

Capability Name	Question Name	Question	2021 Responses (Current)	2021 Responses (Future)	Changed Current State from 2020?	Change Justification (Current State)	Changed Future State from 2020?	Change Justification (Future State)
2. Ignition risk estimation	A.II.b	How automated is the ignition risk calculation tool?	ii	iii	Downgrade	SDG&E's reason for de-maturation from "Mostly (<50%)" to "Partially (<50%)" in the current year was due to our interpretation of the question rather than a change in process of ignition risk estimation. SDG&E's interpretation of automation is when data is automatically pulled from different sources and databases, it automatically flows through different models to automatically simulate results without any involvement and interpretation from the Subject Matter Experts. Based on our understanding of this definition, questions related to Capability 2, 4 and 3 fall in different categories. Capability 2 (A.II.b) is focused on the likelihood of an ignition. SDG&E uses a combination of tools to assess ignition risk based on data, Subject Matter Expert input, and ignition history. The tools used for assessment are automated, however, there is a need for manual effort upfront to gather the data, run it through the model and lastly, it requires a Subject Matter Expert for analysis of the outputs to make them meaningful. Based on this reasoning, the ignition risk estimation tool is partially automated.	No Change	N/A
3. Estimation of wildfire consequences for communities	A.III.f	How are the outputs of the ignition risk impact assessment tool evaluated?	iv	iv	Upgrade	SDG&E subject matter experts assess the output of the wildfire modeling and have the ability to make real-time changes and updates based upon experiences and conditions measured or observed. Additionally, SDG&E plans to work with Technosylva and others to implement innovative approaches to enhance and leverage Wildfire Risk Reduction Model (WRRM) with real time learning	No Change	N/A
4. Estimation of wildfire and PSPS risk-reduction impact	A.IV.b	How automated is your ignition risk reduction impact assessment tool?	ii	iii	Downgrade	SDG&E's reason for de-maturation from "Mostly (<50%)" to "Partially (<50%)" in the current year was due to our interpretation of the question rather than a change in process of ignition risk estimation. SDG&E's interpretation of automation is when data is automatically pulled from different sources and databases, it automatically flows through different models to automatically simulate results without any involvement and interpretation from the Subject Matter Experts. Based on our understanding of this definition, questions related to Capability 2, 4 and 3 fall in different categories. Capability 2 (A.II.b) is focused on the likelihood of an ignition. SDG&E uses a combination of tools to assess ignition risk based on data, Subject Matter Expert input, and ignition history. The tools used for assessment are automated, however, there is a need for manual effort upfront to gather the data, run it through the model and lastly, it requires a Subject Matter Expert for analysis of the outputs to make them meaningful. Based on this reasoning, the ignition risk estimation tool is partially automated. Capability 4 (A.IV.b) has a new element of risk modeling for PSPS risk reduction. However, very similar to capability 2 - the tools are partially automated due to the manual process of gathering and interpreting the results.	No Change	N/A
7. Weather data resolution	B.II.a	How granular is the weather data that is collected?	iv	iv	Upgrade	SDG&E's response upgraded for the current year as SDG&E's weather data remains sufficiently granular to monitor current conditions and validate model performance. In addition, SDG&E forecast model provides wind estimation at about 50 atmospheric altitudes, with those closest to the surface being most relevant to ignition risk.	Upgrade	SDG&E's response upgraded for the current year as SDG&E's weather data remains sufficiently granular to monitor current conditions and validate model performance. In addition, SDG&E forecast model is developed wind estimation over 50 atmospheric altitudes.
7. Weather data resolution	B.II.b	How frequently is data gathered	v	v	Upgrade	SDG&E's response upgraded for the current year because the weather stations that did report every 10 minutes now have the capability to report every 30 second on demand.	Upgrade	SDG&E's response upgraded for the current year since the Weather stations at SDG&E report every 10 minutes and up to every 30 second on demand. Over 200 SDG&E weather stations are equipped with 30 seconds capability.
