

## KLEINSCHMIDT HYDROPOWER PRACTICE EXPERIENCES STRONG GROWTH AS DAM AND HYDRO INFRASTRUCTURE AGES, AND HYDRO HELPS BALANCE RENEWABLES ON THE GRID; SEES FUTURE IN OFFSHORE WIND AND TIDAL

**K**leinschmidt is one of only a few engineering consulting firms in North America specializing in hydropower, a segment it has worked in for more than 50 years. Kleinschmidt's history dates back to 1966 when it was founded by an engineer and professor named Dr. R. Stevens Kleinschmidt in Pittsfield, Maine. The company started by designing hydropower for the pulp and paper industry. Over the years Kleinschmidt began diversifying into FERC relicensing and environmental services. The company is now known for its expertise in fish passage, hydropower, FERC relicensing, dam safety, environmental, water resources and habitat restoration. Primary clients are utilities and independent power companies, but the company also works for governmental and non-governmental organizations. We currently have approximately 160 people in 10 offices across the United States and in Canada.

*Tim Oakes – Vice President Power & Energy Business Sector Leader. Tim has approximately 30 years of experience in the renewable energy industry – the last 24 at Kleinschmidt. Tim has managed the licensing process for a number of hydro and pumped storage projects, including managing the licensing and environmental studies associated with a large hydro project expansion in Pennsylvania and the first pilot project tidal license in New York City. He has managed and conducted numerous environmental and engineering studies for hydropower, wave, tidal, and offshore wind projects. Tim served two terms on the National Hydropower Association's Board of Directors and was a founding co-chair of NHA's Marine Energy Council. Tim has led Kleinschmidt's national practice areas in licensing, fish passage, dam safety, and marine renewable energy. He is currently responsible for providing overarching strategy and leadership for Kleinschmidt's business development and client service efforts throughout North America. Tim holds a Bachelors degree in English with a concentration in Science from the University of Richmond and a Certificate in Business Essentials from the University of Delaware.*

### **EBJ: How has business been for Kleinschmidt's Power & Energy Sector Business Unit over the past couple of years?**

**Oakes:** Our business has seen strong growth over the last couple of years. We're seeing a continuing trend of reinvestment in existing hydropower facilities as it represents an important part of our clients' carbon-free generation. Two of the major tailwinds that have led to this growth is hydropower's ability to balance intermittent renewables and the need for reliability with aging dam and hydropower infrastructure. All of our service areas have seen growth including generating equipment

upgrades, gate and penstock upgrades, and enhancements for dam safety. We are also helping a number of clients with their Federal Energy Regulatory Commission (FERC) relicensing efforts as FERC issued licenses are good for 30-50 years and have to be renewed through a multi-year regulatory and NEPA process.

### **EBJ: What impact has COVID had on your business unit, and have you changed your strategy to adapt?**

**Oakes:** We intentionally operate as one company and not individual profit centers like many firms in the industry. Because of this and the fact that we had an increas-

ing number of work from home professionals on staff, we've invested heavily in communications and networking over the years. We had moved to Cloud based file storage and Microsoft Teams and were fortunate to be in a good position to take the entire company virtual within two weeks of COVID quarantines starting in March. We also invest heavily in leadership training and development and have a CEO that recognizes the importance of having strong leaders throughout the company. That leadership made and continues to make a huge difference as numerous people have stepped up to help our clients, each other, and the communities we live in.

Initially, we had several projects that involved interactions with the public or travel within quarantined states delayed. However, since much of our work involves critical energy infrastructure projects, many of our staff needed to continue to travel and we developed COVID specific safety protocols and are regularly updating them. As a result of these efforts, we have been able to meet all our client deliverables and take on new projects. We've been continuing to hire and bring on new employees and have been able to continue forward with planned technical development and training.

Our business strategy has not changed as a result of the pandemic, though we have had to revise our tactics. We primarily focus on serving our core clients as they account for a significant part of our business. We typically pick up new clients from technical presentations or exhibiting at industry conferences. Due to the cancellation of industry conferences we have shifted our focus to turning technical presentations into white papers and blogs and other more proactive marketing efforts to remain in front of new potential clients. We have also looked for new and creative ways to stay connected to our clients who we would normally visit or get together with at industry events.

**EBJ: Could you provide some insight into the transformation of the power and energy industry and its infrastructure?**

**Oakes:** The last five years have really represented a turning point for renewable energy. It's been amazing and refreshing to see the U.S. finally moving towards a renewable energy based grid infrastructure. Coal plants are being retired and many natural gas plans are being scrapped. Renewables are an increasing source of energy. This is being driven by leadership at the State, city, and corporate level, by sustainability (ESG) minded investors, and financial markets that recognize climate change is real. It's also being driven by technological advances throughout the world. Offshore wind, for example has seen significant cost reductions as it has been built out in Europe and other parts of the world. The turbines alone are 5 times more powerful than they were just 10 years ago and the foundation designs and construction techniques have been developed to significantly reduce construction and design risks. The U.S. is just beginning to develop offshore wind and the potential energy is enormous. Kleinschmidt has been active in offshore wind as well as emerging wave and tidal power technologies for a number of years and are excited about the rewarding work opportunities coming in these areas.

