Attachment B: Preliminary List of Barriers to Realizing the Full Potential of Microgrids in the District of Columbia

This document presents an initial overview of some key barriers to the development of microgrids in the District of Columbia, as well as consequences, possible solutions, and precedent or examples from other jurisdiction (when possible). These barriers can be roughly divided into two categories: legal and regulatory factors that can impede the development of microgrids, and challenges to the financial feasibility of microgrids.

Legal and Regulatory Barriers:

1) Barriers to installing and operating distribution systems in DC under the existing regulatory framework
2) Legal uncertainties and potentially burdensome regulatory burden on microgrids (depending on how they are classified) that deter developers and potential investors
3) Gaps in the existing legal framework that limit the District's ability to promote development of microgrids
4) Existing laws and regulations that fail to account for some public benefits provided by microgrids (eg in resiliency, reducing emissions), and therefore do not provide incentives for microgrid developers to provide these benefits

Financial Barriers:

1) Cost barriers, such as overcoming high predevelopment costs and allocating costs between involved parties
2) Challenges to securing debt and equity that fit the financial model
3) Managing risk and uncertain cash flows, costs, and incentives
4) Aligning the microgrid project with broader development plans, and optimizing for total revenue

Legal and Regulatory Barriers

Barrier	Consequences	Possible Solutions	Precedent and Examples in Other Jurisdictions
Barriers to installing and operating distribution systems in DC			
Pepco Franchise & Easements: There is uncertainty both about the legal basis of Pepco's franchise (and if it exists but is non-exclusive, uncertainty about its extent) and the basis for its easements.	Investors and lenders are unwilling to commit equity and debt without greater clarity. Similarly, end-users, especially real-estate developers, unwilling to commit their loads. There is no existing mechanism for microgrids to replicate Pepco's	• Clarify legal foundation for franchise • Determine accurate basis for existing Pepco easements, as memorialized with the Recorder of Deeds • Move any entitlements from	• NH PSC found, in the absence of an explicit franchise, that historic solidarity in the market did not create the right of exclusivity in the law.[1] • Pepco could take on a role similar to the DSPP

1 Id. at 27-8. Appeal of Pub. Serv. Co. of N.H., 676 A.2d 101, 103 (N.H. 1996)

Barrier	Consequences	Possible Solutions	Precedent and Examples in Other Jurisdictions
	easements, and potential for long delays in implementation while agencies debate roles and responsibilities.	common law to explicit statute, or move to a transaction-based model instead of a regulatory compact	(Distributed System Platform Provider) envisioned under the NY REV process.
Rights of Way: Crossing public rights-of-way with thermal and/or electrical distribution systems may be prohibited.	Right of way questions could eliminate many potential microgrid sites from feasibility, or site owners could be forced to keep internal roads out of public domain. If crossing rights-of way is only prohibited for thermal distribution, these components of a microgrid (hot water, chilled water, steam) may not be feasible.	• Reinforce existing system of revocable consent permits by public manager of rights-of-way (DDOT) for private conduits. • Clarify outdated definition of "pipeline company" to include only the transfer of ownership of the fluids themselves, excluding transportation of fluids whose value resides in their energy content.	• New York City system of permits for electric distribution wires (e.g., Amalgamated Warbasse) • Almost all other jurisdictions outside of DC have a modernized definition of "pipeline company"
Legal uncertainties and potential regulatory burden			
Regulatory Burden as a Public Utility: Selling electricity to a retail customer, or crossing public rights-of-way with energy distribution systems may trigger regulation as a public utility.	Being declared a fully-regulated "public utility" will deter most project developers or potential owners.	• Limit the scope of what constitutes a "public utility" by defining a membership status within a microgrid that does not constitute a "retail" sale, and removing crossing rights-of-way as a potential trigger for utility regulation. • Include microgrid size or other parameters before triggering regulatory regimes. • Ensure extremely light regulatory burden.	• Energy Improvement District legislation in Connecticut and Community Aggregation in California allow for non-retail sales of electricity. • Massachusetts does not base regulations on whether wires cross rights-of-way. • RED-Rochester (see above) provides an example of light regulatory burden.
Uncertainty in Electric Company Regulation: Lack of clarity around	Complex organizational and financial structures required to avoid even	Acknowledge that existing "internal wires" exemption can apply within	

