

CHAPTER 5

LEGAL ISSUES FOR MARKET FINANCING OF CALIFORNIA WATER

In part, this study investigates market methods for generating revenues for water resource system improvements. A prerequisite for a successful market is to have a fungible product that has similar financial characteristics. Traditionally, water is financed in terms of the units of delivered product and by fixed access charges for the system. Since different systems have different components that make up the final water charge, defining market units in terms of their function rather than the end product may make for a set of more homogenous financial products. In addition, pricing and trading the components separately rather than as a single end product might lead to greater flexibility and adaptability.

California's water supply system can be separated into components of water supply, conveyance, and storage. To date, most water users in California pay for water based on a rate that combines all three of these services (See e.g. Mecham and Simon 1995 regarding CVP pricing; O'Conner 1994a regarding SWP pricing). The California legislature passed three bills in 1995 aimed at water supply reliability for urban areas (Statutes of 1995, Chapters 330, 854, and 881) (DWR 1998a). One general obligation bond measure, Proposition 204, passed in November of 1996 for \$995 million, has been earmarked to finance actions recommended by the CALFED process. By de-coupling the individual components, the CALVIN model is able to estimate the economic value and possible revenue generation that this added flexibility might produce.

This chapter, which addresses the legal ability to de-couple and market California's water supply components, is structured as follows. The following section is divided into subsections for each of the three components of water supply. Each subsection outlines the extent to which current law allows water supply, conveyance, and storage to be marketed as separate commodities. In addition, the next section explains recent developments that are extending current law, and presents areas where the law would have to change to allow further de-coupling. A further section discusses examples from the natural gas and electric industries where de-coupling has taken place, and the last section looks at some public and private financing issues that might accompany future policy options.

CURRENT LEGAL FRAMEWORK OF CALIFORNIA'S WATER SUPPLY SYSTEM

California's water supply is derived from surface water and groundwater. It is important to note at the outset that Californian's cannot possess a right to the corpus of water, but rather can only possess the right to use water (Water Code §§ 1000-1001). Rights to use or transfer surface water in California may derive from riparian, appropriative or contractual rights in the user.

A variety of water code provisions enacted in the 1970's and 80's provided for the transfer of surface water in California (Water Code Sections 109, 1011, 1435, 1706, 1725, 1736, 1810(d)). The Central Valley Project Improvement Act of 1992 (CVPIA) and various California Department of Water Resources (DWR) and US Bureau of Reclamation (USBR) regulations and guidelines control transfers dealing with contractual rights and/or use of State Water Project

(SWP) or Central Valley Project (CVP) facilities. Groundwater rights, on the other hand, are derived from common law and are not comprehensively addressed in the Water Code (Littleworth and Garner 1995).

The following discussion outlines the extent to which each type of water right in California can be transferred. This discussion also addresses the different types of transfers allowed under the Water Code, federal law, and DWR and USBR's regulations and policies.

The Water Itself

Surface water: appropriative, riparian, and contractual water rights.

Appropriative Rights in the Transferring Party: The holder of a valid appropriative right may transfer all or a portion of the water available under that right (Water Code §§474 – 484). However, if a transfer involves a change in place of use, point of diversion, or purpose of use for an appropriative right established after 1914, the parties must petition the State Water Resources Control Board (SWRCB) for approval of the change, regardless of the duration of the transfer. The right to use water under pre-1914 appropriative rights may be transferred without SWRCB approval as long as there is not adverse impact on another legal user of water (Bookman-Edmonston Engineering 1996).

When the Transferring Party does not hold the Appropriative Right: Often, a contracting district or water company holds rights for water, which it delivers, to individual users. The Water Code provides that such water suppliers may transfer water allocated in a given year to its water users, provided that the water needs of the suppliers' service area are still met (§§1745.04 -1705.06). These provisions allow water to be freed for transfer via conservation and fallowing, to a limited extent (O'Brien and Gunning 1994).

Transfers of Water Under Contract: In cases of transfers of contractual water rights from DWR or USBR, the transfer must be consistent with DWR and USBR policy and any applicable federal law (Gray 1994). In addition, since DWR and USBR are the actual water right holders, they must make any necessary change petitions to the SWRCB to effectuate a transfer. Transfers of SWP contract water must occur pursuant to California law and DWR policy. Transfers of CVP contract water must occur pursuant to Federal law (section 3405 of the CVPIA), California law, and USBR policy (Gray et al. 1991; Roos-Collins 1987). In this regard, USBR has adopted interim guidelines for the implementation of the CVPIA (USBR 1993a; USBR 1993b).

Under the CVPIA, transfers of CVP water between districts in the same county, watershed, or area of origin are simple and are deemed to have met the conditions specified in the statute (CVPIA §3405(a)(1)(I)). Transfers of CVP water become more complicated as the water is transferred further from the district, to non-CVP contracting entities, or if a transfer is initiated by a member of a contracting district rather than the district itself. All such transfers require USBR approval, invoking the NEPA process.

Most CVP districts have internal policies that require district approval for transfers initiated by their members. In addition, the CVPIA provides that the contracting water district must approve transfers that involve more than 20 percent of its long-term contract supply. The CVPIA also authorized transfer of CVP water outside the CVP service area, subject to several conditions and a right of first refusal by existing CVP users within the service area. Such transfers must be

consistent with state law, approved by USBR, and must obtain the relevant change in place-of-use, point of diversion, and purpose of use order from the SWRCB.

