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WORKING DRAFT

Concept Paper: Hosted Regulatory Sandboxes

Chicago Advanced Energy is the city chapter of Advanced Energy Group, a member supported organization that facilitates quarterly breakfasts to convene key regional stakeholders committed to the achievement of Greater Chicago's clean energy and resiliency goals.

The purpose of this document is to initiate a dialogue and garner support to explore the efficacy of regulatory sandboxes to model, simulate and test potentially valuable regulatory reforms that could have life-saving benefits to Illinois residents.

Regulatory Sandboxes: *A concept to facilitate near term actions that can be undertaken quickly and without necessitating long-term regulatory reforms, to enable rapid modeling, testing and demonstration of potentially life-saving business models and technical solutions that brace against increased challenges to Illinois power surety.*

Regulatory sandbox principles have found a home in the evolving financial sector, for reasons that are similar to those presently challenging the utility industry: Technologies are rapidly changing, and those changes bring opportunities for new business models and new products and services that sometimes challenge long-standing regulatory practices. In the field of financial technologies, as many as 20 countries have established regulatory sandboxes, in Asia, Australia, Europe, and North America.[1]

Regulatory sandboxes are intended to enable the rapid prototyping of novel products, technologies, and business models, with the opportunity to test and evaluate innovations under a set of rules, supervisory requirements, and appropriate safeguards to protect all interested parties from any large-scale, long-duration, unintended negative outcomes. The United Nations Secretary General's Special Advocate for Inclusive Finance for Development (UNSGSA) describes a regulatory sandbox as an approach that "is… typically summarized in writing and published, that allows live, time-bound testing of innovations under a regulator's oversight." The regulatory sandbox concept, says UNSGSA,

- creates a conducive and contained space where incumbents and challengers experiment with innovations at the edge or even outside of the existing regulatory framework;
- brings down the cost of innovation, reduces barriers to entry, and allows regulators to collect important insights before deciding if further regulatory action is necessary; and,

[1] https://www.finextra.com/blogposting/15759/the-role-of-regulatory-sandboxes-in-fintech-innovation and http://financialinstitutions.bakermckenzie.com/2018/10/31/finsight-regulatory-sandboxes/. The first one was established in the UK in 2015, but that one was joined by several others in 2016, and the numbers have continued to grow. Financial-technology innovation regulatory sandboxes are already established in Abu Dabi, Bahrain, Australia, Canada (Ontario), Denmark, Holland, Hong Kong, Kuwait, Indonesia, Jersey, Malasia, Norway, Russia, Sierra Leone, Singapore, Spain, Thailand, and the U.S. (in Arizona).

- may result in several outcomes, including full-fledged or tailored authorization of the innovation, changes in regulation, or a cease-and-desist order.[2]

Amidst the growing urgency to transform and adapt our energy infrastructure, markets and policies to protect current and future Illinois state residents and the reliability and resilience of our essential infrastructures, appointed regulators must make far reaching decisions on complex, interconnected issues that sometimes carry grave consequences. The creation of regulatory sandboxes in partnership with utilities and identified key utility customers and interested parties can strengthen a regulator's decision-making ability while providing educational, low risk opportunities to learn from trial and error. For grid hardening and microgrids, this project anticipates working with interested parties on three different levels of regulatory sandbox activities:

Level 1: Equipment modeling in selected targeted areas where microgrids are being considered, so that different types of operations can be considered without necessitating any changes;

Level 2: Modeling the selected areas to simulate microgrid operations using different kinds of new equipment and considering different kinds of possible controls and operational parameters; and,

Level 3: Test implementation, in one or more of the selected areas, intended to demonstrate whether and how particular operations might necessitate changes to existing regulations, and clearly describe those changes and identify the benefits that can accrue for Illinois if those changes are made.

At the core of many major regulatory decisions are benefit / cost analyses (BCA). An excellent example is the January 21, 2016 BCA Order by the New York Public Service Commission, which required all NY utilities to assess the BCA of four key areas of utility expenditures: (1) investments in Distributed System Platform (DSP); (2) procurement of Distributed Energy Resources (DER) through competitive selection; (3) procurement of DERs via tariffs; and, (4) general energy efficiency plans. Each NY utility was then required to develop and publish a BCA Handbook covering both utility rate-based infrastructure investment and customer incentivized investment. (Please note the Con Edison BCA Handbook which is supported by six case studies.)

A regulatory sandbox would also benefit Illinois' vision for a clean energy future, and further the mission of the Future Energy Jobs Act (FEJA), that "stimulates job creation with new investments in energy efficiency, renewables and energy innovation." These sandboxes will provide the opportunity to test and pilot new energy technologies that will require well-trained workforce to support the installation and maintenance of the systems. The sandbox will also align with FEJA's mission to position Illinois as a leader in zero-carbon activity and enhance the state's position as a leader in the clean energy economy. Clean energy technologists and companies will be attracted to Illinois sandbox communities and growth opportunities supported by the pro-investment regulatory policies we support today, creating new jobs in the sector.

