By SustainableExploration.org mikelcarpenter@sustainableexploration.org 216 702 5188

Sustainable Exploration is a charitable foundation. Our Charter is the faster adoption of resilient grids for communities: power and water, heat and light, air and food, education and outreach. Our proposal is to help you achieve your vision with less cost, in less time, with higher quality.

The County wishes to:

> ***"Transform Northeast Ohio's energy grid to be cleaner, more resilient, more secure and more cost effective for its residents, industries, and commercial businesses."***

We work in voluntary partnership now to support existing partners of Cuyahoga County's vision, including other volunteers from NASA GRC, Brite, Cleveland State, Case Western, and others.

We participate in research & development for cleaner, more resilient, more secure, and more cost-effective energy and water grid solutions. In the past two years we've presented to, hosted, collaborated with, promoted and supported organizations including: The U.S. National Disaster Resilience Council, EISCouncil, INCOSE, ISACA, NOCInfragard, EnergyTech; others.

Projects have included micro-grids, water security, EMP/EMF/GMD protection, resilience, power generation and storage, power transmission, aerospace, security, and OSINT, in partnership with organizations like Critical Ops, GridForm Consortium, Telepath Systems, AdaptiveBCS, ADI Technologies, Maradyne, MoonshotWork and other profit and non-profit partners nationally.

Beyond these projects, we devote time and resources to promoting transformational inventions, and can bring some innovations to the County 'at cost' through the generosity of our partners.

We're exploring linked repeatable nano-pilots leading to progressively larger ROI including:

- Early civilian adoption of practical clean water-making technology that reset DoD records
- Medical applications of the clean water produced for off-grid and emergency saline
- Early regional adoption of solar thermal technology better-suited to northern latitudes
- Solar thermal electric charging vehicle stations paired with licensed NASA technology
- Early regional adoption of 1,000 liter/minute water cleansing point solutions for pollution
- Nano-agriculture both for supplemental public food and for niche cash crop production
- Inexpensive added protection for new and existing regional power infrastructure
- Nano-grid solutions for critical infrastructure like hospitals to enable emergency services

The County and its partners produced this Vision document, which states in part:
https://engagedscholarship.csuohio.edu/cgi/viewcontent.cgi?article=2755&context=urban_facpub

"This transformation will not just reduce emissions and improve resiliency: it will also constrain costs, improve comfort, enhance safety and demonstrate new technologies and tariff strategies for adoption by others. And, importantly, it will create and retain jobs. It will do this by attracting business to high-uptime utility districts and by engaging the regional grid-edge development economic cluster in construction."

The County has generally noted the following as requirements to achieve Its Vision.

- *Cost-effective - we've focused on finding immediately affordable solutions, in some cases more than 80% less expensive than current methods of doing the same thing.*
- *Comfortable - whether making or cleaning water, or capturing solar heat, abundant human comfort and resources are our goal, not minimal and uncomfortable austerity.*
- *Smart - we advocate for stopping doing dumb things as well starting new smart things. Landscaping, signage and other optional grid uses need more moderation/oversight.*
- *Safe - solutions must not only be as or more safe than those they replace, they must also be more renewable and more environmentally responsible at the same time.*
- *New - we directly promote only transformational inventions: 7-10 times better results than the status quo. We help to protect their intellectual property for future public benefit.*
- *Adopt-able - we directly promote solutions that are at a current Technical Readiness Level for immediate adoption at scale and on the County's current vision timeline.*
- *Secure - these U.S.-supply chain solutions in all cases are being commercialized after having already been 'proven' in testing by DoD, NASA or other credible U.S agency.*
- *Reliable - we promote solutions that are 'both', not 'either/or', and that are naturally themselves resilient, simple, and redundant (and in some cases fully ruggedized).*
- *Clean - the cleansing technologies we are exploring now have the reasonable potential to provide clean water, air and food supply solutions for the whole region.*

We also prioritize:

- *Ethical - able to provide benefits to the disadvantaged as well as the advantaged*
- *Local - capable of being manufactured in our region as well as used in our region*
- *Reputable - with good public track records, references and 'cleared' members of staff*
- *Proven and possessing verified test results demonstrating superior metric performance*
- *Visionary and providing both immediate value and logical future expansions of value*
- *Scalable and providing good value at nano scale, with immense value at larger scales*
- *Security of the microgrid and its connected loads / facilities for high reliability operation*

The County Seeks to:

> **Develop energy districts that attract commercial activity and improve the quality of life for its residents.**

The County plans to operate its electric generation and distribution systems through public/private partnerships, accomplished in part by building and operating microgrids.

