INVESTMENT STRATEGY UPDATE

March 31, 2014

A DRY STATE

In 2011 ("Water, Water, Every Where, Nor Any Drop To Drink"), we wrote about how a growing, industrializing world population was placing strain on the planet's fresh water resources. Back then there was an obvious need for governments to be thinking about expanding their water supply options. Today, the issue is more urgent, and closer to home. In 2013, California received less rainfall than in any year in its history as a state, and on January 17, Governor Brown declared a state of emergency. He has also cut off the North-to-South flow of the State Water Project. Given that BTR is a theme-based investment management firm located in California, we felt it was time to re-visit the issue of water supply, how it will affect economic activity, and what investors can do to benefit in some way from an otherwise negative situation.

How Dry We Are

The unfortunate fact is that as bad as the current 3-year drought is here in the West, it pales in comparison to what has happened in the past. And we're not referring to the Dust Bowl years, which were bad almost everywhere in the U.S., but rather to two extended droughts in California and the surrounding region, one lasting more than 200 years, and another lasting more than 140 years, between approximately 850 and 1350 A.D. Some of the earliest work in identifying evidence of these extended droughts was performed by Professor Scott Stine in the early 1990s. He examined tree ring samples taken by divers from fully-rooted trees preserved on the floors of two different lakes, a river, and a swamp in the Sierra Nevada Mountains. The particular species of tree in question can't survive with its roots in water, which begged the question of how trees that had lived well over 100 years could be located there. After additional research by Stine and others, he concluded that neither seismic, tectonic, nor other factors could explain the consistency of the findings across a broad geographical area. Mega-droughts were the only plausible explanation.

The North American Drought Atlas, which also utilizes tree ring data to give an historical view of drought conditions, finds that this 500-year stretch in the Middle Ages clearly stands out as an arid period that hasn't been matched since. Modern California has experienced a number of severe droughts, for example those of 1928-34 and 1987-92. However, the reality is that the period since statehood in 1850 has been the third-wettest period of such length in the past three millennia. If our long-term resource and infrastructure planning has been based on this particularly wet period, then it could mean that we need a new and better plan.

Steps Taken, and To Be Taken

Ironically, the more arid Southern California may well be in better shape to face the current drought than the North is. That's because the region spent $12 billion in the aftermath of the 1987-92 drought to make its water supply more secure. The Metropolitan Water District of Southern California, which serves 19 million customers, has 6 million acre-feet of available storage, compared to 300,000 in 1991 (an acre-foot is approximately the amount used by a family of five in a year). Though they aren't exactly brimming with water, they can support a year of consumption at pre-drought levels.

It's all well and good to have additional storage in place, but if the rain doesn't fall for a prolonged period, unprecedented in modern times, the reservoirs will go dry. Conservation is clearly an important element to a long-term plan for water sustainability, but that only goes so far. In many peoples' opinion, a yard full of cacti and one-minute showers would reduce their quality of life. Therefore, an important complementary approach is to reuse as much water as possible. Indirect Potable Reuse ("IPR") is a process whereby recycled water, which has already been treated sufficiently for use in agriculture or industry, is pumped into surface water supplies, such as reservoirs, where it eventually goes through the additional treatment used for all drinking water. Although this process is currently used in various places around the world, the catchphrase "toilet to tap" may turn many off the concept. Once one gets past the imagery, however, it is a reasonably economical way to get more out of the existing water resources. For example, water obtained through IPR costs Orange County $800-850 per acre-foot. Given that as of mid-2013 the cost of importing water from the Bay Delta and Colorado River was nearly $800 per acre-foot, Orange County's solution makes sense.

In an extended drought, however, there will be a need to do more than simply conserve and recycle. After all, California's population has grown by approximately 8 million people since the end of the 1987-92 drought. Clearly the state cannot count on the weather, and bickering amongst and within the western states over distribution of existing resources is already a problem, which leaves desalination as about the only viable way to increase supplies reliably. The San Diego County Water Authority found that 68% of its ratepayers are willing to pay higher tariffs for a drought-proof water supply. How much higher is an important question, but we believe that many Californians outside San Diego would also find the extra money spent to be well worth it.

