

• Strategic Power Plan

Water System Operations

Summary

The objective of the Strategic Power Plan (SPP) is to assess options for energy management and carbon reduction in Metropolitan's distribution system and Colorado River Aqueduct (CRA) system. These options would allow Metropolitan to implement the Board's strategic priorities as outlined in the April 2007 Board Retreat, which called for a reduction in Metropolitan's carbon footprint and mitigation against risks associated with future carbon-related fees and regulations. While the SPP effort only addresses Metropolitan-owned facilities and the State Water Project (SWP) is not in its scope, Metropolitan is working with the California Department of Water Resources (DWR) and the State Water Contractors (SWC) to develop energy and carbon management actions for the SWP, to meet objectives of California's energy policies and legislation.

Over the past year, a number of energy related briefings were given to your Board. The presentations provided energy consumption and cost data for Metropolitan's distribution system, the CRA, and the SWP; Metropolitan's activities related to the next Hoover power contract; and approval of updated Energy Policy Principles.

In September 2008, your Board received an oral report introducing the SPP effort. Background information was provided on the California Global Warming Solutions Act of 2006 (AB 32) – and on other issues such as climate change and the potential impact on Metropolitan and its operations. Regulations implementing AB 32 will be developed over the next two years pursuant to the California Air Resources Board (CARB) - Climate Change Scoping Plan. As these regulations are developed, staff will learn more about their specific impacts to Metropolitan.

At the November 2008 meeting, your Board received an oral report updating the SPP effort. This update focused on four strategic options: 1) carbon reduction; 2) carbon neutrality; 3) energy independence and carbon neutrality; and 4) a No Action option. The four strategic options were assessed based on key energy issues identified during the April 2007 Board Retreat. These key energy issues include: 1) price volatility; 2) system reliability; 3) environmental stewardship; 4) energy independence; 5) cost; and 6) implementation risk including technical complexity and feasibility. In addition, the oral report included proposals for a strategic approach to implement carbon reduction and proposed SPP policy goals. The primary elements of Metropolitan's proposed strategic approach for implementing SPP entail Metropolitan's pursuit of: 1) carbon neutrality; 2) cost-effective energy projects; and 3) implementation of these actions in a phased manner. The oral report also recommended that Metropolitan forego purchasing carbon offsets at this time, and instead invest in cost effective renewable energy projects at Metropolitan's treatment plants and other facilities.

The proposed SPP Policy Goals are summarized as follows:

- | | |
|--------------------|---|
| Short-term goal: | a) To achieve 25% carbon reduction at all retail energy facilities by 2013. |
| | b) To work with the DWR and SWC on SWP energy and carbon management issues. |
| | c) By 2013, determine the feasibility, cost, timing, and partnership opportunities to gain energy independence. |
| Intermediate goal: | To achieve 100% carbon reduction at all retail energy facilities by 2020. |
| Long-term goal: | To achieve 100% carbon reduction at all retail and wholesale energy facilities by 2030. |

The policy goals are also designed to provide maximum flexibility to address future potential impacts to the SPP process including regulatory changes (both State and Federal), contract issues (next Hoover power contract),

pricing issues (future electrical rate escalation), and other factors such as technology advancements that could reduce the cost of renewable energy project development. In summary, these policy goals will enable Metropolitan to assess options for energy management, carbon reduction, and for reducing risks associated with potential carbon-related fees and regulations, in a cost-effective manner. It is anticipated that the SPP Policy Goals will be presented to your Board for consideration in March 2009.

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Detailed Report

Background

Over the past year, a number of energy related presentations were given to your Board (**Attachment 1**). The presentations included reviews of Metropolitan’s distribution system, the CRA, the SWP, the next Hoover power contract, and in August 2008, approval of updated Energy Policy Principles. In September 2008, the SPP effort was introduced to your Board and an oral report updating the SPP effort was provided in November 2008. This Board Report summarizes and updates the November 2008 oral report.

In 2007, your Board held a retreat to discuss a number of strategic issues that were deemed critical to Metropolitan’s future operations. Among the energy issues discussed, six key areas were identified. These key energy issues include: 1) price volatility; 2) system reliability; 3) environmental stewardship; 4) energy independence; 5) cost; and 6) implementation risk such as complexity and feasibility. An example of one of these key issues is electric price volatility (**Attachment 2**). Attachment 2 illustrates a 10-year period including the highly volatile deregulation years of 2000/2001. Although the average increase in energy prices during this 10-year period was about 3 percent, future average annual increases in energy prices are expected to be in the 5 – 20 percent range, based on most recent projections of rate escalation through 2013.

Metropolitan’s water delivery operations include both retail and wholesale energy use (**Attachment 3**). The definition of wholesale and retail energy facilities are:

Wholesale: Metropolitan’s CRA operations including the five pumping plants.

Retail: Metropolitan’s distribution system facilities including treatment plants, pump stations (including OC-88, Wadsworth Pumping Plant), Union Station Headquarters, and all other local facilities.

The primary difference between retail and wholesale energy use is that retail power is provided by the local utility company in accordance with approved rate schedules. Wholesale power is purchased and sold directly by Metropolitan in bulk power markets. As such, power costs can vary significantly depending upon the supplier and market conditions.

Metropolitan utilizes a significant amount of electrical power to deliver water to the Member Agencies (**Attachment 4**). For 2007, Metropolitan's total direct and indirect electrical energy use was approximately 5.9 million (M) megawatt-hours (MWh). The two main contributors to this use are the SWP, which utilized 4.4 M MWh (75% of total) to deliver 1.52 million acre-feet (MAF) to Metropolitan, and Metropolitan's CRA wholesale energy operations, which utilized 1.4 M MWh (24% of total) to deliver 713 thousand acre-feet (TAF). The remaining amount of approximately 0.1 M MWh of electrical energy use (1% of total) results from Metropolitan's retail based operations, which includes the treatment plants, Union Station Headquarters, and the OC-88 Pumping Plant. For 2007, the total cost of this energy use exceeded \$243 M. Metropolitan's reliance on electrical energy used to deliver water to Southern California makes it particularly susceptible to changes in electrical energy pricing. Even a modest increase of 5 percent per year can have significant financial impacts over relatively few years. While it is unknown at exactly what rate electrical power will actually increase over the next few years, it is very likely to exceed the previous 10 year average of about 3 percent per year. The future introduction of carbon related fees in order to reduce California's carbon emissions in accordance with AB 32 will add increasing pricing pressure on California's electrical power markets.

Metropolitan's water supply is also dependent on watershed conditions of the Colorado River Basin and the SWP. The potential impact of climate change and global warming could have significant impacts to the operation and yields of these projects. In addition, the threat of rising sea levels could have serious ramifications in potential salt-water intrusion in the Sacramento-San Joaquin Delta region of California. This could result in periods of limited pumping to Southern California and reduced yields on the SWP. It is for these reasons, as well as those identified during the 2007 Board Retreat, that Metropolitan initiated the SPP process to begin addressing these critical issues.

SPP is being developed to address the Board's strategic priorities, as outlined in the April 2007 Board Retreat. The Board's strategic priorities called for the reduction in Metropolitan's carbon footprint and mitigation measures that would hedge against risks associated with future carbon-related fees and regulations. The SPP focuses on the development and implementation of energy management and carbon reduction options for facilities owned and operated by Metropolitan, including the District's distribution system and CRA system. Approximately 25 percent of Metropolitan's total energy use is addressed in the SPP.

At the same time, a comprehensive assessment of energy management and carbon reduction for the SWP is also underway, with an expected completion date by the end of first quarter 2010. The SWP is owned and operated by DWR. Metropolitan and other SWC are working with DWR to develop viable options to meet the objectives of California's energy policies and legislation. DWR has set energy goals for the SWP to reduce greenhouse gas emissions to 1990 levels by 2020, and DWR is developing a policy to incorporate renewable energy in the SWP energy portfolio. DWR is currently discussing with the SWC, a potential commitment to meet 33 percent of its future net long-term sustained energy needs (excluding SWP large hydroelectric generation) with eligible renewable energy by 2020. The outcome of the SWP energy assessment will have a significant impact to Metropolitan as the power requirements for SWP water deliveries is approximately 75 percent of the District's total direct and indirect energy use.

Strategic Power Plan - Objectives

The SPP provides a comprehensive assessment of energy and carbon management options for Metropolitan's distribution and CRA systems. The primary objectives under the SPP effort are to:

- 1) Provide carbon management options including strategies for greenhouse gas reduction and achieving carbon neutrality.

