**FINAL Environmental Impact Report**
**Grayson Repowering Project**

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The following minor revisions or errata have been made to correct spelling and/or typing errors and additions within the Final EIR. Additions and corrections are in Red text and deletions can be found as strikethrough black text (i.e. ~~text~~).

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# Executive Summary

## Project Location and Description

Pursuant to the requirements of the California Environmental Quality Act (CEQA), the City of Glendale (City) has prepared this Draft Environmental Impact Report (EIR) to evaluate the potential environmental impacts of the proposed repowering of the Grayson Power Plant ("Repowering Project" or "Project"). The Project site is located at 800 Air Way, Glendale, California 91201, northeast of the Interstate 5 freeway and Hwy 134 interchange.

A majority of the equipment and facilities at the existing Grayson Power Plant were completed between 1941 and 1977, and are proposed to be replaced with more reliable, efficient, flexible, and cleaner units. With the exception of the 2003 simple cycle peaking plant (Unit 9), the City is proposing to replace the existing generation equipment and related facilities with a combination of new combined cycle and simple cycle gas turbine generation units. The generating capacity would increase from 267 megawatts (MW) net to 310 MW net (an increase of 43 MW net) which is necessary for the City to serve its customer load and meet a regulatory requirement for reliability. Because the Project involves less than a 50 MW increase in generation capacity, it is not subject to the California Energy Commission's Power Plant Licensing jurisdiction. The City is the CEQA Lead Agency for the Project.

The Project is designed to provide reliable generating capacity, avoid electrical capacity shortages, facilitate the use of more renewable energy by freeing up transmission line capacity to bring more renewable-based electricity to the City, and to provide flexibility to operate efficiently over the wide range of electrical loads placed on the City's electric system. The Project will allow the City to maintain reliable service, keep rates affordable, and facilitate compliance with state regulations regarding renewable energy supplies mandated through the Renewable Portfolio Standards without the need for new transmission lines. The Project will also allow the City to meet its existing and future electrical demands even if the City is separated from existing interconnections with the electric grid, it will minimize the City's reliance on importing power from remote generation locations across a congested transmission grid, and it will support water conservation efforts by eliminating the use of potable water for generation purposes.

Additional background including the site's history as a power plant, purpose and need, objectives, and benefits of the Project are included in Section 2.0. A detailed Project description is included in Section 3.0

## Environmental Impacts and Mitigation Measures

Topics evaluated in this Draft EIR have been identified based on preparation of an Initial Study (Appendix A), the responses to the Notice of Preparation (NOP), and the review of the Project by City staff. The City determined through this initial review process that impacts related to aesthetics, air quality, geology and soils, greenhouse gases, hazards and hazardous materials, hydrology and water quality, noise, traffic and transportation, and tribal cultural resources could be potentially significant and require an assessment in this Draft EIR.

Based on the analysis in the Draft EIR, the City determined that the Project would result in less than significant impacts to air quality, geology and soils, greenhouse gas emissions, hydrology and water quality, and tribal cultural resources. However, it was also determined that aesthetics, hazards and hazardous materials, noise, and transportation and traffic would, with associated mitigation measures, also be reduced to a less than significant level. The Project has no potentially significant impacts that could not be mitigated.

The required mitigation measures for the Project are summarized below. A more detailed summary of all the Project's environmental impacts is included in Table 2-4 and detailed environmental impact analyses are in Sections 4.0.

### Aesthetics

During the construction period, construction activities may contrast with the existing visual character/quality of views in the Project area. Mitigation Measure AES-1 requires screening construction activities and laydown areas to reduce their visibility.

### Hazards and Hazardous Materials

There would be a potentially significant temporary hazards and hazardous materials impact. The demolition and construction phases of the Project may create temporary hazards and hazardous materials impacts due to the use of fuels, handling of petroleum-impacted soils, and handling of materials containing asbestos/lead based paint. Mitigation Measures HAZ-1, 2, 3, 4, and 5 require adherence to a Soil Management Plan, Hazardous Materials Management Plan, Asbestos and Lead Paint Management Plan, and safe fuel handling practices/spill response.