We've made a list on the following page of what appear to us to be important elements in achieving the County's visions, and have prepared a half-dozen detailed approaches for discussion we think may work to achieve those goals faster and more cost-effectively.

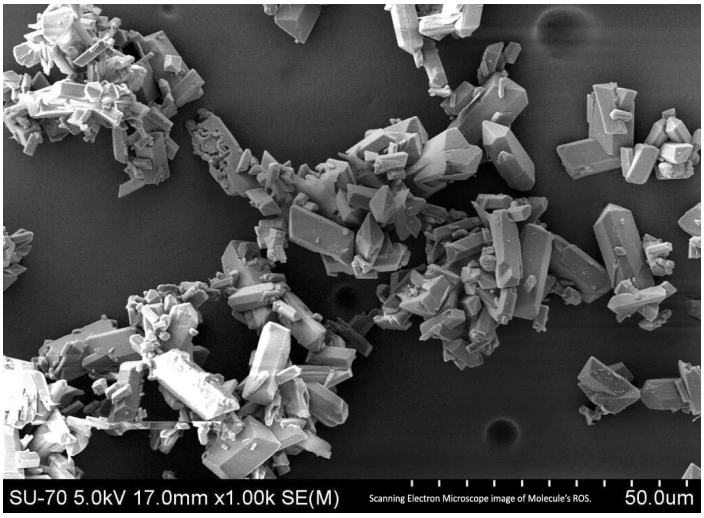
Regional Growth, economic opportunity, and individual well-being are the result of regional collaboration for resilience, based on the experience we've seen of communities as diverse as San Antonio, Washington D.C., Raleigh, Tacoma, Omaha, Houston, Santa Barbara, NYC and Spokane, to name only a few. To best drive County growth, new resilience and micro-grid projects should be 'mini-non-profits' in operation, re-investing constantly in wealth. Wealth is measured in guaranteed capacity of kilowatts of power or gallons of water, not in dollars. Bushels of food, acres of watershed, depth of aquifer, and biomass per acre are other metrics of success and abundance for County infrastructure, economic development and resilience efforts.

The County wishes to provide superior utility service, and has identified key customers:

- Power supporting higher-education and medical institutions
- Power supporting innovation, including NASA GRC
- Power supporting advanced manufacturing

We think prioritizing the following customers becoming County customers is wise also:

- *Water and wastewater treatment*
- *Law enforcement, emergency services and National Guard loads / power demands*
- *All places of education, worship and public assembly*
- *Such manufacturers as are necessary to ensure the supplies of food and essentials*
- *Necessary Transportation, including all airports, lake and river ports, railyards, interstate and Turnpike infrastructures and feeder roads essential for safe and regular commerce*



(pictured: water absorptive material, Molecule.us)

Technologies for the better management of point sources of pollutants is a key part of our research, and includes pharmaceutical and fertilizer remediation, hydrocarbon and dioxin cleanup, the cleanup of PFOAs and PFAs, mine waste remediation and reclamation of various contaminants to be repurposed into new materials and advanced manufacturing (and for nano-agriculture).

From our regions' existing vibrant interstate commerce and the Turnpike, there is a buildable future where Cuyahoga County is more of an air, ground, lake, and rail hub than ever before. We helped host a conference in 2021 (videos available) where Drive Ohio, Fly Ohio, and the Ohio Turnpike shared their views of the future, which aligns with the County's vision for load projects that are also resilient while still being partners and customers of the County utility.

By using properties 'central' to the County and simultaneously near Cleveland-Hopkins Airport and the Turnpike for EV charging farms, we can help to fulfill the 'every 50 mile' requirement for EV charging in our region[1] and position Cleveland to be an electric hub by land, air, rail and sea.

- *we retain control and can provide heterogeneous charging support, not brand-limited*
- *we can in later phases provide hydrogen fueling as well*
- *we can do this in cooperation with the Turnpike to make our whole region more robust*
- *we can design the system to continuously consume some load from the County but also to provide power back into the County grid as a 'resilient island' - a self-supporting microgrid that also has at some times of day 'spare' power to store and at other times of day has a 'deficit' of power (at night, or when peak charging demand is highest)*
- *we can integrate and provide valet charging and detailing service support within a radius of the facility to provide employment and anchor subscription revenue for faster ROI*

International maritime trade industry will be encouraged by a robust road transport system to which its cargoes can be offloaded and effectively delivered to final destinations. Likewise, some of our ideas imply new manufacturing (and power customers) that can be sited in Cuyahoga County. Such a key transportation interchange will be a large consumer of energy and need the highest levels of resilience for true 24x7x365 smooth continual operation with safety and health.

