by 2025	IOUs, munis, public districts, co-ops
Pennsylvania	2004	By Tier, 8-10%, includes waste coal and coal gas	IOUs
Rhode Island	2004	16% by 2020	IOU (Narragansett Electric)
Texas	2005	5,880 MW by 2015; 10,000 MW by 2025	IOUs
Vermont***	2005	20% by 2017	All retail utilities
Washington	2006	15% by 2020	IOUs, munis, districts, co-ops 25k cust.
Wisconsin	1999	10% by 2015, varies by utility	IOUs, munis, co-ops

*Year signifies when RES first enacted. This may differ from the year RES went into effect.

**Goal is final year target based upon latest revisions to state RES. Many states include requirement for wholesale suppliers in addition to distribution utilities.

*** Vermont's SPEED program is voluntary. If the Public Service Commission determines in 2012 that utilities are lagging, the requirement becomes mandatory in January 2013

Smart Grid Report

June 2019



I was contracted to research and write this 90-page regulatory filing, inventorying, and benchmarking 60 PGE programs, offerings, technologies and incentives, working with 25 professionals at PGE including the executive committee

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No Grid, No Gain:

Untangling the Transmission Tie-up

By Matthew I. Slavin, Sustainingrüp, and Jason J. Zeller,
California Public Utilities Commission

Great strides have been made in enacting state renewable energy standards (RES) in the United States, which significantly affect the urgency of developing new renewable energy facilities. Also called Renewable Portfolio Standards and Alternative Energy Portfolio Standards, over 30 states have adopted RES mandates. These initiatives are paving a path toward a more economically and environmentally sustainable and secure energy future for America.

Success to date notwithstanding, one primary hurdle facing renewable developers stems from limitations to the existing transmission grid. Simply put, efforts to integrate renewable generation into the U.S. energy mix have frequently been stymied by the lack of available transmission facilities. For example, the Midwest has been colloquially called the “Saudi Arabia

would allow wind generated electrons to be transmitted to major urban markets such as Chicago, St. Louis and Kansas City.

Nevada has the highest solar energy potential in the nation. The U.S. Department of Energy calculates that 100 square miles of Nevada land could supply all U.S. electricity needs with current commercial efficiency rates. However as Nevada Economic Development Commission Executive Director Mike Skaggs has noted, development of Nevada’s ample solar energy resource is hindered by the fact that a “significant portion of the area feasible for renewable energy generation is not currently connected to adequate transmission technology.” Nevada’s transmission challenges are not atypical.

How bad is the transmission tie up? A white paper jointly issued by the



The Turning Point:

Need to Know Handbook for Procuring, Fueling and Maintaining Compressed Natural Gas Bus Fleets

Academic

Sustainability in America's Cities



Creating the Green Metropolis

Edited by
MATTHEW I. SLAVIN

URBAN PLANNING | DESIGN

Sustainability in America's Cities highlights how the nation's cities are solving conflicts between urban development and the environment, and reducing the impacts of climate change. It presents empirically based, multidisciplinary case studies of sustainability policy, planning, and practice from a geographically diverse group of cities.

Advance Praise for *Sustainability in America's Cities*

"This book is amazingly rich in its content and breadth—from wind energy production in Honolulu to urban forest restoration and greening food supplies in New York City. It does as much to back the theory of sustainable urbanism with hard numbers and convincing case commentary as any work to date. It also packs a powerful political message—green buildings, green transport, and green energy can translate into green jobs. It's a must-read for anyone who cares about charting a sustainable urban future."

—ROBERT CERVERO, Professor of City and Regional Planning and Director of the Institute of Urban and Regional Development, University of California, Berkeley

"Across America, cities are driving the innovative solutions we need to deliver the environmental, social and economic benefits of sustainability. Through a careful examination of some of the successes and failures of our urban initiatives, *Sustainability in America's Cities* provides timely lessons for those interested in making our buildings, cities, and planet more livable."

—RICK FEDRIZZI, President, CEO and Founding Chair, US Green Building Council

"Cities' practices can be identified, but without some assessment of how well these practices work in different settings, prescriptions seem premature at best. . . . this book jumps into the void, providing detailed information heretofore not readily available."

—From the foreword by KENT E. PORTNEY, Professor of Political Science, Tufts University

MATTHEW SLAVIN is founder and Principal of Sustaingrüp. His publications on energy, climate change, and sustainability have been featured in leading professional journals and metropolitan newspapers.



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