NewEnergyUpdate

Interview with Advisian (WorleyParsons Group) – the Owner's Engineer for the DEWA IV Project, the largest Concentrated Solar Power (CSP) project in the world

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Question 1: Having recently been nominated as the Owner´s Engineer for the DEWA IV project, could you tell me what that fully involves in this case?

As Owner's Engineer for this incredible project, we will provide a review of the basic and detailed engineering, manage technology risk and provide technical support as required for the Factory Acceptance Tests and during the construction and commissioning of the plant as necessary.

Advisian will deliver the project using the specialized CSP technology team based in our Renewable Energy Center of Excellence in Madrid, Spain, with support from Shanghai based engineers, to interface with the power block design. We will also draw on subject matter experts in our Dubai office for site supervisory support.

Question 2: This is the largest project of its kind in the world. Do you foresee any unique challenges and technology risks with such a project?

The project will indeed be the largest single site Concentrated Solar Power (CSP) plant in the world, with a capacity of 700MW. Of course with any project of this scope there are challenges and risks, however the demonstrated experience and expertise of our world class team mean we are best positioned to mitigate these risks.

The plant must integrate three different technologies with quite different degrees of maturity. There is extensive experience in photovoltaic plant technology, which forms a minor but interesting component of the Project and although the parabolic trough plants including thermal energy storage (TES) are large, this is also technology that we thoroughly understand and for which there is good experience in the market.

There is more limited experience in the industry with central tower technologies including TES and this is a component of technology risk that the consortium needs to manage. Our task is to provide technical support during this process. ACWA Power and Noor Energy 1 (the Owner Company) has strong experience with all three technologies, which will be an asset to the project.

The main EPC contractor, Shanghai Electric, is an experienced contractor in conventional power and although they have limited experience with the CSP technology, they have engaged experienced subcontractors to strengthen the team.

Managing those interfaces, the multiple cultures they represent and the associated project structure is one of the challenges that the team is excited to take on. As Owner´s Engineer, we take this challenge seriously and will ensure that our part is well managed.

There is also an interesting technical challenge in integrating all the three technologies in such a way that the whole installation is able to deliver 700MW of maximum power output at the electrical delivery point as a unique integrated plant.

We are very confident that our strong risk mitigation processes will ensure optimum performance.

Question 3: What strategies will you put in place to minimise those risks?

Together, the project stakeholders possess significant experience in delivery of CSP plant installations.

ACWA Power is one of the most important CSP power producers in the world. Abengoa and Bright Source are Technology Leaders in CSP plants. Shanghai Electric is a reputed EPC company, with vast experience in power generation. They have the support of the Shanghai Design Institute for the conventional components of the plant. Empresarios Agrupados has been largely present in the energy business and has participated in several CSP projects.

Our WorleyParsons team is a renowned player in the development of CSP projects. We have played key roles as Owner´s Engineer in the majority of the global CSP markets. Our organisational experience and subject matter expertise, combined with that of Noor Energy and the other stakeholders, enables us to draw on lessons learned to minimize known risks and identify potential new issues, prior to their occurrence.

The challenge will be ensuring adequate integration and management of technology risk while remaining focussed on the common objective of all stakeholders: the success of the project, from a safety and technical point of view.

We are excited to bring our extensive project experience in CSP and other technologies, to facilitate and optimize the required alignment.

Question 4: I presume you will be working closely with other companies. What will be the dynamic between yourself and Shanghai Electric as well as other contractors to the Noor Energy 1?

As Owner's Engineer, our primary function is representing the owner and facilitating the alignment of the delivery team. We are committed to retaining a strong partnership approach with Shanghai Electric to achieve the optimum outcome for the owner.

Our Centre of Excellence is already collaborating with NE1, coordinating the engineering activities, primarily in Madrid, where a task force of all stakeholders is formed during this initial design period. Conceptual and basic design is critical to ensure a proper plant concept. Strong alignment and relationships established early on in the project will carry through in a most positive way, and this is now a focus area.

To manage some of the potential cultural challenges of the varied project stakeholders, we will position team members in Shanghai, after an initial period in Madrid. This will ensure strong partnership between the owner´s team and the EPC team in Spain, Shanghai Electric and the Shanghai Design Institute (ECEPDI). WorleyParsons has a strong presence in China, which we will leverage to support the project.

Question 5: What are the timelines for the DEWA IV project?

The plant is expected to be completed in 48 months from the Notice-To-Proceed (NTP). The central tower plant and the first Parabolic Trough (PT) plant are expected to be constructed in parallel. The second and third PT Plant construction will commence with an approximately eight month offset each. Since the purpose of the PV Plants is to provide auxiliary consumption for each unit, each of these plants will be commissioned at the same time, as its associated plant.

