Bridging the U.S. Environmental Technology Gaps to Market

The Need to Seize the Economic Opportunity of Our Era

Matt Myers
EarthxCapital

Taite McDonald
Holland & Knight
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- **Corinne Allen**
  Advanced Research Projects Administration - Energy
- **Chris Angelo**
  New Energy Risk
- **Chanette Armstrong**
  Advanced Research Projects Administration - Energy
- **Tom Ashley**
  Greenlots
- **Steven Berkenfeld**
  Barclays Capital
- **Cassie Bowe**
  Energy Impact Partners
- **Jason Cahill**
  Carbon Ventures
- **Reid Capalino**
  Aligned Climate Capital
- **Sara Chamberlain**
  Energy Foundry
- **Gary Davison**
  RedWave Energy, Inc.
- **Stephan DeLuca**
  Energy Materials Corporation
- **Geoff Eisenberg**
  Ecosystem Integrity Fund
- **Stephan Feihauer**
  Macquarie Capital
- **Marcos Gonzales Harsha**
  U.S. Department of Energy
- **Jeremy Harrell**
  ClearPath
- **Simon Irish**
  Terrestrial Energy
- **Scott Jacobs**
  Generate Capital
- **Jed Johnson**
  Crow Holdings Capital
- **Steven Kantowitz**
  Warburg Pincus
- **Leila Madrone**
  Sunfolding
- **Brian Mayers**
  Breakthrough Energy Ventures
- **Eric McCarthy**
  Proterra Inc.
- **Taite McDonald**
  Holland & Knight
- **Matt Myers**
  EarthxCapital
- **Rick Needham**
  The Rise Fund
- **Kristina Nilsson**
  J.P. Morgan
- **Billy Parish**
  Mosaic
- **Puon Penn**
  Wells Fargo
- **Conner Prochaska**
  U.S. Department of Energy
- **Gia Schneider**
  Natel Energy
- **Doug Steward**
  Wattershed
- **Philipp Strartmann**
  Velocys
- **Kyle Wiley**
  U.S. Department of Energy
- **Johanna Wolfsen**
  PRIME Impact Fund
- **Ray Wood**
  Bank of America Merrill Lynch
- **Abe Yokell**
  Congruent Ventures
- **James Zahler**
  Advanced Research Projects Administration - Energy

EarthxCapital is an initiative of EarthX, an international environmental 501(c)3 non-profit dedicated to educating and inspiring people and organizations to take action towards a more sustainable future worldwide.
Introduction

EarthxCapital facilitated Chatham House Rule white boarding sessions in collaboration with the U.S. Department of Energy during EarthX's third annual eCapital Summit. Convening a select group of later-stage environmental technology CEOs and investors representing over $600 billion of investable capital, the goal of the white boarding sessions was to identify bipartisan and market friendly opportunities for the federal government to help catalyze private investment into later-stage environmental solutions.

The impetus behind the April 2019 white boarding sessions was the broad consensus that the federal government could and should do more to address commercialization and deployment stage funding challenges faced by U.S. born and bred environmental technologies, or continue to see critical IP and job creation resulting from industries of the future (IoTF) being acquired by other countries. Recent outcomes from the white boarding sessions, as of September 2019, include the following:

- **The Trump Administration has begun with the coordination of all current federal innovation spending and funding opportunities** to facilitate the efficient dissemination of such opportunities to domestic private capital and the U.S. innovation ecosystem.

- **EarthxCapital is forming a bipartisan task force** with the mission of identifying and advancing critical issues and actionable one year solutions designed to drive tangible changes catalyzing private investment into U.S. environmental technologies, such as the opportunities highlighted in this working paper.

The format of the eCapital white boarding sessions involved CEOs of later-stage environmental technology companies presenting commercialization and deployment challenges they are facing followed by open discussion and debate between session participants. **The eCapital white boarding sessions highlighted a combination of critical challenges industry is facing and potentially bipartisan, market friendly actions the federal government can take to help catalyze private investment into U.S. environmental technologies.** The information set forth below provides a synopsis of the white boarding sessions, as well as follow-on discussions with participants and other thought leaders.