Barrier	Consequences	Possible Solutions	Precedent and Examples in Other Jurisdictions
non-Pepco "electric company" regulation and DC statutory exemptions; no regulatory framework to deal with an "electric company" other than Pepco.	possibly falling under definition of "electric company." Uncertainty and fear that microgrid will end up being ruled a "public utility" deters investors.	microgrids	
Key Questions: There are several regulatory gaps around specific points relevant to microgrids, such as: • Is residential sub-metering is the same as commercial sub-metering per DC Code? • Do 'Consumer Choice' requirements apply within a microgrid?	• Billing responsibilities left to owner who may reject that role, plus limited accountability / incentives for energy efficiency for residents • Having each individual user within a microgrid make supplier decisions is likely an insurmountable commercial burden	• Acknowledge that current commercial sub-metering procedures also apply to residential end-users • Define the microgrid itself as the entity entitled to Consumer Choice (assuming a single point of common coupling to access the larger grid)	New Connecticut law and regulations overturning previous limits on residential sub-metering
System Benefit Charges: No mechanism to support the goals of various system benefit charges	Funds may become stretched for SEU, LIHEAP, and other programs	• Define the microgrid itself as the entity subject to the system benefit charges, levied only on grid purchases. • Require SBC contributions for non-regulated tariffs (if a legal basis can be found to do so). • Create policy mechanisms so microgrid can provide similar benefits to users, or contract with the District to do so	
Gaps in the existing legal framework that limit the District's ability to promote development of microgrids			
Zoning and Planning: There is no mechanism for requiring "microgrid-ready" construction or renovations in a defined zone. Similarly, there are no zoning		Similar to Green Building requirements, require that over a certain size, developers must carry out the financial analysis as condition of zoning (Large Area /	

Barrier	Consequences	Possible Solutions	Precedent and Examples in Other Jurisdictions
requirements to even consider participating in a microgrid.		PUD / etc)	
Legal / Regulatory Authority: • No regulatory framework for a publicly-owned (municipal) utility, and no statutory or legal mechanism to apportion franchise-like abilities to a microgrid ("mini-muni"). • In DC, the government also lacks a statutory or legal mechanism to require participation in thermal services of a microgrid. • Lack of procedure for pre-approval of generation asset construction	• District government cannot act on behalf of public policy goals. If DC lacks regulations for municipal or "mini-muni" utilities, FERC will step in, potentially with steep compliance costs. • Without ability to enforce participation, contiguous properties can drop out of microgrids and developers will be unable to recover distribution system capital costs. • Investors will not put their capital at risk without pre-approval	• Establish framework for a "Mini-Muni," with an extremely light regulatory touch. • Revise permitting milestones to permit pre-approval for generation assets.	• Recycled Energy Development (RED-Rochester LLC) at the former Eastman Kodak site was afforded "lightened regulation" by the PSC.2 • Most other jurisdictions outside of DC allow for pre-approval of generation asset construction.
Existing laws and regulations fail to account for some public benefits provided by microgrids			
Emissions: Air permitting is not source-based, (e.g. no credit for avoided emissions vs. BAU); so existing regulation does not count offsets for avoided emissions from other jurisdictions (e.g., WV coal plants that blow straight toward DC).	Unwarranted scrutiny for air quality permits, even in the dominant case of actual reductions in criteria pollutants within DC boundaries.		EPA is promoting source-based accounting for air regulators.[3]
Resiliency Benefits: No mechanism exists for microgrids to capture the	• Opportunities for reliability improvements and real savings to	• Replicate DC Plug funding mechanism for other resiliency	• California utilities were required to file their first

2 Case 13-M-0028, RED-Rochester LLC and Eastman Kodak Company, Order Confirming Prior Order and Granting Certificates of Public Convenience and Necessity (issued June 13, 2013)

3 EPA CHP Partnership, "Accounting for CHP in Output-Based Regulations," February 2013

Barrier	Consequences	Possible Solutions	Precedent and Examples in Other Jurisdictions
benefits they create in: • Relieving stress on the local distribution system. Resiliency payments are made unequally to Pepco and to microgrids. • Providing "pooled" standby power per code requirements for standby generation.	ratepayers can be lost. • DC Plug funding and other mechanisms may be more expensive means of improving resiliency in particular locations compared to microgrids, but microgrids are not competing on level playing field. • Individual buildings or end-users are forced to install costly and inefficient diesel engines, instead of devoting those capital investments toward more flexible and more reliable standby power, outside the building envelope but under the control of the microgrid.	and storm-hardening measures, if they can demonstrate they are significantly more cost-effective • Define a microgrid Standby Service tariff (capacity based) where a microgrid is compensated for being able to serve critical infrastructure during outages	Distribution Resource Plans on July 1st, identifying locations where distribution generation would deliver the most benefit. • At a coarser level, the NY Prize process includes Opportunity Zones, which may be refined under the REV process.

Financial Barriers

Barrier	Consequences	Possible Solutions	Precedent and Examples in Other Jurisdictions
Cost Barriers			
Predevelopment Costs: Difficult for developers to access capital to complete expensive pre-development efforts.	Significant early-stage pre-development investments required, including upfront legal costs to secure loads, easements, covenants, etc.; site level engineering analysis; and significant design and engineering investments to demonstrate project costs and potential revenues from anticipated loads.	• Developers can assume up-front costs in order to lock in project development opportunities. • Investor groups can assume greater short-term risks during development for higher returns. • Pre-development costs can be defrayed through early public investment to establish privately	• TPWR – Walter Reed & Urban Ingenuity energy development RFP model, with at-risk participation • Almono – Economic Development Corporation partnership with local philanthropy • Philadelphia Navy Yard Energy