Advancing social equity can be done with great and quick effect if we can provide better power, water, food, and comms solutions to disadvantaged areas at nano-scale that are portable, flexible, and affordable. We believe this is possible, and in so doing to directly help provide more equal access to high-speed internet, jobs protecting nano-infrastructure solutions in their own communities, and cleaner water and better access to fresh food grown with the water sources. Food deserts are a real problem in Cuyahoga County. By combining a few new innovations, we can achieve new levels of food output, water efficiency and flexibility for our communities.

Cuyahoga County has a massive obligation to help to mitigate climate change, here where we have been relatively less affected than many other parts of the State, Country or world. Our excellent climate can help to bring jobs into the region as well as being a more desirable place to live. Things we can do to preserve this regional competitive advantage include:

- *Finding ways to make power and energy that don't require burning things*
- *Reducing and better managing waste heat entering the air and/or water*
- *'Over-cleaning' and adding spare cleansing capacity to ensure effluents are 'better than'*
- *Interdicting 'dead zones' directly to ensure they are being effectively remediated*
- *Encouraging re-use of existing structures rather than building new*
- *Limiting of the amount of contiguous paved space vs. green space*
- *Encouraging gardening and self-production of other foods including animal proteins*
- *Providing effluent-management and remediation guidance and technology*
- *Creating ways of turning current pollution sources into raw materials for reinvestment*

[1] Merge electrical grids with mobility through EV charging stations and use of hydrogen storage and refueling infrastructure.

Our proposals include customers (new load) as well as suggestions. The County intends:

> **This includes the creation of energy districts to attract businesses that value uptime, such as are found in the digital economy. In particular, the County intends to align this vision with the needs of a community of advanced manufacturers seeking to operate their facilities in more climate friendly and resilient geographies within the Great Lakes region.**

For such a vision, to have the independent ability to add large power consumers that are service providers to other power customers of the County can be a revenue engine.

Such technologies include:

- Cleansing of industrial waste and pollution
- EV vehicle charging farms
- Nano-agriculture
- Micro-nuclear power solutions behind-the-meter

To further support the County's vision, we propose each of these critical revenue engines and service providers to power customers (that are also themselves large consumers of power) further be required to be 'micro-grids' as well - normally consuming the power budgeted from the County, but producing also their own power and able to function off grid; providing excess in the meantime back to the County at or below the rates to which the County sells power to our proposed project, which include power from 'next' generation resilient microgrid sources:

- Nano-scale solar thermal that is twice as efficient as photovoltaic cells
- Micro-nuclear solutions
- Geothermal
- Natural gas
- New non-battery large-scale storage solutions

To control costs while still providing valuable jobs, automation is key for all operation control systems, security systems, and related support systems, with highly trained people overseeing that cost effective automation and learning new ways to direct the automation to optimize outputs. Our team brings with it knowledge and experience in smarter and more secure distributed control systems ranging from electro - and hydro-mechanical through cyber-security to IoT and massively distributed automation networks for various national and global utilities.

Our aim is to use what we know to accelerate the County's learning curve to becoming a net regional exporter of energy as well as fully self-sufficient and resilient as a region.

Entity / Business Name, summary of services, and relevant experience.

SustainableExploration.org (*an IRS-designated charitable foundation and 501.c3*) provides low cost and preferred access to technologies, services and intellectual property that drive human comfort, resilience, sustainability, and environmental improvement. Our specific Charter is to foster the adoption of new solutions for human quality of life. In two years we and our partners (including EnergyTech, GridForm Consortium, Critical Ops, AdaptiveBCS, MoonshotWorks, AdaptiveBCS, Telepath Systems and others) have brought forward aerospace, water, and education solutions cost-effectively. We've helped to host and sponsor more than a half-dozen conference events and many more virtual and informal worksessions. We've attracted new volunteers to several regional non-profit organizations. We've effectively promoted general awareness of good efforts in Cuyahoga County, nationally (and will do so again mid-October at the annual conference of the U.S. National Disaster Resilience Council, at Johns Hopkins Applied Physics Lab). We've been working alongside the existing partners of the County since before we were formalized as an organization. We share the County's resilience goals and vision for the region. Some of our members were active participants in the early research phase of the Cuyahoga/CSU microgrid system and vendor RFI formulation.

