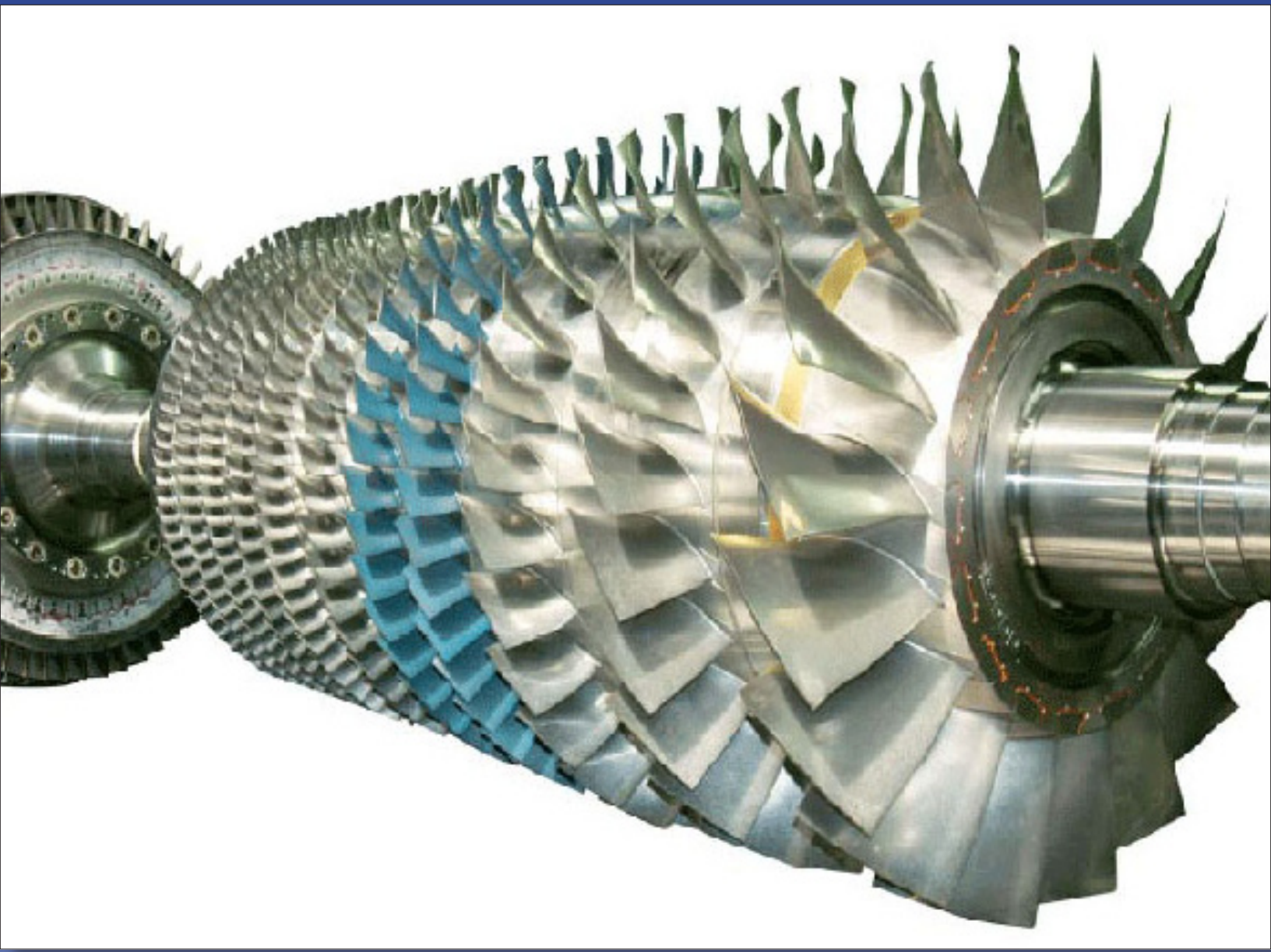
The Market for Steam Turbines for Combined-Cycle Installation

