The South-to-North Water Diversion Project: Impacts on China's Industrial Water Pricing and Companies' Bottom Line

March 2014

The December 2013 completion of the first phase of the South-to-North Water Diversion Project in China is already precipitating dramatic changes to industrial water prices in eastern provinces. As some portion of the scheme's infrastructure costs will be passed onto users, ***high transferred water prices from the Project's eastern route may signal higher future operating costs for water-intensive companies in water-stressed regions.*** As the impact of the Project on water pricing continues to unfold, we identified the following foreseeable operating risks and opportunities for companies operating in China:

1. ***Increased operating costs due to a transferred water price premium*** could impact companies on the eastern seaboard if they are required to use transferred water, instead of cheaper local sources. Shandong-based beverages companies **Tsingtao Brewery** and **Yantai Changyu Pioneer Wine** could be vulnerable to such impact;
2. ***Shifting intra-industry cost bases*** where companies in land-locked regions are affected by higher transferred water prices upon completion of the central route, in contrast to companies in relatively water-rich regions that remain reliant on local water sources. **Silvercorp Metals** in Henan province will likely be more affected by higher water pricing than **Jiangxi Copper** in Jiangxi province;
3. ***Long-term increased competition for water resources in formerly water-rich regions*** that are dramatically impacted by the Project, compounding recent droughts, particularly the Han River Basin area;
4. ***Significant new government-sponsored contracts*** for utilities companies involved in the rollout.

As Transferred Water Comes Online, Out-pricing of Local Water Softens Expected Market Demand

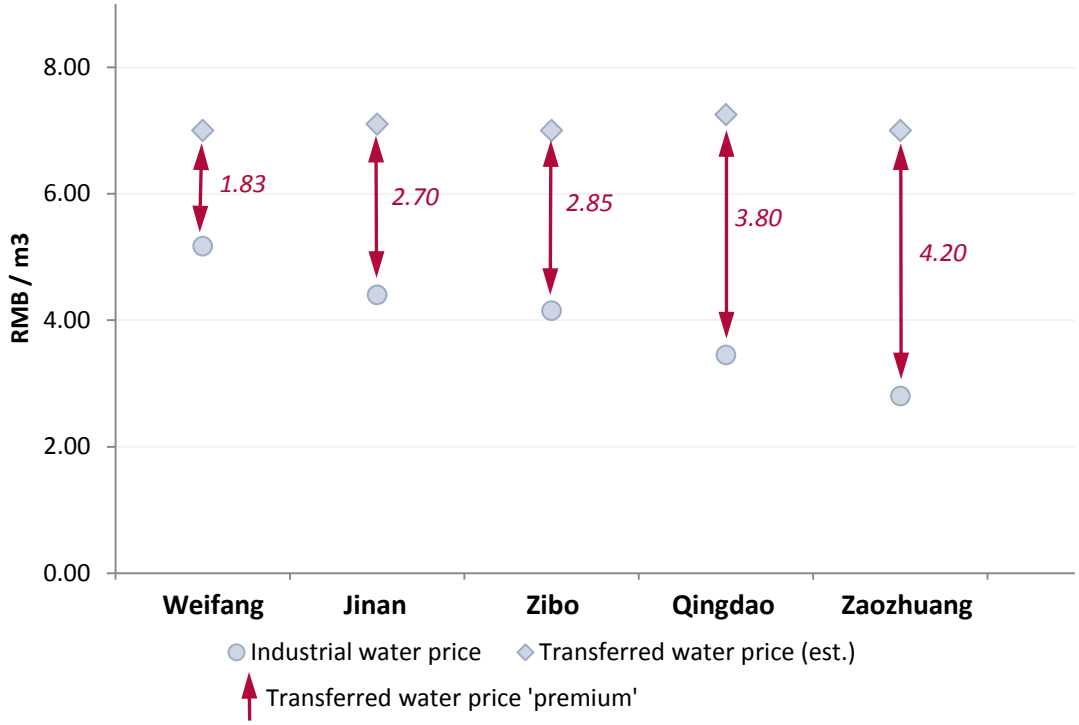
The South-to-North Water Diversion Project is an ambitious, multi-decade infrastructure Project that aims to address severe disparity of water resources in China: Four-fifths of China's water resources are in the south, whereas half its population and two-thirds of agricultural land are in the north. When completed, the Project will link China's two largest water basins, the Yangtze River Basin and the Yellow River Basin, and will annually pump 45 billion cubic meters of water from the south to the parched north via three canals in eastern, central and western China. The Project is expected to cost around USD 79.4 billion, more than twice the Three Gorges Dam Project.

Shandong province, which currently faces an annual water shortage of between 4 and 5 billion cubic meters, is first in line to receive transferred water after the December 2013 launch of the Project's eastern route. The eastern route will transfer an average of 1.35 billion cubic meters annually to Shandong, targeting the water needs of residents, industrial development, and agricultural industries.