9. External sources used in weather forecasting	B.IV.c	For what is weather data used?	iii	iii	Upgrade	SDG&E continues to leverage and enhance live map platforms to create a single visual map to support real-time operation with the weather data. SDG&E has operationalized a new internal PSPS dashboard, resulting in the increased rating.	No Change	N/A
10. Wildfire detection processes and capabilities	B.V.c	How is information on detected ignitions reported?	iii	iii	Upgrade	SDG&E continues to work and build relationships with emergency response agencies, strategic partner organizations and fire suppression agencies. SDG&E upgraded the response this year, with the assumption that the stakeholders that we continue to build and expand and improve collaboration with are CAL OES and the CPUC.	Upgrade	SDG&E continues to work and build relationships with emergency response agencies, strategic partner organizations and fire suppression agencies. SDG&E upgraded the response this year, with the assumption that the stakeholders that we continue to build and expand and improve collaboration with are CAL OES and the CPUC.
13. Grid design for resiliency and minimizing PSPS	C.III.b	What level of redundancy does the utility's distribution architecture have?	ii	ii	No Change	N/A	Downgrade	SDG&E is a normally radial system and majority of the circuits within HFTD have ties, sectionalizing devices to minimize customer impact during failures/outages. With the system being normally radial, SDG&E currently is not actively looking at ways to create a redundant system (i.e. a network) for n-1 within the HFTD to achieve much lower impact.
13. Grid design for resiliency and minimizing PSPS	C.III.d	How does the utility consider egress points in its grid topology?	ii	ii	No Change	N/A	Downgrade	SDG&E implicitly considers egress risk in grid topology based on circuits and communities but not in a formalized or quantitative way for each customer at the moment. However, the timelines to get this in an application are still unclear and are being worked on. The future maturity was updated in the 2021 assessment due to uncertainties about that timeline.

14. Risk-based grid hardening and cost efficiency	C.IV.b	At what level can estimates be prepared?	iii	iii	Upgrade	Recognizing the need for enhanced approaches to evaluate risks and determine strategies based on evaluation of more granular risk spend efficiencies (RSEs), in 2020 SDG&E worked on developing its Wildfire Next Generation System (WINGS) model; a. WINGS is a new tool that enables more granular risk assessments and alternatives analysis to be conducted at the segment (sub-circuit) level with the objective of identifying solutions to reduce the impacts of PSPS and mitigate the risk of wildfires. SDG&E is continuing to improve the model to get a granular assessment of risk across the system	No Change	N/A
14. Risk-based grid hardening and cost efficiency	C.IV.e	Can the utility evaluate risk reduction synergies from combination of various initiatives?	ii	ii	Upgrade	While SDG&E continues to expand and further improve on the evaluation of risk reduction synergies, SDG&E is able to evaluate combinations of grid hardening solutions manually on a case-by-cases basis but plans to continue to enhance this effort.	Upgrade	While SDG&E continues to expand and further improve on the evaluation of risk reduction synergies, SDG&E is able to evaluate combinations of grid hardening solutions manually on a case-by-cases basis but plans to continue to enhance this effort.
16. Asset inventory and condition assessments	D.I.a	What information is captured in the equipment inventory database?	iv	iv	No Change	N/A	Downgrade	SDG&E notes that there is an accurate inventory of equipment that may contribute to wildfire risk, including age, state of wear, and expected lifecycle, including records of all inspections and repairs and up-to-date work plans on expected future repairs and replacements. SDG&E is developing, adding and learning more about the data and it isn't mature enough to seek independent auditing of this data. Meanwhile, SDG&E stores ISO and PUC audited information for maintenance records, but it isn't seeking independent auditing of sensor outputs (Condition Based Maintenance, SCADA, Relay, Sectionalizing Recloser) for everything under Distribution, Transmission and Substation currently, however, may consider it for future.
21. Vegetation inventory and condition assessments	E.I.a	What information is captured in the inventory?	iv	iv	No Change	N/A	Downgrade	In capability 21, the highest level of maturity involves up-to-date tree health and moisture content to determine the risk of ignition and propagation. SDG&E currently has a comprehensive and detailed tree inventory database. Each inventory tree record is updated during the inspection activity and captures information such as species, clearance, tree condition, work status, customer and location information, activity history, etc. SDG&E doesn't intend to take into consideration the fuel moisture content by tree to determine risk of ignition and propagation by end of 2022.
27. Protective equipment and device settings	F.I.b	Is there an automated process for adjusting sensitivity of grid elements and evaluating effectiveness?	ii	ii	No Change	N/A	Downgrade	SDG&E tracks setting changes via manually created workflows, which is reviewed to ensure accuracy. Automated scripts are initiated by operations to change field settings. SDG&E plans on full automation into risk profiles by device for the future, however, this is something that will go beyond 2022.
28. Incorporating ignition risk factors in grid control	F.II.d	When does the utility operate the grid above rated voltage and current load?	i	iii	No Change	N/A	Upgrade	SDG&E's goal is to never operate the grid above rated voltage and current load. SDG&E has system restrictions to identify all voltage and current limits for individual circuit segments. In addition, SDG&E plans on further improving and developing on those systems, partnering with internal System Planning team to identify potential overload locations on the system which will allow quick identification and response to mitigate any system overload conditions.
29. PSPS op. model and consequence mitigation	F.III.b	What share of customers are communicated to regarding forecasted PSPS events?	ii	iii	Downgrade	There were multiple factors that contributed to the decrease in our customer communication rate, though we are very focused on continuously improvement moving forward. Fire season 2020 posed several forecasting challenges for the meteorology team to anticipate every circuit that may experience critical fire weather conditions. To not over-communicate, over-warn or "cry wolf" to our customers, we strive to be very precise and targeted with our notifications, and this has led to isolated instances where extreme fire weather conditions have materialized in unanticipated areas causing de-energization without pre-notification. Additionally, we leverage remotely controlled sectionalizing devices to isolate the impacts of our PSPS efforts. There were multiple instances in 2020 in which the communications with these devices were not successful, requiring our system operators to leverage the next available switch, impacting customers that we did not expect to be impacted by the outage. In both of these instances, our team is focused on mitigating these unanticipated impacts moving forward.	No Change	N/A

29. PSPS op. model and consequence mitigation	F.III.e	During PSPS events, what is the average downtime per customer?	v	v	Upgrade	<p>SDG&E's response was upgraded from 2020, due to a change in interpretation of "downtime". The initial response in 2020 was based on interpreting downtime as outage duration and was answered based on looking at system SAIDI. In 2021, SDG&E's interpretation based on the line of questions in this capability changed to interpreting "downtime" as website downtime rather than power outage. During 2020, SDG&E did not experience any website downtime throughout the wildfire season.</p> <p>SDGE.com is hosted on the Amazon Web Services (AWS) "Cloud" infrastructure (we started this in 2011).</p> <p>During an active PSPS event, SDG&E utilizes 24/7 monitoring tools and staff to check not only up-time, but performance, as well. If SDG&E detects degradation of SDGE.com performance, they add AWS web servers (AWS' Elastic Web-Computing) to increase capacity to handle the load.</p> <p>SDG&E has built a highly-scalable website infrastructure, including:</p> <ul style="list-style-type: none"> - Using CloudFlare as our Content Delivery Network (CDN) - Fine-tuned load balancing and proxy caching - A multi-tier stack, that separates the web servers from the file/database servers - Upgraded disaster recovery system (in different parts of the country) 	Upgrade	<p>SDG&E's response was upgraded from 2020, due to a change in interpretation of "downtime". The initial response in 2020 was based on interpreting downtime as outage duration and was answered based on looking at system SAIDI. In 2021, SDG&E's interpretation based on the line of questions in this capability changed to interpreting "downtime" as website downtime rather than power outage. During 2020, SDG&E did not experience any website downtime throughout the wildfire season.</p> <p>SDGE.com is hosted on the Amazon Web Services (AWS) "Cloud" infrastructure (we started this in 2011).</p> <p>During an active PSPS event, SDG&E utilizes 24/7 monitoring tools and staff to check not only up-time, but performance, as well. If SDG&E detects degradation of SDGE.com performance, they add AWS web servers (AWS' Elastic Web-Computing) to increase capacity to handle the load.</p> <p>SDG&E has built a highly-scalable website infrastructure, including:</p> <ul style="list-style-type: none"> - Using CloudFlare as our Content Delivery Network (CDN) - Fine-tuned load balancing and proxy caching - A multi-tier stack, that separates the web servers from the file/database servers - Upgraded disaster recovery system (in different parts of the country)