The CVPIA also imposes pricing conditions on transfers of CVP water that are in addition to the regular charges for the water paid by the district. Transferees who are Municipal and Industrial (M&I) users or non-CVP contractors must pay the USBR established temporary full cost rate for the water. M&I purchasers must also pay a \$25 surcharge per acre-foot of transferred water.

Riparian Rights: Although there are no statutory procedures for transfer of riparian rights, riparian rights were purchased as part of the Drought Water Bank (O'Brien and Gunning 1994; Wahl 1994). Water Code §1707 authorizes the SWRCB to approve a petition to transfer water under any type of right, including a riparian right, for the purpose of preserving or enhancing wetlands habitat, fish and wildlife resources, or recreation in or on the water. Water rights quantified by statutory adjudication may be transferred pursuant to Water Code §1740 (Bookman-Edmonston Engineering 1996).

Groundwater

Common law has historically governed groundwater rights and use. Under this regime, overlying landowners have paramount rights to groundwater. Those who extract groundwater for use on public or non-overlying land are appropriators whose rights to groundwater are junior to those of overlying owners (Guy and Cordua 1997; Littleworth and Garner 1995).

Increasing recognition of the connection between surface water and groundwater in a region has led to several water code provisions dealing with groundwater. These provisions do not expressly allow the sale and/or transfer of groundwater, but do allow groundwater to be used as part of a conjunctive use program. Other Water Code provisions allow for the management of groundwater basins (AB 3030 Water Code §§ 10750 et seq.) which can include conjunctive use. An increasing number of local county ordinances also seek to govern the use of groundwater, especially for conjunctive use (DWR 1998a). Some of California's groundwater basins have been adjudicated. In these basins, a court-appointed water master regulates groundwater extraction (DWR 1998a).

Conjunctive use programs can include in-lieu operations and groundwater substitution (DWR 1998a). A transferor of surface water can resort to groundwater for the duration of a transfer (groundwater substitution), or a groundwater user will take surface water in-lieu of pumping to recharge the groundwater basin with a like amount of water for a particular person's benefit (in-lieu operation) (Guy and Cordua 1997). Groundwater Substitution was widely employed in the Drought Water Banks. Potential concerns involving groundwater substitution include its effect on neighboring groundwater users and its possible inducement of additional basin recharge that depletes usable stream flow (DWR 1998a).

Conjunctive use programs are often useful tools to improve groundwater levels. However, active recharge programs involve allocation of the rights to water that is recharged. Rights to recharge water lies with those who recharge it rather than the overlying landowners. The extent to which these programs vest in those who pay for additional recharge to the basin, but are not overlying groundwater owners, a paramount right to recapture water stored in the basin is a keenly contested issue (Kletzing 1988; Guy and Cordua 1997; Kidman 1999).

The Water Code provides that a transferor may only substitute groundwater for the transferred water if the groundwater use is consistent with a groundwater management plan or if the water supplier determines that the transfer will not lead to overdraft conditions (§1745.10). DWR and USBR have similar requirements in their guidelines for the approval of transfers of water under a contractual right, or the approval of wheeling of non-project water through their facilities. In addition to the provisions addressing groundwater in the context of transfers, Water Code §1011.5 provides conditions on the use of conjunctive use programs in general that are designed to preserve the health of California's groundwater basins.

The Logistics of Water Transfers in California

Transfers can generally be categorized as either short-term, long-term, permanent, or leases. Transfers may include transfer of actual water rights, contractual rights to receive water, or just an assignment of the right to receive water under another's water right for a specified period.

Temporary Urgency Changes: Water Code §§1435-1442 allows temporary urgent changes to be made for 180 days with SWRCB authorization upon a showing of urgent need. The no-injury rule applies to these changes, as does CEQA. The SWRCB can renew the permit approving a temporary change for successive 180-day terms.

Short-term or temporary transfers: Short-term or temporary transfers are for one year or less and are governed by Water Code §§1725 - 1732, requiring SWRCB approval for any required changes in place of use, point of diversion, or purpose of use. Such changes must comply with the no-injury rule, but are exempt automatically from CEQA compliance. This is the most commonly used practice for water transfers in California, evidenced by a variety of spot market transfers (Howitt 1996), the Drought Water Banks of the early 1990's (DWR 1998a; Israel and Lund 1995), and the CVPIA interim water acquisition program (DWR 1998a).

Long term transfers: Water Code §§1725-1737 provides for petitions to the SWRCB for a change in point of diversion, place of use or purpose of use for more than one year. Unlike short-term transfers, all transfers of a duration longer than one year require CEQA compliance. The SWRCB must also hold a hearing before approving a long-term transfer petition (Water Code §1736). The no-injury standard for long-term transfers is different than that for short-term transfers - a long-term transfer may not be approved if it will result in a substantial injury to another legal user of water.

Permanent transfers: Permanent transfers involve the transfer of water rights themselves, rather than just the right to use water available under someone else's water right for a given period of time. Permanent changes in place of use, point of diversion, or purpose of use require SWRCB approval, a hearing, and compliance with the no-injury rule and CEQA (Water Code §1740). Examples of permanent transfers include (1) the Monterey Agreement, which provides for up to 175,000 af of permanent transfers of SWP entitlement away from agricultural uses, (2) the CVPIA Interim Water Acquisition Program, and (3) the CVPIA AFRP Water Acquisition Program (DWR 1998a).

Leases: A water lease allows the water right holder to retain the water right, but allows the leaseholder to use the water under certain conditions for a specified period of time (DWR 1998a). Generally, parties to agreements to lease water must comply with the applicable Water

Code provisions relating to short or long term transfers, outlined above, depending on the duration of the lease. However, parties to a lease might choose to structure their lease in accordance with section §§1020 et seq. of the Water Code under certain circumstances.