Included are synopses of both the current critical obstacles to market faced by later-stage environmental technology companies and economically viable bipartisan policy opportunities that can facilitate trillions of dollars of private investment to ensure the U.S. remains the world leader in industries of the future (IoTF).
Critical Obstacles and Opportunities

The investments made by the U.S. Department of Energy into energy innovation and technology over the past 20 years, both within and outside of the 17 national labs, puts the U.S. at the forefront of an opportunity to be an unrivaled world leader in energy technology and energy dominance. A multitude of environmental reports has created a global call to action by a coalition of investors worth over $32 trillion, making the transition to new energy and infrastructure solutions one of the largest and most lucrative economic and innovation opportunities of this era. However, to maintain its leadership position and ownership of technology funded by U.S. taxpayers, it is critical for the U.S. Departments of Energy, Transportation, Defense, Interior, Treasury, Commerce and Agriculture to collaborate with the Executive Office of the President, Congress, and the private sector to develop constructs for bipartisan public-private initiatives that are cost-effective, efficient, and drive expanded economic opportunities for U.S. scientists and entrepreneurs in an expedited manner.

This expanded and expedited strategic collaboration must move forward imminently because what was once a free market has now been hijacked by global competitors aiming to own the next century’s economy. For example, historically it did not negatively impact the U.S. for technologies such as the hydraulic fracturing patents created by the U.S. Department of Energy in the 1970’s and the solar technology created by national labs in the 1950’s to sit on the “shelf” until the U.S. market was ready to adopt them. However, in an increasingly globalized world, patience is no longer an option due to technology espionage and government market creation by global competitors such as China and Saudi Arabia. The U.S. government and financial systems have not reacted swiftly enough to the emergence of new economic competitors. Accordingly, it is becoming increasingly evident that the energy technology of America’s future may only be available to us at the profit and mercy of our competitors, resulting in a permanent loss of GDP growth and high-paying jobs.
Critical Obstacles to Market & Deployment

Currently, the major U.S. banks, many of which were participants in the initial eCapital Summit white boarding sessions, have a goal to invest $600 billion globally. While this is admirable, $600 billion is far below where we need to be—especially considering current investors of “deployment capital,” which take on more risk than large financiers, turn down approximately 95% of deals per year. Accordingly, U.S. companies have no choice but to obtain foreign investment. More notably, many of the deals and transactions that do not proceed are strong transactions with one or two bankability obstacles, such as offtake contracts or testing needs. These are often the deals our global competitors invest in since they are willing to take on a greater amount of risk. **Time, energy, and resources need to be spent to make more technology investment-grade and that can be started today.**

During the eCapital Summit white boarding sessions participants identified a multitude of critical obstacles preventing the flow of capital necessary to bring more promising environmental technologies to market domestically, and ever more crucially to scaling the deployment of proven products and services. The following is a summary of the obstacles to market and deployment agreed upon by a majority of session participants.

**LACK OF DEMONSTRATION PROJECT FUNDING APPETITE**
There is a lack of appetite from the investor community to fund later-stage demonstration projects, leaving many cutting-edge technologies that have made it through initial Technology Readiness Level hurdles to rely upon foreign investors insisting upon majority ownership of the technology and intellectual property rights.

**LACK OF CREDIT ENHANCEMENT TOOLS**
Large projects advancing to the commercialization and deployment stages need credit enhancement for bankability, but such solutions do not exist in the U.S. market. Accordingly, there is a “dead zone” for final financing in the $100-$250MM+ range when there are no contracted revenue streams and other insurance products available. Contracted revenue streams are not available for the majority of such projects because of stringent testing requirements and little-to-no appetite for risk on behalf of private companies.

**FEDERAL AND STATE PROGRAMS TOO RISK AVERSE**
Federal and state-backed government financing programs are so de-risked that they compete with private sector capital and result in promising technologies becoming too expensive to take a risk on pursuing.

**INSUFFICIENT WORKING CAPITAL**
Funds for working capital costs, which are desperately needed, are not currently available through government programs.
LACK OF STRATEGIC GOVERNMENT OFFTAKE
Hesitation or unwillingness by federal agencies to act as a market adopter strands companies without an immediate offtaker in the private market; this is becoming more of an issue in the wake of Saudi Arabia’s announcement to build a $500BB city acting as a test bed for its technology acquisitions.

