

Introduction to TAGWeb – EPRI’s Power Plant Cost and Performance Software

Technology Cost and Performance Program,
PS178A



Agenda

- Background on EPRI
- TAGWeb -- EPRI's Technology Cost and Performance Software:
- Key Drivers
- Direct Application and Benefits of TAGWeb
- Utility Staff Engagement
- TAGWeb Demonstration

Our History...Born in a Blackout



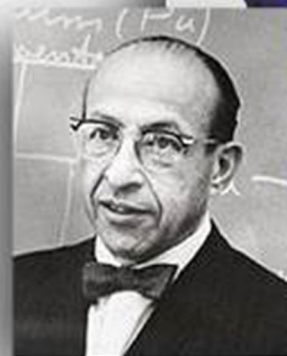
- EPRI was founded by and for the electricity industry in 1972 following **The Great Northeast Blackout** in New York City in 1965
- Formally established in 1973 as the Electric Power Research Institute, EPRI manages a broad public-private collaborative research program on behalf of the electric utility industry, the industry's customers, and society at large.

Our History...Born in a Blackout



ELECTRIC POWER
RESEARCH INSTITUTE

- **EPRI** is an independent, nonprofit center for public interest energy and environmental research
- Collaborative resource for the electricity sector
- Major offices in Palo Alto, CA; Charlotte, NC; and Knoxville, TN
 - Laboratories in Knoxville, Charlotte, and Lenox, MA



Chauncey Starr
EPRI Founder

Energy & Environmental Analysis



ENERGY & ENVIRONMENTAL ANALYSIS

178: Integrated Energy Planning, Market Analysis, and Technology Assessment

PS178A: Technology Cost and Performance

PS178B: Integrated Energy System Planning and
Market Analysis

Highlighted Applications:

- Efficient Electrification State and Utility Assessments
- Understanding Climate Scenario and Goal Setting Activities
- High Renewable Mandates: Implications for System Operations, Resource Planning AND CO₂ Emissions



Energy & Environmental Analytics Issues Addressed

Efficient
Electrification

Emerging
Technologies

Energy System
Modelling

Fuel &
Electric Markets

Policy Effectiveness

Resource
Planning

Cost & Performance
of Technologies

Operations &
Maintenance

Environmental
Regulation Analysis

Climate Mitigation

Program 178 Structure

P178: Integrated Energy Planning, Market Analysis, and Technology Assessment

**Project Set 178A
Technology Cost and Performance**

**Project Set 178B
Integrated Energy System Planning and Market Analysis**

Included in TAGWeb supplemental

- **Annual Technical Assessment Guide (TAG)**
- Associated Technical Studies
- **Annual TAGWeb User Access**
- **New GTCC Project Development Interest Group**
- Reciprocating Internal Combustion Engine (RICE) Interest Group¹

Included in TAGWeb supplemental

Manager: Clarence Lyons
¹RICE Manger: Andy Maxson

EPRI's Technology Cost & Performance Software: TAGWeb

- TAGWeb is an internet-based software package that serves as both a cost database of power generation and storage technologies and financial analysis tool.
- The TAGWeb software is accessible via membership in Program 178, Project Set 178A or TAGWeb supplemental.