- 2) Provide energy management options to develop cost-effective energy projects and evaluate the potential for achieving energy independence.
- 3) Develop carbon and power management actions in the areas of renewable power, energy efficiency, and the potential use of renewable energy credits (RECs) and carbon offsets.

A REC is a certificate of proof that one MWh of electricity was generated and delivered by a renewable energy source such as wind turbines, qualifying hydroelectric power facilities, or solar energy systems. A carbon offset represents one metric ton of carbon dioxide (CO₂) equivalent resulting from a specific carbon reduction action or project. Examples of carbon offsets include forestry management actions and the potential sequestration of CO₂ in deep underground wells and caverns.

Four strategic options were assessed under the SPP:

- 1) No Action Option – Establish a baseline for carbon reduction management assuming no reductions in Metropolitan's carbon footprint from implementation of energy efficiency efforts or renewable energy projects
- 2) Strategic Option 1 – Achieving carbon reduction through cost-effective energy management projects (retail power sites only)
- 3) Strategic Option 2 – Achieving carbon neutrality through cost-effective energy management projects (retail and wholesale power sites)
- 4) Strategic Option 3 – Attaining energy independence and carbon neutrality objectives (retail and wholesale sites)

Strategic Power Plan – Assessment of Strategic Options

No Action Option

The primary objective of the No Action Option is to provide a baseline for carbon reduction management and Metropolitan's carbon footprint (**Attachment 5**). In developing this footprint, CRA supplemental power purchases are based on the assumed availability of a full CRA once every four years on average. It is also assumed that no energy efficiency or renewable energy projects are implemented at Metropolitan facilities. Actual data are provided for 2005-2007, and projected estimates are used for 2008 – 2020. In addition, the estimated carbon footprint for 1990 is shown for comparison purposes to illustrate where Metropolitan stands in regards to AB 32 carbon reduction goals. A primary goal of AB 32 is to reduce California's overall carbon emissions to those levels that existed in 1990. Metropolitan's current carbon footprint is much lower today than in 1990 due to lower CRA pumping (and associated energy requirements) and lower carbon intensity in the source of supplemental power used. In 1990, a significant portion of energy procured for the CRA was generated by a coal-fired power plant in Arizona. Coal-fired generation has significantly higher carbon intensity than the natural gas based generation that is typically procured in the current wholesale markets. The primary reason for lower CRA diversions results from the signing of the Colorado River Quantification Settlement Agreement in 2003, which reduced the availability of surplus water on the Colorado River that could be available to Metropolitan. As Metropolitan's current carbon footprint is lower than in 1990, Metropolitan has in fact, already exceeded the goals set for California under AB 32.

Metropolitan's retail and wholesale energy use is a primary driver of Metropolitan's carbon footprint, as 95% of its carbon footprint results from electrical energy use. Metropolitan's non-hydroelectric CRA energy use accounts for approximately 75-80% of Metropolitan's carbon footprint.

A summary of the extent to which the No Action Option addresses the energy issues identified during the 2007 Board retreat follows:

- Price Volatility: minimal benefit as Metropolitan continues to depend on market suppliers, conditions and pricing for energy

- Reliability: no improvement as Metropolitan is totally dependent on local and regional electrical distribution grids for facility power requirements
- Stewardship: no reduction of carbon footprint due to assumption that no energy efficiency or self-generation projects would be implemented
- Energy Independence: minimal benefit as reliance remains with the overall energy markets and grid
- Cost: no immediate cost impact but full exposure to future carbon related fees
- Implementation risk: none – as it is assumed nothing is implemented under this option

In general, this option provides very little benefit or improvement of these issues. In addition, while there is no immediate cost impact, this option would fully expose Metropolitan to future potential carbon related fees and regulations.

Strategic Option 1 – Carbon Reduction

Strategic Option 1 includes cost effective energy projects with a payback period of less than 15 years, to reduce Metropolitan's retail energy use and associated carbon footprint ([Attachment 6](#)). The primary driver is the increased power needs resulting from the addition of ozone as a primary disinfectant at the treatment plants. Energy consumption in 2005 was considerably higher than current years due to high levels of pumping into DVL for filling the reservoir. Over the past three years, storage in DVL has declined due to reduced supplies from the Colorado River and SWP, and pumping operations have not occurred since 2005.

Under this option, it is assumed that the 1 MW Skinner Solar Project (currently in construction) is completed and on-line in 2009, and an additional 10 MW of solar PV (at a number of treatment plants) is acquired via purchased power agreements (PPA). This option also assumes the conversion of the Yorba Linda small hydro plant to provide direct electrical service to the Diemer Treatment Plant. This power plant conversion is currently planned to occur upon completion of the ozone retrofit at Diemer in 2013. As a result of implementing these projects, a 25 percent reduction in Metropolitan's retail-based carbon footprint is achieved ([Attachment 7](#)). It is estimated that the average cost for implementing this carbon reduction (solar projects and Yorba Linda conversion) is about \$3 M/yr during the analysis period of 2009-2020. This value is obtained by adding the estimated costs for implementing the 1 MW solar PV project at Skinner, for conversion of the Yorba Linda power plant to provide direct service to the Diemer Treatment Plant, and for integrating the additional 10 MW of solar PV to be obtained via PPAs, and dividing that sum by the study period of 12 years to obtain an approximate annual expenditure.

A summary of the extent to which Strategic Option 1 addresses the energy issues identified during the 2007 Board retreat follows:

- Price Volatility: some benefit with additional self-generation
- Reliability: some improvement with additional self-generation
- Stewardship: reduces retail based carbon footprint by 25 percent
- Energy Independence: minimal benefit as reliance remains with the overall energy markets and grid
- Cost: low immediate cost impact but high exposure to future carbon related fees
- Implementation risk: low due to the nature of the energy projects implemented

While costs are relatively low, and there are some benefits gained in a number of issues due to the addition of self-generation, there remains a high exposure to future carbon related fees and potential regulatory changes with this option.

Strategic Option 2A – Retail Based Carbon Neutrality

To provide for a phased approach to achieving carbon neutrality, Strategic Option 2 has been split into retail only and combined retail/wholesale components. Strategic Option 2A represents the retail facility energy use component, and only addresses Metropolitan’s retail based carbon footprint. This option assumes that the solar PV PPAs and Yorba Linda conversion project indicated in Strategic Option 1 have been implemented. Retail-based carbon neutrality can be achieved by retaining the REC benefit of a portion of Metropolitan’s small hydro energy generation or through the purchase of carbon offsets (**Attachment 8**).

Retail-based carbon neutrality can be achieved at an estimated cost of between \$4-\$7 M/yr during the analysis period of 2009-2020. For all cost analysis purposes, the purchase of a carbon offset is estimated to range between \$20 and \$100 per metric ton. If small hydro environmental attributes (RECs) are used to help achieve carbon neutrality, then it is assumed that current hydropower sales contracts would be terminated as required, and new power sales contracts negotiated and executed. The analysis considers a 50 percent reduction in revenue due to the lower value of the hydropower (without the RECs). This consideration is referred to as “hydro contract renegotiation revenue loss.” For Strategic Option 2A, only a portion of the small hydropower sales contracts would be changed in this manner to achieve retail based carbon neutrality. Due to existing contractual notification and termination requirements, 2013 is the earliest date that some of these hydroelectric contracts could be modified.

A summary of the extent to which Strategic Option 2A addresses the energy issues identified during the 2007 Board retreat follows:

- Price Volatility: some benefit with additional self-generation
- Reliability: some improvement with additional self-generation
- Stewardship: 100 percent reduction in retail based carbon footprint
- Energy Independence: minimal benefit as reliance remains with the overall energy markets and grid
- Cost: moderate cost impact but reduced exposure to future carbon related fees
- Implementation risk: low due to the nature of the energy projects implemented

This option better addresses the issues identified during the Board retreat, and achieves a 100 percent reduction in Metropolitan’s retail based carbon footprint. In addition, while costs are now rated as moderate, there is the benefit of reduced exposure to future carbon-related fees and potential regulatory changes.

Strategic Option 2B – Retail and Wholesale Based Carbon Neutrality

Strategic Option 2B addresses Metropolitan’s total carbon footprint including retail and wholesale energy use. As with Strategic Option 2A, this option assumes implementation of the solar PV and Yorba Linda conversion projects indicated in Strategic Option 1. Strategic Option 2B requires the use of all of Metropolitan’s small hydro generation RECs to achieve carbon neutrality. Any remaining carbon emissions would be reduced via the purchase of carbon offsets (**Attachment 9**). Alternatively, carbon neutrality could also be achieved with carbon-offset purchases alone.