In 1991 the Legislature added Chapter 1.5 to the Water Code (§1020 - §1030) providing for water leases of up to 25% of the water the lessor would have applied or stored in the absence of the lease, for a period not to exceed 5 years (Water Code §§1020, 1021). The benefit of structuring a lease under this Chapter is that the parties do not have to petition the SWRCB for any change in place or use, point of diversion, or purpose of use associated with the transfer (Water Code §1025.7). On the other hand, all leases under this chapter are subject to CEQA, including those for less than one year (Water Code §1029). This chapter also has specific noticing requirements, environmental and other no-injury rule protections, and outlines how the proceeds of the lease agreement are to be distributed. For these reasons, the provisions in this chapter have not been used as of 1994 (O'Brien and Gunning 1994).

Transactions Costs for Transfers: Water transfers in California that are more than just annual transfers between contractors of either the state or federal projects can be quite complex and involve significant transaction costs. The following requirements outline the hurdles that the transfer must cross:

1. DWR and USBR must approve transfers of water under their permits, invoking NEPA compliance. USBR requires that the party requesting the transfer cover the agency's costs to comply with this law.
2. SWRCB change petition: If a transfer involves a change in place of use, point of diversion, or purpose of use for an appropriative right established after 1914, the parties must petition the SWRCB for approval of the change, regardless of the duration of the transfer. In such cases, DWR or USBR holds the actual appropriative right and must petition the SWRCB for any change required for the transfer. The reality of this scenario is that the transferring parties have little control over the time in which a change petition is actually completed and presented to the SWRCB for approval. The petition to the SWRCB must be accompanied by a nominal processing fee.
3. Fees and Notice to Fish and Game: In all cases that require a notice to or petition of the SWRCB, the Water Code also provides for notice to the State Department of Fish and Game. The notice to Fish and Game requires a \$850 fee (Water Code §§1726 and 1736).
4. CEQA compliance: In all change petitions for more than one year, or for temporary urgency changes, CEQA is invoked. DWR requires that the party requesting the transfer cover the agency's costs to comply with this law.

The No-Injury Rule

Complying with the no-injury rule is a significant transaction cost for water transfers. California has led the nation in adopting the no-injury rule for water transfers. The no-injury rule basically means that an appropriator cannot change a point of diversion, place of use, or purpose of use so as to cause injurious consequences to the rights of another (Gould 1988; O'Brien and Gunning 1994). This rule is codified expressly in the Water Code §§ 1702 and 1706, but the same

principle also appears in most of the other Water Code provisions dealing with water transfers. In addition, the no-injury rule has been extended to protect fish and wildlife (Senate Bill 301 of 1991 amended Water Code sections 1703, 1707, 1726, and 1736 in this regard) (O'Brien and Gunning 1994).

Since transfers involve changes in the place of use of water, they are also often accompanied by a change in consumptive use, invoking the no-injury rule (O'Brien 1988). Water Code §1725 specifically limits the amount of water that can be transferred to that which would have been consumptively used or stored in absence of the transfer. In addition, both DWR and USBR have guidelines limiting transfers to the amount of water historically consumptively used by the transferring party. These guidelines do not use the same definition of consumptive use found in the Water Code, which has led to controversy (O'Brien and Gunning 1994).

Conveyance Capacity

California's statewide water conveyance system is primarily comprised of three large systems. The CVP operated by USBR, the SWP operated by DWR, the Colorado River Aqueduct (CRA) operated by Metropolitan Water District of Southern California (MWD). In addition, there are a wide variety of locally developed systems. The right to use the capacity in this conveyance system for a given water user is generally tied to a contractual right to receive water from either USBR or DWR, and is not sold as a separate commodity. However, recent legislation established a "wheeling" policy that encourages agencies that control conveyance systems to make unused space available to others for fair compensation (Water Code §§ 1810-1814). In addition to the Water Code, the SWP and CVP each have their own regulations regarding wheeling for contractors and others.

The SWP

The SWP's California Aqueduct is the only large conveyance facility connecting north to south in California, and its use is required for most transfers. The Monterey Agreement provides a mechanism for using SWP facilities to transport non-Project water for SWP contractors. However, first priority for use of the Aqueduct is reserved for project purposes. Second priority is reserved for wheeling of contractor to contractor transfers of project water. Third priority goes to wheeling of non-project water for State contractors. The last priority is kept for wheeling of non-project water for non-contractors. These priorities have yet to be formalized (USBR 1993a).

The CVP

The Delta-Mendota canal is the primary federal conveyance facility for water transfers in California. Use of this, and other CVP facilities, must be either tied to an existing CVP contractual right to delivery of water through the facility or a Warren Act contract for conveyance of non-CVP water (43 U.S. Code §§523-525, 2212) (USBR 1993a). Entering into a Warren Act contract requires that the USBR comply with NEPA and other federal environmental laws (Bookman-Edmonston Engineering 1996). The same priorities outlined above for wheeling in the State Aqueduct apply to wheeling in federal facilities (USBR 1993a).

Fair Compensation under the California Wheeling Statutes

Water Code sections 1810-1814 authorizes joint use of unused capacity in water conveyance facilities. Under this statutory scheme, state, regional, and local public agencies that own

conveyance facilities are required to make available up to 70% of their unused capacity for a bona-fide water transfer upon payment of fair compensation, as long as certain no-injury conditions are met. The statutes define “fair compensation” to include reasonable charges incurred by the owner of the conveyance system, including capital, operation, maintenance, and replacement costs. However this definition has been the subject of substantial controversy with respect to MWD’s conveyance facilities, and is the subject of currently proposed legislation, SB 506 (1999, Peace).

