From www.cspplaza.com 04-August-2015

Interview with Miroslav Dolejsi on CSP Project Financing

CSP Projects' Financing And Testing Process Optimization Prior To The FAC-Targeting on Lower LCOE

Posted by: Summer Yang 04/08/2015 in Company, Focus, Research Leave a comment

Report from CSPPLAZA

Updated: 4-Aug-2015

Miroslav Dolejsi, the Deputy General Manager of German-based CSP engineering consulting firm SolEngCo GmbH, also a senior expert of the CSP industry recently gives ideas about financing and testing process optimization of CSP projects to CSPPLAZA.

photo: Miroslav gives presentation on CPC 2015

From www.cspplaza.com 04-August-2015

Interview with Miroslav Dolejsi on CSP Project Financing

Mr. Miroslav:

Currently, CSP Business is focused on cost reduction and making the levelized cost of electricity (LCOE) more competitive than that of conventional technologies like PV or Wind Power.

Weighted average LCOE of CSP varied by region from a low of USD 0.20/kWh in Asia to a high of USD 0.25/kWh in Europe. However, though costs fall further, projects are built with LCOEs of USD 0.17/kWh, which is still high.

Financial models show that the LCOE depends primarily on capital costs while capital costs preliminary depend on local solar resource. All experts across CSP business dealing with capital costs reduction are mainly discussing an optimization of plant size, new materials and automation leading to price declining the prices from manufacturing industry, training O&M staff in existing facilities, advances in R&D, a more competitive supply chain as well as improvements in the performance of the solar field, solar-to-electric efficiency and thermal energy storage systems.

But it is very rare to hear about financing conditions and their impact on the overall costs of a CSP plant , which is consequently on LCOE.

It should be a task for developers to look for better equity or debt financing conditions. In case of debt financing, the project company gets a loan and promises to repay the loan over the time (20 to 25 years) with interest. Here, it is necessary to consider that CSP plants have different ration between capital cost and O&M costs. Compared with conventional technologies, CSP plants need very high capital costs and very low operational costs. Therefore any reduction of capital costs has influence on such a long term capital expenditures , which is finally on LCOE.

Banks still consider CSP technologies as not quite conventional technologies, therefore the interests of the credits are relatively higher.

One of the reasons is the performance testing process of CSP projects. The testing prior to the Provisional Acceptance Certificate (PAC), in the banks' point of ` view, is quite similar to conventional technologies. However, the testing up to the Final Acceptance Certificate (FAC) is quite different from testing of other power plants. This testing includes a Yearly Performance Testing (YPT), which must be successfully finished within 36 months.

An YPT is necessary to prove CSP Plants on power generation performance, particularly depending on accuracy of the SCAs during one solar year.

When the first commercial CSP project with TES was planned (Andasol 1) many technical risks were considered. For example if the aperture area of the solar field cannot harvest the design solar energy, spare loops were foreseen. That results to a time needed for an assembly and erection of these spare loops and starting YPT again. Also learning curve for operating personnel was taken into account manly in optimizing the operation with three sources of energy; from solar field, from TES and from fossil fuel. When consideration of all the technical and operational risks was finished, a total period of 36 Months was established.

From www.cspplaza.com 04-August-2015

Interview with Miroslav Dolejsi on CSP Project Financing

After commissioning of approximately 100 CSP projects we learned that the challenges are not in the risks we had considered before the first plants were build but with unaccepted impropriate design of well proven equipment like pumps, heat exchangers, etc. or O&M problems with ball joints, broken receivers and mirrors etc.

EPC and O&M contractors as well as manufactures have learned these lessons and they have improved their engineering and designs.

Now we are asking the question: do we still need a total period of 36 Months for fulfilling the YPT?

Well established companies in CSP business had learnt already during the design, implementation and operation, therefore it should be a time to optimize the project risks.

Even Andasol Projects did not need entire period for this YPTs and they were finished earlier. If developers, reading this article, would be interested in this topic, we would be very pleased to provide any consultancy services, because the optimization of the total period of testing prior to the FAC will be different for CSP with TES and without TES, CSP with boosters and for ISCC Projects and also other factors have to be taken into account e.g. the country in which such a plant will be implemented.

Note: For more details, please contact Mr. Miroslav Dolejsi, Deputy General Manager of SolEngCo by Email: **dolejsi@solengco.com**

From www.cspplaza.com 04-August-2015

Interview with Miroslav Dolejsi on CSP Project Financing

优化CSP项目性能检测流程以获得更低的融资成本和LCOE

2015-8-7 17:34 | 发布者: admin | 查看: 446 | 评论: 0 | 原作者: Miroslav Dolejsi | 来自: CSPPLAZA光热发电网

CSPPLAZA光热发电网报道：德国SolEngCo公司副总经理Miroslav Dolejsi是太阳能热发电行业的一位资深专家，他对光热发电项目的性能检测有着丰富的经验和专业的见解，今年6月26日，他出席CSPPLAZA年会2015并就他所参与的西班牙Andasol槽式电站的检测作了分享。在下面这篇他为CSPPLAZA的读者撰写的文章中，他进一步就项目的性能检测作了阐述。