Retail and wholesale based carbon neutrality can be achieved at an estimated cost of between \$9-\$38 M/yr during the analysis period of 2009-2020. For all cost analysis purposes, the purchase of a carbon offset is estimated to range between \$20 and \$100 per metric ton. Again, if Metropolitan’s small hydro generation RECs are used, the associated hydropower sales contracts would be terminated and new contracts negotiated and executed (at an estimated 50 percent reduction in revenue and value). For Strategic Option 2B, utilization of all of Metropolitan’s small hydro generation RECs would be required to reduce the carbon footprint to achieve carbon neutrality. This would result in a lower amount of carbon-offset purchases to achieve complete carbon neutrality. However, staff will evaluate the cost of carbon offsets compared to the loss in hydro power revenue, and recommend the most cost-effective option to achieve carbon neutrality.

A summary of the extent to which Strategic Option 2B addresses the energy issues identified during the 2007 Board retreat follows:

- Price Volatility: some benefit with additional self-generation
- Reliability: some improvement with additional self-generation
- Stewardship: 100 percent reduction in retail and wholesale based carbon footprint
- Energy Independence: minimal benefit as reliance remains with the overall energy markets and grid
- Cost: moderate to high cost impact but significant reduction in exposure to future carbon related fees
- Implementation risk: low due to the nature of the energy projects implemented

With this option, there is greater improvement in addressing the issues identified during the Board retreat, with significant positive impacts in the area of Stewardship – resulting from a 100 percent reduction in Metropolitan’s total carbon footprint. Also, while costs have increased with Strategic Option 2B, there is a significant reduction in exposure to future carbon related fees and potential regulatory changes.

Strategic Option 3 – Energy Independence and Carbon Neutrality

Strategic Option 3 addresses both carbon neutrality and energy independence. As with Strategic Option 2B, this option addresses both retail and wholesale energy use. Under this option, Metropolitan would consider development of large-scale renewable energy projects for the CRA. These projects could include generation from wind turbines, solar thermal (power towers or trough systems), and solar PV. The primary difference between solar thermal and solar PV (photovoltaic process) is that while electric power generation occurs directly with solar PV via the exchange of electrons in the photosensitive material, solar thermal power generation utilizes the sun to heat a transfer fluid that is then used to produce steam for conventional steam generation. The two primary designs for heating this transfer fluid are by concentrating the sun’s heat at a single point (“power tower”) – or having the transfer fluid flow in tubes, which are placed in parabolic troughs (“trough systems”), which concentrate the heat on the tubes. Clean coal is another potential option for low emission power generation. With clean coal, additional equipment such as advanced scrubbers, are installed to limit the emission of CO₂. In addition, various CO₂ sequestration alternatives are implemented to capture and then remove/store the CO₂ either on site or at other sites that would be developed specifically for this purpose. This technology has yet to be fully implemented on utility-scale projects. Staff would also consider various implementation strategies including sole development, partnerships with others, and use of an RFP or PPA for obtaining renewable or clean energy contracts. The overall goal is to achieve ownership or long-term interest in carbon neutral generation projects, sufficient to meet all of Metropolitan’s energy needs and achieve carbon neutrality.

A comparison of renewable/low emission power development costs show that current renewable projects are significantly more costly than non-renewable energy projects such as natural gas ([Attachment 10](#)). As an example, solar PV capital costs are estimated to be between \$7,000-\$8,000/kW, and wind project capital costs are estimated at \$2000/kW. Capital costs for natural gas generation plants are estimated to be approximately \$1,250/kW. While Federal tax incentives are available for large-scale wind and solar development, Metropolitan is unable to benefit except through a partnership or long-term structured PPA, where a second private party is eligible to take advantage of the tax credits. The high cost of renewable development directly impacts the resulting cost of energy from such projects ([Attachment 11](#)). The cost of wind energy generation is estimated to be twice that of Metropolitan’s current average supplemental power cost for the CRA (\$50/MWh), and the estimated cost of solar thermal/PV energy is almost three times as much. It is anticipated that as the carbon markets and carbon related fees are established, electrical rates – both retail and wholesale – will escalate. However, renewable energy development is anticipated to remain costly for the near future.

A summary of the extent to which Strategic Option 3 addresses the energy issues identified during the 2007 Board retreat follows:

- Price Volatility: greatest benefit with additional self-generation (retail and wholesale)
- Reliability: higher improvement with additional self-generation (retail and wholesale)
- Stewardship: 100 percent reduction in retail and wholesale based carbon footprint
- Energy Independence: significant benefit towards achieving energy independence with additional self-generation in both retail and wholesale facilities
- Cost: significant capital and O&M cost but minimal exposure to future carbon related fees
- Implementation risk: higher – to be determined

With Strategic Option 3, there is significant beneficial impact on the key energy issues identified during the Board retreat in 2007. The primary challenge with this option is that there are significant cost and planning requirements that would need to be addressed. In addition, while there is minimal exposure to future carbon related fees and potential regulatory changes, there are increased implementation risks, which would also need to be assessed.

Strategic Power Plan – Proposed Strategic Approach and Policy Goals

Proposed Strategic Approach

The primary elements of Metropolitan’s proposed strategic approach for implementing the SPP entail Metropolitan’s pursuit of: 1) carbon neutrality; 2) cost-effective energy projects; and 3) implementation of these actions in a phased manner. It is also recommended that Metropolitan defer purchasing carbon offsets at this time, and instead invest in cost effective renewable energy projects at Metropolitan’s treatment plants and other facilities. This strategy will enable Metropolitan to assess options for energy management and carbon reduction in a cost-effective manner, reduce Metropolitan’s carbon footprint, and manage risks associated with potential carbon-related fees and regulations.

Proposed Policy Goals

The proposed SPP Policy Goals are summarized as follows:

- | | |
|--------------------|---|
| Short-term goal: | a) Achieve 25% carbon reduction at all retail energy facilities by 2013. |
| | b) Work with DWR and the SWC on SWP energy and carbon management issues. |
| | c) By 2013, determine the feasibility, cost, timing, and partnership opportunities to gain energy independence. |
| Intermediate goal: | Achieve 100% carbon reduction at all retail energy facilities by 2020. |
| Long-term goal: | Achieve 100% carbon reduction at all retail and wholesale energy facilities by 2030. |

In conjunction with the proposed strategic approach, these policy goals also provide flexibility to address future potential impacts to the SPP process including regulatory changes (both State and Federal), contract issues (next Hoover power contract), pricing issues (future electrical rate escalation), and other factors such as technology advancements that could reduce the cost of renewable energy project development ([Attachment 12](#)). It is anticipated that SPP Policy Goals will be presented to your Board for consideration in March 2009.

Strategic Power Plan – Future Impacts

Under the SPP, several energy and carbon management options have been developed to address the uncertainties and potential risks of pricing, regulations, and contract negotiations. Metropolitan will continue to monitor the status, trends, and changes in the risk categories in the future so that the SPP can be adapted accordingly.

Examples of potential future impacts to the SPP process are grouped into the following categories:

- 1) AB 32
- 2) Contracts
- 3) Pricing
- 4) Other

Under the AB 32 category, the following potential impacts have been identified:

- a) *Carbon offset cost.* For this study, the carbon offset cost is estimated to be \$20-\$100/ metric ton. This is quite a large range, but it is consistent with emerging markets on the east coast. Actual costs will not be known until regional carbon markets are established.
- b) *Cap and Trade Market.* It is likely that a regional or Federal cap and trade market for carbon emission allowances will be established in the future. Essentially this would be a market where industry limits are set for carbon emissions (“cap”) either at a state or Federal level (depending on applicable law – one may exceed the other), and then entities with excess allowances could sell (“trade”) those allowances to others that need to purchase them. There are a number of trade alternatives available including direct sale or via an open auction.
- c) *Carbon Tax.* The potential for a “tax” (fee) on carbon is unknown. If enacted, this tax may be applied at high levels in the source chain. It is likely that the impact will affect the electrical and transportation industries in particular, and trickle down to all end-users.
- d) *Regulatory changes.* Currently, Metropolitan is not directly affected by proposed regulatory mandates or requirements. Hence, any carbon reduction actions that Metropolitan enacts are on a purely voluntary basis. However, it is possible that future regulatory changes could affect Metropolitan directly. The SPP policy goals provide for a means to mitigate this risk, as well as Metropolitan’s exposure to future carbon related fees.
- e) *Potential Federal action.* While there is currently no specific Federal plan for greenhouse gas reduction, bills have been introduced that would establish a cap and trade market and limit greenhouse gas emissions. It is likely that Federal legislation on greenhouse gas reduction or limits will be enacted within the next two sessions of Congress.