Question 6: Working as part of Spain's mature CSP industry, you have seen it all from the good, the bad and the ugly. Having worked on multiple projects local and internationally, what is your advice to CSP developers and owners to ensuring the projects they develop hit their energy production targets?

A large attribute of success, and the cause of failures when not implemented correctly, can be associated with an adequate communication of issues and implementation of lessons learned.

Project success depends on utilising lessons learned from the industry in all the markets where CSP technology has been implemented, strong management of risks, technologies, cultural backgrounds and of safety standards. Safety is paramount to both us and the owner and is inherent in our culture. From our position as Owner's Engineer, we will contribute all our experience in similar projects to ensure safety is a core focus for the entire project team.

But we also understand the owner's desire for us to be a problem-solver, rather than us merely being an independent problem-identifier. This is an attitude that has helped us deliver high-quality projects without endangering the schedule.

Also essential to success are excellent project management practices, including risk management, cost and schedule control, review and approval of engineering, proper management of EPC, quality control and assurance, document control and experienced construction management supervision and control. Not all are in our scope, but our experience indicates they all are needed for success.

If best practices are implemented, with the correct team, the majority of potential issues can be minimised.

Question 7: What does this mean for the future of CSP? How far can costs go down?

The project is an iconic project. The new cost barrier broken by the ACWA Power proposal renders the technology competitive with conventional generation, if the full value of the plant is taken into account.

Specifically this refers to the value of avoided emissions and dispatchability. The price can still reduce somewhat, and will over time, but possibly not as significantly as what has been achieved by this plant. The large pilot program being implemented in the Chinese market will have to be observed, and will help that trend. New technological improvements will also aid the decrease.

How far exactly the costs will decrease is difficult to establish, but ACWA Power already foresees another drop from the 7.3c/kWh of the DEWA IV plant. It should also be noted that many locations such as in the north-west of Saudi Arabia, the Ma'an region in Jordan or the Atacama Desert in Chile have a much better solar resource than Dubai, in some cases up to 40% better, with correspondingly lower potential tariffs.

Question 8: Which other regions do you hope to see implementing CSP on this scale?

Most countries globally are now implementing variable renewable (PV and wind) power generation projects. All forms of power generation and their enablers are a core focus for our organisation, as we continue our commitment to helping our customers meet the world's changing global energy needs.

The impact that variable renewables have on grid stability needs to be mitigated by backup generation, or storage, in any of its forms. CSP plants have an important role to play in this mitigation, particularly given the current price break-through, and the need for longer term storage options at scale that baseload generation requires.

Morocco has a CSP program that will soon have over 500MW operating in Ouarzazate. Another 800MW of combined CSP and PV is in the process of tendering at the Midelt site.

South Africa also has a significant CSP program, with 500 MW operating (or close to operating) and will soon start the construction of the 100 MW Redstone CSP Tower project.

Australia has awarded a 100 MW CSP Tower and a number of smaller tower projects are in development, supporting some of the innovations required in the market and potentially addressing a smaller capacity market that the current CSP plants are not addressing.

The program in China is moving ahead, and aims to implement more than 1GW of CSP in the near term, and five times that number in the medium term.

Saudi Arabia has one of the largest renewable energy programs planned and has announced a CSP program of this scale to be started in the near future.

Both Spain and the US, although they have the biggest fleets of operating CSP plants, are currently not planning CSP plants in the near term, but this could also change.

There are a number of countries that are working on developing projects, including Tunisia and Jordan, but as more CSP plants are built and as prices come down further, together with increases in variable renewable generation penetration, such as the Kuwaiti Al Dibdibah project and the significant PV installations in India, CSP may see significant growth in many markets.

Question 9: Finally, as a speaker at the CSP Madrid 2018 Conference, what do you think we will learn at the Conference come round November?

Understanding that it is important to protect the intellectual property of each company, I think it is important for the success of the industry to share information. It is our common interest that the risks associated with CSP technology continue to fall and investor confidence is increased.

The combination of CSP and PV is of much interest, due to the natural combination of dispatchability of the former and low price of the latter. We should learn from the developers currently active in the Midelt tenders about the advantages of this technology, and their true integration. New technology developments may be discussed and new markets identified.

There should be discussions from manufacturers, technologists and developers on new technology trends and how those can aid in the continued downward pressure on energy costs. Some of these will be small steps from existing technologies, and others from consideration of new directions. As an industry, we need to keep an eye on all other forms of storage, which form the core of the success and unique positioning of CSP plants. Many countries are now looking into battery storage systems to shift some of the solar PV generation, which is very cheap, into the evening peak. But once a CSP project has been built to complement the PV system, the same can be achieved by increasing the size of the very cost-effective molten salt tank in the CSP system. A slightly bigger molten salt system could be much more cost-effective than a huge battery system. It is this kind of energy-system thinking that can bring the overall cost down further.