Surprisingly, there are only two operational desalination plants in California today, both of which are less than five years old. One, which uses reverse osmosis, is located in Sand City, a small beach community. The plant generates hundreds of thousands of gallons of fresh water per day, which sounds good, but is actually only about as much as a typical aircraft carrier produces, so it can do little more than help its immediate regional neighbors. There are, however, 17 desalination plants in the planning or construction stages along California's coast, one of which, when completed in 2016, will be the largest in the Western Hemisphere and will supply 7% of San Diego County's needs. The cost of desalinated water can differ significantly between locations, because the nature of the source water and environmental regulations impact plant design and ongoing operational costs (particularly energy). However, we do know that the San Diego County Water Authority has a 30-year

commitment to purchase water from the developer of the Carlsbad facility at $2,000 per acre-foot. That's a significant premium, to be sure, but how much value does one place on a reliable water supply in what is essentially a desert?

Of course, prices for desalinated water have been coming down over time as technological advances are implemented, but one unavoidable fact of desalination is that it requires a large amount of energy. A new company, however, is operating a solar-powered thermal desalination plant in Fresno County. The silver lining to a lack of rain clouds is an abundance of sunshine, so this approach has merit, and the facility has now been operating for a year, generating fresh water from irrigation runoff for $450 per acre-foot. The plant's operator has big expansion plans, so this development bears watching.

Economic Consequences

It is impossible to overstate the importance of fresh water not only to sustaining life, but also to maintaining a high quality of life. In that sense, there are no winners in this drought, and every consumer is a loser. Obviously, we expect water rates to go up and restrictions on water use will probably be extensive in parts of the state. Food prices seem likely to rise, as well. California's agriculture sector historically uses 80% or more of the state's water, but in doing so it produces half the fruits and vegetables for the entire country. A lot of those products come from the Central Valley, where farmers for the first time will not be getting any water allocation from the federally operated Central Valley Project. As a result, more than half a million acres of farmland are expected to go fallow this year, with farmers focusing on more permanent orchards and vineyards over row crops.

As noted above, there is a strong link between water and energy resources. It takes a lot of energy either to desalinate or to transport water, but water is also used to generate power. In normal times, hydroelectric might constitute 13% of California's total power production, which is about twice the national average. In December 2013, however, it accounted for less than 6% of the total. Natural gas-fired power plants, already the bulk of the fleet, have had to pick up the slack. In an ominous sign, the California independent system operator called for a Flex Alert (a call to conserve electricity immediately and shift demand to off-peak hours) on February 6, when such alerts would normally not be expected until peak summer cooling days. The brutal Eastern winter and Western drought have pushed up natural gas prices as of this February to $6 per million BTU from $3.33 the prior year and $4.24 in December.

Investment Implications

Given that there is likely to be upward pressure on food, electricity and, of course, water prices from this drought, where can investors look to actually benefit from the situation? As in 2011, our focus remains on the value-added processes that will enable increases in water resources, particularly desalination and treatment. We see two main areas of interest. First are those companies involved in the filtration technology used in desalination. Second are those in engineering and construction. With so many desalination plants in process in

California, and the likely need for more dams, there should be a lot of work to go around. Also of interest are those companies that supply highly-efficient agricultural irrigation equipment.

The water utility industry is ripe for consolidation. Given that a small fraction of U.S. water systems supply the vast majority of the population, and 90% of consumers are served by government entities, many of whom could still be struggling with budget issues, Ernst & Young believes public-private partnerships will become more common. Outright sales by municipalities looking for immediate cash could allow publicly traded utilities with access to capital a good growth opportunity. The other side of that coin is the need to keep our eyes on bonds that were issued by municipal water authorities, for signs of fiscal stress resulting from volume reductions that may overwhelm price increases, thereby resulting in lower revenues.

We also continue to monitor energy prices in the context of California's enormous and increasing need for natural gas as we enter the summer. If gas prices, which were beaten down before the extremely cold winter, continue to rise, this would be cause for us to consider further investment in exploration and production, or a new investment in a merchant energy provider within the western states.

Market Outlook

The stock market has spent the first quarter in consolidation mode, reflecting in part the outsized gains of 2013. The news flow has certainly given investors plenty to chew on. Between Russia's questionable annexation of Crimea, Janet Yellen's confusing first news conference as Fed Chair, and the extremely cold winter in the East causing economic activity to slow, one could argue there is cause for concern. But the latter issue is expected to reverse as the weather improves and overall, our view on economic fundamentals remains positive.

The trickier issue is stock market dynamics. There remain huge reserves of investor cash still to be invested, earning nothing. Vast numbers of investors await a stock market correction so that they can increase their exposure, but therein lies the problem. With so many anticipating a pullback, and buying the dips as a result, corrections may not be meaningful, or may not happen at all. Eventually, cash-heavy, stranded investors may throw in the towel and buy stocks, whatever the price. This would drive the market up, but unless the economy picks up meaningful steam, rising valuations would lead to a day of reckoning down the road. If that is to be the case, however, it won't be for some time.

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