At the commencement of the Project in December 2002, 13 cities in Shandong applied to use transferred water from the Yangtze River. However, since launch, only 5 cities (cited in the Chart over page) have announced their 2014 plan for using transferred water. The hesitation seems to come from the fact that, ***taking into account infrastructure and administrative costs, transferred water is currently more expensive than water extracted from local sources.***

According to current estimates from the National Development and Reform Commission (NDRC), the average price of 'raw water' that is transferred from the Yangtze River to Shandong should be around RMB 1.54/m^3 (i.e. excluding other fees and levies such as sewage treatment fees). However, the NDRC has stated that end-users of Yangtze water in Shandong may need to pay around RMB 6 per cubic meter for raw transferred water, once the costs of infrastructure construction are taken into account. ***Thus, in some cities in Shandong, after water treatment fees, the premium represented by current transferred water prices can exceed RMB 4*** (see Chart below). Transferred raw water also out-prices desalinated sea water (RMB 5 per cubic meter), which is emerging as a preferred sources for some expected participants of the Project.

Chart: Current transferred water premium for selected cities in Shandong Province



Note: At 28 February 2014, USD 1 = RMB 6.1 (avg)
Source: National Development and Reform Commission, China Water (www.h2o-china.com), MSCI ESG Research

Impact 1: Increased operating costs due to a transferred water price premium

Top-down compulsory measures to allocate transferred water use are likely to see industrial water consumers in affected Northern regions bear the largest burden from higher water costs. In February 2014, a State Council regulation was passed that establishes central planning for raw water pricing and water use from the diversion project among regions, with final prices to be set at the provincial level. Given that transferred water ultimately costs more than local water, the regulation further provides that local governments implement a 'reasonable allocation' of transferred water that avoids waste or underutilization. Simultaneously, the regulation stipulates that groundwater exploitation should be reduced or even stopped in the interests of environmental protection. Thus, the use of transferred water will occur against the backdrop of regulatory compulsion and market pricing.

Among the 144 Chinese issuers included on the MSCI Emerging Markets Index, two beverages companies are headquartered in Shandong, **Tsingtao Brewery Company Limited** and **Yantai Changyu Pioneer Wine Company**. They need significant amounts of water for the bottling process, and abundant access to clean water is critical for manufacturing drinks: In 2012, Tsingtao Brewery sold a total of 7.9 million liters of beer, with water consumption at RMB 4.63 m^3/liter per product produced. They also rely on water-intensive crops (wheat, malt and barley) for the raw materials used in drinks. ***If Tsingtao and Changyu are compelled to use transferred water at higher prices, this will likely have a direct impact on operating costs.*** The companies could also absorb higher raw materials costs if agriculturalists were to pass on any water price increases.

To identify the potential impact of transferred water on Tsingtao's direct water use, we mapped 56 of its 59 factories across China. We identified that 20 production sites, representing around 41% of Tsingtao's total production (based on the capital investment into local sites) are in provinces targeted for transferred water use. Our modeling of an expected transferred water price for these 20 cities which indicated that on average transferred water will be more expensive than local industrial water by an estimated 91.9% (see Table). ***Thus, if Tsingtao was compelled to switch to transferred water, its annual direct water costs could increase by up to 32% at the upper extreme (i.e. a 100% switch to transferred water).***

The structure of Tsingtao's raw materials costs could also be impacted by transferred water pricing, as our estimates suggest that water contributes around 10% of the cost of a unit of wheat production in China. ***In locations where transferred water is used, Tsingtao could see raw materials costs increase up to 9.1% at the upper extreme.***

Table: Tsingtao Brewery: Potential direct water usage cost increases under different water use scenarios (based on FY2012 estimated plant-level direct water consumption rate)

