



ANALYSIS GROUP
ECONOMIC, FINANCIAL and STRATEGY CONSULTANTS

WMLP Greenhouse Gas Emissions Reduction Study

Overview and Introduction

Prepared for: Wollesley Town Hall Public Forum

February 13, 2018

Agenda

Purpose and Context

Scope of Analysis Group Study

Greenhouse Gas Emission Reduction Measures

Method, Sources and Data

Schedule

Goals for Today:

- Provide an overview of the scope of work
- Discuss method, options, issues
- Answer questions
- Get your feedback

About Analysis Group



- Largest privately held economic consulting firm in North America
- More than 35 years of experience providing economic and financial analysis and consulting services
- 13 offices in the U.S., Canada, Europe and China
- Global client base, including many of the nation's largest law firms, Fortune 500 companies, industry associations, and government agencies
- 700+ professionals, most with advanced degrees in economics, statistics, finance, accounting, or management
- Diverse experience in litigation support, expert witness work, business consulting, economic analysis, and regulatory strategy advice
- Network of authoritative academic experts at leading universities
- Diverse set of practice areas – securities, health care, finance, antitrust, M&A, IP, **energy & environment**
- AG Team: Paul Hibbard (Principal; former Chair MA DPU); Craig Aubuchon

AG Energy/Environment Focus Areas



Climate & Clean Energy	Energy/Emission Market Design	Regulatory Proceedings & Public Policy	Price/Rate Analysis & Design
<ul style="list-style-type: none"> ▪ Federal, regional, & state climate policies ▪ Environmental impact valuation ▪ Energy efficiency programs & policies ▪ Renewable portfolio standards 	<ul style="list-style-type: none"> ▪ Emissions trading & allowance markets ▪ Transmission policies & wholesale market rules ▪ RTO/ISO tariffs/practices ▪ Retail market rules ▪ Gas/electric market integration 	<ul style="list-style-type: none"> ▪ Rate case expert testimony ▪ Alternative regulation ▪ Siting/permitting ▪ Regulatory & business model strategies ▪ Economic studies 	<ul style="list-style-type: none"> ▪ Performance-based ratemaking ▪ Rate design ▪ Dynamic & time-differentiated pricing ▪ Price forecasts ▪ Production cost modeling
Market Analysis	Valuation & Litigation Support	Resource Planning & Procurement	Grid Modernization
<ul style="list-style-type: none"> ▪ Electric, gas, fuel, & environmental market analysis ▪ Market power studies ▪ Demand response ▪ Emerging technologies ▪ Regulatory risks & trends 	<ul style="list-style-type: none"> ▪ M&A ▪ Contract disputes ▪ Shareholder litigation ▪ Chapter 11 proceedings ▪ Class certification ▪ Damages ▪ Enforcement actions ▪ Price manipulation 	<ul style="list-style-type: none"> ▪ Design of resource procurements ▪ Resource planning studies/analyses ▪ Assessment of resource & project alternatives ▪ Comparison & benchmarking 	<ul style="list-style-type: none"> ▪ Business case analysis ▪ Value of uninterrupted service studies ▪ Standards development ▪ Grid flexibility & prices-to-devices approaches ▪ Innovation & technology commercialization