In addition, to mitigate the off-site consequence of the worst-case accidental release of ammonia during Project operation. Mitigation Measure HAZ-6 requires the surface area of the proposed and existing ammonia tank containment systems to be effectively reduced by 90 percent or greater which would restrict the concentrations of concern within the site boundary.

### Transportation and Traffic

During the demolition and construction phases, traffic would increase in on adjacent public roadways and the acceptable circulation standard at the San Fernando Rd./Doran St. intersection could be exceeded during construction. Mitigation Measures TRA-1, 2, 3, 4, 5, 6, 7, 8, and 9 require adherence to a Traffic Control Plan and number of public safety precautions as well as limiting the number of vehicle trips at the San Fernando Rd./Doran St. intersection during construction.

### Noise

The noise from the Project operation has been reduced through engineering design and controls as described in Mitigation Measures NOI-1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 which require limits on source noise levels and controls to ensure acceptable noise levels during facility operation are not exceeded.

### Mitigation Measures

Implementation of the above mitigation measures would reduce the Project's potentially significant impacts to aesthetics, hazards and hazardous materials, noise, and transportation and traffic to a less than significant level. When the EIR is certified, a mitigation monitoring program would be adopted to ensure that the mitigation measures are fully implemented. With the implementation of these mitigation measures, the Project would not result in any significant and unavoidable environmental impacts.

## Alternatives to the Project

A reasonable range of alternatives that could feasibly attain some of the basic objectives of the Project and their potential environmental impacts are evaluated in the Draft EIR. These alternatives include use of a battery energy storage system, off-site utility-scale renewable energy generation combined with the addition of new high voltage transmission capacity and interconnections, a combination of reduced on-site generating capacity combined with the addition of new high voltage transmission capacity and interconnections, and a combination of reduced on-site generating capacity and a battery energy storage system. A summary of each alternative evaluated in this Draft EIR is set forth below. A more detailed evaluation of alternatives is set forth in Section 5.0.

### No Project Alternative

The No Project Alternative would involve running the existing power plant to failure and not proceeding with repowering of the Grayson Power Plant. The No Project Alternative would result in reduced environmental impacts over time as the units are shut down and would have less potential environmental impacts than those of the Project.

However, the No Project Alternative is not a viable alternative in that it would not serve the needs of the City as the City could no longer meet its obligations as a load serving entity for its residents and customers, placing them at significant risk for decreased electrical system reliability and availability. Moreover, the No Project Alternative would not meet the Project objectives and would fail to comply with Federal and State reliability standards.

**Energy Storage Project Alternative**

The Energy Storage Project Alternative would involve replacing Units 1 – 8 at the existing Grayson Power Plant with a battery energy storage facility. Use of the City's existing Unit 9 electrical generation, the City's allotment from the Magnolia Power Plant, and transmission capacity to serve the City's electrical load and charge batteries when excess capacity is available. Energy stored in the batteries would then be discharged to serve the electrical load when demand exceeds available transmission and generation resources.

The Energy Storage Project Alternative's potential for local air quality, greenhouse gas emissions, hydrology and water quality, noise, and traffic and transportation impacts are less than those of the Project. More distant impacts due to the additional night-time generation needed to charge the batteries, when renewable solar energy will not be available, are potentially increased. Additionally, during the summer season, it is not possible to import enough electricity to charge the batteries to serve the daytime load. For these reasons, this Alternative was not selected because it does not feasibly meet the Project objectives to the same extent as the Project.

**Alternative Energy Project Alternative**

The Alternative Energy Project would involve some combination of photovoltaic or wind power production with energy storage and transmission lines. While the Alternative Energy Project Alternative reduces local potential air quality, greenhouse gas emissions, hydrology and water quality, and noise impacts local to the Grayson Power Plant site, it increases off-site impacts due to the need for increased transmission as well as the large area needed for a wind farm or solar field.