Plant Location	Province	Water Consumption (m^3/year) (est)	Current Price (RMB/m^3)	Expected Price (est RMB/m^3)	Cost increase scenarios		
					100% use	*50% use*	*25% use*
Beijing (北京)	Beijing	4,799,568	6.2	7.8	25%	13%	6%
Shijiazhuang (石家庄)	Hebei	1,463,551	5.3	7.5	41%	21%	10%
Langfang (廊坊)	Hebei	451,361	6.0	7.5	26%	13%	7%
Luoyang (洛阳)	Henan	911,841	3.4	7.2	113%	57%	28%
Xuzhou (徐州)	Jiangsu	179,359	3.9	7.7	99%	50%	25%
Suqian (宿迁)	Jiangsu	113,980	2.8	7.0	152%	76%	38%
Yangzhou (扬州)	Jiangsu	72,947	3.5	7.1	101%	51%	25%
Jinan (济南)	Shandong	2,553,156	4.4	7.1	61%	31%	15%
Rizhao (日照)	Shandong	1,322,170	3.1	7.0	125%	63%	31%
Heze (荷泽)	Shandong	592,697	2.6	7.1	173%	87%	43%
Weifang (潍坊)	Shandong	341,940	3.9	7.0	79%	40%	20%
Tengzhou (滕州)	Shandong	278,203	3.3	6.5	95%	48%	24%
Shouguang (寿光)	Shandong	276,334	5.2	7.0	35%	18%	9%
Xuecheng (薛城)	Shandong	205,164	2.8	7.0	150%	75%	38%
Pingyuan (平原)	Shandong	113,980	2.7	6.8	152%	76%	38%
Taierzhuang (台儿庄)	Shandong	22,796	2.8	7.0	150%	75%	38%
Rongcheng (荣成)	Shandong	91,184	3.2	6.8	113%	56%	28%
Penglai (蓬莱)	Shandong	170,970	3.4	6.8	100%	50%	25%
Qingdao (青岛)	Shandong	501,513	3.5	7.3	110%	55%	28%
Mengying (蒙阴)	Shandong	547,397	2.2	7.0	220%	110%	55%
Average			***3.7***	***7.1***	***106%***	***53%***	***27%***

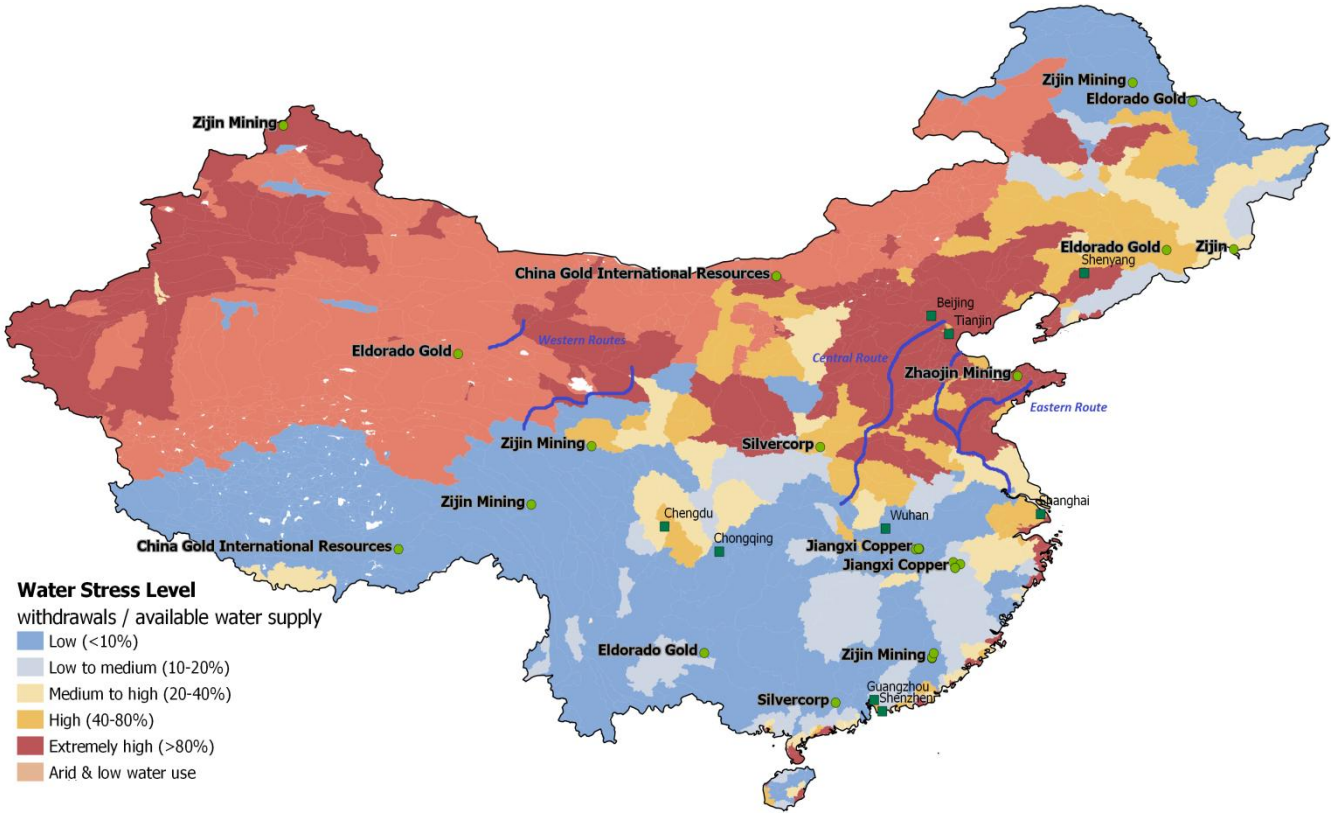
Source: Company disclosure, MSCI ESG Research

