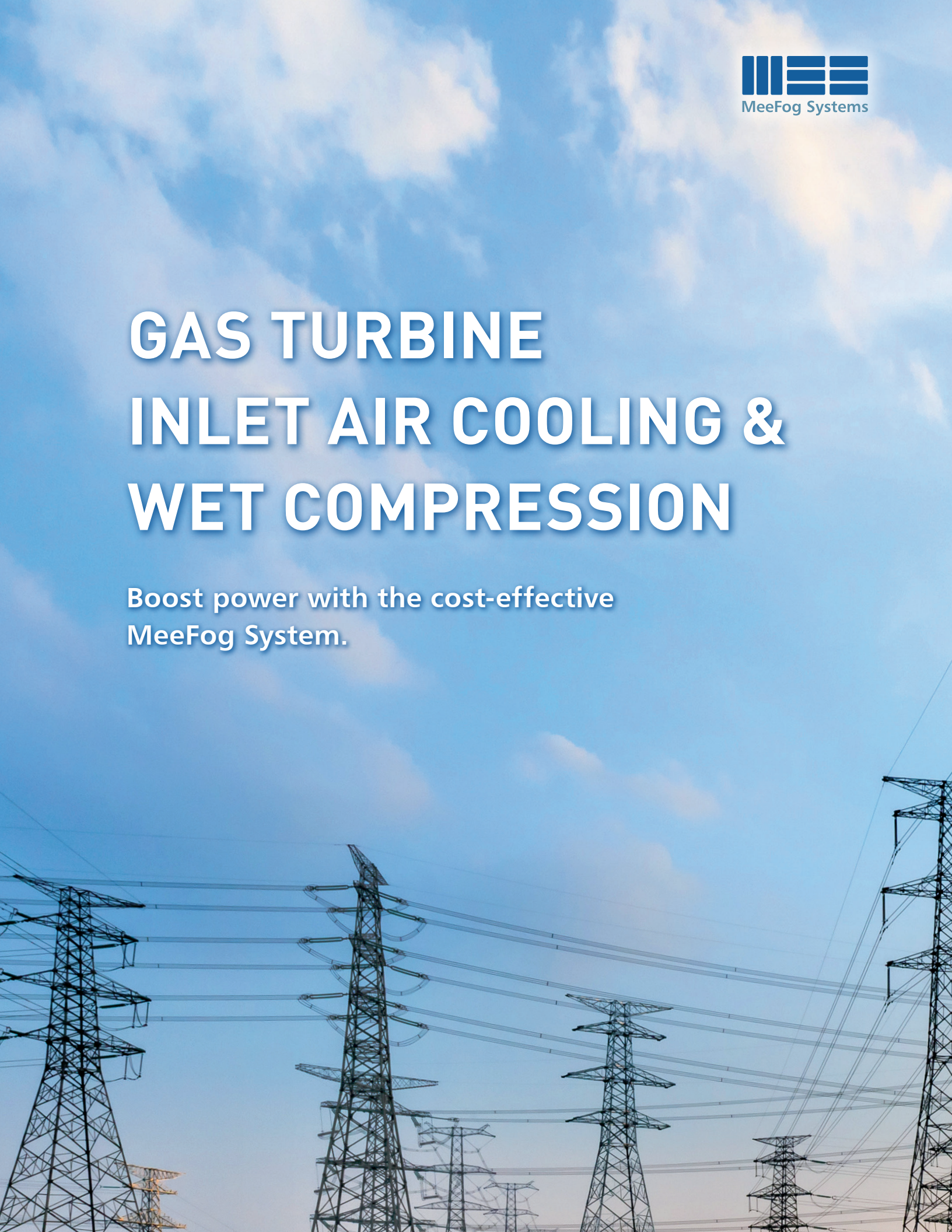
MeeFog Systems

GAS TURBINE INLET AIR COOLING & WET COMPRESSION

Boost power with the cost-effective MeeFog System.



Over 1,100 gas turbines worldwide have increased power output using MeeFog

MeeFog Systems have been approved by every major gas turbine manufacturer in the world.

The MeeFog pump skid provides high pressure water to fog manifolds located at turbine inlet.

MeeFog customers

AEP • AES Argentina • Alstom Power • Aluminium Bahrain • Amata • American Electric • BP Colombia • Bechtel • Black & Veatch • British Petroleum Colombia • Commision Federal de Electricidad • Deacero Power • Darby Power • Dominican Power • Dubai Electricity • Duke Energy • Dynegy • Empresa • Energia Campeche • Energy Australia • Energy Control • ENI Venice Refinery • GASCO India • General Electric • Gila River Power • Glow IPP Company • Gujarat Refinery • Gulf Cogeneration • Hays Energy • Indian Oil Corporation • Ingredion Mexico • Jabil • JFE Steel • Kawasaki • Kansai Electric & Power • Korea Electric & Power • Kimistu Thermal • Kobe Steel • Korea Western Power • Linden CoGen • LG Chemical • Ma Gang Steel • Malakoff • Massachusetts Municipal • Mitsubishi Heavy Industries • Midland Cogeneration • Midlothian Energy • Myanmar Lighting • Ministry of Electricity Iraq • Montpelier Generating • MTBE Petronas • MTBE Malaysia • Natural Gas Fernosa • Nevada Power • Niject Services • Nong Khae Cogen • North Carolina Electric • Northeastern Energy • Ocean State Power • PDVSA • Petro China • Petro Vietnam Power • