1.1: Metrics Analysis
(Foundational Analysis for GMLC Establishment)

Project Description
This project assesses the feasibility and usefulness of metrics for measuring change in the evolving electricity infrastructure. Metrics and associated methods are being developed to assess the power grid’s evolution with respect to characteristics that are organized into the following six categories: reliability, resilience, flexibility, sustainability, affordability, and security.

Expected Outcomes
• Validation and adoption of metrics with stakeholders and regional partners
• Enhanced metrics that enable DOE to better set priorities on modernization research and development

<table>
<thead>
<tr>
<th>Significant Milestones</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Begin implementing pilot tests with partners</td>
<td>9/2017</td>
</tr>
<tr>
<td>Publish validation of new metrics as result of pilot tests</td>
<td>9/2018</td>
</tr>
<tr>
<td>Develop final report/briefing material</td>
<td>9/2018</td>
</tr>
</tbody>
</table>

Progress to Date
• Technical report about emerging metrics (March 2017)
• Webinars with key stakeholders, including five federal agencies, seven associations, two regional transmission organizations, three state entities, and one utility
• Working with American Public Power Association (APPA) to implement value-based System Average Interruption Duration Index (SAIDI) on its web platform for use by municipal utilities by summer 2017.

Reliability
New metrics for distribution to represent value-based planning

Resilience
Analysis Process
New metrics for system impacts using North American Electric Reliability Corporation transmission/generation availability data

Flexibility
Developed large set of candidate metrics that represent network properties of flexibility and lack of flexibility, engaging stakeholders to identify most useful metrics

Sustainability
Ability of federal greenhouse gas data products to capture changes in electric-sector CO2 emissions that might result from future grid modernization varies, depending on coverage of certain energy sources anticipated to grow.

Affordability
Cost Burden Metrics (emerging)
- Customer electricity cost burden
- Electricity affordability gap
- Affordability gap headcount
- Temporal indices of these metrics

Security
Protective Measures Index
- Determines protective security posture of an entity.
- Initially developed for and applied by Department of Homeland Security (DHS).
- Stakeholder agreement for use as physical security metrics for Electric sector.
- Allows comparison of physical security posture for similar entities.
- Has been applied to 400-plus electric facilities.