		financeable projects.	Cluster – Federal subsidy for local consortium
Allocating costs and benefits: Micro-grids substantially reorganize how physical assets are structured, owned and paid for.	Re-assigning costs between the energy system developer, property owners, real estate project developers, and tenants requires flexibility and new tools. Providing clear answers to these questions influences what is financed and how.	• Establish a formula for shared savings from capital cost budgets between the microgrid developer and property owners or developers to allow micro-grids to benefit from cash flows generated through increased savings to capital budgets. • Market offerings like back-up generation for un-interruptable power as premium products to generate new revenue streams.	
Securing Debt and Equity			
Cost of Capital: Because micro-grids and other forms of clean technology are relatively new, perceived risk may be inflated.	This can drive capital costs up, misaligning yield expectations from equity investors, treating what is ultimately a long-term stable infrastructure investment as a higher risk form of project equity investment.	• Identifying long term infrastructure investors such as utilities and institutional investors. • Utilizing market vehicles that have tended to finance longer dated assets in real estate and infrastructure to finance clean energy and microgrid infrastructure.	• Washington Gas (WGL) – Utilizing traditional infrastructure finance to capitalize innovation • NRG – Reaching the market using a Yield Co structure • Hannon Armstrong – Clean Energy REIT & IRS ruling
Term: In current rising interest rate environment, it is often hard to find private capital to make long dated infrastructure investments and appropriate returns.	Accessing long dated debt is key to driving down the cost of debt service, and achieving strong positive cash flows to support private investment.	• Policy-driven finance tools such as IRB's, TIFs, and PACE Assessments have effectively been used to drive down the cost of publically beneficial infrastructure projects • Pension funds and insurance companies: Certain investor pools actively seek long dated	• AFL-CIO BCTD & HIT – Labor capital is showing increasing flexibility to engage these investments, the AFL-CIO Building & Construction Trades in the mid-Atlantic are seeking such investments. • Pegasus Debt Fund – New private funds emerging

		assets for fixed rate investments.	
Managing Risk			
Uncertainty and Execution Risk: Uncertainty on the timing and size of total energy demand is a major barrier to allowing financing of project costs. Additionally, financial returns can only be realized when projects are properly executed.	Without certain revenue estimates, it is impossible to secure capital commitments, and execution problems cut into revenue streams.	• Developers have several tools to mitigate uncertainty and secure loads, such as Covenants, Codes, and Restriction agreements, or by establishing anchor loads. • Existing legal structures such as Power Purchase Agreements, Energy Services Agreements, and Performance Guarantees can help limit execution risk.	• TPWR – CCRs incorporate energy into site leases and other agreements • Southwest Waterfront and EBDI – East Baltimore and the failed SW Waterfront project rely on project by project contracts
Counterparty Risk & Credit Underwriting: It is important for microgrids to address issues of credit quality and counterparty risk in establishing long term service contracts.	These can have strong bearing on the relative risk or certainty of underlying cash flows to support debt payments or equity returns. The mechanisms for managing these risks also have bearing on developer willingness to allow a microgrid for their site.	With traditional utilities, non-payment costs are socialized. However with a smaller rate payer base, this requires more creative structuring from micro-grid developers to provide contractual remedies, reserve funds, and other tools for backstopping credit and non-payment risks.	
Predictability of Costs and Incentives: It can be difficult for microgrid developers to predict future utility tariffs and incentives/subsidies.	• Uncertainty on federal tax credits for co-gen and renewables are a real barrier to investment, and local subsidies can be hard to predict during early project development when they are most useful. • The DC co-gen tariff rate for natural gas is currently individually negotiated, making fuel costs hard to anticipate.	• Clear framework for microgrids to access local subsidies and incentives. • Greater transparency around utility tariffs, and clear rules in the regulatory framework for engaging the regional energy grid need to be developed to understand total project economics for micro-grids.	
Aligning Incentives			

Aligning energy and real estate project development: Important to align project cycles and balance interests of energy infrastructure within real estate development projects.	• Project development cycles: Conduct microgrid analysis early enough that fundamental infrastructure design choices can still be influenced. • First cost vs. total cost: Real estate generally focuses on minimizing first costs for infrastructure, rather than on treating energy as a source of revenue (or cost offset).	• Integrated planning, policy-driven planning approaches • Microgrid Project Developer Models: Engaging a separate party with a long term desire to own and operate assets, and hold them on balance sheet to align the interests of energy infrastructure within real estate development projects.	• TPWR – Shifting to a microgrid, allowed substantial infrastructure costs to move off-balance sheet for the developer
Optimizing for total revenue: Traditional co-gen only design optimizes for thermal efficiency, rather than looking broadly at the economic output of assets.	Co-gen only design leaves many cash-flow opportunities on the table and does not achieve maximum long term economic value, making projects less financeable.	• Moving from thermal-only district energy systems to integrated micro-grids establishes extensive opportunities to establish new cash flows, and to organize project sizing to maximize more valuable electric production.	• TPWR – Design experience at Walter Reed shows that microgrid projects that at first appear un-economic can be made viable with electricity values.