

Modern Grid Metrics

Presented by Joe Miller, Modern Grid Initiative Team

Modernizing the Grid Northeast Regional Summit

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What is a Modern Grid Metric?

- **Measurable**
- **Easily monitored**
- **Can be trended**
- **“Drill-down capable”**
- **Has a quantified target that defines success**
- **Drives desired behavior**

➤ **Standard considerations for any metric...**



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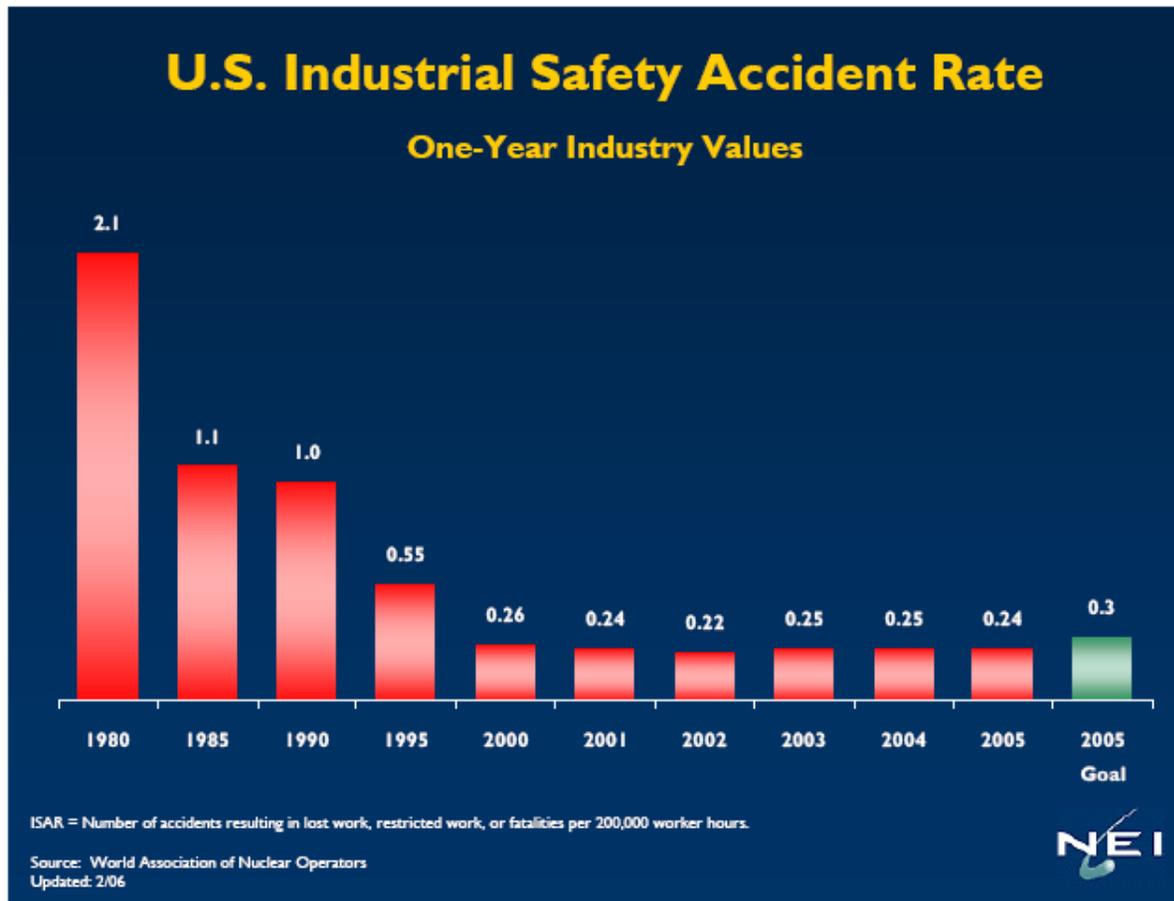
- **Modern Grid Team brainstorm and present some examples for consideration**
- **Solicit stakeholder input**
 - Discussion group participation (today)
 - Website interaction & Working Group reviews
- **Consider best practices by others**
- **Post metrics on website**