31. Protocols for PSPS re-energization	F.V.c	What is the average amount of time that it takes you to re-energize your grid from a PSPS once weather has subsided to below your de-energization threshold?	iv	v	No Change	N/A	Upgrade	<p>After the SDG&E weather network shows that wind speeds have reduced and the forecast doesn't indicate that the wind speeds will re-accelerate above certain thresholds, the process of re-energization can take place.</p> <p>The goal for each re-energized circuit is to complete the patrols with 4-8 hours of daylight for SDG&E field crews to inspect lines to determine whether there is any damage and deem it safe to restore power. In some cases patrols can be completed faster with air traffic permits, longer daylight hours, etc. However, there are conditions that are outside of SDGE control, such as the weather may have subsided, but the wind speeds need to be below a certain threshold for helicopter to fly safely to conduct patrols.</p>
33. Data collection and curation	G.I.f	Does the utility share best practices for database management and use with other utilities in California and beyond?	iii	iii	Upgrade	<p>SDG&E prioritizes cooperation and sharing of best practices as an important component of our fire mitigation activities. SDG&E is currently working with the other IOU's within California to share best practices for WMP database development and management. It does so through periodic joint meetings on both the programming and structure required to create a searchable database for WMP matters. We are also sharing best practices with the other IOU's on the structure and formatting of the governing documents needed to support the overall database as well as how a glossary comes to play. For example, SDG&E is a member of a consortium of utilities brought together by UMS Group Inc., an international management consulting firm specializing in solutions for the global energy and utility industries. The IWRMC is made up of multiple utilities from the United States, Australia, South America, and other areas. Engaging with this international consortium provides an opportunity to leverage global experience instead of just local or regional wildfire risk mitigation experience. It also may accelerates learnings and development of new solutions, helping to lead industry direction, and innovative approaches to risk mitigation.</p>	Upgrade	<p>SDG&E prioritizes cooperation and sharing of best practices as an important component of our fire mitigation activities. SDG&E is currently working with the other IOU's within California to share best practices for WMP database development and management. It does so through periodic joint meetings on both the programming and structure required to create a searchable database for WMP matters. We are also sharing best practices with the other IOU's on the structure and formatting of the governing documents needed to support the overall database as well as how a glossary comes to play. For example, SDG&E is a member of a consortium of utilities brought together by UMS Group Inc., an international management consulting firm specializing in solutions for the global energy and utility industries. The IWRMC is made up of multiple utilities from the United States, Australia, South America, and other areas. Engaging with this international consortium provides an opportunity to leverage global experience instead of just local or regional wildfire risk mitigation experience. It also may accelerates learnings and development of new solutions, helping to lead industry direction, and innovative approaches to risk mitigation.</p>
34. Data transparency and analytics	G.II.e	Are the most relevant wildfire related data algorithms disclosed?	iv	iv	Upgrade	<p>SDG&E continues to publicly share relevant wildfire related data algorithms, regardless of regulatory request. Relevant wildfire related data includes scientific publications such as Santa Ana Wildfire Threat Index (SAWTI) which calculates the potential for large wildfire activity based on the strength, extent, and duration of the wind, dryness of the air, dryness of the vegetation, and greenness of the grasses, Fire Potential Index, etc. SDG&E continue to focus on enhancing academic partnerships through broader data sharing. Additionally, SDG&E put more effort into providing more detail around its risk modeling algorithms in the 2021 WMP update.</p>	Upgrade	<p>SDG&E continues to publicly share relevant wildfire related data algorithms, regardless of regulatory request. Relevant wildfire related data includes scientific publications such as Santa Ana Wildfire Threat Index (SAWTI) which calculates the potential for large wildfire activity based on the strength, extent, and duration of the wind, dryness of the air, dryness of the vegetation, and greenness of the grasses, Fire Potential Index, etc. SDG&E continue to focus on enhancing academic partnerships through broader data sharing. Additionally, SDG&E put more effort into providing more detail around its risk modeling algorithms in the 2021 WMP update.</p>