In a recent California validation action interpreting California’s water wheeling statutes (*Metropolitan Water District of Southern California v. All Persons Interested in the Matter, et al.*, Case No. BC164076, San Francisco Superior Court (1998), MWD argued that it should be able to include portions of its system-wide capital costs in wheeling rates for the Colorado River Aqueduct in order to avoid stranded costs.

In this case, San Diego County Water Authority (SDCWA), one of MWD’s member agencies, challenged MWD’s approval of postage stamp wheeling rates for interruptible and firm transportation service through the CRA. SDCWA will need to wheel any water it obtains through a long-term transfer agreement with IID through the CRA. As approved, MWD’s postage stamp wheeling rates included MWD’s costs of obtaining water from the State Water Project and conservation programs, as well as the costs associated with operation and maintenance of the CRA. The postage stamp rates were also fixed per acre-foot, regardless of the distance the water was to be wheeled through the CRA.

MWD’s defended its postage stamp rate structure by arguing that if member agencies such as San Diego were allowed to use the CRA for only the variable costs of conveyance, the remaining member agencies would bear the burden of paying larger shares of MWD’s system wide costs. Theoretically, more member agencies could follow San Diego’s lead and secure alternative, lower cost supplies and MWD would have to allow them to use the CRA for only variable costs of transmission thereby leaving fewer and fewer MWD customers to pay increasingly larger shares of the system wide costs.

The court rejected MWD’s arguments on several grounds. First, the wheeling statute only requires MWD to sell its excess capacity at “fair compensation”, which does not include system-wide costs. Thus MWD should actually benefit from being able to sell capacity in the CRA that would otherwise generate no revenue. The rationale for this decision assumed that MWD would still have sufficient demand to continue moving the same amount of water through the CRA that it had in the past, and thus could cover anticipated system-wide costs.

Second, the statute was clearly written to encourage creative water transfers and improve the efficiency of California’s water industry. If conveyance facility owners such as MWD were allowed to impose unrelated system-wide costs on all parties wishing to move water secured by a water transfer, many water transfers would become cost prohibitive. The court noted that this result would contravene the intent of the Legislature in enacting the wheeling statutes.

In response to the ruling described above, legislation was introduced this year by Senator Steve Peace to amend the definition of “fair compensation” in §1811 (SB 506). The amendment would ensure that the State, regional and local public agencies may charge for the reasonable point to

point charges that they incur as a result of a water transfer. However, they may not charge system-wide operation and maintenance costs, or other costs that are not directly related to the specific facilities and services utilized for the water transfer at issue.

Storage

Storage in above ground reservoirs

Currently the water code does not address rights to storage in surface reservoirs. These rights are generally tied to contractual rights to receive water from either the state or federal water projects. Under the Monterey Agreement between DWR and its contractors, carryover storage is permitted by contractors in state owned reservoirs, subject to a spill priority that favors project water stored within a contractor's proportional share of the available storage capacity. Storage for non-state contractors will be spilled first (DWR and State Water Contractors 1994).

To effectuate storage in a federal reservoir beyond that allocated pursuant to a water service contract, a Warren Act contract must be executed with the United States. USBR also had guidelines for rescheduling water for carryover storage (USBR 1993a).

Storage in groundwater basins

The Water Code does not currently expressly provide for the marketing of groundwater basin storage capacity. However, several provisions of the code allow conjunctive use and groundwater banking as part of groundwater basin management strategies. The Monterey Agreement also created the ability for SWP contractors to store water outside their service area either directly or through exchanges utilizing another agency's reservoir or groundwater basin (DWR and State Water Contractors 1994). This provision has helped firm up water supplies for contractors and the smaller agencies that are storing water on their behalf. Urban water supply agencies with insufficient water storage capacity in their own service areas store water with smaller agencies in wetter years, in exchange for the ability to recover a smaller amount of water in drier years (DWR 1998a).

Groundwater banking agreements are generally characterized as water transfers, but they also inherently involve storage rights. When surface water is transferred to a district to be "banked" the transferor receives a "credit" that can be redeemed later. When the transferor seeks to redeem its credit, the redeemed water will be obtained from either the storing district's surface water, foregone in exchange for groundwater, or the storing district's groundwater, pumped into conveyance facilities and sent to the transferor. In either case, the storage capacity of the storing district's groundwater basin is utilized. Similarly, conjunctive use programs also utilize the storage space available in groundwater basins. It is still unclear how the rights of various agencies to engage in groundwater banking and/or conjunctive use interact with the paramount rights of overlying owners to groundwater (Guy and Cordua 1997; Kidman 1999).

Several examples of groundwater banking programs can be found in Kern County, including Semitropic Water Storage District's groundwater storage program (DWR 1998a) and a similar program between Arvin-Edison and MWD (DWR 1998a).

LESSONS IN DEREGULATION FROM OTHER UTILITIES

Similar to the natural gas and electricity industries, California's water supply system can be divided into water production and transmission components. Also similar to these utilities, California's water supply and transmission has been linked together and sold as a bundled commodity, administered by a few large organizations, at regulated prices. Thus, some of the gains achieved with deregulation in the natural gas and electricity sectors may also be achievable for California water industry.