Under the Contracts category, the following potential impacts have been identified:

- a) *Small hydro contract renegotiation and potential lost revenue.* If Metropolitan were to utilize the environmental attributes (RECs) from the small hydroelectric facilities, it is likely that the revenue received from the generation would be reduced. For SPP study purposes, a fifty percent reduction in revenue is assumed.
- b) *New Hoover Contract.* In 2017, the current Hoover contract expires. Initial contract renewal discussions have begun and there is a proposal by one of the contractual parties that would reduce the amount of energy that Metropolitan receives from Hoover by approximately 7 percent. While it is too early to assess, if in fact, this proposal will be agreed upon by the parties, any reduction would result in the need for additional CRA supplemental power purchases in 2018 and beyond.

Under the Pricing category, the following potential impacts have been identified:

- a) *Electrical price escalation.* As shown in [Attachment 2](#), future electric rate escalation could be as much as 5-20 percent/yr in the short-term. This is significantly greater than the 1996-2005

average of 3 percent/yr. The impact of increasing the Renewable Portfolio Standard (RPS), from 20 percent to 33 percent by 2020 for California, is unknown. In addition, imposition of a carbon tax or future restrictions on carbon allowances (cap and trade market) would also put increased upward pressure on electrical rate escalation.

- b) *Incentive changes (Federal and State).* Federal incentives for renewable energy projects are currently established for wind power (Production Tax Credit (PTC)) and for solar (Investment Tax Credit (ITC)). While the PTC was recently extended until the end of 2009, the ITC was extended for 8 years. It is not known if these incentives will be increased in the next administration.

Under the Other category, the following potential impacts have been identified:

- a) *DVL renewable certification.* Currently, DVL generation is not recognized as “renewable” as the nameplate capacity of 39 MW exceeds the California renewable qualifying limit of 30 MW. Staff is evaluating several available options for qualifying DVL generation as renewable.
- b) *Technological advances.* Technological advances hold the highest potential for bringing down the cost of renewable energy development. However, it can take years to implement new technology on a commercial, cost-effective basis.
- c) *Electrical reliability impacts.* As increased amounts of intermittent or variable power sources such as wind or solar PV are brought on-line via state mandated RPS requirements, the overall electrical grid is subject to increasing levels of system variances and disturbances. While there are ongoing studies in the industry to evaluate high renewable energy penetration rates in the electrical grid, and new control technology is being introduced to regulate system disturbances, there is the risk that wide spread grid disturbances could occur more frequently in the future. Construction of costly transmission lines to remote locations also places upward pressure on electric rates. One possible way to mitigate the potential reliability and financial impact is the development and implementation of additional self-generation projects.

Accomplishments to-date

Although currently not mandated to reduce its greenhouse gas emissions, Metropolitan has been pro-active in the areas of climate change and renewable energy development. In addition to the SPP process, Metropolitan has completed the following critical accomplishments in these areas:

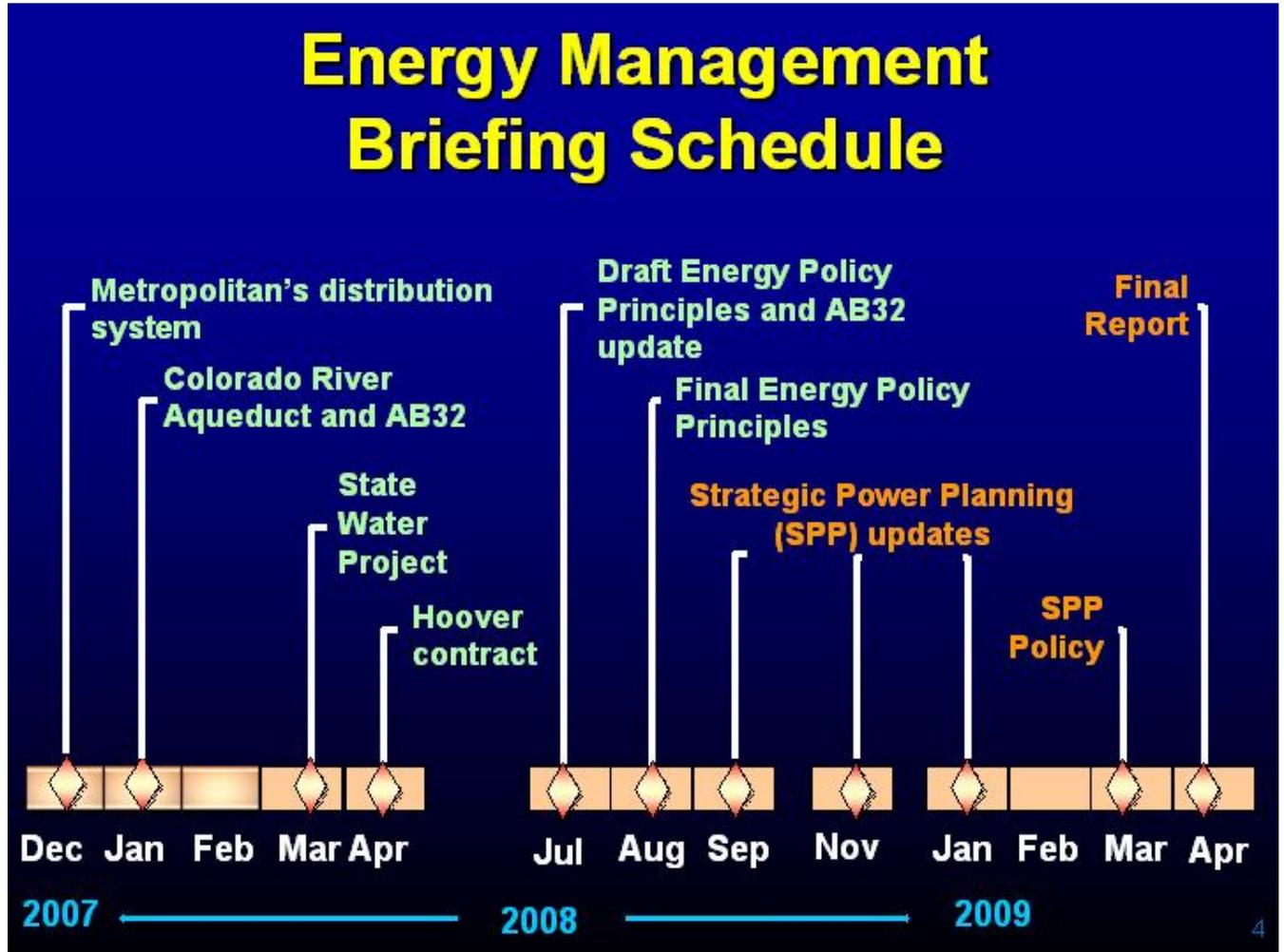
- Finalized assessment of wind energy potential at Hinds Pumping Plant
- Joined the California Climate Action Registry
- Awarded Skinner Solar Construction Contract
- Authorized Weymouth Solar Preliminary Design
- Completed Hydro Plant Expansion Screening Study
- Authorized Hydro Plant Expansion Detailed Study
- Updated Energy Policy Principles

In addition, Metropolitan has been monitoring CARB’s development of the Climate Change Scoping Plan, and provided input to the review process as necessary. It is anticipated that Metropolitan will continue monitoring the development of regulations for implementing AB 32, and will continue to assess potential impacts and provide comments as appropriate to protect Metropolitan’s interests.

