IMPERIAL IRWMP

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

Exhibit 3.2 – Carbon Emissions from IRWM Plan Climate Change Report

Imperial Region
2014 IRWM Drought Grant Proposal

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INTEGRATED REGIONAL WATER MANAGEMENT PLAN

GEI Consultants

FINAL

Imperial Region Integrated Regional Water Management Plan

Volume 1: IRWM Plan

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water demand and power consumption for domestic and industrial cooling with associated increases in power generation emissions.

Farmers are sure to respond to weather changes that impact quality and economic value of crop yields; their response may include changing cropping calendars, type and amount of crop planted, etc. These changes would in turn impact water consumption patterns. However, with its 24/7 delivery schedule, these types of changes in demand patterns can be accommodated by IID.

5.6 Greenhouse Gas Emissions Related to Water Services

In the process of transporting, treating or pumping of water, power is expended. Emissions associated with water related activities are attributed to this electricity use. Appendix O presents the GHG analysis for the Imperial Region. The analysis is intended to provide metrics to compute emissions from each type of energy intensive water related activity that presently occurs or is expected to occur due to implementation of IRWMP project alternatives.[29] Energy intensities of water related operations can be multiplied by emissions generated per unit of energy used to obtain the carbon dioxide equivalent (CO_2e) emissions for processing the water.

As of April 2012, water-energy intensity (the amount of energy required to process a million gallons of water) in the Imperial Region is estimated at 3067 kWh/MG for wastewater treatment, 800 kWh/MG for potable water treatment, 314 kWh/MG for non-irrigation agricultural operations, and 1228 kWh/MG for recycling water. Colorado River water is transported by gravity from Imperial Dam to the Region, and IID generates hydropower along the All American Canal. Therefore, a minus 304 kWh/MG water-energy intensity is associated with water deliveries to the Imperial Region. There are no desalination plants or groundwater banks operating in the Imperial Region. However, typical water-energy intensities from other regions indicate that 2840 kWh/MG is required for water desalination while groundwater pumping requires 2410 kWh/MG. For 2008, IID reported an emissions factor of 1270.9 lbs of CO_2e/MWh of electrical energy generated (excluding exports) or purchased and used within the service area. Net emissions from all water-related activities are negative (-4,926 metric tons of CO_2e emissions) since avoided emissions benefits for hydropower energy generation exceed total emissions from power use in the water sector in the region.

Four project alternatives for creating 100 KAF annually of new water to supplement IID's Colorado River water supply were evaluated in terms of their impacts on greenhouse gases emissions: groundwater banking, recycling wastewater, retiring agricultural land and desalination. The water-energy intensities and electricity emission factors presented above are used in the computations. The results of the project alternatives analysis are presented below:

1. Groundwater banking of underruns yielding of 100 KAF annually runs would cause an increase of about 45,280 metric tons of CO2e in water-related emissions.

[29] Does not include Definite Plan or System Conservation Plan project activity, which is outside the scope of the IRWMP.

2. Recycling projects yielding 100 KAF annually of wastewater would increase emissions by 23,070 metric tons of CO2e.
3. Retirement of agricultural land to obtain 100 KAF annually of water would result in an overall emissions reduction of about 5,907 metric tons of CO2e, excluding reductions in indirect fuel emissions from farm equipment operations and live-cycle emissions from products such as insecticides and fertilizers.
4. Desalination projects yielding 100 KAF annually would lead to an increase of about 53,356 metric tons of CO2e.

Geothermal energy generation cannot be considered as a separate alternative for reducing water use. Geothermal energy is considered a likely future water user as there are plans to develop the resource. Emissions from use of water in geothermal energy generation are between 0.68 lbs CO_2e /AF and 0.85 lbs CO_2e /AF. Use of 100 KAFY of water for geothermal energy generation would lead to an emissions increase of between 30 metric tons of CO_2e and 38 metric tons of CO_2e.

An analysis of transportation-related and energy generation emissions in the Imperial Region was performed to provide context to the scale of the water-related emissions. The analysis shows that for 2010, energy generation emissions from the net electrical energy delivered and used within IID amounted to 2.022 million metric tons of CO_2e while emissions from fossil-fuel use in transportation amounted to 1.376 million metric tons CO_2e. Even desalination, which is the highest emitting 100 KAFY water project alternative, would contribute less than 4 percent of either the energy generation or transportation-related emissions. The water project alternatives in the Imperial Region will therefore have minimal climate mitigation impacts.

5.7 Historic and Future Water Demands Methodology

Colorado River water use in the Imperial Valley is under terms and conditions of the QSA/Transfer Agreements described above in Section 5.7 and below in Section 5.10. Under the QSA/Transfer Agreements efficiency conservation measures are to be implanted and operated to transfer water historically used in the Imperial Region out of the region to urban areas in Southern California. Agricultural water consumptive use is to remain the same unless there is permanent irrigated land retirement as a result of planned land use changes consistent with the Imperial County General Plan, when agricultural lands are annexed to an incorporated city consistent with prevailing city general plans, or when a solar voltaic development is granted a Conditional Use Permit by Imperial County. As has been the case historically, annual agricultural demands are expected to vary year-to-year based on commodity markets, rainfall, temporary or long-term fallowing and other factors.

Changes in agricultural use due to the QSA/Transfer Agreements, although described herein, are out of scope for the Imperial IRWMP, because they are the result of years of negotiation, and have been agreed to and signed by California and non-California water agencies, the state of California and the federal government. Potential changes in use by agriculture due to urban and/or solar voltaic development are considered below and in Chapter 11 and 12.