Natural Gas Industry

Like many large utilities, natural gas distribution is a natural monopoly. In the 1930's the Federal Trade Commission recognized a high level of power and potential for market abuse in the natural gas industry, leading to the Natural Gas Act (NGA). The NGA placed regulatory controls on interstate transportation of gas. The United States Supreme Court later read the NGA as regulating the production of gas as well, if it moved within interstate commerce (McArthur 1997).

Thus a system of regulated pipelines developed. Similar to the way the USBR and DWR act with respect to water today, each company that operated such a pipeline performed all of the services necessary to bring gas from the field to the market. These services were "bundled" together and sold at a single price. Pipelines made no profit on the purchase and sale of gas. Rather, pipelines bought gas from unaffiliated gas producers under long-term contracts at regulated prices. Until the early 1980's the FERC set cost-based pipeline rates that covered costs and achieved a "reasonable" rate of return (McArthur 1997). The cost of the gas itself was also regulated by FERC's wellhead pricing scheme. Customers paid for the cost of the gas on a pass-through basis.

The energy crisis of the 1970's triggered the downfall of natural gas regulation. Regulators and industry learned that the regulated pricing structure they operated under could not respond to market conditions. Natural gas deregulation began in 1985 with a FERC Order that created open access transportation for pipelines (Order 436). Order 436 required pipelines to provide transmission services for their customers who were now able to directly purchase natural gas from lower-cost suppliers. In 1989, FERC removed price controls on wellhead sales of natural gas. In 1992, FERC issued Order 636, requiring pipeline companies to provide open-access transportation and storage and to separate sales from transportation services completely. This order also mandated capacity release, electronic bulletin boards, and straight-fixed-variable rate design. Order 636 also provided for a new pricing structure to reflect the full range of services that come with purchasing natural gas including gathering, processing, transmission, and marketing. In recent years, several states have followed suit by requiring local gas distribution companies to unbundle their services and allow for retail customer choice (Costello and Lemon 1997; McNulty 1986).

Today, wellhead gas prices are virtually free of regulation while transmission services remain regulated to some extent. The natural monopoly character of the pipeline industry has led to a series of mergers among pipeline companies. FERC's transmission pricing policy allows pipelines to petition FERC to implement market-based delivery rates for customers who are

shown to have reasonable alternatives (Threadgill 1995). In other words, FERC's policy is aimed at preventing monopoly pricing in the natural gas transmission business (McArthur 1997).

Most natural gas distributors now offer unbundled services - allowing large end users to select the most cost effective and efficient mix of supply, transportation, storage, and backup services, among others. Gas Marketing Firms have also emerged offering "value-added" gas supply services (Costello and Lemon 1997). Deregulation has also improved efficiency and technology, from 1988-1994 gas production increased 11%, real well-head prices fell by 11%, and proved reserves fell 2%.

Deregulation of the natural gas industry is credited with lowering well-head gas prices and transmission costs, resulting in customer savings of at least \$50 billion. The ability to use existing transmission pipelines to transport direct purchases of natural gas from lower cost suppliers allowed customers access to these lower cost supplies. It also stimulated investment and exploration for these alternate supplies. Thus market prices for gas allowed the market, rather than regulators, to control long-term investment decisions in the natural gas industry (Costello and Lemon 1997).

However, deregulation has not come without costs (Abbott and Watson 1983). The energy crisis of the 1970's and early 1980's caused gas suppliers to enter into long-term high-priced supply contracts. The costs of these contracts were passed on to gas customers. The deregulation orders, however, allowed customers to get out of their obligation to buy gas under these higher-priced contracts, and forced pipelines to transport the gas that customers could now purchase from lower-cost producers. Traditional gas suppliers were stuck with the long-term higher-priced contracts and a lack of mechanisms to hold customers accountable to their contracts to purchase gas under these contracts. In the end, the traditional gas suppliers were forced to absorb the stranded costs associated with the older, higher-priced contracts to the tune of forty billion dollars, or eighty-percent of the settlement costs.

As gas customers are offered a larger variety of alternatives, pipeline owners fear pipeline customers (shippers) will fail to renew their contracts for firm transportation service (Abbott and Lemon 1983). If pipelines are unable to resell that released firm capacity they may have to absorb these new stranded costs. Local gas distribution companies (LDC's) now have the responsibility for managing their contractual rights to interstate transmission and storage capacity (Order 636). State public utility commissions are encouraging LDC's to minimize the costs they pass on to end-users. Thus as most firm transportation contracts are set to expire before 2002, LDC's are often choosing to relinquish these contracts in favor of a more diversified value-added service packages offered by emerging gas service companies (McArthur 1997).

Deregulation has allowed more flexible use of pipeline receipt and delivery points and has expanded the use of pipeline interties, thereby increasing transactional efficiency on and between pipelines. A group of emerging gas supply companies is using this new flexibility in the system to offer LDC's value-added supply services that diminish the need for the firm transportation services (traditionally provided by the big pipelines), and at a lower price. Having these market-center services with access to a diverse portfolio of gas supplies and local storage options, provides alternatives for meeting peak-day demands that are less expensive for LDC's than maintaining primary firm transportation capacity contracts (McArthur 1997).