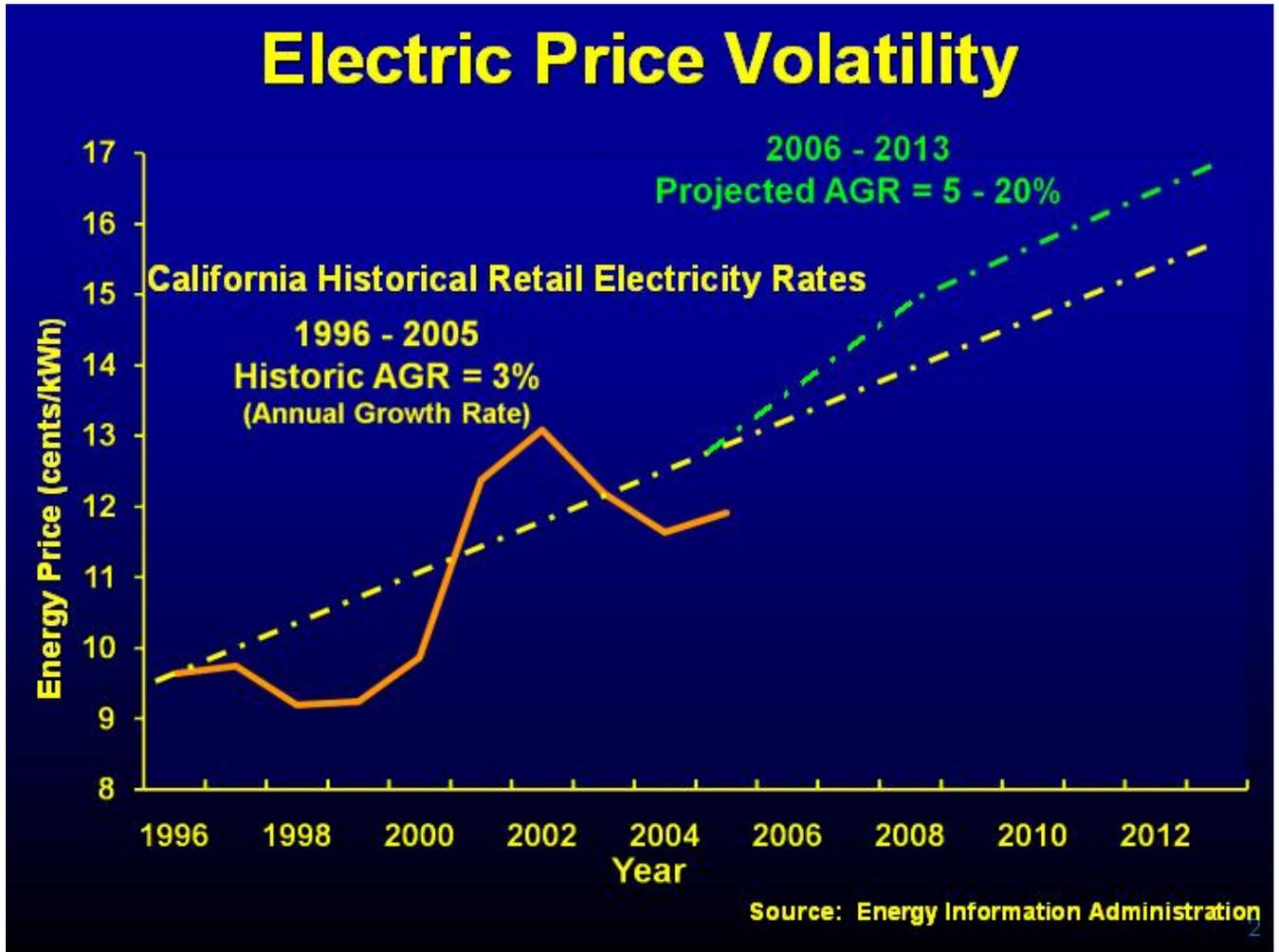
Conclusion

The SPP policy goals will enable Metropolitan to assess options for energy management and carbon reduction in a cost-effective manner, reduce Metropolitan's carbon footprint, and manage risks associated with potential carbon-related fees and regulations. It is anticipated that the SPP Policy Goals will be presented to your Board for consideration in March of 2009. It is also anticipated that the final report on the SPP effort will be completed in April of 2009. The final report will detail Metropolitan's carbon footprint and greenhouse gas emissions, current status of AB 32 and CARB's Climate Change Draft Scoping Plan, strategic option assessments, and identify potential carbon management and renewable energy action alternatives. In conjunction with the proposed strategic approach, these policy goals are not only achievable, they also provide the flexibility necessary to address future potential impacts to the SPP process including regulatory changes (both State and Federal), contract issues (next Hoover power contract), pricing issues (future electrical rate escalation), and other factors such as technology advancements that could reduce the cost of renewable energy project development.

Energy Management Briefing Schedule
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Electric Price Volatility
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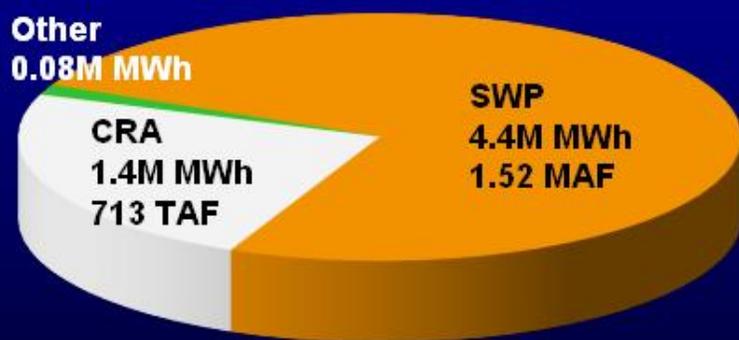


Metropolitan Retail and Wholesale Energy Facilities
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Metropolitan's 2007 Electricity Use
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MWD Electricity Use and Cost Calendar Year 2007

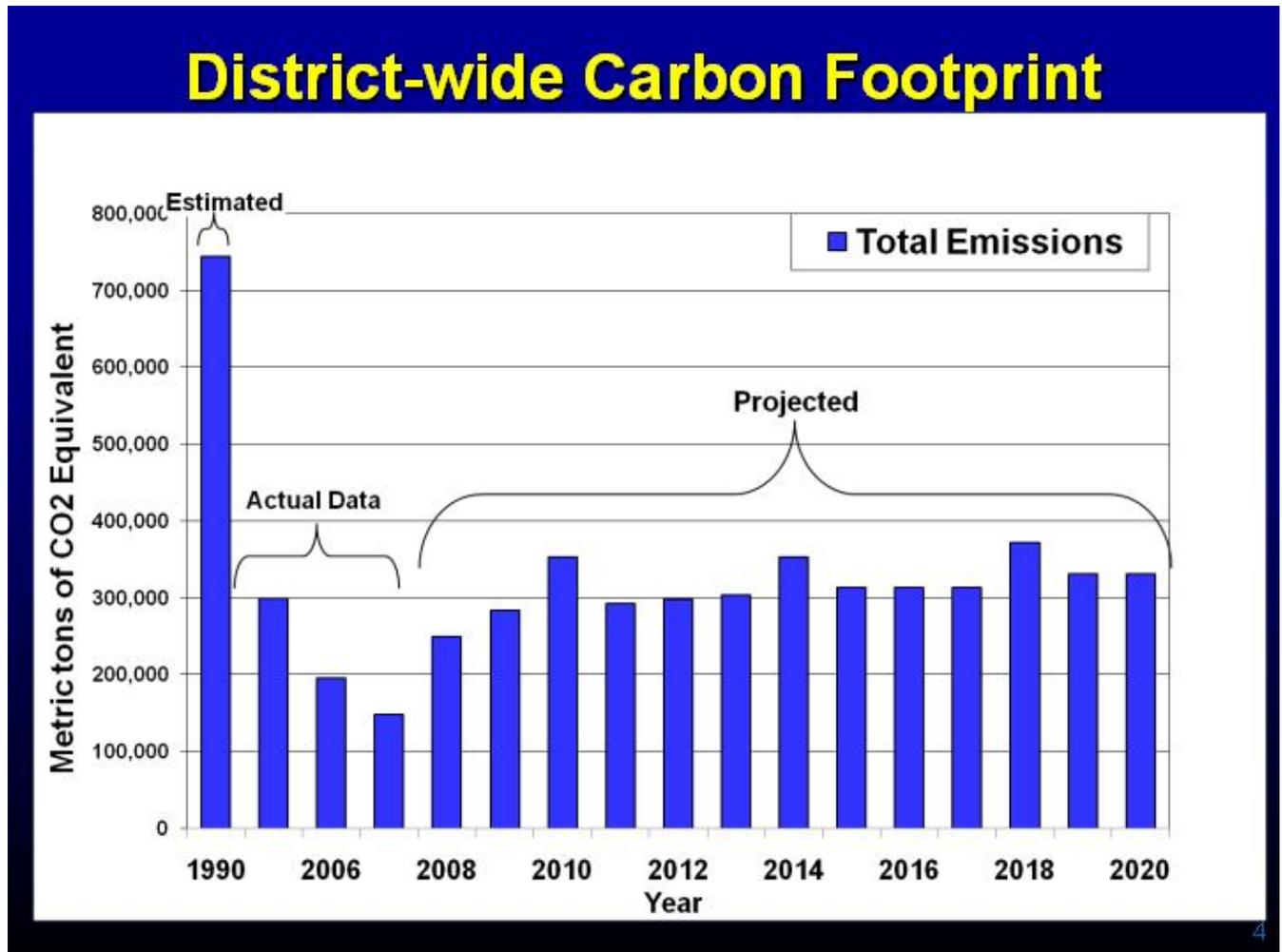


Other includes:

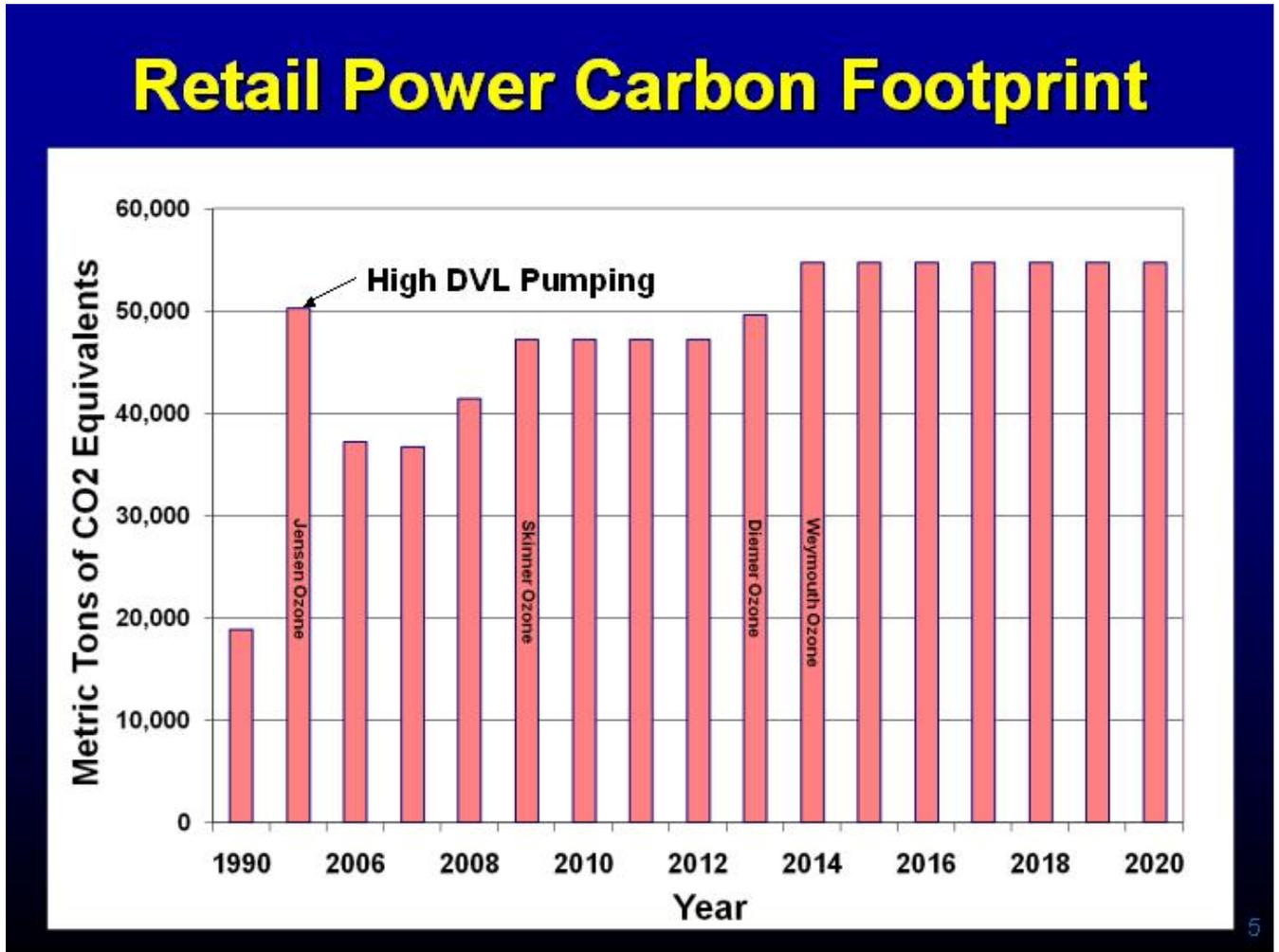
- Treatment Plants
- Union Station Headquarters
- OC-88 Pumping Plant
- Diamond Valley Lake Pumping Plant

Total Electricity Cost = \$243.4M
Total Electricity Used = 5.9 M MWh

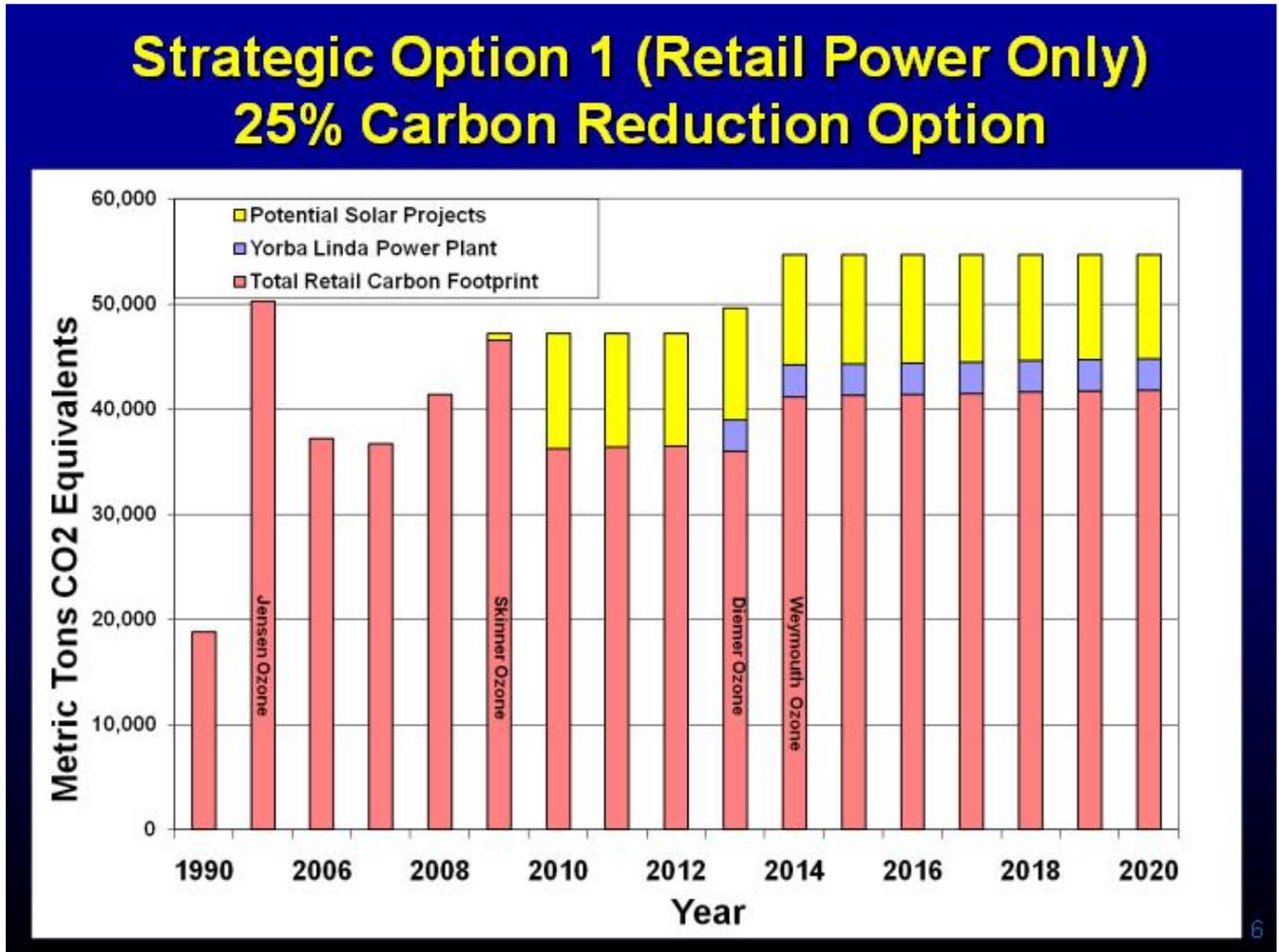
Metropolitan Carbon Footprint
Attachment 5, Page 1 of 1