Impact 2: Shifting cost bases between industry peers

Industry peers may face divergent water costs, and eroding competitive advantages, linked with their dependence on different water basins in China. After the flood season of 2014 the central route of the Project is planned to come online, servicing inland provinces such as Henan all the way to Beijing in the far north-east. Current projections indicate that water from the central route will be even more expensive than the eastern route, with the transferred water price for Beijing estimated at RMB 8 per cubic meter[1] – higher than the current RMB 6.21/m^3 for industrial water.[2]

Silvercorp Metals Inc is a small cap Canadian silver mining company that primarily operates in Henan Province, ***with around 60% of mines dependent on the water-stressed Yellow River basin.*** Silvercorp's Henan operations currently rely on a local water price of RMB 2.8/m^3; given the projections of the price of central route water, ***Silvercorp may have to trade increased water security for higher operating costs.*** In contrast, with 73% of its assets in Jiangxi, Jiangxi Copper relies on water supplies outside a targeted region for the Project, and faces less projected future pricing pressure.

Diagram: Placement of Eastern Route (current), Central Route (under construction), and Western Route (planned)



Source: Gassert, F., P. Reig, T. Luo, and A. Maddocks. 2013. "Aqueduct country and river basin rankings: a weighted aggregation of spatially distinct hydrological indicators". Working paper. Washington, DC: World Resources Institute, November 2013 (http://wri.org/publication/aqueduct-country-river-basin-rankings); SNL Metal Economics Group; MSCI ESG Research

[1] Office of the Project Commission of the State Council.

[2] China Water (www.h2o-china.com).

Impact 3: Increased competition for water resources in southern regions

In the long-term, increased water supply to North China will likely come at the expense of intensifying competition for water resources between companies operating in drier southern regions. From 2014, the Project will annually draw 9.5 billion m^3 from the Han River (the largest branch of the Yangtze River), or 20-30% of the river's total flow. This withdrawal seems likely to compound unprecedented severe drought that has started to appear in the south. Jiangsu and Hubei, which are water sources for the eastern and central routes respectively, have both suffered record-breaking droughts in the last 3 years; and in February 2014 the Yangtze River level in Hubei hit a 148-year low.

Zijin Mining, which operates three gold mines in the region, is a prime example of a company exposed to risk due its dependence on the Han River Basin in an area downstream from Hubei province. The company's long history of severe pollution incidents involving rivers, and its ad-hoc approach to managing water use and impacts across its operations, has already been red flagged by MSCI ESG Research. Once the central route impacts the Han River, ***water-intensive companies with poor track records such as Zijin are more likely to be targeted by restrictions on water use*** – especially given the Chinese government's increased sensitivity to water insecurity in the region, and reluctance to pass on increased water costs directly to agricultural users.

Impact 4: Significant new government-sponsored contracts for utilities companies

1. ***Water Utilities: Early concerns over the quality of transferred water may yield opportunities for companies engaged in water purification and water treatment.*** According to the Ministry of Environmental Protection (MEP), the Danjiangkou reservoir, at the headstream of the central route, is already classified as the 'fourth category' grade of surface water (polluted). Further, industrial activity and residential and industrial waste water discharges along the routes are compromising transferred water quality. While local governments remain responsible for water quality in their areas, the MEP also has plans for 474 projects targeting improved water quality in Henan, Hubei and Shaanxi provinces. By the end of 2013, only 51 projects were completed.

   Beijing Enterprises Water Group earned nearly 90% of FY12 revenues from businesses related to sewage treatment and water resource management, and is well-positioned to respond to emerging water management opportunities. The company has signed water treatment project contracts with the Zaozhuang and Tengzhou governments in December 2012, related to the opening of the eastern route. In 2013, the Group further acquired two major water treatment companies in Beijing in preparation for the launch of central route.

2. ***Electrical Utilities: Pumping water from the south to the north will be an extremely energy-intensive undertaking that will rely on expanded power sources close to the canals.*** There will be 67 pumping stations with a total installed capacity of 678 megawatts along the eastern route of the Project. One part of the western route will require elevating and pumping water through the Bayankala Mountain, situated among the Himalayan mountain range, to a height of 458 meters and with an estimated annual power consumption of 7.1 billion kwh.[3] Independent power producers stand to benefit from a concentrated boost in energy demand resulting from the Project.

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[3] Office of the South-to-North Water Diversion Project Commission of the State Council.

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[1] *As of September 30, 2013, as reported on January 31, 2014 by eVestment, Lipper and Bloomberg*

Feb 2014