FERC and the natural gas industry are currently trying to establish policies to help allocate the stranded costs associated with released firm transportation pipeline capacity. So far, the imposition of exit fees on customers to pay for stranded costs has been rejected by FERC. However, it is increasingly acknowledged that forcing pipeline stockholders to absorb all the uncontracted capacity costs is inequitable to shareholders, when external regulatory forces changed the contracts. Possible solutions to the stranded cost conundrum include the following:

1. Split the costs using rate structures that depart from the straight fixed-variable method (SFV),
2. Consider seasonal SFV - volume of FT and monthly demand charges to accurately reflect need for and value of capacity (McArthur 1997),
3. Eliminate the price caps for interruptible and short term deliveries, and
4. Auction all available capacity at any price exceeding the pipeline's variable cost

Before deregulation, the natural gas industry was similar to the California's water industry in that the pipeline conveyance system was integrated with the supply system and controlled by the same entities. Furthermore, market forces did not affect bundled services or future investment. However, the natural gas industry is also drastically different than the California water industry in that water is ingested (i.e. quality is important), and subject to a far greater variety of laws, making it questionable as to whether California water is as fungible a commodity as natural gas.

FERC accomplished natural gas deregulation in a series of orders, and courts have followed along. Companies that owned both gathering and transportation assets have easily divested their gathering assets and become solely transporters. Alternatively, they have spun-down gathering operations to affiliated companies. Given the financial and social benefits from deregulating the gas industry, it is worth asking if the same can be done for California's water industry?

The Electric Industry

The deregulation process of the electric utility industry has learned from the natural gas industry. Congress began deregulation of the electric utility industry in 1997. Previously, electric service providers had to buy power as part of a "bundled" service from a company that provided both generation and transmission. Now, all transmission facility owners must provide open access in an anti-discriminatory manner, regardless of whether a service provider is purchasing power from that owner or from another generator. By being able to purchase power from the lowest-cost generator, and purchase transmission from the lowest-cost transmitter, FERC estimates an annual saving for retail providers ranging from \$3.5 billion to \$5.4 billion. FERC expects that these savings will eventually be passed on to retail customers. Other goals of electricity deregulation include: (1) better use of existing assets and institutions; (2) development of new market mechanisms; (3) technical innovation; and (4) less rate distortion.

FERC Orders 888 and 889 are largely responsible for electricity deregulation. FERC order 888 requires all electric utilities that own transmission facilities to provide "unbundled" transmission service to private and public utilities and electric cooperatives under strict anti-discrimination requirements. Public utilities must completely separate their wholesale power marketing and transmission operation functions. Order 888 allows full recovery of stranded costs from departing customers for prudent investments. Order 888 also establishes a priority system for obtaining transmission service, in that conditional reservations can be displaced by competing requests for longer-term firm service, which is then followed by requests for longer-term non-

firm service. For comparable requests, price is a tiebreaker. Also Order 888 established that firm transmission customers do not lose their rights to capacity if they don't use it for a period of time. Existing customers get the right of first refusal when potential customers request the use of their previously used capacity, only if they are willing to match price and contract duration. Finally, reassignment is allowed for point-to-point transmission service because it sets forth clearly defined capacity rights. No such rights can be defined for network transmission service (Hebert 1998).

FERC Order 889 established OASIS and the Standards of Conduct for companies participating in the deregulated electricity industry. OASIS stands for "Open Access Same-time Information System" -- an electronic system for information sharing about transmission capacity. Public utilities that own transmission facilities must use OASIS to obtain information about available capacity on their own system for their own wholesale power transactions, the same way their competitors do (Baumol and Sidak 1995; Hebert 1998).

The similarities and differences of the electricity industry to California Water raise the following questions that are addressed by the CALVIN model.

1. Unbundling in electricity was motivated by the availability of more economic power generated by utilities or by non-traditional sources such as independent power producers. Do the cost differences in supply from market sources such as fallowing and conjunctive use and those required to construct new dams in California have a similar motivation?
2. Can we use CALVIN or a similar model to distinguish "point-to-point" and "network" transmission capacity in California's water conveyance systems? Or is our system too integrated to establish "rights-to-capacity"?
3. FERC is an overriding authority that can police monopoly power and discriminatory practices. Can the dominant agencies in California be persuaded to form a counterpart for California's water supply industry?
4. OASIS allows all participants equal access to system information. Can this type of equal access to information exist for California water in the form of a publicly available CALVIN model?
5. Electric transmission facilities are owned by a variety of utilities. The state and federal government primarily own California's water conveyance systems. One decision by FERC controlled the entire electric utility industry. Reforming California's water conveyance system will require coordinated actions by state and federal governments.

STEP-WISE ALTERNATIVES FOR THE FUTURE

Current California laws has "unbundled" California's water supply, distribution and storage systems to some extent. Water transfer provisions allow market prices to control the supply of water to particular users. Wheeling provisions allow those who purchase water to move it from one place to another using existing facilities owned by another agency. However, California law has yet to expressly allow variety in the rates for water delivery based on reliability (Kucera 1995).

Increasing regulation in the Bay-Delta is projected to reduce water supply reliability to those with CVP and SWP contracts. These contractors will seek to replace this lost reliability or to increase total water supply reliability. This is especially true for contractors serving urban and industrial customers who must ensure a stable water supply for their existing population as well as for any growth. By unbundling California's water supply, delivery, and storage systems by increasing degrees, these contractors may be able to purchase this reliability efficiently through various forms of water transfers and/or expansion of physical infrastructure. The premium paid for this increase in reliability can generate revenue necessary to finance water infrastructure. The following discussion presents a variety of policy options for California.

Supply

Determining the amount of water available for transfer.

The current no-injury rule in the Water Code and DWR and USBR policy makes it difficult, time consuming, and often expensive to determine exactly how much water is available for transfer. In particular, DWR and USBR have different definitions of consumptive use, neither of which is the same as that found in the Water Code (§§484, 1725) (O'Brien and Gunning 1994). There is also an inherent conflict of interest in that DWR and USBR must approve transfers that may ultimately affect their ability to meet their contractual commitments to other parties (O'Brien and Gunning 1994). The time and expense involved in determining the amount of water available for transfer often inhibits smaller transfers (Young 1986). An active water market in California will require that this transferable amount become easier and faster to determine.