Sustainable Exploration and its partners expect to help to contribute at minimum:

- Apply proven systems engineering methods and principles to the program for the effective and comprehensive life-cycle management and evolution of the target microgrid
- Assure that stakeholder needs and aspirations are properly elicited, understood and reflected in system requirements
- Ensure that microgrid system and connected loads are compliant with security requirements and expectations (including cyber, physical, and electromagnetic)
- Create/recruit some loads/customer and their integration into the utility
- Procure and/or create some sources of energy/power (incl. solar and nuclear)
- Protect some of the distribution infrastructure from EMP/GMD/EMF/cyber, etc.
- Advise on some development of microgrids and distributed generation projects
- Identify and help to research, test, and prototype new applicable innovations
- Generate viable proposals for front of and back of meter power and storage
- Identify some sources of capital/matching funds and/or components and services

• What role(s) would the respondent fulfill?

• Utility Management:

o We have the ability to assist in the design of the business model, organizational model, microgrid system architecture, and contracts needed between entities, and rates/tariffs for customers from the experience of the hundreds of organizations that a members of The GridForm Consortium and other individual members like Telepath Systems, and Critical Ops, as well as the network of experts from the diverse non-profit and governmental organizations with whom we currently collaborate.

o Some of our members are uniquely positioned and experienced as former managers, operators and executives to temporarily support the successful management of the County Utility at or below market rates for the same or less experienced resources. Through our contacts with existing government contracting organizations we can either enable temporary customer billing, call center operations, and accounting from existing known firms, or, help the County to partner with those firms to rapidly establish new operations providing jobs and further capabilities here in Cuyahoga County, or, both.

o We intend to participate in and/or oversee the surgical recruitment of new customers and their integration into the utility, in some cases helping deliberately to envision and create those new loads to strengthen County and regional resilience and strategic development capabilities. We intend to help procure and schedule new energy supply, new protection for distribution infrastructure, and new innovations to otherwise make the macro, micro and nano grids resilient.

o Some of our members have significant prior experience managing Construction and Ongoing Operations and can help to temporarily oversee the development and construction of microgrids and distributed generation projects, while training and passing along experience to County staff. It's true that some people we work with are at or approaching the ends of their careers - this puts them in position to pass along what they know to the County staff and truly be temporary, cost-effective, and a surgical support for the County Vision without trying to 'own' it. We also work with other differently-abled people and those in unusual circumstances that possess the skills and aptitudes needed, and just need a little accommodation to participate to help us.

• Many of our partners have significant actual *and theoretical* experience in the development of Utility Customers, Distributed Generation Projects, and/or Microgrids - on and off planet! but more so with more applicable Department of Energy advanced research projects and pilots.

o We will be more credible at recruiting customers to join the County Utility than anyone else. We Believe in the Vision and have been trying to assist that Vision for years already. We have the credibility of earnestness, naivete, and persistence on our side, and facts, science, and innovation. Many of us have significant experience in contracting and can help with 'pre-review' to stretch precious County Legal resources which are expensive and scarce at the best of times.

o We've been expending effort already to develop a half-dozen distributed generation project concepts including in-front-of-the-meter solar, battery storage, hydropower, and regionally attractive solutions like geo-thermal, as well as micro-grid projects for individual customers, both single-site and multi-site. The County Utility would have both off-takers *and new resilient quality reliable inputs to the regional power, energy and water grids*. As we figure out how to fund various levels of demonstrations in the region, we'll bring proposals forward as projects for others to join and support. For such projects as seem good to the County, we'd help the County implement them. We have specific paths and ideas for such funding at the level required if our relationship with the County requires it; no magic, but the full range of public and private grants, loans, and/or investments are available to our partners, more so than to private sector firms.

• Our team, partners, and advisors contain members with exceptional design, engineering and construction experience including detailed BOM, procurement, construction oversight for distribution Infrastructure, distributed generation, microgrids and also the adjunct systems that support them, including data centers and other 'purpose-built' infrastructures (e.g. fuel terminals) for automated controls, security and cyber-security.

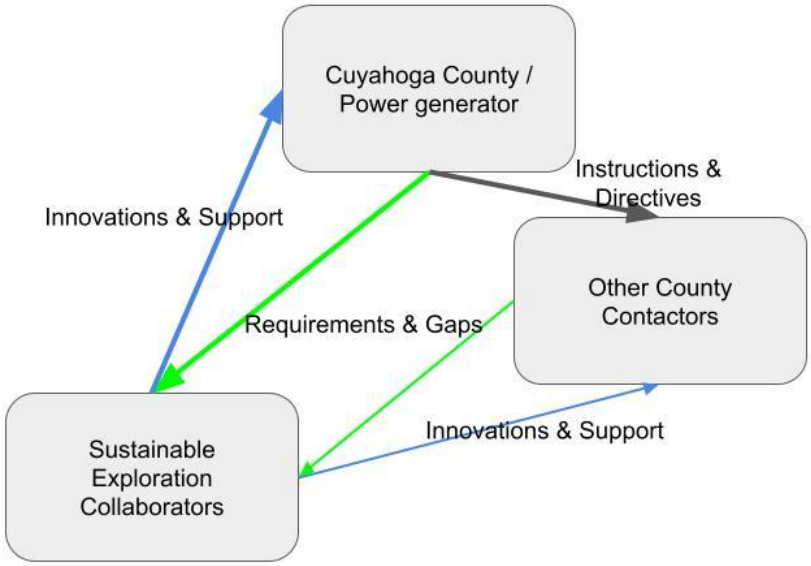
o Our team has displayed tremendous creativity in procurement of equipment and materials and in some cases has devised new means and methods of doing so. If we're the best for the job initially, we'll help the County learn from our experience in developing superior procurement chains all on its own, and even increasing regional manufacturing to further shorten them.