Because of the very limited ability to site solar or wind resources within the City, combined with the energy storage considerations discussed in the preceding Energy Storage Project Alternative, as well as the complications associated with building a new transmission line to import alternative energy, the Alternative Energy Project Alternative was not considered an adequate replacement for the power that would be generated by the Project. Additionally, the Alternative Energy Project Alternative does not feasibly meet the Project objectives to the same extent as the Project.

**150 MW Project Alternative**

The 150 MW Project Alternative would involve a reduced size power project located on the existing project site with a new transmission interconnection. While the 150 MW Project Alternative would have incrementally less potential air quality, greenhouse gas emissions and noise impacts than those of the Project, the potential impacts at the Grayson Power Plant site are generally similar.

However, the 150 MW Project Alternative also includes construction of a new transmission line that has the potential to result in greater potential impacts to aesthetics, agriculture and forestry resources, cultural/tribal cultural resources, geology and soils, land use and planning, and population and housing. In addition to the potential environmental impacts, the 150 MW Project Alternative does not feasibly meet many of the Project objectives or meet them as well as the Project.

**200 MW Project Alternative**

The 200 MW Alternative would have reduced air and greenhouse gas emissions and noise from one less generation unit compared to the Project, with the reduction of one unit offset by the addition of a battery energy storage system (one that is smaller than the earlier alternative). The battery energy storage system adds the impact of the cost of periodic battery replacement as well as the need to dispose/recycle the batteries when they reach end of life. If sufficient transmission capacity were not available for charging the BESS, then the air emissions may not be reduced due to the need to operate additional unit(s) to charge the BESS.

**Environmentally Superior Alternative**

The Draft EIR found that none of the alternatives would totally avoid or significantly lessen significant impacts of the Project. As a result of this analysis, the proposed Project would meet all project objectives while resulting in the fewest impacts when compared to the feasible alternatives evaluated and is therefore considered the environmentally superior alternative.

**Alternatives Considered but Not Evaluated in this EIR**

A number of alternatives were considered but eliminated from further consideration in this Draft EIR. The alternatives that were not evaluated further include alternative power plant sites, and a variety of alternative technologies (generation technology, fuel technology, and alternative power plant cooling). These alternatives are more fully discussed in Section 5.3.

**Environmentally Superior Alternative**

The Draft EIR found that none of the alternatives would totally avoid or significantly lessen significant impacts of the Project. As a result of this analysis, the proposed Project would meet all Project objectives while resulting in the fewest impacts when compared to the feasible alternatives evaluated and is therefore considered the environmentally superior alternative.

# Abbreviations

| | |
|---|---|
| µg/m$^3$ | micrograms per meters squared |
| AADT | Average Annual Daily Traffic |
| AAQS | Ambient Air Quality Standards |
| AB | Assembly Bill |
| ACM | Asbestos-Containing Materials |
| ACWM | Asbestos-Containing Waste Materials |
| AERMOD | American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Dispersion Model |
| AES | Aesthetics |
| AICUZ | Air Installation Compatible Use Zone |
| ANSI | American National Standards Institute |
| AVO | Average Vehicle Occupancy |
| BA | Balancing Area |
| BAT | Best Available Technology Economically Achievable |
| BCT | Best Conventional Pollutant Control Technology |
| BLM | Bureau of Land Management |
| BMPs | Best Management Practices |
| Btu | British thermal units |
| CAA | Clean Air Act |
| CAAQS | California Ambient Air Quality Standards |
| Cal ARP | California Accidental Release Prevention Program |
| CalEEMod | California Emissions Estimator Model |
| CalEPA | California Environmental Protection Agency |
| Cal-OSHA | California Occupational Safety and Health Administration |
| Caltrans | California Department of Transportation |
| CARB | California Air Resources Board |
| CBC | California Building Code |
| CCCT | Combined Cycle Combustion Turbine |
| CCR | California Code of Regulations |
| CEC | California Energy Commission |
| CEMS | Continuous Emission Monitoring Systems |
| CEQA | California Environmental Quality Act |