LIMITED COMMERCIALIZATION OF NATIONAL LAB TECHNOLOGIES
The U.S. national labs excel at early-stage research and development, but there is a lack of incentives to move such technologies out of the lab and towards demonstration and commercialization. The focus on early-stage research during the federal budgeting and appropriations process to further fund lab research often comes at the expense of federal support for commercialization.

POLICY UNCERTAINTY
Policy uncertainty at the federal and state levels leads companies to defer or cancel planned investments. The practice of allowing tax credits and other incentives to lapse before they are retroactively extended stalls momentum across a number of sectors, including new energy, energy storage, advanced vehicles and biofuels.

RISK AVERSION AMONG STATE REGULATORS
Risk aversion among state regulators inhibits the deployment of capital in a way that can be included in a rate base, inhibiting the willingness and ability of utilities to partner with early-stage companies except in select circumstances.

OUTDATED INFRASTRUCTURE
Outdated infrastructure leaves mature electrification solutions without the means to scale, limiting valuations and forcing companies to seek market expansion and resulting job creation elsewhere.

SKILLED WORKFORCE SHORTAGE
Skills gaps for high-paying jobs created by new energy and industries of the future (IoT) slowly provides a crucial competitive advantage for economic adversaries.

EXCESSIVE RED TAPE
Cumbersome red tape discourages high-quality applications to government funding opportunities as well as inhibits the geographic expansion of new technologies.
Bipartisan Policy Opportunities

There are a host of potential bipartisan policy solutions available which will neither limit economic opportunity today nor require over-reaching policies, such as the Green New Deal. Many of these solutions can be driven at the federal and state levels, or wholly within the private sector, without new policy authority from Congress; while others can be integrated into actionable bipartisan policies supporting industries of the future (IoTF). The white boarding sessions during EarthX’s 2019 eCapital Summit unveiled the following solutions which can be executed over the next year with further collaboration.

FEDERAL LEGISLATIVE AND REGULATORY SOLUTIONS

FEDERAL PROCUREMENT
The Department of Energy, along with other departments such as Defense and Transportation, can procure technology and/or power to enhance credit and drive bankability. Limits in doing such are encouraged, but smarter solutions should be evaluated and rolled out imminently to remain competitive globally.

CREDIT ENHANCEMENT INITIATIVE
Developing a credit enhancement initiative within the Department of Energy, through a hybrid public/private initiative, or via a fund can provide flexibility to address the critical market gaps that prohibit technologies from becoming bankable.

INCREASED AND ENHANCED DEMONSTRATION AND WORKING CAPITAL GRANTS
The U.S. Department of Energy’s Office of Energy Efficiency and Renewable Energy (EERE) historically provided larger grants to address working capital funding obstacles. The Advanced Research Projects Agency (ARPA-E) has the authority to provide funding for demonstration projects, not just for research and development. Furthermore, the Department of Energy’s Technology Commercialization Fund has the authority and budget to provide matching funds with private partners to foster the commercialization of promising technologies. Such authorities and budgetary capacity need to continue to be elevated and utilized more intelligently to address market obstacles.

PUBLIC-PRIVATE PARTNERSHIPS
The federal government provides market signals that can change the course of investment, and thus the future. It is imperative for government to convene leading stakeholders and large companies to agree upon actionable investment and technology adoption goals that will encourage companies to take on calculated risk and proceed with transactions in an expedited manner. For example, the federal government can convene financiers to agree upon $3 trillion in investment goals, rather than simply $600 billion, and request that leading investors work with the federal government to increase deal flow so that companies have choices beyond foreign investment.

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TECHNOLOGY TEST BEDS AT REGULATORY AGENCIES
Regulatory agencies, such as FERC, play an enormous role in erecting or eliminating barriers to commercialization as evident in proceedings for energy storage. Creating innovation offices within these agencies, and providing them with additional authorities, could provide regulated entities with the freedom they need to establish partnerships with pre-commercial companies.

