

***Advancing Renewable Energy Technology
Commercialization***

through

Federal, State and Local Collaborations



- Is a non-stock, tax-exempt **applied research and commercialization services company** with more than 25 years of experience building multi-organizational teams.
- Currently **manages more than 100 national and international programs worth over \$1B** in applied R&D contract value.



- Leads **applied research and commercialization** across a diverse range of industries
- Facilitates **technology solutions** with broad-industry involvement and impact
- Provides **commercialization services** for rapid, industry-wide technology implementation
- **Creates custom collaborations** with leaders from industry, government, and academia
- Executes **objective leadership** in an environment of trust where competitors collaborate for mutual benefit



- **Manage three research parks** in the state of South Carolina (Charleston, Columbia, Clemson)
- **Execute economic development mandates from the South Carolina General Assembly**
 - **Construct, staff and manage three Innovation Centers** within the state
 - Work with the state's three research universities to **accelerate commercialization of university-generated Intellectual Property**
 - **Provide support services for “knowledge economy” business formation and growth...including seed venture capital investments**

- **State Economic Development Mission** *and*
- **Technology Solutions and Services Focus** *supported by*
- **Infrastructure for Innovation**



Commercialization Support
for Early-Stage Tech Companies



Delivering Technology Solutions
to Federal and Corporate Clients



Research Parks and Innovation Centers

....where the whole is greater than the sum of the parts.

- **The Power and Energy Challenge**
 - Mission requirements; capability needs
 - Executive Order 13514 direction
 - DoD and Service-specific vision / guidance
 - Budgetary constraints

- **Potential Solution Set**
 - Buy “off the shelf”
 - Develop internally (ONR, ARL, AFRL, UARCs, etc.)
 - Develop externally
 - “One off” contract to meet specific need
 - Long term contract to meet this and future related needs

- **Proposed Solution – Go to market.....without having to go it alone**
 - Successful case studies
 - Emerging opportunities

- **E.O. 13514 (October 2009)**
 - Reduce energy intensity in buildings
 - Increase use of renewable energy; implement renewable energy generation projects
 - Reduce use of fossil fuels
 - Reduce GHG emissions

- **DoD / Service-specific vision/guidance (Navy as example)**
 - October 2010 “Navy Energy Vision”
 - By 2020, half of total Navy energy consumption afloat from renewables
 - Sail the “Great Green Fleet” by 2016 (nuclear, hybrid-electric ships running on biofuel, aircraft flying on biofuel)
 - By 2020, half of Navy’s total energy consumption ashore from alternative sources
 - By 2020, half of Navy installations “net-zero” energy consumers

- **Budgetary constraints**
 - Deficit reduction pressure
 - Competing Service budget priorities (recapitalization, maintenance and repair, etc.)
 - DoD acquisition efficiency improvement initiatives

- **Buy commercially-available (COTS)**
 - Must accommodate military-unique requirements / operating environment
- **Develop internally (DoD labs or University Affiliated Research Centers)**
 - Many, but not all skill sets are available “in house”
 - Cost effectiveness jeopardized if unique new infrastructure required
 - **There is no dedicated UARC for power and energy technologies**
- **Develop externally (“traditional” contract with outside providers)**
 - May or may not need to fund new infrastructure
 - Government’s overhead challenge grows with multiple, “one-off” contract transactions
 - Breadth of capability challenge grows with long term contract to single provider having deep but narrowly-focused skill sets
- **Develop jointly with others**
 - Other services
 - Other federal agencies
 - Non-federal entities (including consortia of private industry / academia entities)

Increasingly, the answer seems to be....

OPP / OPM

(Other People's People; Other People's Money)

Given the significant overlap of power and energy requirements, objectives and research assets across Services, federal agencies and the private sector, the opportunities for mutually-beneficial collaborations are significant

- Affords advantages of shared infrastructure, shared awareness, multiple opportunities for technology transition
- This approach is consistent with current DoD efficiency initiatives

However,

- No “silver bullet” template for every case, but worth evaluating the extra effort required for multi-party collaboration versus the potential payoff if successful
- Even if the will to collaborate is there and the potential payoff is evident, some degree of herding cats is going to be required

- Does the “pain” exist in more than one Service or agency?
 - **Is there interest by more than one “customer?”**
- Does the solution require university or other research assets (people and/or facilities)?
 - **Who needs to be part of developing the solution?**
- Does the “pain” extend to the private sector?
 - **Is there a shared interest in the private sector for finding a solution?**
- Does geography matter?
 - **Are there federal, state or local incentives that can reduce the cost of developing the solution?**

- **Potential “Customers” for Power and Energy Solutions**
 - DoE
 - DoD
 - DHS
 - USDA
 - DoT (FTA)
 - EPA
 - DoC (Economic Development Agency)

- **Financial Incentives for Renewable Energy**
 - Investment Tax Credits
 - Internal Revenue Code / Treasury Regulations for non-profit organizations

