

Virtual Power Plant Considerations (SMUD Snapshot)

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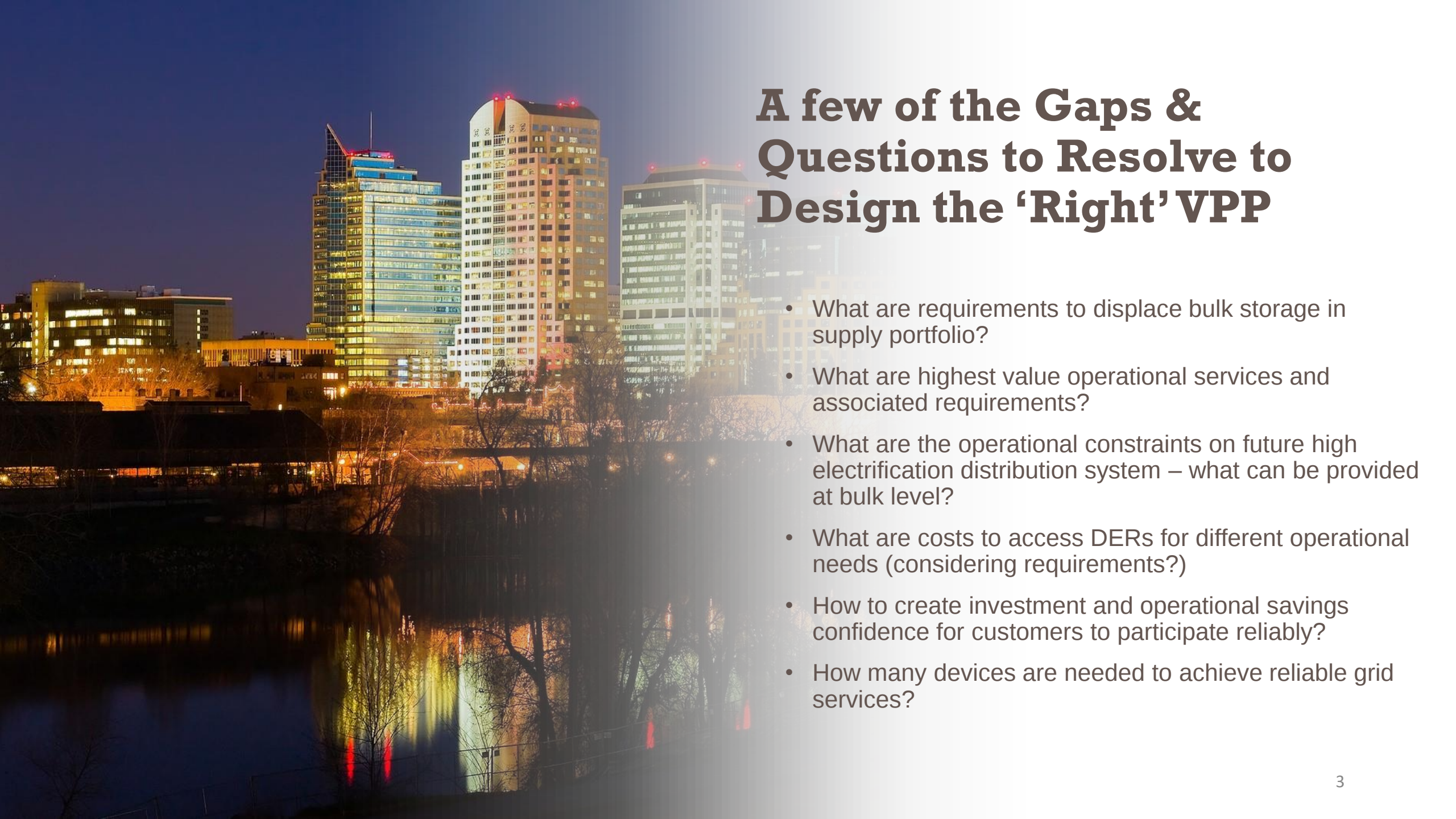
Powering forward.
Together.





From DR to VPPs

- 6X growth in Evs over next 6 years, 50X growth in BTM storage, V1G, V2G...?
- Potentially >1000 MW of new controllable loads beyond hundreds of MW of traditional DR potential
- Pace of distribution upgrade requirements for electrification will exceed staff capacity
- Scale of bulk storage investment to meet 0 emissions by 2030 are massive
- In process of a shift from DR for RA (planning value) to VPPs for diverse set of planning and operational values (Bulk and distributed)



A few of the Gaps & Questions to Resolve to Design the 'Right' VPP

- What are requirements to displace bulk storage in supply portfolio?
- What are highest value operational services and associated requirements?
- What are the operational constraints on future high electrification distribution system – what can be provided at bulk level?
- What are costs to access DERs for different operational needs (considering requirements?)
- How to create investment and operational savings confidence for customers to participate reliably?
- How many devices are needed to achieve reliable grid services?