当下，光热发电行业的焦点是降低成本，使其LCOE相对于PV和风电等发电技术更具竞争力。

目前，光热发电LCOE的平均区间为0.20美元/kWh（亚洲地区）~0.25美元/kWh（欧洲地区）。即便成本进一步下降，降到0.17美元/kWh，仍然是较高的。

From www.cspplaza.com 04-August-2015

Interview with Miroslav Dolejsi on CSP Project Financing

目前，光热发电LCOE的平均区间为0.20美元/kWh（亚洲地区）~0.25美元/kWh（欧洲地区）。即便成本进一步下降，降到0.17美元/kWh，仍然是较高的。

图：SolEngCo公司副总经理Miroslav Dolejsi在CPC2015大会上发言

融资模型分析表明，LCOE的主要影响因素为投资成本，投资成本则由本地光照资源条件等决定。如今，CSP领域内的专家们讨论的最多的话题无非就是如何优化电站的装机规模、使用什么样的新材料、如何实现操作自动化、当前服役电站运维人员的培训、如何推进先进技术的研发、如何打造更具竞争力的产品供应链、如何提高光场性能和提高光电转化效率、以及如何提高储热系统性能等一系列具有成本经济潜力的方面。

然而，对于融资条件及其对整体电站成本影响方面的讨论，我们听到的少之又少。而这事实上也是影响LCOE的关键因素。

项目开发商的重任之一就是寻找更好的股权或债权融资条件。对于债权融资，项目公司可以通过贷款，并承诺在20-25年内还本付息。值得一提的是，CSP项目的投资成本和运维成本之间的比例是不定的。与常规的发电技术相比，CSP项目的投资成本相对较高，而运维成本相对较低。因此，任何投资成本的下降对长期资本支出都是具有影响深远的，最终则反应在LCOE上。

目前，银行并未把CSP技术视为很常规的技术，因此仍需要支付较高的贷款利息。其原因之

因此，任何投资成本的下降对长期资本支出都是具有影响深远的，最终则反应在LCOE上。

目前，银行并未把CSP技术视为很常规的技术，因此仍需要支付较高的贷款利息。其原因之一在于CSP电站的性能检测程序。

在CSP电站获得PAC（临时验收证书）之前的一系列性能检测流程，在银行看来，非常类似于常规电站。然而，CSP电站在获得FAC（最终验收证书）之前的检测与其它传统电站的检测是特别不一样的。因为CSP电站的检测还包括YPT（年度性能检测），而这一过程必须要在36个月内完成。

CSP电站的发电性能表现特别依赖于SCA（集热器列阵）的精度，因此有必要在一个太阳年期间进行一次全年性能测试（YPT）来证明。

在规划第一个商业化带储能CSP电站- Andasol 1的时候，我们考虑了很多技术风险。比如，我们考虑到万一光场的采光面积收集不到设计要求所需要的能量的话，就必须要安装额外的集热回路。而这样的话就会导致更多的材料和时间上的花费，YPT也要重新开始。我们也要考虑电站操作人员的学习曲线，特别是在优化三方面能量来源（太阳能、储能系统和化石辅助能源）系统的运行方面。当所有的这些技术和运行风险的计算完成时，结论是安达索1的YPT的时间总周期需要36个月。

之后在全世界范围内，调试了大概100多个电站之后，CSP行业发现实际电站上的挑战并不是来自于前文中安达索电站建设前我们所考虑到的那些风险，而是出乎意料地来自于与被充分验证过的设备相关的不恰当的设计，比如泵、热交换器等等，或者运维过程中出现的球型接头问题、集热管和反射镜的破损等问题。

当然，EPC、运维商和设备生产商已经意识到这些问题，并在工程和设计上作了相应的改善。

当然，EPC、运维商和设备生产商已经意识到这些问题，并在工程和设计上作了相应的改善。

那么，现在我们回到与前文相关的问题：CSP电站的YPT真的需要长达36个月之久吗？

CSP行业的那些知名公司已经在项目设计、实施和运行过程中完成了他们的学习提升，现在他们已经改善了他们对于项目风险的认识。

实际上，即使是Andasol电站的YPT也没有花费36个月的时间，也是提前完成了的。

如果您是项目开发商，在阅读了这篇文章后对这个话题感兴趣的话，我们非常乐意为您提供相关咨询服务，因为对于不同的CSP电站（带储热与不带储热、混合型电站、ISCC、以及其它考虑到所在国具体环境状况不同等因素的项目）而言，在项目获得最终验收证书之前的整个检测期内的检测都是不一样的。

备注：

1、英文原文报道请点击链接：CSP Projects' Financing And Testing Process Optimization Prior To The FAC-Targeting on Lower LCOE

2、如欲了解更多关于电站性能检测的细节，您可直接与Miroslav Dolejsi先生取得联系，联系邮箱：dolejsi@solengco.com；您也可以联系CSPPLAZA寻求协助。