o Our team would not directly construct the major components of the distribution infrastructure, distributed generation, and/or microgrids, but would rather take a role in advising the County in selecting and managing competent professional constructors and their many staff, complex equipment and support systems, which like healthcare are an ecosystem unto themselves, and one where we feel other firms have generally better direct ability and more relevant experience. This applies also to any direct support of distributed power generation and microgrid operations in conjunction with, or on behalf of the County Utility and/or its manager or operator.

We also don't think at this time there's any sense in broadening the scope further to consider too many more roles or options than the County already has. It seems more time to pick what seem to be the most actionable and immediately beneficial options and build our first outcome.

'No plan survives first contact with the enemy', and in our case, the 'enemy' is the status quo. We're going to try to make change for the benefit of everyone in the region, but not everyone will see it that way, and that doesn't make those people our enemies, but neither will that friction make achieving basic outcomes any easier at first. If we focus on some easy wins that provide perhaps more than usual benefit to some disadvantaged portions of the community (as these initial pilots will need funds and other considerations to be donated by the community to succeed), then we'll be able to earn the right to undertake larger scale efforts with bigger ROI.

o Optional - Within this section, consider providing a hypothetical organizational chart, a Responsible, Accountable, Consulted, and Informed (RACI) matrix, or other visual to help define roles and relationships.



	Responsible	*Accountable*	*Contributing*	*Informed*
Utility Management			√	√
Customer Recruitment			√	
Customer Service			√	
Design & Engineering	√	√	√	
Generation & Micro-Grids	√		√	
Construction				√
Procurement & Operations			√	√

We would be delighted at any point to meet with the County to present (more) ideas and answer followup questions. We are open to any reasonable teaming or subcontracting.

We are 'expert' at rapid project delivery, and we believe from start to finish a reasonable expectation is 36 months. Our contracting is efficient as are our approaches to demonstrating compliance, and so 90 days should be adequate for any arrangements to be finalized.

Optional / Encouraged Information:

• Publications / case studies / references / sites from our members and partners would have to include their LinkedIn and Google Scholar references, which can be provided upon request depending on specifically who out of the dozens of people currently involved are the best experts for the County's needs. We'll be happy to provide the resumes, references and supporting information provided to various other grants programs and government agencies when appropriate. Conveniently available web materials to sample our members include:

- https://www.5g2go.us/
- Adaptive Business Continuity: A New Approach
- https://www.adaptivebcp.org/
- https://www.adaptivebcs.com/
- http://aditechnologies.com/
- http://CriticalOps.com/
- https://www.empshield.com/about-us/
- https://www.energytech.org/
- https://www.gridformers.com/about-us
- https://www.gugliotta.legal/blog
- MoonshotWorks: https://moonshotworks.com/watercrisissolution/
- DIY EMPShield Install on Toyota Sequoia TRD Sport in under 10 minutes.
- Water From Air Technology Presentation for NASA's EnergyTech Conference June…
- https://app.box.com/file/975359887899
- NDRC: Powering Through 2021 (and 2016, out of print) https://www.amazon.com/dp/0998384429/ref=cm_sw_r_em_api_glt_fabc_WG54NX3DTBAC6VS3D9XN
- https://solarspace.io/projects/dod-fema
- https://www.SustainableExploration.org
- https://www.telepathsystems.com/

7. Appendix

1. Vision

a. What is your vision as to how the County Utility could fit into the emerging energy ecosystem?

Resilient islands[2]. The County can be a point of organization for a collective made up of resilient 'islands''; organizations, each generally self-sufficient, each having periods of more or less grid surplus[3]. Some will also need to draw from the County at various times of day or year. Enabling individually resilient customers (loads) and then connecting them so they can be steady consumers or providers, as the situation justifies, provides the County with the initial base load stability it will need to operate cost-effectively and with stability. The County will spend less in initial capital expenses. Some of the large resilient 'island' customers won't spend any more than they were planning on spending for their own resilience. Both expenditures are made in coordination[4], so both the County and the resilient 'island' customer benefit more and faster.

b. How might the County Utility improve services compared to traditional systems?