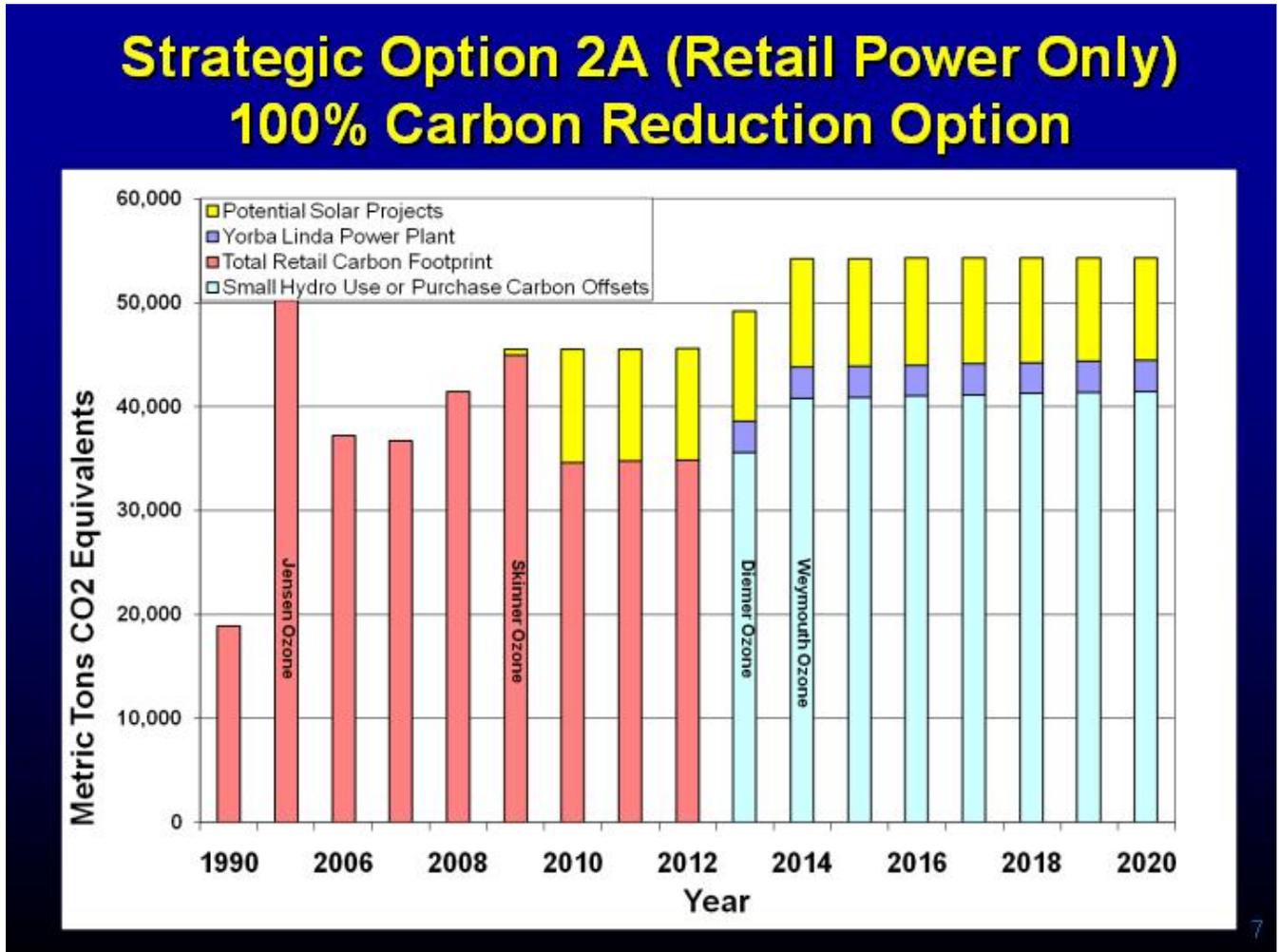
Metropolitan Retail Power Carbon Footprint
Attachment 6, Page 1 of 1



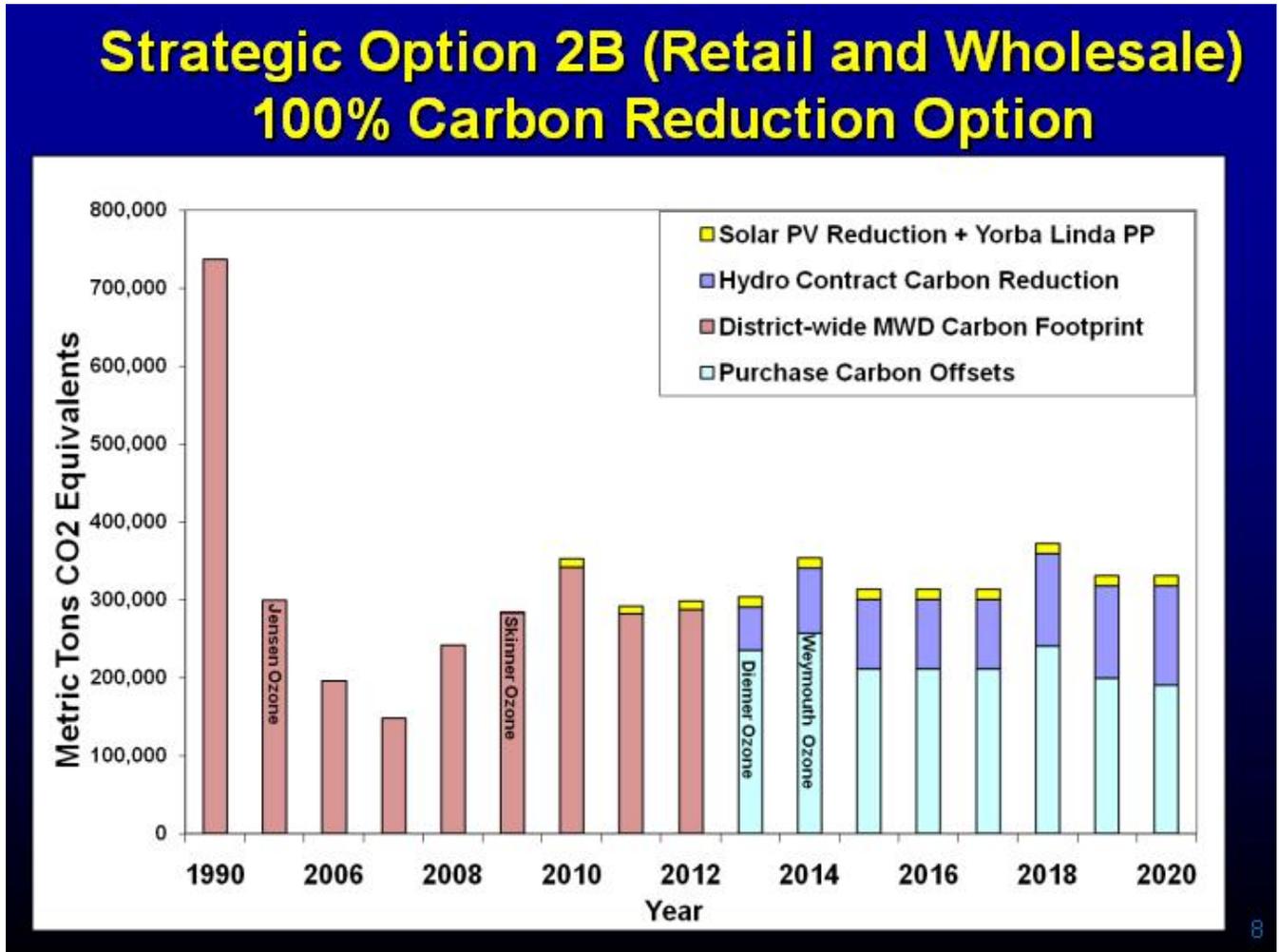
Strategic Option 1 – 25% Carbon Reduction at Retail Power Facilities
Attachment 7, Page 1 of 1