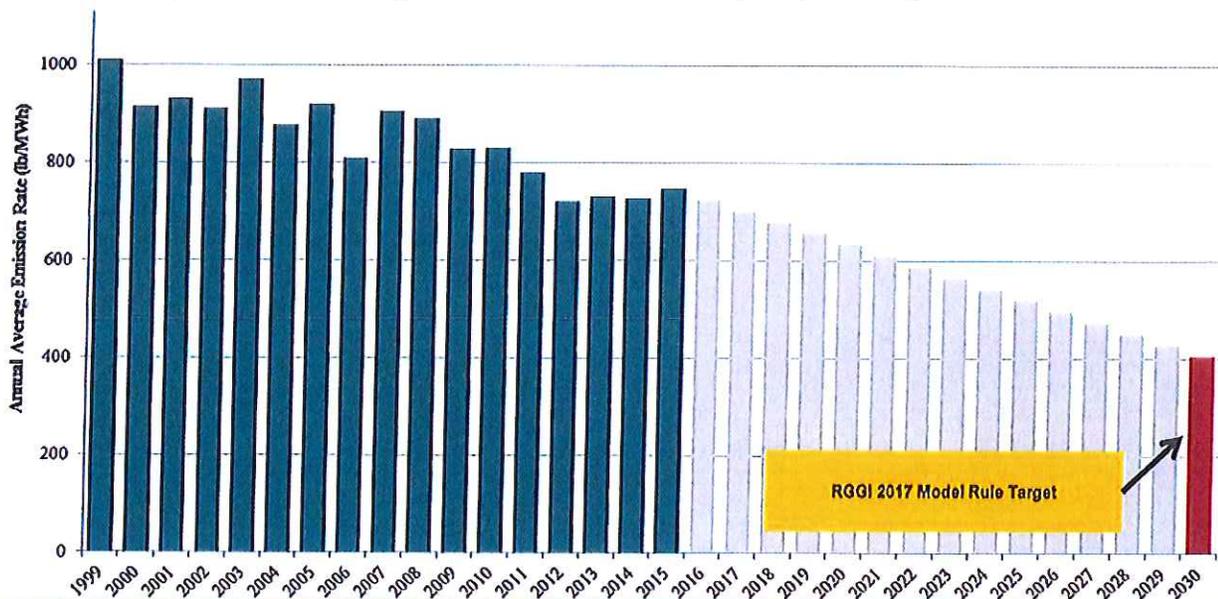
What the AG Study is, and is Not

- **Wellesley goal – reduce GHG emissions from all sources by 25% from 2007 levels by 2020**
 - Current goals adopted in 2014, with comprehensive efforts led by Wellesley Sustainable Energy Committee
 - Town-wide, all sector goal
 - Wellesley could decide to seek additional reduction targets going forward
- **Purpose of AG study – provide data/information on potential GHG reduction options in the *electric sector***
 - Electric sector analysis – not reviewing transportation, non-electric heating, etc.
 - Focus is on providing data and analysis for town's review and consideration; will not identify or recommend specific goals
- **Study will help identify the range of potential electric sector GHG reductions and the expected cost of those reductions**
 - Input for the town and the Wellesley Municipal Light Plant (WMLP) in considering future electric sector emissions and potential changes to town-wide GHG reduction goals
 - Will focus on options and technologies to reduce emissions, and potential costs

- **Conduct a systematic review and quantification of viable potential GHG emission reduction strategies for the WMLP, including GHG reduction potential and costs**
 - *Phase I:* Viable near-term measures/strategies for the period 2018 to 2030
 - *Phase II:* Viewpoint on industry trends and business model, with implications for potential GHG reduction strategies, beyond 2030
- **Project will focus on four steps:**
 1. **Identify** CO₂ reduction opportunities (e.g., from REC purchases, renewable procurement, energy efficiency...)
 2. **Assess** the feasibility and cost of achieving such reductions, given publicly available data and pricing information, and
 3. **Construct** a "supply curve" of options available to WMLP that provides detail on each technology or strategy, the impact on WMLP's CO₂ profile, and the potential cost to WMLP customers
 4. **Quantify** potential GHG emission reductions and associated costs for the milestone years 2020, 2025, 2030, 2040 and 2050, with qualitative assessment of key issues and uncertainties

Backdrop: Power System Emissions

- **State and regional programs will affect regional wholesale CO₂ emissions**
 - RGGI
 - MA Global Warming Solution Act - DEP Rule 310 CMR 7.74 (MA power plant cap)
 - Long-term contracts
 - Regional investments in EE, RE (grid-connected & distributed)
 - ...all point to declining GHG emission intensity of power system



- WMLP actions exceed regional performance – emission reductions exceed regional average over past ten years (*ENE Portfolio Emission Report, 2017*)
- Going-forward GHG reductions: supply-side and demand-side options
 - *Supply-side* measures mostly would occur through contractual transactions and affect wholesale costs – e.g., purchase of energy, capacity from specific low/zero-carbon resources
 - *Demand-side* and distributed measures can affect both wholesale and distribution system costs by (a) reducing energy/capacity purchases, and (b) deferring distribution system investment – e.g., energy efficiency, demand response, distributed solar
- Cost effectiveness of achieving GHG reductions depends on (a) cost of action, (b) wholesale and/or distribution cost savings, and (c) quantity of GHGs reduced

Measures Under Review (both reports)



Supply Side

- Ownership or purchase of energy, capacity, and/or RECs from low-CO₂ resources (a) in operation, (b) in development, and/or (b) proposed (with/without complementary storage capacity)
 - E.g., grid-connected wind, solar, hydro, nuclear
- Increased/accelerated purchase and retirement of renewable energy credits (REC)

Distributed

- Energy efficiency measures and programs
- Distributed low-carbon resources (e.g., solar PV) (with/without complementary storage capacity)
- Demand response measures/technologies
- Longer-term considerations (may be qualitative or quantitative)
 - Rate design (e.g., time of use rate structures, distributed solar tariffs)
 - Distributed solar/storage applications
 - Fuel switching (e.g., displacement of fossil-based heating with electric heat pumps)
 - Impact of increased penetration of electric vehicles
 - WMLP business model considerations

- Evaluation of options will quantify the following metrics:
 - Total CO₂ reductions, and the implied percent reduction in WMLP carbon emissions and intensity
 - Costs to achieve reductions (costs and financial impacts for the milestone years 2020, 2025, 2030, 2040 and 2050)
 - Representative impacts on WMLP customer bills
- Develop a supply curve in 3 steps
 - Estimate program costs for each GHG reduction program, measure or approach
 - Estimate potential cost reductions (if applicable) associated with actions (e.g., reduced energy/capacity costs), based on forecasted future costs
 - Estimate avoided GHG emissions based on the size(s) of the reduction measures or programs, and impact on *but-for* emissions of WMLP purchases
- Present results on an annual average basis for each milestone year
 - Potential CO₂ reduction quantities and costs (total costs, cost per ton of CO₂ avoided)
 - Representative ratepayer bill impacts for postulated reduction quantities
- Summarize uncertainties, feasibility, risks, and other considerations

- Some data will be robust (e.g., energy efficiency program costs and savings)
- Some data will be general, based on historic information and industry knowledge (e.g., potential range of contract costs for renewable resource procurement)
- Some cost and GHG reduction estimates will be based on review of industry projections and third-party estimates (e.g., forward cost curves for distributed solar, storage)
- Reports will necessarily involve assumptions, forecasts, and approximations
- Our focus: **Transparency**
 - Preference for publicly-available data that may be reviewed by others
 - Clear and explicit assumptions, description of analytic method
 - Qualitative discussion of uncertainties and variability
 - Transparent application of professional judgment

Approximate project schedule as follows:

- Initial research and data collection (underway)
- Construction of supply curve model and cost analyses (through February)
- Completion of initial draft report (March)
- Development of longer-term analysis/report (March/April)
- Presentations, discussions regarding results (April)

Contact

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