37. Scenario analysis across different risk levels	H.I.a	For what risk scenarios is the utility able to provide projected cost and total risk reduction potential?	iii	iii	Upgrade	<p>Assuming different scenarios in this context are interpreted as scenarios for risk mitigations; upon further review of this capability, SDG&E responded based on the how Risk Spend Efficiencies (RSEs) were presented in the RAMP. The assessments in the RAMP include range of high, low and mid-points for both the risk calculations as well as the RSE analysis which includes risk reduction and costs. The current template structure for the WMP asks for a single point in which case SDG&E provides one score for the RSEs but can provide ranges where necessary.</p>	Upgrade	<p>Assuming different scenarios in this context are interpreted as scenarios for risk mitigations; upon further review of this capability, SDG&E responded based on the how Risk Spend Efficiencies (RSEs) were presented in the RAMP. The assessments in the RAMP include range of high, low and mid-points for both the risk calculations as well as the RSE analysis which includes risk reduction and costs. The current template structure for the WMP asks for a single point in which case SDG&E provides one score for the RSEs but can provide ranges where necessary.</p>

39. Process for determining risk spend efficiency of vegetation management initiatives	H.III.e	Can the utility evaluate risk reduction synergies from combination of various initiatives?	i	ii	No Change	N/A	Upgrade	SDG&E has been able to evaluate combined risk reductions in RAMP by grouping vegetation management initiatives to calculate RSEs but recognizes the need to improve methods to do so in the future and will be working on exploring those by end of 2022.
40. Process for determining risk spend efficiency of system hardening initiatives	H.IV.b	At what level can estimates be prepared?	iii	iv	Upgrade	SDG&E developed the Wildfire Next Generation System model (WINGS) in 2020 and is continuing to improve the model this year to provide granular estimates. WINGS is built upon the Risk Spend Efficiency (RSE) methodology in RAMP, evaluates both wildfire and PSPS risks at the sub-circuit/segment level to inform its investment decisions by determining which initiatives provide the greatest benefit per dollar spent in reducing both wildfire risk and PSPS impact. WINGS analysis can be done at a segment and circuit-level for grid hardening initiatives.	Upgrade	While SDG&E continues to improve and enhance the RSEs at the circuit level, SDG&E is doing further analysis and conducting studies to gather data at the span level, which will be ingested by the Wildfire Next Generation System model with the goal of providing more granular assessments.
40. Process for determining risk spend efficiency of system hardening initiatives	H.IV.d	What grid hardening initiatives are included in the utility risk spend efficiency analysis?	v	v	Upgrade	All grid hardening initiatives are included in the utility risk spend efficiency analysis. Initiatives that are lab-tested such as Falling Conductor Protection are also included in the risk spend efficiency analysis. The FCP program detects changes in phasor measurements to de-energize broken conductor before they fall to the ground	No Change	N/A
40. Process for determining risk spend efficiency of system hardening initiatives	H.IV.e	Can the utility evaluate risk reduction effects from the combination of various initiatives?	i	ii	No Change	N/A	Upgrade	While SDG&E continues to expand and further improve on the evaluation of risk reduction synergies, SDG&E is able to evaluate combinations of grid hardening solutions manually on a case-by-cases basis but plans to continue to enhance this effort.
51. Collaboration with emergency response agencies	J.IV.a	What is the cooperative model between the utility and suppression agencies?	iii	iii	Upgrade	SDG&E's continues to cooperate with suppression agencies by ensuring good communication and regularly strengthening relationships before, during, and after incidents. Alert Wildfire is used by the suppression agencies to confirm fires. SDG&E also works cooperatively with these agencies when ignitions occur and the reporting paths for ignitions are part of our standard operating procedures.	Upgrade	SDG&E's continues to cooperate with suppression agencies by ensuring good communication and regularly strengthening relationships before, during, and after incidents. Alert Wildfire is used by the suppression agencies to confirm fires. SDG&E also works cooperatively with these agencies when ignitions occur and the reporting paths for ignitions are part of our standard operating procedures.