COMPANY

QBotix, Inc.
qbotix.com

LOCATION

Menlo Park, California, USA

SOFTWARE

Autodesk® Factory Design Suite
Autodesk® Product Design Suite Ultimate
Autodesk® AutoCAD®
Autodesk® Inventor®
Autodesk® PLM 360
Autodesk® Sim 360®
Autodesk® Vault®

Robots to the rescue

Innovative firm cuts cost of solar power by 20 percent with help from Autodesk

In the end, we don't see ourselves as a solar company, but as a robotics company focused on clean tech applications. As we grow, we will absolutely need tools—such as Autodesk software—that help us accelerate our product development.

—**Wasiq Bokhari**
CEO and Founder
QBotix, Inc.

Image courtesy of QBotix.

Introduction

Wasiq Bokhari, CEO and founder of QBotix, wants to use the sun to change our world. His company's goal is to reduce the cost of electricity generated by solar power so that it becomes fully competitive with power from conventional sources. "The cost of solar power has come down recently, but incentives are still necessary for it to compete head to head with fossil-fuel-based power," says Bokhari.

To drive costs down, QBotix fundamentally rethought the concept of the dual-axis solar tracker, a device that orients the photovoltaic panels toward the sun as it moves across the sky. Traditional solar tracking systems are massive, requiring large amounts of costly—and carbon-intensive—steel and concrete, as well as hundreds of failure-prone motors, gearboxes, cables, and controllers. A relatively small 1-megawatt installation could easily contain more than 600 motors. "That is a potential nightmare for reliability and maintenance," says Lalo Ruiz, vice president of technology at QBotix.

A revolutionary robot

To reduce costs while increasing system reliability, QBotix developed its innovative Robotic Tracking System™ (RTS). In this system, solar panels are mounted on Qbotix-designed dual-axis trackers optimized for materials usage, durability, and simplicity of installation, but without motors or gearboxes. Instead, autonomous QBotix robots travel from tracker to tracker on a rail system and use built-in motors to adjust each tracker periodically to face the sun. One pair of these rugged robots can control up to 340 kilowatts (kW) of solar panels with a high degree of accuracy, reliability, and redundancy. In the example above, only six robots could control the entire 1-megawatt installation. Designed to work with any type of solar panel or inverter in virtually any terrain, the RTS can help reduce the cost of solar power by up to 20 percent. "It is equivalent to cutting the cost of the solar panels in half," says Bokhari.

The Autodesk Clean Tech Partner Program supports clean technology innovators with design and engineering software they can use to accelerate their development of solutions to the world's most pressing environmental challenges. For more information, visit **autodesk.com/cleantech.**

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The company's preassembled solar trackers help reduce solar system installation costs

Built with powerful tools

"To reduce the cost of electricity, you can cut up-front costs or increase electricity production," says Bokhari. "Our solution does both." The modular system is pre-assembled, making installation quick, easy, and approximately half the cost of traditional dual-axis systems. On the production side, the QBotix tracking system can help increase lifetime power production by 30 to 40 percent in comparison to a fixed mounted system. The net result is a 20-percent overall reduction in the cost of electricity.

QBotix designs the RTS using software it obtained through the Autodesk Clean Tech Partner Program, using Digital Prototyping through the process. For the interior components, QBotix used Autodesk® Inventor® Professional software, which came included with Autodesk® Product Design Suite Ultimate.

To design the robot's sleek orange and gray exterior, QBotix used Autodesk® Alias® industrial design software. Because the robot itself is durable, robust, and, virtually weatherproof, the exterior design is a powerful marketing tool. "Alias helped us design something that really differentiates us from the competition," says Ruiz.

Throughout the design and installation processes, QBotix uses a variety of other Autodesk® products, including Autodesk® Vault® for version control and Autodesk® AutoCAD® to create solar field layouts for customers. Ultimately, Ruiz plans on using Autodesk® Factory Design Suite to create 3D field layouts of the company's tracker systems.

QBotix also employs Autodesk® 360, a cloud-based platform that serves as a digital workspace for design and collaboration among geographically dispersed team members. "Autodesk 360 is especially useful for our operations people who don't have access to Inventor or AutoCAD," says Ruiz. "With Autodesk 360, they can review the models right from their browsers." QBotix used Autodesk® Sim 360® to perform a structural and thermal analysis of an Inventor model of the robots interior. "After performing the analysis, we actually validated the results with a physical model of the robot," says Ruiz. QBotix also used Autodesk® Simulation CFD to perform wind loading calculations.

The result

QBotix currently has three installations in the United States, two in Japan, and several more under construction, as well as plans to install systems worldwide. As the company grows, it plans to expand into other clean tech product lines, which it plans to manage with Autodesk® PLM 360 and its easy integration with the company's Enterprise Resource Planning system.

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For more information about the Autodesk Clean Tech Partner Program, please visit **www.autodesk.com/cleantech.**

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> Vice President of Technology
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Image courtesy of QBotix.

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