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|---|---|
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CERS | California Environmental Reporting System |
| CFR | Code of Federal Regulations |
| CGS | California Geological Survey |
| $CH_4$ | Methane |
| CHLs | California Historical Landmarks |
| CHSRA | California High Speed Rail Authority |
| City | City of Glendale |
| CMP | Congestion Management Program |
| CNEL | Community Noise Equivalent Level |
| CO | Carbon Monoxide |
| $CO_2$ | Carbon Dioxide |
| $CO_2e$ | Carbon Dioxide equivalent |
| CRHR | California Register of Historical Resources |
| CRS | California Road System |
| CTG | Combustion Turbine Generator |
| CUPA | Certified Unified Program Agency |
| CWA | Clean Water Act |
| dB | decibel |
| dBA | A-weighted decibel |
| dBC | C-weighted decibel scale |
| DC | Direct Current |
| DTSC | California Department of Toxic Substances and Control |
| EIR | Environmental Impact Report |
| EPC | Engineering, Procurement, and Construction |
| ERAs | Exceedance Response Actions |
| ERC | Emission Control Credit |
| ESA | Environmental Site Assessment |
| FEMA | Federal Emergency Management Agency |
| FHWA | Federal Highway Administration |
| FIRM | Flood Insurance Rate Map |
| G | Ground absorption |
| GHG | Greenhouse Gas |
| GIS | Gas Insulated Switchgear |
| GIS | Geographic Information System |
| gr | grains |
| GWP | Glendale Water and Power |
| $H_2S$ | Hydrogen Sulfide |

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|---|---|
| HAZ | Hazards |
| HCM | Highway Capacity Manual |
| HFCs | Hydrofluorocarbons |
| HI | Hazard Indices |
| HOV | High Occupancy Vehicle |
| hp | horsepower |
| hr | hour |
| HRSG | Heat Recovery Steam Generator |
| HSWA | Hazardous and Solid Waste Act |
| Hwy | Highway |
| Hz | Hertz |
| I-5 | Interstate 5 |
| IBC | International Building Code |
| ICU | Intersection Capacity Utilization |
| in | inches |
| ISO | International Organization for Standardization |
| KOP | Key Observation Points |
| kV | kilovolt |
| kWe | kilowatt electrical |
| kWH | kilowatt hour |
| $L_a$ | Vibration Acceleration Level |
| LADWP | Los Angeles Department of Water and Power |
| lbm | pounds-mass |
| Ldn | day-night average sound level |
| Leq | equivalent continuous sound level |
| LFN | Low Frequency Noise |
| LORS | Laws, Ordinances, Regulations, and Standards |
| LOS | Level of Service |
| LST | Liquid Storage Tank |
| $L_v$ | Vibration Velocity Level |
| m | meters |
| MERPs | Modeled Emission Rates for Precursors |
| MICR | Maximum Individual Cancer Risk |
| MM | Mitigation Measure |
| mmcf | Million Cubic Feet |
| MND | Mitigated Negative Declaration |
| MOE | Measure of Effectiveness |
| mph | miles per hour |

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|---|---|
| MRR | Mandatory Reporting Rule |
| MT | Metric Tons |
| MW | Megawatt |
| MWH | Megawatt-hour |
| $N_2$ | Diatomic Nitrogen |
| $N_2O$ | Nitrous Oxide |
| $Na_2PO_4$ | Tri-sodium phosphate |
| NAAQS | National Ambient Air Quality Standards |
| NAGPRA | Native American Graves Protection and Repatriation Act |
| NAHC | Native American Heritage Commission |
| NALs | Numeric Action Levels |
| NCP | National Contingency Plan |
| NECs | No Exposure Certifications |
| NERC | North American Electric Reliability Corporation |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| $NH_3$ | Ammonia |
| NHPA | National Historic Preservation Act |
| $NO_2$ | Nitrogen Dioxide |
| NOIs | Notices of Intent |
| NOP | Notice of Preparation |
| NOTs | Notices of Termination |
| $NO_x$ | Nitrous Oxides |
| NPDES | National Pollutant Discharge Elimination System |
| NPL | National Priorities List |
| NSR | New Source Review |
| NSWDs | Non-storm water discharges |
| $O_2$ | Oxygen Gas |
| $O_3$ | Ozone |
| OEHHA | Office of Environmental Health Hazard Assessment |
| OPR | Governor's Office of Planning and Research |
| OSHA | Occupational Safety and Health Administration |
| PAHs | Polycyclic Aromatic Hydrocarbons |
| Pb | Lead |
| PCB | Polychlorinated Biphenyls |
| PCE | Passenger Car Equivalent |
| PCR | Public Resources Code |
| PFCs | Perfluorocarbons |
| PHI | California Points of Historical Interest |