Example - nuclear power performance indicators



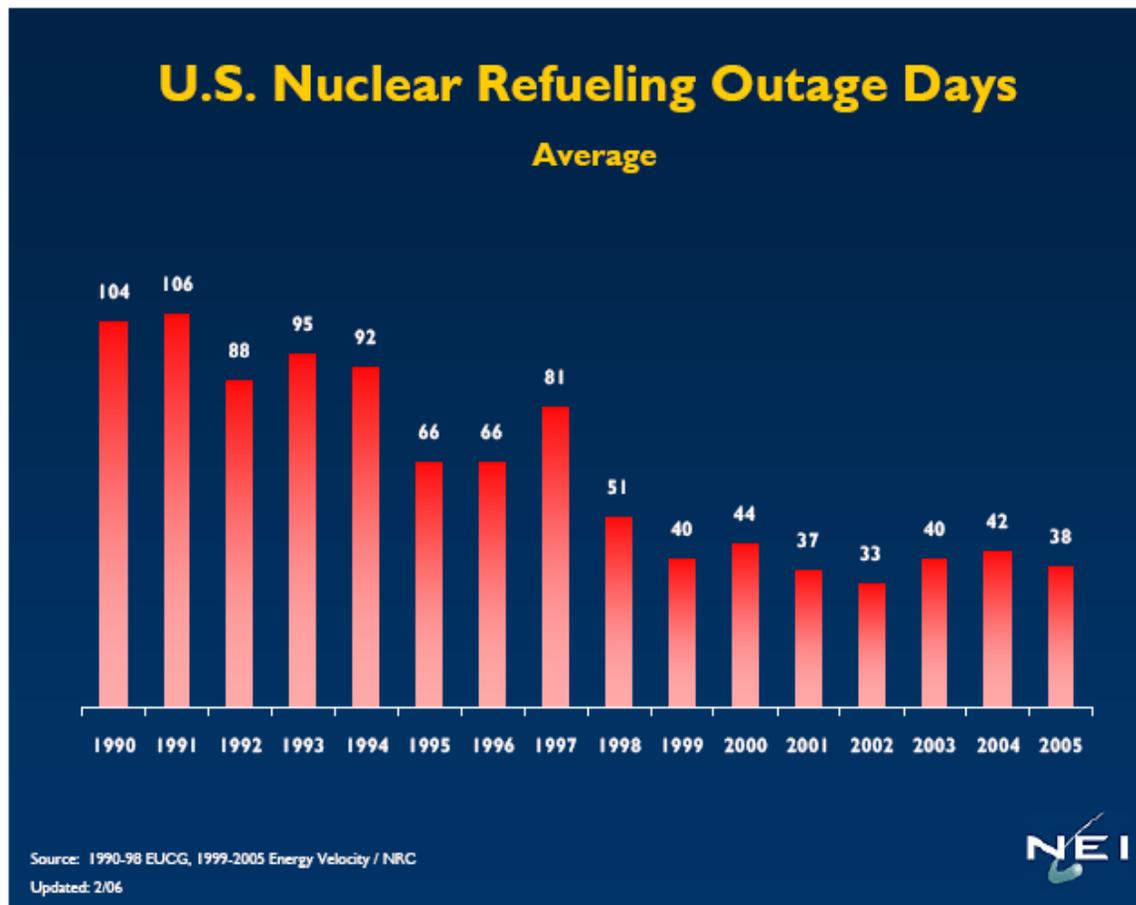
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Nuclear Power Performance Indicator - Example