EVALUATE AND MONITOR FOREIGN COMPETITION
In addition to the Saudi Arabia example set forth above, other such countries, such as Canada, are undertaking multi-billion dollar initiatives to address credit enhancement and test bed needs. It is critical to better understand and monitor policies and investment trends of other countries to ensure U.S. competitiveness and chart a bipartisan path forward for the United States.

BOOST NATIONAL LAB TECHNOLOGY COMMERCIALIZATION
In the past, national lab-developed technologies could sit on the shelf until there was a market for them. However, we now face competition from other countries that will purchase the intellectual property and proceed to create the market themselves. Incentives to push lab-developed technologies out of the door can ensure more U.S. taxpayer funded technologies remain in the U.S.

CUT EXCESSIVE RED TAPE
It is critical to identify, analyze and remove regulations and government processes inhibiting the funding and scaling of new energy and infrastructure technologies. Additionally, federal funding opportunities need to be simplified and amplified to encourage best-in-class entrepreneurs to apply.

TAX INCENTIVES TO MANUFACTURE IN THE U.S.
New energy industries of the future will continue to outsource their manufacturing despite a strong desire to remain in the U.S. Tax incentives for U.S. new energy companies to open their manufacturing facilities in the U.S. will not only help stem the offshoring of high-paying jobs, but also alleviate IP loss through technology transfer.

INCORPORATE NEW ENERGY INFRASTRUCTURE INTO NEW SPENDING BILLS
U.S. infrastructure is in need of trillions of dollars of investment to keep up with global economic competition over the next century. For example, China now has over 50% of overall EV charging infrastructure. It is crucial that new infrastructure spending supports the technological trajectory towards the “electrification of everything” while supporting the geographic scaling of new energy distribution technologies, such as microgrids.

NATIONAL WORKFORCE DEVELOPMENT AND DEPLOYMENT INITIATIVE
Considering the necessity for a massive rollout of new energy infrastructure and the acceleration of industries of the future, the U.S. needs an initiative representing an evolution of the Public Works Administration to supply the skilled labor necessary to satisfy demand.
STATE AND LOCAL SOLUTIONS

PROCUREMENT AGGREGATION
By banding together and aggregating their purchasing powers to accelerate the scaling and driving down the cost of adopting new energy technologies, municipalities can leverage their significant collective balance sheet. For example, the City of Los Angeles is leading a coalition of nearly 60 cities and counties to purchase electric vehicles. With hundreds of thousands of vehicles in their municipal fleets, all of which need to be replaced at some point, this coalition has considerable leverage in the electric vehicle and charging markets. Moreover, California state PUC initiatives for batteries made storage projects financeable years ago. Such work can be critical to the market adoption of technologies, but it is very challenging for states and local governments to execute on. The federal government should work with state and local leaders to facilitate and drive such initiatives.

DEMONSTRATIONS AT REGULATORS AND UTILITIES
Establishing regulatory sandboxes for electricity generation and transmission, and allowing municipalities to buy in, could help eliminate some of the hurdles faced by companies at the demonstration stage. Regional transmission operators and independent system operators can push distributed energy solutions down to state regulators and utilities.

STATE-LED PROJECT CAPITAL INITIATIVES
States have a significant amount of financing tools, such as tax-exempt bonds, flexible grant capital, workforce training grants, and now visibility and incentives surrounding opportunity zones. The U.S. Department of Energy should evaluate how to best proceed with governors and state energy officers to drive investment opportunities and provide assistance ensuring that funding is available to close financing gaps in instances where viable projects face one or two gaps to market.
Conclusion

Market pull from a global economy addressing extreme environmental degradation presents an opportunity for the U.S. to ensure its economic domination of the next century. However, the white boarding sessions during EarthX’s 2019 eCapital Summit identified numerous market obstacles that, if left unaddressed, would yield control of industries of the future to other countries.

Systemic in nature, the market obstacles identified in this working paper have already resulted in the loss and espionage of critical intellectual property, and thus important sources of job creation. Fortunately, a host of market-friendly, bipartisan solutions with the thoughtful utilization of upcoming federal and state appropriations can help place the U.S. in a more competitive position for years to come.