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| PM | Particulate Matter |
| PPA | Peak Particle Acceleration |
| ppb | parts per billion |
| ppm | parts per million |
| ppmv | parts per million by volume |
| ppmvd | parts per million by volume, dry basis |
| PPV | Peak Particle Velocity |
| PRDs | Permit Registration Documents |
| PSD | Prevention of Significant Deterioration |
| psig | pounds per square inch gauge |
| P-waves | Primary waves |
| RCRA | Resource Conservation and Recovery Act |
| REL | Reference Exposure Levels |
| RMP | Risk Management Plan |
| RMS | Root-Mean-Square |
| ROWD | Report of Waste Discharge |
| RTP | Regional Transportation Plan |
| R-waves | Rayleight waves |
| RWQCB | Los Angeles Regional Water Quality Control Board |
| s | second |
| SARA | Superfund Amendments and Reauthorization Act |
| SB | Senate Bill |
| SCAB | South Coast Air Basin |
| SCAG | Southern California Association of Governments |
| SCAQMD | South Coast Air Quality Management District |
| SCC | Siemens Combined Cycle |
| SCCT | Simple Cycle Combustion Turbine |
| scf | square cubic feet |
| SCR | Selective Catalytic Reduction |
| SCRRA | Southern California Regional Rail Authority |
| SEA | Significant Ecological Area |
| $SF_6$ | Sulfur Hexafluoride |
| SMARTS | Storm Water Multiple Application and Report Tracking System |
| $SO_4^{2-}$ | Sulfates |
| SoCalGas | Southern California Gas Company |
| $SO_x$ | Sulfur Oxides |
| SPCC | Spill Prevention, Control, and Countermeasure |
| SR | State Route |

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| SRTS | Safe Routes to School |
| SUSMP | Standard Urban Stormwater Mitigation Plan |
| S-waves | Secondary waves |
| SWPPP | Stormwater Pollution Prevention Plan |
| TEWAC | Totally Enclosed Water to Air Cooled |
| TMDL | Total Maximum Daily Loads |
| TPY | Tons Per Year |
| TQ | Threshold Quantity |
| TRA | Traffic |
| USC | United States Code |
| USEPA | United States Environmental Protection Agency |
| UST | Underground Storage Tank |
| V/C | Volume-to-Capacity |
| VMT | Vehicle Miles Traveled |
| VOC | Volatile Organic Compound |
| vpd | vehicles per day |
| WECC | Western Electricity Coordinating Council |

# Glossary

## ENGINEERING TERMS

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| **Auxiliary Load** | The difference between the gross generation as measured at the electric generators output and the net generation delivered to the electric grid at the point of interconnection. The auxiliary load is the electric load necessary to operate a generating unit, e.g., pumps, fans, controls, etc. |
| **Balancing Area** | A geographic area defined by the interconnected transmission/distribution systems (which may be owned/operated by different entities) that are managed by the Balancing Authority. The boundaries of the Balancing Area are defined by the points of interconnection to other Balancing Areas. The generation within a Balancing Area must be constantly adjusted so that the sum of the power generated within the Balancing area, plus power imported into the Balancing Area, less the power exported from the Balancing Area, less the load within the Balancing Area is maintained at zero, e.g., in balance. For the Grayson project, the Balancing Area is composed of Los Angeles Water and Power, Glendale Water & Power, and Burbank Water & Power. |
| **Balancing Authority** | The responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time. Los Angeles Department of Water and Power is the Balancing Authority for the Project area. |
| **Blow Down** | The removal of a continuous or intermittent stream of water from a Heat Recovery Steam Generator or cooling tower to remove the dissolved impurities and maintain the required water/steam quality requirements. |
| **Boiler Building** | A building containing mechanical and electrical equipment used to heat water and produce steam to be used in a steam turbine for power generation. |
| **Capacity Factor** | The capacity factor is the ratio of the energy generated over one year, divided by the potential energy generated over one year. For example, a five-megawatt generator could produce a maximum of 5MWx8760hours/year=43,800 megawatt-hours (there are 8,760 hours in a |