- **Varies by State**
- **South Carolina has several legislative initiatives very supportive of renewable energy technology in general, and hydrogen and fuel cell technology in particular**
 - Research Centers of Economic Excellence Act (2002)
 - Research Innovation Centers Act (2005)
 - Industry Partnership Act (2006)
 - Hydrogen Infrastructure Development Act (2007)
- **Fuel Cells 2000 “State of the States” report (Spring 2010) listed South Carolina as one of the top 5 states in the US in advancing hydrogen and fuel cell development**
 - Others were CA, OH, CT and NY
 - SC cited specifically for “promoting demonstrations, hydrogen stations and business development”

- **“Traditional” model is a Federal Agency - Industry (or Academia) partnership**
 - Agency solicits solutions to meet requirements
 - Industry (academia) develops solutions
 - Agency provides funding (may require cost share)

HOWEVER...

- **Other models exist and may help advance technology and/or share funding burden and/or accelerate commercialization opportunities**
 - Federal -- state -- local -- industry
 - Federal inter-agency -- state -- industry
 - Federal inter-agency -- regional – industry
 - Private industry -- federal -- state
 - Others

- **Model: Federal -- state -- local -- industry**
- Example: National Fuel Cell Bus Program
 - Federally-funded; cost share requirement of 50%
 - Customer: FTA
 - Partners
 - CTE (Atlanta-based non-profit)
 - Proterra (bus manufacturer)
 - University of South Carolina (demonstration site coordinator)
 - Central Midlands Regional Transit Authority (demonstration site operator)
 - SCRA (fueling infrastructure coordination)



Proterra Bus Preparing to Fuel at Columbia Hydrogen Fueling Station, March 2009

- **Model: Federal inter-agency -- state -- industry**
- Example: Fuel Cell Backup Power “Market Transformation” project at Ft. Jackson, SC
 - Federal / state co-funded
 - DoE \$325K; SCRA \$155K
 - Inter-agency agreement between DoE and DoD
 - Administered through Army Corps of Engineers Engineer Research and Development Center (Construction Engineering Research Laboratory)
 - Executed by ATI
 - Agreements structured to enable private partner (Logan Energy) the ability to capture federal investment tax credit for fuel cell equipment



Fuel Cell System Backup for Ft. Jackson Emergency Services Center, April 2009

- **Model: Federal inter-agency -- regional -- industry**
- Example: Ft. Sumter Renewable Energy Project
 - Co-funded by two federal agencies (DoE, National Park Service)
 - Follow-on phases will leverage funding from state/local entities
 - Marries DoE H&FC “Market Transformation” program (focused on hydrogen/fuel cell technology) with NPS “Smart Parks” initiative (focused in this case on solar technology)
 - Administered through Army Corps of Engineers Engineer Research and Development Center (Construction Engineering Research Laboratory)
 - Project will be the first under DoE-NPS Smart Parks Initiative
 - Regional economic development group (Aiken, SC) partnered on the project and is contributing cost share
 - Executed by ATI



Planned Site for Ft. Sumter Renewable Energy Project, Fall 2010

- **Model: Federal -- state -- private industry**
- **Example: Landfill Gas – to – Hydrogen Production for Use in Industrial Material Handling Fleet**
 - Host site: BMW Manufacturing Company (Greer, SC)
 - Funding sources:
 - US Department of Energy
 - SC Energy Office
 - SCRA (via SC Industry Partnership Fund, Hydrogen Infrastructure Development Fund)
 - Private foundation(s)
 - Project goals
 - Prove economic and technical feasibility of converting LFG to hydrogen
 - Demonstrate no adverse impact on long term fuel cell MHE performance using LFG-produced hydrogen
 - Support BMW decision to scale up to support entire MHE fleet (>400 pieces)



BMW X5 and X3 Production Facility, Greer, SC

Innovator Award for:

- outstanding initiative that encourages economic opportunities and quality of life relating to bio-products, alternative energy, and energy efficiency
- innovative use of technologies to promote energy efficiency; promotion of cross-industry collaboration; commercialization/technology transfer; preparation of workers for green collar jobs; and its replicability to other organizations or geographic areas
- collaborative partnership with the public, private, university, government and nonprofit sectors



**Gov. Haley Barbour
Presents Southern
Growth Policies Board
“Innovator Award” to
SCRA CEO Bill Mahoney,
June 2009**

- **Ingredients for success:**

- Supportive legislation (federal and state)
 - Sometimes geography matters a lot
- Supportive regional / local communities
 - Often associated with research universities / institutions
- Address the most pressing source of customer “pain”
 - Varies by geography and by target market
- Collaboration and cooperation
 - Shared risks and rewards to create market demand (and market acceptance)

- **Hard realities:**

- Federal funding availability (and priorities) can be unpredictable
- State economic development construct biased against small, entrepreneurial companies (immediate job creation)
- Competing technologies (including incumbent technologies)
- Public perceptions (and mis-perceptions)

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