The County is in a position with a green-field and existing regional advantages. With a frugal, sustainable[5], collaborative approach that gains commitments to reinvest initial ROI for greater scale in later phases, the County can be competitively priced, more reliable, transparent, and a better overall value for the community in just a few years.

c. How would you propose building a system in a manner that constrains costs based upon available loads, yet is flexible enough to adapt to new end users who are attracted to the system?

By initially building the system around the more self-sufficient organizations (resilient islands) that are willing to be both customers of and providers to the County Grid. We have a list of such organizations in the County, considering CISA.gov and the 16 sectors of resilience[6]. Those are the most valuable initial customers for the County, and the organizations where it's most important to the public that they also possess a high degree of self-sufficiency in general.

As this system grows, it will place the County in a position to either have vast energy reserves and/or become a steady net exporter of energy, in multiple forms, to other regions.

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[2] Importantly, the microgrid has the capacity to "island" from the main grid during a disturbance. This can be accomplished through state-of-the-art control systems now commercially available that can seamlessly remove the load from the main grid.

[3] The Utility's principal strategy for developing clean energy, high-uptime districts is through microgrids. A microgrid is a contained energy system capable of balancing captive supply and demand resources in a manner to maintain reliability.

[4] Electrical infrastructure is expensive, the microgrids will be built out modularly, over time, and as the customers are willing to invest

[5] The principal goal of the microgrid is to cost-effectively maximize reliability and efficiency. Distributed power tends to be cleaner..

[6] The microgrid can, and frequently does, deploy other utilities, including steam, hot water, chilled water and network connectivity. Microgrids work best when optimizing all of these systems, thereby capturing the highest efficiencies and performance possible.

d. How might your approach be different for new developments, such as industrial or commercial parks, versus existing customers?

Rather than focusing on 'landing them as customers', we'd initially focus on how to make each a net energy (or other resource) contributor[7] to the County grid on average. Then, we'd ensure that they had access to consume the necessary baseload from the County to 'balance' their daily input to the grid - literally, a 'rising tide' of energy in the region 'floating' all the participating organizations in the County grid to a greater and greater level over time. Holding energy prices steady in the future and still having net excess capital to reinvest in connecting the individual resilient islands (like an airport, a stadium, a hospital, a university) will cause County customers to remain invested in the long-term success of the County as both a provider of energy to them and a consumer of energy from them. That's a customer/partner relationship that will be hard to ever attract away from the County, once the relationship is initially established. Beyond that, the very real benefits to County citizens from more individually resilient infrastructures and organizations will have economic development and quality of life benefits far beyond just dollars.

Would you envision merging district energy or transportation or hydrogen into the development? e. How might you go about marketing your vision to end users?

Absolutely, we specifically envision excess energy being stored with new and highly efficient large-scale sustainable storage innovations and that power being used to level the peak loads for an EV charging hub where the Turnpike and the Interstates come together near the airport. Hydrogen is also a part of this, as will be the production and support of other manufacturers, and of the application of new technologies (such as 'cleaner' diesel through hydrogen).

Our members collectively have the ability to create these and other outcomes we've noted as examples in our response and many have prior national or international experience in doing so.

2. Business Economic Models

a. How do you envision revenue flowing through the various entities?

Customers that are also grid contributors may for some or all months of the year have a zero bill bit when in need of added power, get access to it with due consideration for the fact that at other times, they are a power provider. Customers that are not contributors pay rates the County sets.

The County has to 'connect' the resilient islands, and should also take the opportunity to aid some customers to be more self-sufficient with temporary financing, which the County for such purposes is in position to get with lower interest rates than their customers. This provides another opportunity to discuss the shared value of collaboration where public grants, bonds, and private investment intersect.

[7] Early adoption will be behind the meter on campuses, with single customers. These early adopters can, over time, be transitioned into in front-of-the-meter commercial microgrids.

The County power utility could enable its customers in the development of their own microgrids, by facilitating the acquisition and selling of the excess power that they create "behind the meter" to other customers of the County power utility or those in the power and electricity markets. In this way, the County will be able to make it possible for them to combine their savings and earnings to fully fund their own microgrids and attract funds from the capital markets to do so. The County power utility could make a percentage of the revenue that these energy exchanges generate resulting in financial success as the County power utility customers succeed in the development of their own resilient power systems. This would be a model for others to emulate as a sustainable power utility model of the future.

b. The County envisions a scenario where the developer/concessionaire is compensated through a pass-through model from power purchase agreements with individual customer/off-takers. Do you see any problems with this model or have suggestions on possible alternative compensation models?