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| | year). If it produces 25,000 megawatt-hours over the course of a year, then its capacity factor is 57% (25,000÷43,800 = 0.57, i.e. 57%). |
| **Clean Energy** | Electricity produced from sources that do not create emissions such as renewable resources (solar, wind, geothermal, small hydro), large hydroelectricity, and nuclear power. |
| **Combined Cycle Unit** | Combined cycle units utilize both the electricity produced by a combustion turbine generator as well as the high temperature exhaust gases which are used to produce boil water and produce steam, which is then supplied to a steam turbine to generate additional electric power without requiring additional fuel. Combined Cycle Units are nearly twice as efficient as simple cycle plants, but take more time to get to full load. |
| **Combustion Turbine Generator (CTG)** | A combustion turbine draws air into the engine, compresses it, which then flows into the combustors. Fuel (natural gas) is mixed with the compressed air and ignited. The hot exhaust gas then flows into a turbine that is mechanically connected to and drives the compressor. The same shaft also drives the electrical generator.<br><br>This is the same technology as used for the engines on a jet airplane. Unlike an airplane, since combustion turbine generator is on the ground where weight, size, and shape are less of a concern, the combustion process and exhaust gases are treated to produce far cleaner engine exhaust. |
| **Contingency** | Planning for the unexpected failure or outage of a system component, such as a generator, transmission line, circuit breaker, switch or other electrical element. |
| **Continuous Emission Monitoring Systems (CEMS)** | A system for measuring and reporting on a real-time continuous basis the combustion turbine exhaust emissions to the South Coast Air Quality Management District, the regulatory body that reviews the project and issues the air permit. |
| **Cooling Tower** | A device used to cool water that is used in the power plant to cool various pieces of equipment, the largest of which is the condenser which is used to condense the exhaust steam from the steam turbine back into water for re-use in the HRSG. |
| **Demand Management** | A set of actions taken to modify customer demand and reduce electric system loads by reducing, time shifting, or turning off loads. Examples include: |

- Behavioral change with regards to the use of electricity through education.
- Financial incentives such as time-of-use rates that charge higher rates for electricity during times of the day when electric loads are high
- Financial incentives such as tiered rates that charge higher rates as the amount of electricity used increases
- Time-shifting of load by storing energy during times of low demand to be used during times of high demand

Reducing system load by either voluntary or involuntary means such as turning off air conditioning, reducing system voltage, or in extreme events, interrupting service to a customer.

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| **Derating (or de-rating)** | The temporary or long-term reduction in capacity of a device, unit, or system due to weather, equipment aging, or supply related issues A typical example is operation below the maximum power rating. |
| **Dispatchable Generation** | Generating units that can start, change load, and shut down as needed on a 24/7 basis to serve electric load without being constrained by their fuel source. |
| **Electric Bus** | Refers to a high electric current duty portion of an electric distribution where a source of power feeds multiple loads. Typically, the loads will have their electric breaker to protect the bus and other electric loads from a fault on any load. Functionally equivalent to the distribution panel in a home. |
| **Firming** | Some renewable resources, solar and wind in particular, are subject to unplanned temporary reductions in output due to changes in the weather (wind drops off, clouds pass overhead, etc.). This is referred to as intermittency. To address the intermittency issue, other generating resources are used to supply power to make up the difference on a real-time basis and "firm" the renewable resource so that the combined output meets the planned or committed output. |
| **Frequency Deviation** | The degree to which the alternating current electrical system frequency deviates from 60 Hz due under-generation (<60 HZ) or over-generation (>60 Hz). An excessive frequency deviation, typically <1 Hz, will lead to load shedding and other remedial actions. At 57.9 Hz electric systems will separate from each other per WECC criteria. |