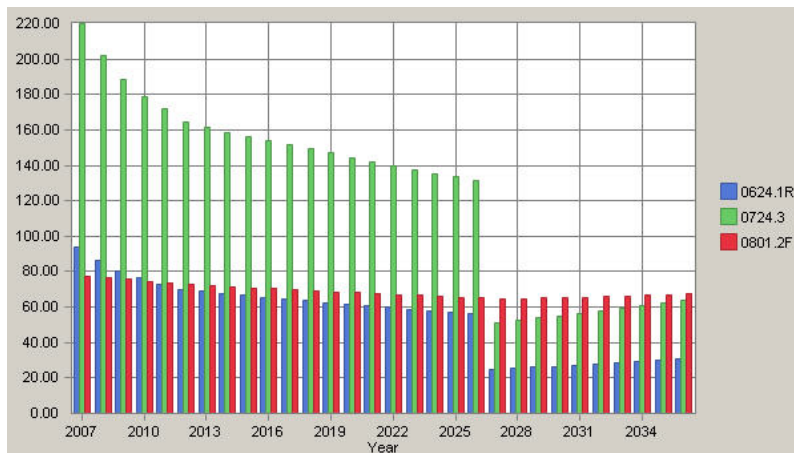


Figure 1: Annualized Costs by Technology Selection

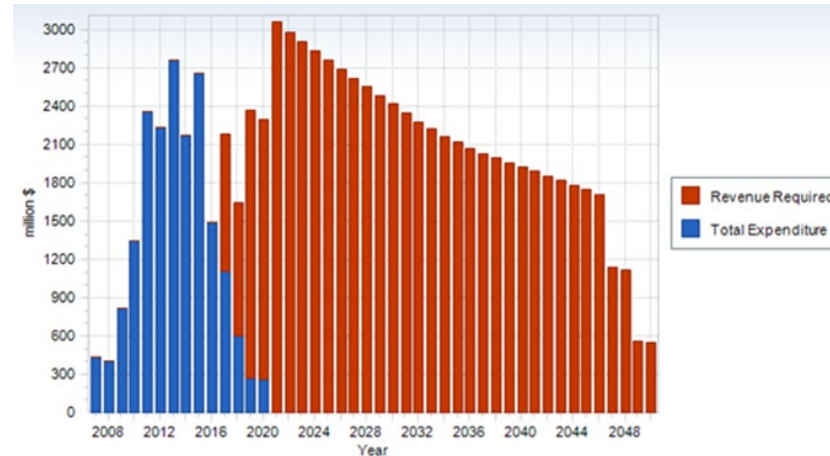


Figure 2: Revenue Requirements

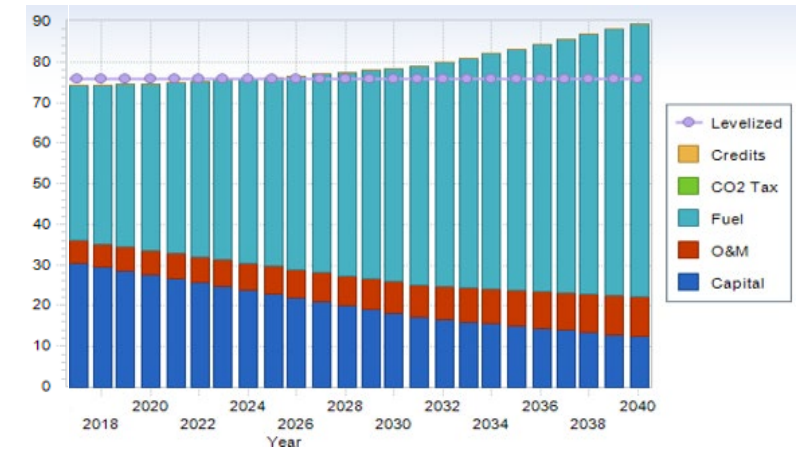
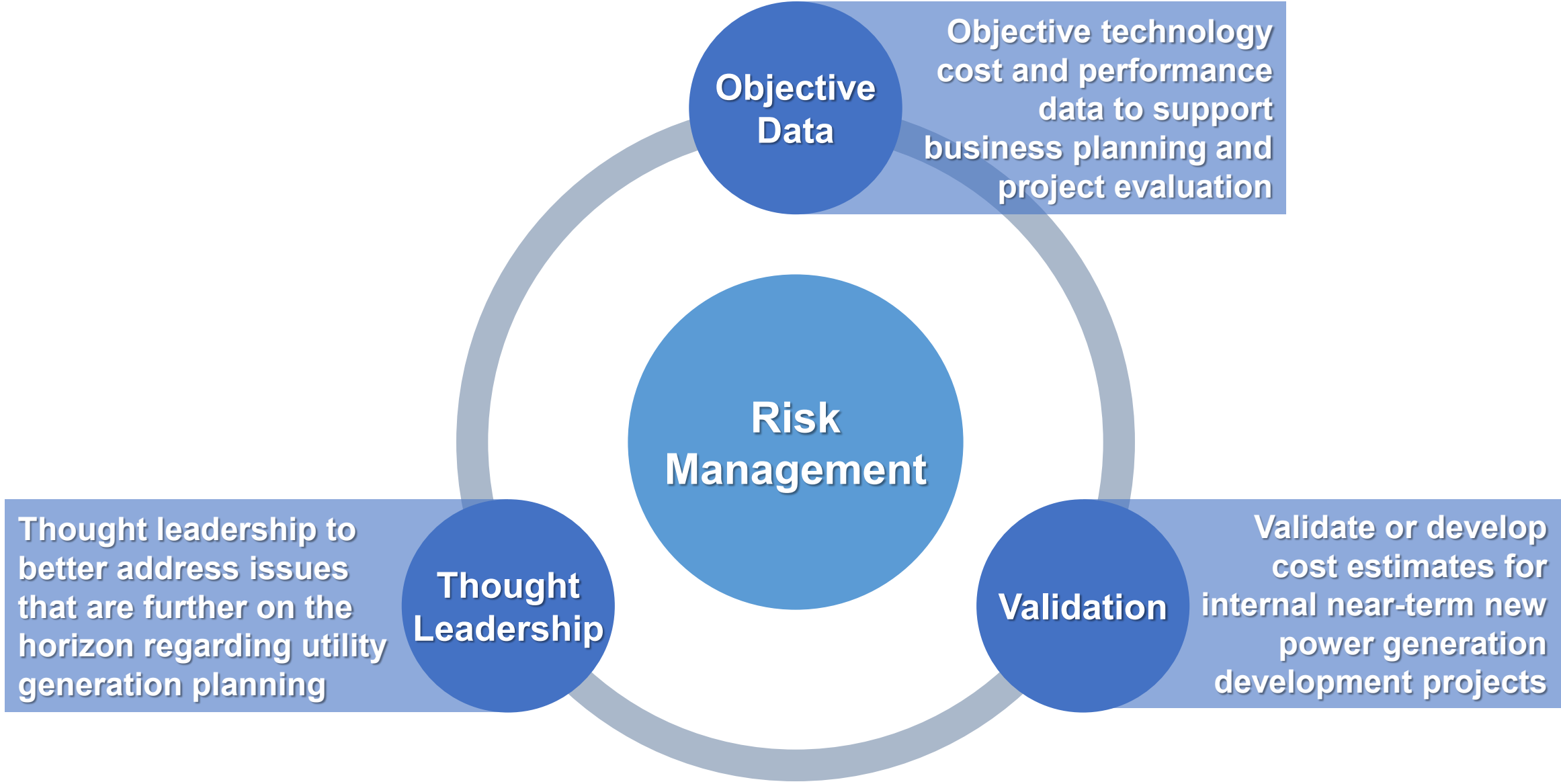


Figure 3: Levelized Costs of Electricity, \$/MWh (LCOE)

TAGWeb provides a sound technical basis for understanding and comparing technology cost estimates and validating results of more detailed, engineering-based studies

Key Drivers for the TAGWeb Software



Direct Application of TAGWeb Software

- Integrated resource planning
- Initial internal business planning
 - Project feasibility / Operations & Maintenance (O&M) contracting practices / internal benchmarking
- Validate internal cost and performance data
- Employee education and development
- Status of commercial technologies and near-term advancements that have the potential to be game changers
- Costs trending provides information for better decision making
- Cost granularity and detailed explanations

Benefits of the TAGWeb Software

Credible

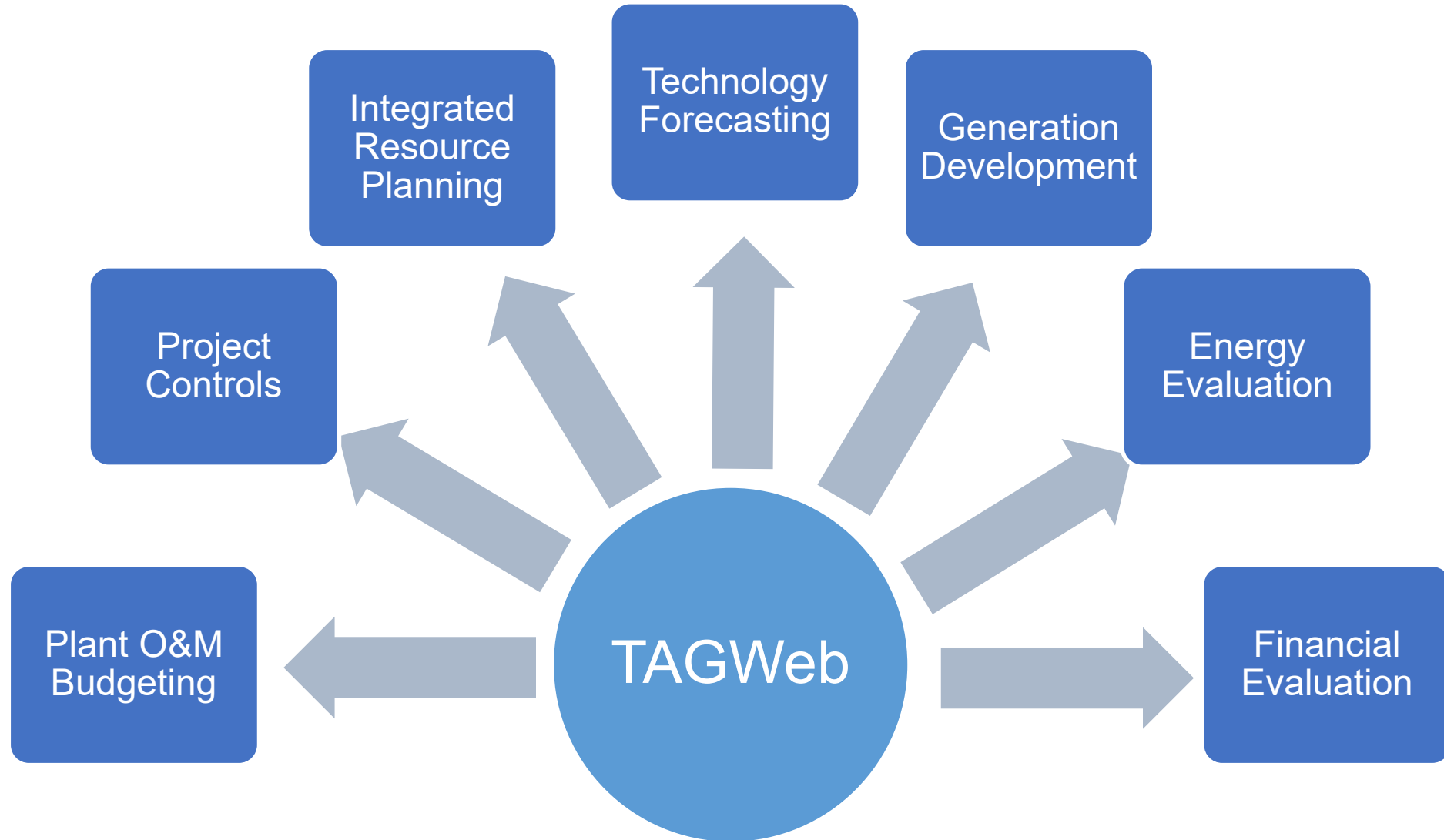
Industry-accepted

Consistent Basis

- “One-stop” information source and analytical tool for capital investment planning in the electric power industry
- Facilitates analysis and customization
- Multi-use tool for energy professionals involved in business planning, investment analysis, integrated resource planning, installed capital and O&M costs estimation

One detailed cost report from an engineering contractor costs \$75–\$100k compared to TAGWeb supplemental membership at \$85k for 3–5 technical cost reports and collaborative opportunities with peers

TAGWeb: A Planning Tool for Energy Professionals



TAGWeb Supplemental Engagement Opportunities

- Two in-person advisors meetings and program webcasts
- Program annual research prioritization process
- New Gas Turbine Combined Cycle Plant Development Interest Group Workshops
- TAGWeb Users Group Workshops*



*These workshops can be scheduled by individual companies at the convenience of interested staff

Hands-on TAGWeb Demonstration

- With TAGWeb, users are able to:
 - Generate reports comparing technologies, fuels, and economic scenarios
 - Export data, plots, tables, text files, and graphics
 - Revise the technical data
 - Conduct sensitivity studies of cost estimates for electric generation and storage technologies