If we are selected as the developer/concessionaire, or part of the structure, we have no problem with such a model and reporting on it with full transparency. We see that many private sector organizations could have difficulty in managing such an arrangement, but a non-profit or charitable foundation such as ourselves has greater latitude to 'break even' than does a firm with stockholders, no matter how ethically and morally the private firm is operated.

c. What process would you take with the County to design customer billing (i.e., tariffs) in a fair and transparent way?

We'd emulate the current generation of millennial inventors and entrepreneurs, as well as good sense: we advise the County to ask its customers, and design the system around their feedback. Keep it very simple and secure. We'd advise the County to ignore most conventional wisdom and product advice other than such platforms that are used by government agencies like the DoE or the DoD now, where the County can have some basic assurance that compliance and 'tricky' expensive topics like that have already been diligently addressed. We would advise the County to only bill ever online and to the extent possible, never touch the financial transactions directly, but to contract that to a professional payment processor.

Our members have the combined expertise to design and implement such a system with the County regardless of the architecture chosen by the County, on behalf of the County.

d. What types of tariffs are needed to support the County initiative?

To be discussed - we don't know enough of the County's specific intent to provide good advice.

e. Would you be willing to provide the capital for the scope/role the County envisions?

If we can secure that capital, absolutely, and we have two plans at present for possible doing so.

The County power utility could also derive financial benefits from these activities by creating a for-profit subsidiary that could attract investment into the funding of user-owned microgrids and telecommunications networks that could make use of the County's right-of way and related contributions. (Similar for-profit subsidiaries have been launched by members of the National Rural Electric Cooperative).

An example of such opportunity would be participation in a prospective investment the Resilient Joint Venture is developing from an equity fund that would like to offer $5 billion to help it acquire a small utility or partner with one in order to demonstrate how to create resilient microgrids. Instant Access Networks, LLC is one of our members and a member of that joint venture. We would be willing to discuss collaboration opportunities with the County.

f. How would you ensure prices for specific projects (e.g. new distribution line or a microgrid) are competitive?

We have no profit motive, and our only revenue motive other than simple cost-recovery is for re-investment to create still-greater scales of public benefit more quickly, as per our Charter.

All our members are very good at finding creative ways to do things faster, better and cheaper.

3. Organization Models

a. Would you be willing to contract directly with the County to be responsible for the full scope of this initiative?

We would be open to discussing that if the County wishes, and were certain conditions met, we would be potentially willing to own the full scope of the initiative until such time as the County assumed direct and full control. In the beginning we would be open to helping more, if needed.

b. What are the tradeoffs for one firm serving all roles versus separate firms serving separate roles?

Many small organizations in collaboration will be more agile, less expensive, higher quality, and will generally meet expectations. The key word is 'collaboration', and the County's job (and ours, if we are selected to help the County) will be to ensure the collaboration occurs such that agility, expense, quality and other expectations are met as envisioned. Our members have a good track record of delivering on large-scale projects over time.

c. How would you structure the relationship between yourself, the County, and other entities (if applicable)?

We are servants of the County Vision whose goal is an abundance of energy, water and other resources for the County. As we have no other motive beyond cost-avoidance/cost-recovery and finding increasing levels of support and investment to take on larger regional projects for more

benefit, we'd have the County set direction and we'd figure out how to enable that direction. We think that's generally the right relationship with the other entities involved, which is applicable; if the County experiences progress similar to what other regions have, it will involve hundreds of organizations in the first few years.

d. What level of responsibility, if any, would you be willing to have for microgrid project identification and development, customer identification and selection, customer contract negotiations, etc.?

As much or as little as wished by the County, subject to certain conditions.

e. What level of pre-design and other information or assurances would you need to respond to an RFP/Q and engage in negotiations with the County?

None, if we can be of help and service. We can't undertake too much cost at first without cost recovery other than the cost of seeking and securing funds for these County efforts, but we are committed to providing services and support at or below cost, transparently reported.

f. What level of commitment would you need to have from potential County utility customers to respond to an RFP/Q and engage in negotiations with the County?
None, if we can be of help and service.

4. Concession Agreement & Other Contracts
a. What contracts will need to be in place and between what entities?
We'll provide this input and experience in detail if the County elects our help.

b. What critical terms and conditions need to be addressed?
We'll provide this input and experience in detail if the County elects our help.

c. What term lengths would respondent be comfortable with for a distributed energy or microgrid PPA?
For discussion.

d. What additional information would you need to sign a contract with the County for a scope of work?
For discussion.