Who is the final decision-maker for transferring water?

The final decision on the transfer of water raises a conflict that will require some reorganization of the decision process in agencies and districts. Currently most water rights are held by the authorizing districts or agencies whose boards and managers perceive themselves to have a mandate to allocate the water. The current allocation priorities seem to have a greater emphasis on equity rather than efficiency. This is to be expected of institutions whose founding was based on equitable rural development goals such as are stated in the Reclamation Act. However, the requirement of greater efficiency in water allocation means that the decision to transfer water and substitute capital investment, reduced yields or fallowing should be taken by the end user of the water, namely the farmer. Simply put, the farmer has the detailed knowledge that enables him to make efficient water allocation decisions, whereas a district manager has to work from district averages. However when assessing the third party impacts of water transfers to a district, the district agency level is the logical level for decisions. In short, the implementation of market systems requires that the initial decision to buy or sell water be taken at the farmer level, and the district level decisions are changed to a secondary filter to prevent excessive third party cost, or at least compensate these costs if they occur.

The shift in decision making can be approximated by some simple quantitative rules. For example, the 20 percent rule for transfers without requiring district approval under the CVPIA has a de facto assumption that the third party effects of a 20 percent transfer are not excessive. Up to this level, the farmer is the sole decision-maker. For water trades greater than 20 percent, the district has the responsibility to its members to minimize third party impacts. A similar devolution of the property rights towards the farmer is needed for all Californian water rights if

market allocation methods are going to achieve their potential gains by more efficient and flexible water allocations.

Conveyance

Increasing environmental protections in the Bay-Delta have created bottlenecks in California's current conveyance system. Potential water transfers are hindered by the lack of reliability in being able to physically move water through California's water supply system when and where desired. The CALFED process has examined three possible solutions that will help alleviate this bottleneck and improve conveyance through the Bay-Delta. Unlike previous water infrastructure ventures, the solutions under consideration do not increase water supply or provide additional water supply contracts. Thus the new water transmission capacity created by these new solutions has yet to be committed to any particular water user.

Decoupling conveyance capacity in new facilities

To increase flexibility, and possibly generate additional revenue, California could maintain its current water supply system in its regulated form, but allow new facilities to be market controlled, to some extent. For example, any new conveyance channels constructed as part of the CALFED solution could become joint public and private facilities. While the facility would be constructed and operated in conjunction with other state and federal facilities, the capacity in it would be allocated using market mechanisms. This capacity could be purchased at auction and then traded among those who make the initial purchases. Alternatively, the capacity could be auctioned off on a yearly or seasonal basis. Temporal differences in the demand for water, and the environmental restrictions on pumping would establish premiums for capacity at various times of the year. Thus units of capacity could be divided to reflect these differences. For example, units of July capacity in the new facility might be more expensive than units of February capacity.

To market new conveyance capacity separately, the legislature would need to amend California's existing wheeling statutes. Water Code sections 1810-1814 requires state and public agencies with excess water conveyance capacity to make up to seventy percent (§1814) of that excess capacity available to bona fide transferors for "fair compensation." The legislature defined fair compensation as including reasonable charges incurred by the owner - including capital, operation, maintenance, and replacement costs (Water Code §1811(c)). Theoretically, if California was to construct a new water conveyance facility without allocating its capacity through long-term supply contracts, that capacity could be sold to bona fide transferors as excess capacity under California's wheeling provisions. However, the current provisions fall short in at least two important respects. First, the definition of "bona-fide transferor" in §1811(a) is too limiting. Second, the current provisions preclude the imposition of opportunity costs in "fair compensation," unduly limiting the revenue potential of new capacity.

Section 1811(a) requires a bona-fide transferor to have a contract for sale of water, which may be conditioned upon the ability to convey that water. Thus, only entities with water contracts would be able to purchase new conveyance capacity, and only to the extent of their existing contracts. In order to market the new capacity created by a new conveyance facility, the state will need to be able to sell capacity to entities who are speculating that they will have such contracts in the future or will be able to sell the capacity they acquire to others. Having such conveyance rights

might lower the transaction risks of water market transfers (Lund, 1993). Thus, new legislation is required to expand the definition of who may acquire excess capacity in a conveyance facility.

Also, section 1811(b) does not allow the owner of conveyance capacity to include the opportunity cost of that capacity in the fair compensation charged for that capacity. A recent California Superior Court interpretation of the wheeling provisions noted that the statutes do not allow an owner to charge different rates for firm and interruptible capacity. Similarly, more extensive reliability-based charges that account for temporal and environmental constraints would not be allowed under the current provisions. This can be remedied with new legislation that would allow the state to sell new capacity in an initial primary market and the purchasers of this capacity to re-sell it in a perpetual secondary market.

The price charged in the primary market would at least equal “fair compensation”, as defined in the current statute- in other words, the marginal cost of the new facility. Primary purchasers could bid for new capacity at a price higher than “fair compensation,” generating two distinct advantages over the strict “fair compensation” limitation. First, those desiring higher reliability could purchase this reliability. Second, the premium paid for this reliability would generate additional revenue necessary for ancillary water supply improvements.