The screenshot displays the TAGWeb interface. At the top, there are navigation links for 'Home' and 'Admin'. Below this, a 'Home >' breadcrumb is visible. The main content area is divided into two sections. On the left is a 'STUDY' navigation menu with a 'Collapse' button. The menu is organized into several categories: 'ALL GROUPS', 'CENTRAL STATION' (listing Pulverized Coal, Fluidized Bed Combustion, IGCC, Nuclear, and Combustion Turbine), 'SMALL SCALE GENERATION' (listing Fuel Cell, Internal Combustion Engine, Small Combustion Turbine, and Micro Turbine), 'RENEWABLES' (listing Wind, Solar Photovoltaic, Solar Thermal, Geothermal, and Renewables Combustible), 'STORAGE' (listing CAES, Pumped Hydro, Flywheel, Batteries, and SMES), 'TRANSMISSION / DISTRIBUTION' (listing Overhead Transmission, Transmission Substation, Overhead Distribution, Underground Distribution, and Distribution Substation), and 'DISTR GENERATION'. Below the 'STUDY' menu are sections for 'ECONOMICS', 'FUEL/RESOURCES', and 'GLOBAL DATA' (listing Code of Accounts, Inflation Data, Depreciation Schedules, Season Definitions, and Regionalization). On the right side of the interface is the 'TAGWeb Quick Search' section. It includes a 'Study:' field with the value '1111.1 cps scenario', a 'Technology Type:' dropdown menu set to 'ALL', and two input fields for 'Minimum Size:' (set to 0) and 'Maximum Size:' (set to 2000), both with units of 'MW'. Two callout boxes are overlaid on the interface. The first callout box, located on the right side, contains the text: 'EPRI provides a baseline data for several cases for each of 19 different technologies, including, for example, different sizes, locations and types of coal and renewable based generation.' The second callout box, located at the bottom right, contains the text: 'Potential builds out for future versions of TAGWeb.'



Together...Shaping the Future of Electricity

Clarence Lyons

Senior Technical Leader

Energy & Environmental Analysis Program

PS178A Program Manager

Tel: 704-595-2788

Email: clyons@epri.com