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| **Fuel Gas Compressors** | A device for increasing the pressure of the natural gas fuel so it can flow into the combustors of the combustion turbine. The fuel gas pressure must be higher than the pressure of the compressed air produced by the compressor section of the combustion turbine. |
| **Gross Output** | The electrical output of an electrical generator measured at the generator terminals. |
| **Heat Recovery Steam Generator (HRSG)** | Is an energy recovery heat exchanger that recovers heat from the hot gas stream of the combustion turbine to produce steam that can then be used to drive a steam turbine |
| **Linear Facilities** | Structures that follow an alignment between two ends such as a transmission line, pipeline, or roadway. |
| **Load-Following** | Adjusting power output as demand for electricity fluctuates throughout the day. Load following plants are typically in-between base load and peaking power plants in efficiency, speed of startup and shutdown, construction cost, cost of electricity and capacity factor. |
| **Load Serving Entity** | An entity that is responsible for securing energy and transmission service to serve the electrical demand and energy requirements of its end-use customers. |
| **Load-Shifting Battery** | A battery energy storage system used to store energy to be used at a later time (typically hours later). The battery is charged when there is excess energy available and discharged during periods when there is a high demand on the electric system or inadequate generation resources are available. |
| **Loading Order** | California, as state policy, has a preferred loading order to address the state's electrical needs. The loading order was adopted in the 2003 Energy Action Plan and included in the California Energy Commission's 2003 Integrated Energy Policy Report. The loading order consists of decreasing electricity demand by increasing energy efficiency and demand response, and meeting new generation needs first with renewable and distributed generation resources, and then with clean fossil-fueled generation. |
| **N-1 or Single Outage Contingency** | Single Outage Contingency (N-1) Criterion Applicability under System Operations. For multiple resources serving a system, the "N" number of resources, the loss of one of the resources, "-1." The N-1 criterion, particularly the loss of the largest resource, is a minimum system reliability |

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| | consideration that the System Operator uses when modeling/planning/operating the electric transmission network to ensure sufficient redundancy of supply and avoid potential power interruptions and/or system failure. |
| **N-1-1 or Secondary Contingency** | N-1-1 Contingency: A sequence of events consisting of the initial loss of a single generator or transmission component (Primary Contingency), followed by system adjustments, followed by another loss of a single generator or transmission component (Secondary Contingency). For planning purposes to ensure system reliability, the Secondary Contingency is typically the second largest resource that is relied upon to serve load. |
| **Net Output** | The electrical output of a Unit delivered to the electrical system measured at the point of interconnection. The Net Output is equal to the Gross Output of the generator(s) less electrical power consumed within the Unit for pumps, fans, and other electrical loads as well as electrical losses in transformers and cabling. |
| **Non-Spinning Reserve** | The non-spinning reserve or supplemental reserve is the extra generating capacity that is not currently connected to the system but can be brought online within 10 minutes. In isolated power systems, this typically equates to the power available from fast-start generators. However, in interconnected power systems, this may include the power available on short notice by importing power from other systems or retracting power that is currently being exported to other systems. |
| **Power Block** | The primary collection of equipment within a power plant unit that converts fuel into thermal and mechanical energy and in turn into electricity. |
| **Power Plant Repowering** | The process of upgrading an older power plant, in part or in whole, with new equipment to improve efficiency and reliability, while reducing environmental impacts through reduced air emissions and water usage. |
| **Reactive Power Support** | The portion of electricity that establishes and sustains the electric and magnetic fields of alternating-current equipment. Reactive power must be supplied to most types of magnetic equipment, such as motors and transformers. It also must supply the reactive losses on transmission facilities. Reactive power is provided by generators, synchronous condensers, or electrostatic equipment such as capacitors and directly influences electric system voltage. It is usually expressed in kilovars or megavars. |