New legislation also would be required to establish the legality of a secondary market for capacity in a new facility. Purchasers in the primary market would then be able to either use the capacity purchased for their own conveyance needs, or market that capacity to other persons or agencies. If the price that could be charged for capacity in the secondary market was limited to “fair compensation” as currently defined, there would be no incentive to purchase capacity in the primary market, because it could not be sold at a profit in the secondary market.

Clearly, the notion of a secondary market in conveyance capacity brings up issues of monopoly or oligopolistic pricing power. Similar to the market for natural gas pipeline conveyance capacity overseen by FERC, it may be desirable to establish an oversight committee for the rate structure used in the secondary market for conveyance capacity (See e.g., McArthur 1997).

Decoupling conveyance capacity in existing facilities

Taking these ideas a step further, it might be possible to eventually use market mechanisms to allocate the capacity in existing California water delivery facilities. Currently, water contractors have “rights” to receive certain quantities of water, but these rights are not divided into a supply right and a time-of-delivery right. With the advent of more sophisticated conjunctive use programs, it may be possible for contractors with local storage facilities to buy and sell the right to capacity in a given delivery system at a given time of year.

New legislation would likely be required to allow conveyance capacity in existing water conveyance facilities owned by the state and federal government, local public agencies, and private companies to be sold in a secondary market.

Storage

Marketing storage capacity in reservoirs

While numerous reservoirs in California are owned by local districts, it not well known whose capacity has been marketed on a per-unit basis. Cost recovery for reservoirs has always been

based on charges for water service. Despite the absence of examples, there does not seem to be any fundamental problem in marketing reservoir capacity on a long or short-run basis.

Marketing storage capacity in conjunctive groundwater projects

Several technical aspects of conjunctive use need to be defined. The principle problems can be summarized in terms of the "take-put" ratio and the lateral flow problem. The "take-put" ratio is central to actively recharged conjunctive use, and is the proportion of water extracted from the bank compared with the water recharged into the bank. The ratio corresponds to the yield-to-storage ratio of a reservoir and critically determines the cost of storage in a conjunctive project. Conceptually, the physical aspects of the aquifer and recharge system should determine the "take-put" ratio. However, a low "take-put" ratio may confer benefits on the overlying water users, and has thus become a bargaining point in conjunctive use negotiations. The few conjunctive use agreements consummated in California and those under negotiation have "take-put" ratios ranging from 0.8 to 0.5.

Another serious problem in defining property rights for conjunctive use projects is that few groundwater basins in California are completely self contained. Most basins have some lateral flow through them. The problem is to define the property right in terms of the holding capacity of the aquifer rather than the water contained in it. During the hearings on the Madera Ranch project the lateral flow problem was posed in the form of the question: "Are the water molecules that are extracted from the basin the same ones that were recharged into it?" The answer was 'no', and the discussion on water rights degraded from that point. Without some new legal concepts of capacity rights in aquifers, conjunctive use agreements will be susceptible to confusion over water rights as distinct from water storage rights.

Agreements entered into to date have expressly treated groundwater storage capacity as an asset that is sold at market rate. Examples of current agreements include the MWD/Arvin-Edison Agreement and the ongoing Madera Ranch negotiations

Privatization Issues

Private Financing

General obligation bonds and tideland oil revenues, as authorized under the Burns-Porter Act of 1960 initially financed the State Water Project facilities. Subsequently, additional revenue bonds and capital resources were raised to develop the project. These bonds and the maintenance, operation, power, and replacement costs associated with the facilities are repaid by the 29 agencies or districts who have long-term water supply contracts with the Department of Water Resources. One option for consideration is the divestment of part of this existing system to private interests (O'Conner 1994b; Savas 1989-90).

New legislation would be needed to allow the private market to generate revenue for construction, or agencies to issue bonds to purchase additional capacity. The Model Water Transfer Act Financing Options contains several ideas for new financing options (Mitchell and Moss 1996).

Private Operation

The operation of private agency water trading in conjunction with public facilities and operation introduces new types of public/private partnerships that will require further modification to the current system of property rights under pure public ownership. Suggestions for changes in the current structure can be found in the following publications:

1. Physical Operation of the System (O'Conner 1994b),
2. Private Brokers for Transfers/Water Banks (Wahl 1994), and
3. The benefits of a centralized water bank (Israel and Lund 1995).

CONCLUSIONS

A transition towards the market financing of additional water supplies will require changes in the legal structure. The most significant changes will have to occur in the areas where there is least development of property right definition, namely groundwater. Since the process of market development will change the value of groundwater and groundwater storage capacity, the legal code in this area will evolve. Hopefully, groundwater rights will evolve towards a more flexible form without eroding the protection of third party interests. Another area of significant legal change will involve the marketing of some of the storage and conveyance capacity in existing public water facilities.

While many of the property rights for surface water are not well suited to market exchanges, there are many rights in California under which the water can be traded. The evolution of the legal code for surface water can wait for the initial market developments under way to highlight the shortcomings in the current code before making changes to the majority of surface water rights.

The experience of the natural gas and electricity industries has valuable lessons for the market-based development of California water. Of particular note is the requirement of a common technical basis to measure the impact on third parties of movements of gas. This created a common fungible commodity whose property rights were technically defined in terms of third parties, as well as those involved in the exchange. The definition of third party property rights must be clarified before the transaction costs of water sales will be low enough to facilitate an active market. The "no injury" rule that currently dominates discussion of third party impacts implies a "no trade" situation if taken to its literal extreme. An important development of the water code would be to clarify the "no injury" rule as a "no significant injury" rule that would serve the greater public interest of increased water trades without exposing third party interests to excessive costs.