Microgrid technology has gone mainstream with advances in batteries and digital controls and renewable power based microgrids are now possible and being developed for numerous purposes including to serve isolated grids and to provide energy for critical support functions in the event of disruptions from natural events or cyberattacks. Solar and wind have been the primary generation sources used to date but potential hydro and pumped storage applications abound. The town of Cordova Alaska is now powering a microgrid with small hydropower and we're excited to see this new and important use of hydro technology.

I expect the next 5-10 years to be dominated by renewable energy development – both small scale distributed sources and large sources like offshore wind or 500

MW solar arrays as we seek to decarbonize our electric grid and eventually, our entire economy. Tesla buyers don't want to charge with coal-fired electricity. Battery development and deployment of electric vehicles will drive even more demand for renewable energy development. This will likely drive even more distributed and home generation as we move more towards "micron" grids.

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**EBJ: We'd appreciate your view of trends in the hydropower segment.**

**Oakes:** We're seeing a growing appreciation for hydro as the oldest and largest source of renewable energy. Hydro's flexibility makes it an ideal partner for intermittent renewables like wind and solar. Pumped storage hydroelectric projects are incredibly valuable for storing renewable energy so it can be dispatched when needed. We have been assisting a number of pumped storage owners in relicensing and mechanical upgrades for years and are now working on designs for several planned and proposed projects.

As noted earlier we're seeing a continuing trend of reinvestment in existing hydro. One of our clients used the term "forever assets" when discussing hydro. If the equipment and infrastructure is maintained well, developments can operate for decades and even centuries. Hydro projects often provide other important benefits like flood control, water supply, fish and wildlife habitat, and recreation so there are many reasons besides power generation for maintain and investing in them. The environmental and ecological impacts of constructing new dams across free-flowing rivers in the U.S. puts additional emphasis

on maintaining the existing infrastructure and making it as environmentally friendly as possible. Reinvesting in existing hydros, installing hydroelectric generation on non-powered dams, building closed-loop pumped storage, and deploying and testing emerging tidal and wave technologies will be the primary new hydro infrastructure investments we will see in the next 10 years or so.

**EBJ: Are hydroelectric companies changing their strategies?**

**Oakes:** For hydroelectric owners, getting more market appreciation – both for the renewable attributes and the ancillary services hydro provides is key. Unfortunately, many state renewable portfolio standards favor wind and solar and existing hydro doesn't receive any economic incentives. The dispatchability and grid-balancing aspects of hydro aren't compensated for in many regions of the country and the price of electricity is extremely low. For many smaller hydros this means shrinking revenues even as costs for environmental enhancements and dam safety increase.

We're seeing more hydro owners and developers finding new markets for their power – providing power directly to cities, universities, and corporations who have renewable energy (or carbon free) initiatives. We're also seeing some clients finding ways to integrate with other renewables, add battery storage, or support hydrogen production to drive more value for their power.

**EBJ: How are clients incorporating technology into their businesses? Has Kleinschmidt adapted its services to accommodate them?**

**Oakes:** Do you mean this week or just this morning? The pace of technological change is incredibly fast and even historically slow-moving utilities are rapidly adopting and innovating. Digitization is a key trend in the industry and we've been fortunate enough to be working with some clients, like the New York Power Authority, who are really at the cutting edge of this, creating digital "twins" of their operations to be able to optimize operations, quickly detect and isolate unplanned outages and other issues. We are constantly adopting

new technologies to do our work in different ways – like using drones to perform biological assessments in hard to reach areas. Having a company full of curious scientists and engineers means we are constantly hearing about new technologies. We try to focus on advancements that will help our staff and clients get things done more effectively and efficiently.

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**EBJ: How is the climate crisis changing demand for the services Kleinschmidt provides to the Power & Energy sector?**

**Oakes:** All of the trends towards renewable energy that I've mentioned are coming directly from our overdue response to climate change. On a macro level those trends will drive the larger industry and development of renewables and storage like a rising ocean level floats all ships. On a micro-level we're seeing more interest in services to harden individual assets against extreme weather events, model changes in flows and inundation levels due to changing weather patterns, and restore or create floodplains and wetlands.

**EBJ: Can you comment on investment trends related to power infrastructure?**

**Oakes:** I know I'm sounding like a broken record but the priority is really on renewables for both the public and private sectors. Major corporations, led by the likes of Google and Microsoft, are demanding their power come from renewable sources and demonstrating that if utilities can't provide this they can and will self-generate with renewable powered microgrids to meet their needs. Some utilities are scrapping plans to build natural gas plants and building solar instead. Major new infrastructure investments will continue to be made in distributed generation and transmission to support it, electric vehicle charging stations, offshore wind and the port investments and ships to build it, as well as solar and land based wind.

**EBJ: How can investments be maximized from a social and economic perspective?**

**Oakes:** Renewable energy is a huge social investment. Deploying technologies that can rapidly reduce our use and dependence on carbon-based energy is one of the most important challenges we face today. Enough of the world now realizes that and is making enormous strides to make renewable energy economical. As renewables gain cost parity with carbon based sources of energy and as green jobs continue to grow and provide opportunities, the arguments against them disappear. ☐

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