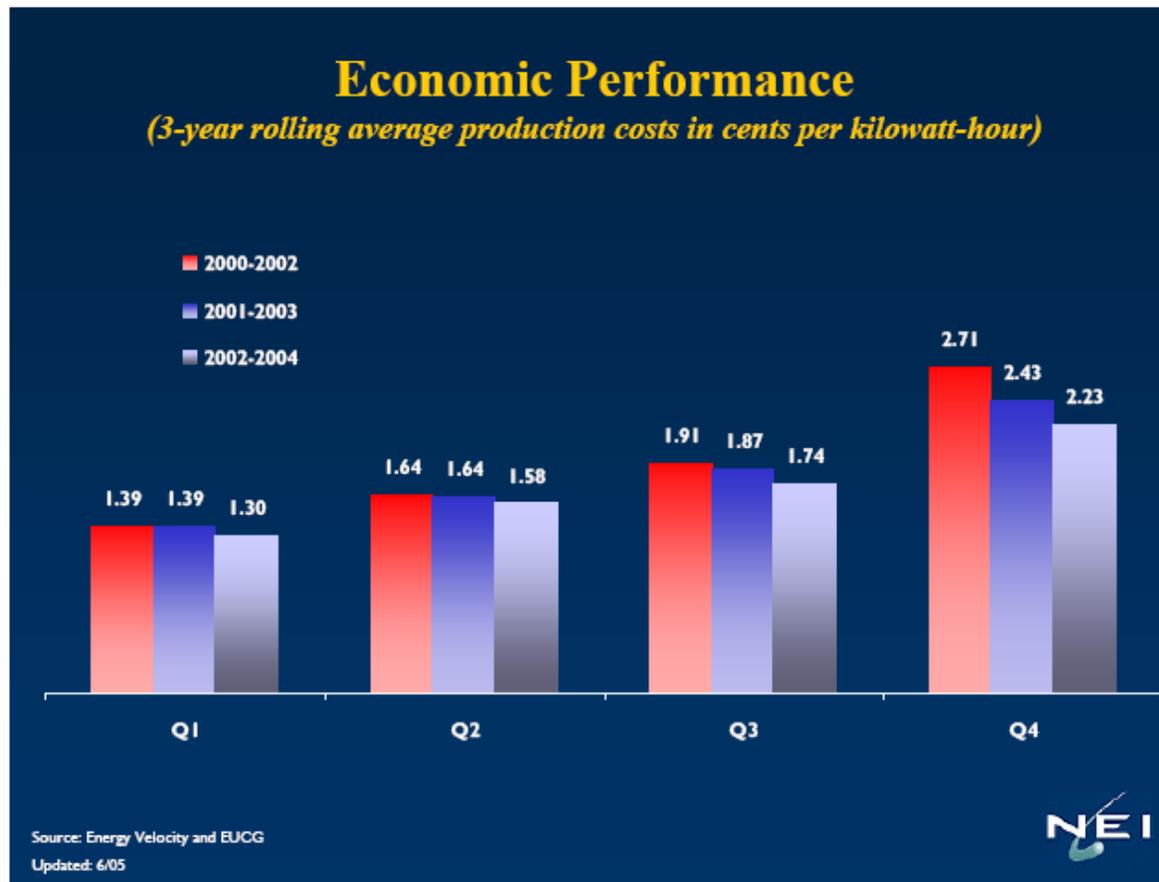
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Nuclear Power Performance Indicator - Example



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Nuclear Power Performance Indicator - Example



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What are the Desired Results?

The Modern Grid is:

- Reliable
- Secure
- Economic
- Efficient
- Environmentally friendly
- Safe

These are the goals!



- **Industry reliability indices**
 - Customer average duration/frequency
 - System average duration/frequency
 - Power quality indices
 - Momentary average frequency
 - Transmission loading reliefs
 - Cost of interruptions
- **Generation availability (all sources)**

- **Improve reliability indices by an order of magnitude by 20YY**
- **Reduce the cost of interruptions by X% by 20YY**
- **Improve availability of generation by 10% by 20YY**



- **Diversity in generating nodes**
 - Average size of generating units
 - Number of generating units $< x$ MW
- **Fuel Diversity “index”**
- **Ability to tolerate multiple contingencies (N-x) designs**
- **Restoration time**

➤ Increase the number of generating units ($< X$ MW) by Y orders of magnitude by 20YY

➤ Improve the fuel diversity “index” by $X\%$ by 20YY



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- **Energy prices**
- **Capacity prices**
- **Peak energy prices**

- **Reduce Average Energy Prices by X% by 20YY**
- **Reduce Peak Energy Prices by X% by 20YY**



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- **Peak demand**
- **Transmission congestion costs**
- **O&M unit costs**
- **Utilization factor for T&D components**
- **System losses**

➤ **Reduce peak demand by 20% by 2015**

➤ **Reduce transmission congestion costs by X% by 20YY**



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- **Emissions (CO₂, NO_x, SO_x)**
- **Renewable sources**

➤ **Reduce emissions by X% by 20YY**

➤ **Increase % of renewable sources by X% by 20YY**



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- **Standard OSHA indices**
 - Reportable cases
 - Lost time accidents
 - Fatalities
- **Public injuries**
- **Public fatalities**

➤ Reduce lost time accident rate by an order of magnitude by 20YY



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- **Fewer vs. many metrics?**
- **Cost to achieve metric target?**
- **Cost to measure and monitor?**
- **Interdependencies among metrics?**
- **Conflicts among metrics?**
- **Process for monitoring and communicating periodic results?**
- **Who takes ownership of the metrics for the industry?**



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- **Discussion group sessions**
- **Brainstorm using “Clean Sheet of Paper”**
- **Recommend top 2-3 metrics and targets for each assigned KSF**
- **Report out your results**
- **Sign up to assist us further “off-line” to refine the process**

We need your involvement!



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