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## Alternative Energy-Driven Oilfield Waste Water Reclamation

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### ABSTRACT

Fresh water is the most valuable resource on the planet for sustaining economic growth & development. As the demand for domestic onshore oil and gas (O&G) continues to rise, the consumption rates of fresh water to support exploration and production (E&P) activities are skyrocketing. Unconventional “tight” gas wells are considered the future of domestic natural gas production, yet the techniques required to complete tight gas wells (i.e., fracture stimulation) require millions of barrels of fresh water per well. Currently, fresh water is utilized in all phases of the well life: drilling, completion, stimulation, and production. Due to the chemically complex techniques used in drilling and completing tight gas wells, fresh water of a high quality is critical. Unfortunately, most of the source water for these activities comes from fresh water wells (the same aquifers that many of our municipalities, rural communities, and farmers use) or surface waters (rivers, lakes, streams, and ponds). Because the waste water effluents of the drilling and completion process are permanently removed from the fresh water cycle (via deep “disposal” well injection), the competition for the limited fresh water resources has already become an industry-limiting factor in many domestic hot-beds for E&P activities. The O&G industry is in great need of an affordable, practical, and “green” water reclamation technology that will help preserve the valuable fresh water resources, help control the rising cost of domestic O&G exploration, and reduce the overall carbon footprint of the O&G industry.

Bear Creek Services, LLC and Hydration Technologies Incorporated (HTI) are working together to develop and deploy an alternative energy-driven water reclamation process for the O&G industry. The technology will reclaim drilling and completion waste water by utilizing a unique filtration technology and harnessing a chemical energy source that is required by downstream processes, a cost and resource that is already being consumed on each well. Using chemical energy that would otherwise be wasted alleviates the need to use costly and energy-inefficient processes to reclaim the water (such as evaporation or reverse osmosis). Furthermore, reclaiming significant portions of the waste water greatly reduces the demand on local fresh water sources and reduces the carbon footprint of the O&G industry, primarily by reducing fossil fuel energy consumption and reducing the need for heavy equipment such as tractors and tankers to haul off the waste water.

Drilling a single well can consume over 1,000,000 gallons of fresh water that will never be seen again. Each stage of completion can consume an additional 500,000 gallons of fresh water. This is significant because tight gas wells often have multiple completion stages, meaning each well can easily consume several million gallons of fresh water. In the United States, there are approximately 2000 drilling rigs exploring for domestic tight gas every day. Therefore, the rate of consumption by the O&G industry of freshwater that can never be used again can exceed 4 billion gallons per day. If it has

**not already done so, the concerns regarding the fresh water demand of the upstream O&G industry will likely soon outweigh the environmental concerns regarding the industry's emissions from fossil fuel consumption.**