As such, a clean, reliable and resilient Illinois energy system that is equitable and inclusive may require some fundamental restructuring of responsibilities, incentives and investment models, specifically around the following areas:

1. distributed vs centralized power generation and load optimization
2. incentives to maximize energy efficiency and electrify transportation
3. monetizing the locational and temporal value of resilient utility services

Our task force has identified three particular Chicago area districts that would benefit greatly from implementing a regulatory sandbox innovation process, inclusive of the electric distribution company, regional transmission operator, key energy user(s), regional and national energy lab(s), and corresponding energy solution providers.

[2] https://www.unsgsa.org/files/1915/3141/8033/Sandbox.pdf.

The three districts include: (1) Shedd Aquarium, a part of Chicago Museum Campus; (2) Illinois Medical District and associated Chicago critical care facilities; and, (3) University of Illinois, Chicago

(1) Shedd Aquarium

Shedd Aquarium, is a unique microgrid system compromised the following capital assets:

- a 265-kW rooftop system with 913 PV panels on the marine mammal pavilion
- Sophisticated building management, metering, analytics, and energy efficiency solutions
- A 1-MW/250-kWh lithium-ion battery energy storage system
- X kW back up diesel generators

A significant portion of these capital assets, specifically the battery system was successfully financed due to a grant from the Illinois Dept of Commerce and Economic Opportunity. As the need for greater resiliency and power surety rise to protect vulnerable Illinois residents, we must find a way to quantify the value of resiliency and the cost of inadequate action. Using the Shedd Aquarium as a sanctioned regulatory sandbox would allow for the trial of different, voluntary utility rates, tariffs and programs, such as, time of use pricing, two-way islanding tariffs, new demand response programs, different incentives for load flexibility and more. A combination of simulated and real hardware testing can be performed with the oversight of Argonne National Lab.

(2) Illinois Medical District

Another fundamental issue is the resiliency and availability of power to critical care facilities. Bellevue Hospital and NYU Langone needed to evacuate patients during hurricane Sandy due to critical failures of the operation of diesel generators. Because diesel generators are only able to come on line once power has been completely lost, critical power systems were not properly tested to reveal failures. The Illinois Medical District is the largest urban medical district in the United States. There is truly a unique opportunity for IMD to be designated a regulatory innovation district for power surety and microgrids. For instance, most emergency backup generators are Tier 2 emergency diesel generators with minimal pollution controls. Consequently, these generators may only be utilized during an actual power outage. These generators are not able to participate in demand response programs to proactively protect the power grid from outages. In the event of a widespread or long duration outage, these generators face operating limits based on existing air pollution regulations. The IMD can be a unique regulatory sandbox to simulate, model and test different incentive programs to minimize the payback hurdle of upgrading applicable Tier 2 generators to Tier 4 classification, which would remove over 90% of air pollutants and enable the generators to participate in demand response programs and protect the stability of the power grid. This sandbox approach can also determine what market approaches would be necessary to lessen the cost of investment in long duration batteries with PV, upgrading to new Tier IV generators or switching to cleaner, more reliable but more expensive backup generators fueled by natural gas or renewable natural gas.

(3) University of Illinois Chicago (UIC)

Essential to Chicago's commitment to decarbonization will be the electrification of transportation and the optimization of mass transit; both of these issues have significant social justice components. UIC currently supports multi-modal transportation across a wide spectrum of socio-economic demographics. UIC is excellent location to model, simulate and test different approaches to optimize mass transit and determine best ownership structures for EV infrastructure.

These are just three brief examples to illustrate the value of developing strategic, regulatory sandboxes in coordination with key energy stakeholders to best support the decision making of appointed commissioners and provide the greatest possible protection to Illinois residents.

Anticipated next steps include:

a. Identifying community stakeholders and key energy users (i.e. Shedd Aquarium, IMD, UIC) interested in developing potential solutions for providing higher reliability and resiliency for energy services for such facilities and convening them to focus on opportunities.

b. Identifying various models and implementation approaches being applied successfully in other jurisdictions, identifying possible business models and potential locations for testing and demonstrating those business models in Illinois, and sharing that information with the community stakeholders.

c. Explaining to stakeholders how the regulatory sandbox approach can support constructive and flexible approaches to facilitate more rapid innovation and learning.

d. Engage with the stakeholders and relevant government agencies regarding the specific value of regulatory sandboxes, namely, to propose near term actions that can be undertaken quickly and without necessitating long-term regulatory reforms, to enable the rapid testing, demonstrating, and evaluating of potentially relevant business models and technical solutions.

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