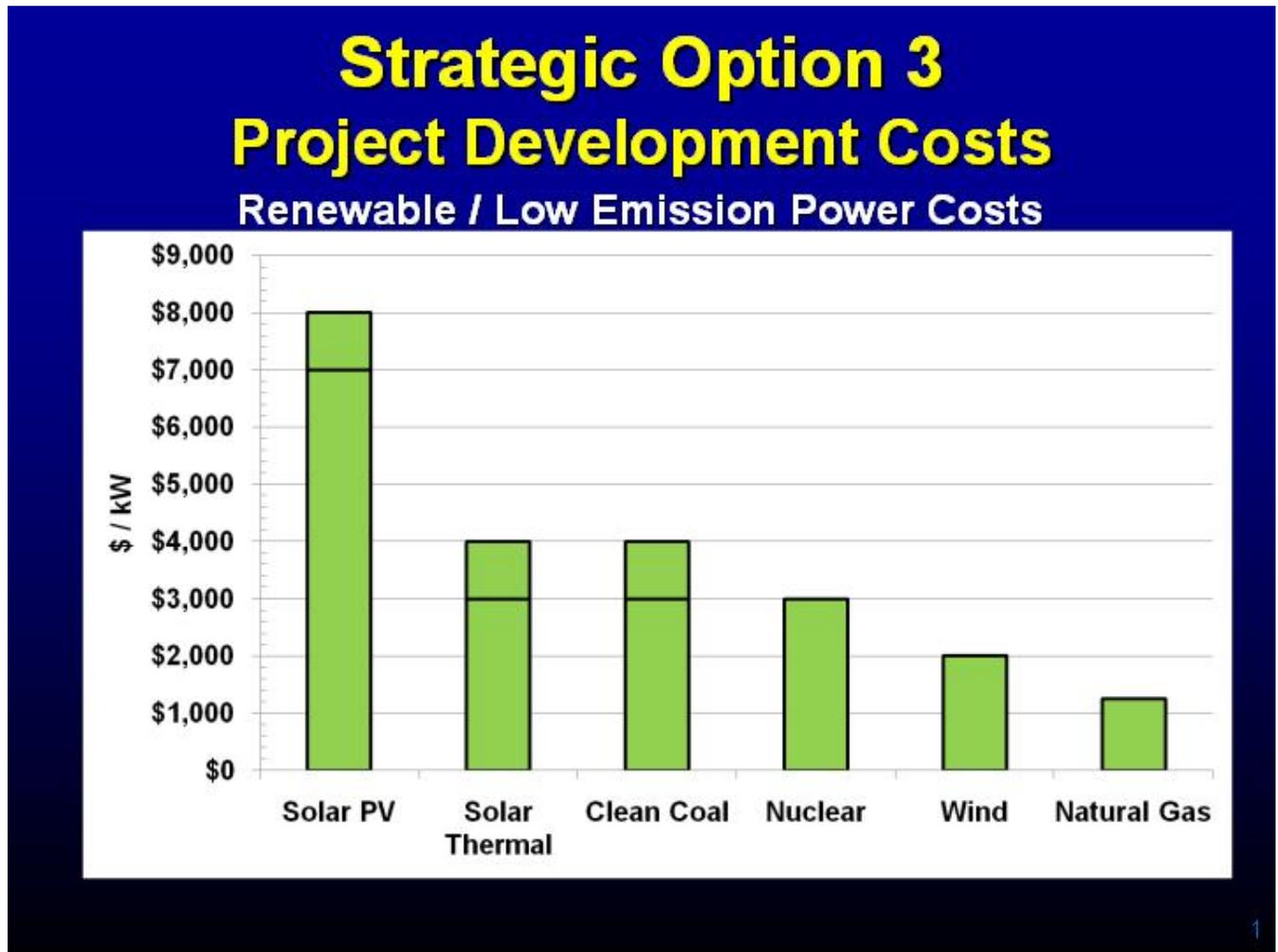
Strategic Option 2A – 100% Carbon Reduction at Retail Power Facilities
 Attachment 8, Page 1 of 1



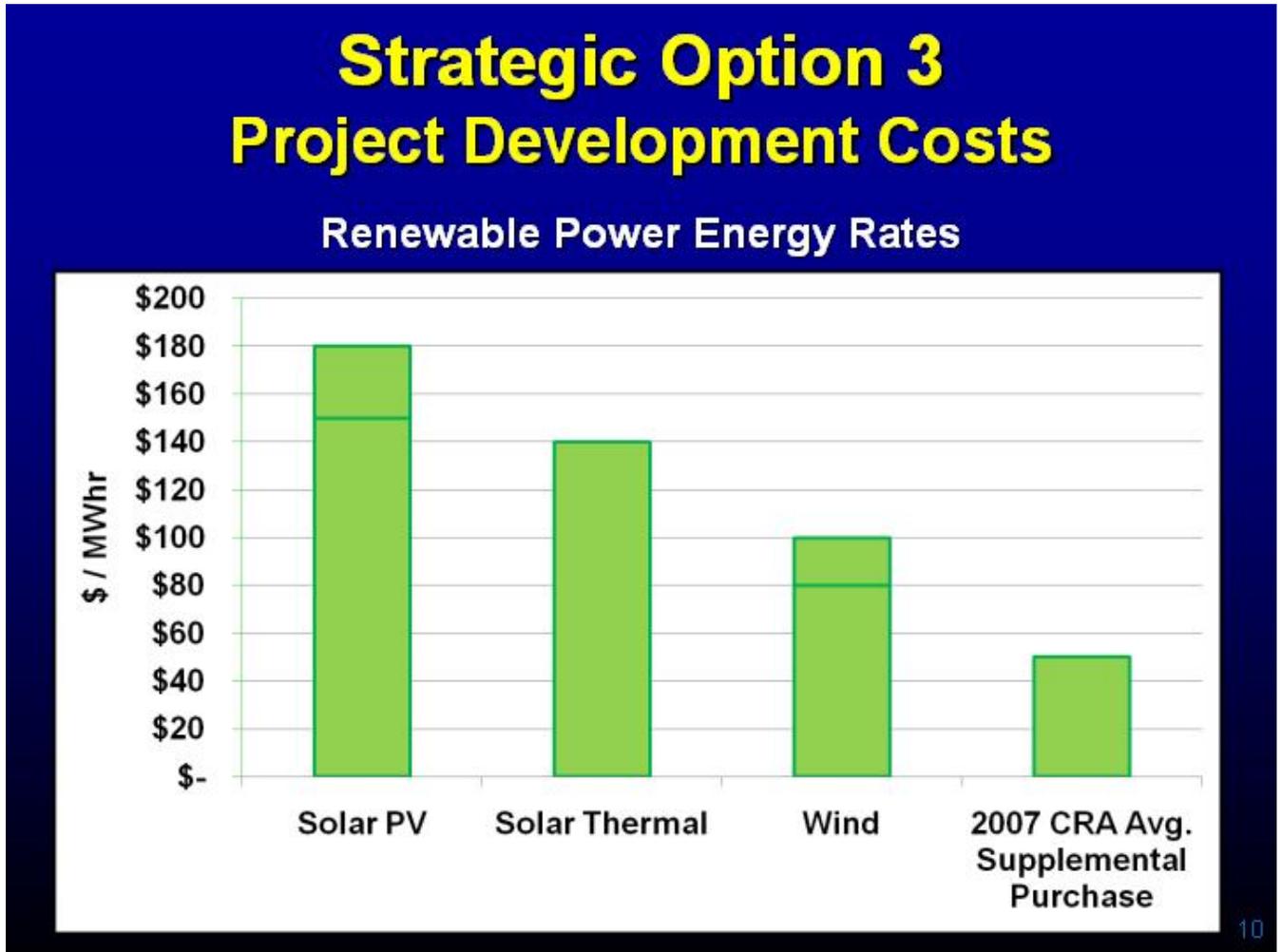
Strategic Option 2B – 100% Carbon Reduction at Retail and Wholesale Power Facilities
Attachment 9, Page 1 of 1



Strategic Option 3 – Renewable / Low Emission Power Project Development Cost Comparison
Attachment 10, Page 1 of 1



Strategic Option 3 – Renewable Power Energy Rate Comparison
Attachment 11, Page 1 of 1



Carbon Reduction Phased Approach Timeline
Attachment 12, Page 1 of 1