2018-2027



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Analysis 5
The Market for Steam Turbines for Combined-Cycle Installation 2018-2027

Table of Contents

* * *

SAMPLE

The Market for Steam Turbines for Combined-Cycle Installation

Executive Summary

In the 2017-2026 forecast period, Forecast International projects that 1,919 steam turbine machines of 20 MW and larger will be built for use in combined-cycle installations. This represents an increase of 1.2 percent over the 1,895 projected in last year's edition of this study. These machines will have a production value of $84.397 billion, an increase of 4 percent over last year's total of $81.149 billion. The average unit cost of these turbines is $44.0 million, an increase of 2.8 percent.

Electrical generation from steam turbines still accounts for over 50 percent of the world's total installed capacity, despite the rapid rise of gas-fired plants. Steam turbines have the advantage that they can burn a wide range of fuel, including anthracite (black coal) and lignite (brown coal). However, growing concern about environmental conditions, including the debate over human impact on climate change, is leading to greater restrictions on the use of coal as a power source. While the Far East and Eastern Europe will continue to burn coal as a heat source for their power stations (and thus remain markets for pure steam turbines), most of the rest of the world is moving rapidly away from coal in favor of cleaner-burning natural gas. The explosion in natural gas availability and the resulting decline in gas prices have reinforced this trend.

Natural gas makes an ideal fuel for gas turbine machines. However, when used alone, gas turbines tend to be fuel intensive, and much of the energy generated by combustion of the chosen fuel source is wasted by the very hot exhaust characteristic of gas turbines. Utilizing this exhaust to generate steam for steam turbines recovers this wasted energy and results in a very efficient power generation package.

While the number of combined-cycle plants to be built will increase markedly in the 2016-2025 period, coal- and oil-fired steam turbine electrical generation plants will be constructed at a slower pace. Going beyond this 10-year period, these trends will continue and pick up momentum as the world's apparently insatiable appetite for electrical power continues to grow. Beyond the period covered by this market overview, the use of simple-cycle steam and gas turbines will continue to decline in favor of combined-cycle plants.

This trend will actually benefit the steam turbine sector. It has often been stated that gas turbines will replace steam turbines in the power generation sector. This belief is probably based on the experience of the marine propulsion sector where gas turbines eliminated steam as a naval propulsion technology in barely a decade. However, land-based power generation facilities face operational demands and design constraints that are very different from those encountered in the naval environment. The enthusiastic acceptance of combined-cycle operations on land stems from the primary demands of low emissions and high efficiency. At sea, the demands are to reduce weight and volume while also delivering a lot of power at quickly variable output levels.

It is also worth noting that steam turbines, considered in isolation, are a clean source of power. It is generating the steam that drives the turbines that has the potential to be highly polluting. If steam is generated by a non-polluting, renewable resource, then steam turbines become acceptable from an environmental and conservation point of view. This approach has been adopted in a number of sunlight-rich areas where solar energy is used to produce steam rather than being trapped by photoelectric cells. The first such plants are now entering service and the technology appears to have significant potential.

This type of plant has the same issues as other solar-powered technologies in that it is subject to intermittent reductions of capacity due to inclement weather conditions. Obviously, this is not a serious problem in the Sahara Desert where existing plants of this type have been built, but a spread of the solar-powered steam turbines into less favorable areas may make this issue significant. It is addressed by incorporating gas turbines into the system for topping purposes. Acting in the same configuration as a combined-cycle plant, these augment the solar power with the waste heat from their exhausts to maintain power output.

Given the escalating worldwide need for electrical generation and the growing acceptance of combined-cycle plants, the production of steam turbine machines should continue to see sustained growth for many years to come. In assessing this situation, it is hard to avoid the impression that gas turbines are not replacing steam for land-based power generation at all. Rather, they are replacing the fossil-fueled boiler as a steam source for steam turbine installations.

* * *

SAMPLE

PROGRAMS

The following reports are included in this section: (**Note:** a single report may cover several programs.)

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