

Subteam 1a. 1b. Distribution Services Definitions, Attributes and Resource Performance and Measurement

1. Distribution Services	2. Definition	3. Service Attribute(s)	4. Notes	5. Consensus (on 1-3 only)	6. Recommendation (on 1-3 only)	7. Resource Performance/ Measurement	8. Notes	9. Consensus (on 7 only)	10. Recommendations (on 7 only)
Load Serving Capacity	Load modifying or supply with <u>Infrastructure capability capacity</u> to manage net <u>normal and emergency</u> loading on distribution infrastructure (substation, feeder, feeder component, transformer)	<ul style="list-style-type: none"> • Distribution capacity (certain hours within a day, month and/or season) • Ramping Up/down • Locational 				<ul style="list-style-type: none"> • Test resource <u>ability to perform the service</u> prior to commercial operation <u>and prior to deadline for IOU to construct traditional alternative.</u> • Test periodically during delivery term. • Ensure DER availability when expected to contribute to grid needs and utility reserved periods • Real-time visibility and control. • Effectiveness of coordinated dispatch/sche 			

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						duling • Analysis of projected equipment loading levels against actual equipment loading levels. • Measure communication reliability between PG&E IOU dispatch operators and the DER to ensure availability			
Reliability: Back-up Capability (Grid Tied)	Reduced frequency and duration of outages <u>under abnormal conditions</u> , ability to withstand and recover from external events & availability of excess reserves to	<ul style="list-style-type: none"> • Distribution capacity (certain hours within a day, month and/or season) • Ramping Up/down • <u>Location</u> 				<ul style="list-style-type: none"> • Test resource <u>ability to perform the service prior to commercial operation and prior to deadline for IOU to construct traditional alternative.</u> Test resource 			

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	reduce demand when restoring customers					<p>prior to commercial operation.</p> <ul style="list-style-type: none"> • Test periodically during delivery term. • Ensure DER availability when expected to contribute to grid needs and utility reserved periods • Real-time visibility and control. • Effectiveness of coordinated dispatch/scheduling • Analysis of projected equipment loading levels against actual equipment loading levels. • Measure communicati 			

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						on reliability between PG&E IOU dispatch operators and the DER to ensure availability			
Reliability: Resiliency (Microgrid)	Ability to provide power when central power is not supplied and reduce duration of outages	<ul style="list-style-type: none"> • Distribution capacity (certain hours within a day, month and/or season) • <u>Ramping Up/down</u> • <u>Isosynchronous generation capacity</u> • <u>Systems to match generation to load while maintaining voltage, frequency, power quality and power</u> 				<ul style="list-style-type: none"> • Test resource prior to commercial operation. • Test periodically during delivery term. • Ensure DER availability when expected to contribute to grid needs and utility reserved periods • Real-time visibility and control. • Effectiveness of coordinated dispatch/scheduling 			

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		<p><u>factor within appropriate limits</u></p>				<ul style="list-style-type: none"> • Analysis of projected equipment loading levels against actual equipment loading levels. • Measure communication reliability between <u>PG&E IOU</u> dispatch operators and the DER to ensure availability • <u>Island parameters within appropriate limits</u> 			
<p>Voltage <u>Control through Real</u> & Reactive Power Support</p>	<p>Improved steady-state voltage to avoid voltage related investment. Dynamic voltage management to keep</p>	<ul style="list-style-type: none"> • Improve power quality • Improve efficiency (certain hours within a day, month and/or 				<ul style="list-style-type: none"> • <u>Test resource ability to perform the service prior to commercial operation and prior to deadline for IOU to</u> 			

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	secondary and primary voltage within Rule 2 limits	season) • Ramping Up/down • Delivering or absorbing a <u>combination of real and reactive power (beyond interconnection requirements) as necessary</u>				construct traditional alternative Test resource prior to commercial operation. • Test periodically during delivery term. • Ensure DER availability when expected to contribute to grid needs and utility reserved periods • Real-time visibility and control. • Effectiveness of coordinated dispatch/scheduling • Measure communication reliability between <u>PG&E IOU</u> dispatch			

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						operators and the DER to ensure availability			

Potential resources that could provide the distribution services may be resources located either in front of the customer meter or behind the customer meter such as:

- energy efficiency
- demand response
- energy storage
- electric vehicles
- distributed generation
- inverters for real power and smart inverters for real & reactive power
- microgrid