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| **Regulation Battery** | A battery energy storage system used to balance short-term imbalances between the generation in service and the electric load. The battery can serve as a load (charging) if there is excess generation and serve as an additional source of generation if there is excess load. Longer-term imbalances are addressed by adjusting the amount of generation in service or shedding load as a last resort. |
| **Reliability Requirements** | The mandatory and enforceable standards for electricity reliability required by Section 215 of the Federal Power Act. |
| **Shaping** | Operation of a generating resource in conjunction with others, to deliver a combined output that matches the required shape of the load curve (load versus time) to meet demand. |
| **Selective Catalytic Reduction (SCR)** | An air emissions control technology system that injects a reductant agent (typically dilute aqueous ammonia) into the exhaust stream of a combustion unit and hence through a special catalyst to reduce nitrogen oxide pollutant concentrations. |
| **Shed-Load** | The action, either manually or as part of an automatic scheme, to disconnect load from the electric system to bring the load into balance with the available generation. Load shedding can result in customers being involuntarily disconnected on a temporary basis. |
| **Simple Cycle Unit** | A power plant that uses a combustion turbine to drive a generator to produce electrical power. Similar to the engines seen under the wing of an airplane, instead of producing thrust to push an airplane through the air, the power is used to drive an electrical generator. Like the engines on an airplane, the combustion turbine can start quickly and go to full power, several times a day if needed, quickly providing energy to the electric system. |
| **Single Largest Contingency** | The planned unexpected failure or outage of a system's largest electrical component. |
| **Spinning Reserve** | The spinning reserve is the reserve or additional generating capacity that is available by increasing the power output of generators that are already operating and connected to the power system. For most generators, this increase in power output is achieved by increasing the torque applied to the turbine's rotor. |
| **Steam Turbine Generator** | A Steam Turbine Generator is a device that uses the high temperature, high pressure steam from the Heat Recover Steam Generator and expands it through the turbine section that then rotates a shaft driving an |

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| | electrical generator and producing electricity. The 'spent' steam in then condensed back into water that is then re-circulated back to the Heat Recovery Steam Generator to again produce steam. |
| **Transformers** | A device that increases or decreases the voltage in an electrical system. As electrical power is transmitted more efficiently at higher voltages, transformers are used to increase the voltage of the generated electricity so it can be distributed efficiently throughout the City. Transformers are also used to reduce the voltage of the generated electricity for use to power motors to drive pumps and fans in the power plant. |
| **Voltage Regulation** | The voltage regulation is the percentage of voltage difference between no load and full load voltages of a transformer with respect to its full load voltage. |
| **Water Treatment Facility** | A system consisting that will clean up the recycled water to a much higher quality for use in the HRSG and other power plant water applications where demineralized water is required. |

## ENVIRONMENTAL TERMS

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| **Best Available Control Technology** | Means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this Act emitted from or which results from any major emitting facility." |
| **City of Glendale local CEQA Guidelines** | The City of Glendale's adopted local CEQA Guidelines as set forth in the document entitled "City of Glendale and Glendale Housing Authority Guidelines for implementing the California Environmental Quality Act" as amended November 1, 2016. |
| **Emission Inventory** | Usually contains the total emissions for one or more specific greenhouse gases or air pollutants, originating from all source categories in a certain geographical area and within a specified time span, usually a specific year. |
| **Emission Reduction Credits** | A reduction in pollution that is equal to one emission unit. A company that reduces its pollution can sell its emission credits to companies that fail to reduce their pollution: If a company fails to meet its emission-reduction target, it will need to buy additional emission credits to cover its excess emissions. |
| **New Source Review** | The New Source Review is a permitting process created by the US Congress in 1977 as part of a series of amendments to the Clean Air Act. |
| **Prevention of Significant Deterioration** | The Prevention of Significant Deterioration, or PSD, permit program was developed by the United States Congress to prevent significant environmental impacts on "attainment areas" from large industrial sources of air pollution. |
| **Priority Reserve** | A Priority Reserve is established to provide credits for specific priority sources. |
| **Repowering** | Repowering is a common term among electric utilities that refers to rebuilding power plants by taking an old generating unit out of commission, dismantling it, and building a new, modern one at the same plant. The repowered units are more energy efficient, create less emissions, and increase reliability of the power grid. |