5. Initiative Timelines

a. What is a typical turn-around time for you to sign a contract for your role(s)?
90 days

b. What is a typical development time for a microgrid, from customer recruitment through operation? What are the major milestones?

Nine (9) months, with the following milestones[8]:

- Requirements defined and accepted
- Engineering complete for major procurement/construction
- Procurement/construction begin
- Final Engineering complete
- Delivery/Construction complete
- Configuration, Testing and Certification

c. What impact on this initiative do you foresee, if any, from the current supply chain disruptions?

Little to none - our members already consult others on how to resolve supply chain issues.

6. Technology

a. What technologies should the County consider to address power issues for commercial and industrial customers? (power quality issues vs. short power outages vs. long power outages)

All of them. Commercial and industrial customers often have overlooked energy opportunities that current technology can allow them to leverage to reduce cost and improve sustainability while at the same time increasing resilience and continuity of operations. Our advice can help.

b. Can you provide high-level cost estimates for distribution infrastructure, distributed generation, and/or microgrid technologies across different sizes? (e.g. 14.4 kV feeder, 1 MW/1 MWh battery, 5 MW solar PV)

Per kilowatt hour, <3 cents for large green-field power installations, <13 cents for mid-size or brown field, and ~50 cents for temporary or mobile supplemental power.

[8] Step 1 – Lay the initial foundation for a microgrid (generation, storage, smart grid and load management) for identified districts. Two communities (Brooklyn and Euclid) are currently being initially considered.
o Step 2 – Build from these foundations to create and connect a community scale microgrid in each district by constructing distribution infrastructure (wires, substations), and connecting to the transmission system.
o Step 3 – Use early demonstrations as the model to develop community microgrids in other areas in the County that have expressed interest. These include, among others, Solon, Broadview Heights/Brecksville, and the Aerozone District.
o Step 4 – Develop strategies for merging resilient and decarbonized transportation, district energy and electrical grid systems. These will deploy local generation, smart grid technologies, plus hydrogen and battery electric storage/charging stations.
o Step 5 – Transfer technology to municipal utilities and rural cooperatives interested in these models, and, as may be consistent with regulations, to investor owned utilities. Demonstrate technology and tariff strategies to pave the way for regulatory alignment.
o Step 6 – Disseminate knowledge through County partnerships with universities and through a local microgrid center of excellence. The Center of Excellence will be managed by a collaboration of universities, laboratories, incubators, and private sector partners.
o Step 7 – Incorporate microgrid districts into communications systems necessary to support smart city adoption and adaptation.

c. Are there ranges of economic feasibility that the County should be aware of when considering on-site generation, storage, etc. For example, do projects only over X MW prove to be economically feasible in your experience?

No, small use cases can be more feasible than large in some cases[9]. The key is whether the 'island' (organization - factory, school, etc.) can be resilient and a grid contributor as well as a grid customer. Small and big islands can both exist together effectively.

d. How should cybersecurity of the utility, individual microgrids, customers, or other pertinent entities be ensured?

As close to the physical layer of communications as possible, and with as much automation and as little 'human interface' as possible. Human access is the largest real threat vector, and our members are deeply experienced in this and other practical operation protection considerations including physical, radiological, environmental, occupational and regulatory.

e. What is your approach to managing: capacity and transmission peak load contributions? Energy market arbitrage? Frequency regulation?

As above, the bulk of the initial capacity and load will be well known and the degree to which there is initial overcapacity is the degree to which customers that are not also grid contributors can be grid participants early on. Rather than 'profit sharing' the net excess is re-invested to strengthen the connections between the resilient islands organizations.

7. Diversity, Equity, and Inclusion
a. How will you ensure Diverse, Equitable and Inclusive (DEI) partnership(s) throughout this Initiative?

We have found a way to enable almost any person with applicable skills to have valuable input to our efforts regardless of age, gender, race, etc. and to drive inclusion and participation. Our members and partners include the differently-abled, veterans, minorities, and women.

8. Other
a. What potential risks, setbacks, or hurdles do you see for this Initiative?

For discussion/future enumeration. Our members include leading experts in such risk analysis.

b. Please provide any other information that you feel would be pertinent to the County at this stage of the process.

We would be delighted at any point to meet with the County to present (more) ideas and answer followup questions. We are open to any reasonable teaming or subcontracting.

[9] It (a microgrid) is defined by function, not size, and it incorporates multiple distributed "grid-edge" technologies, including generation, storage and smart control systems.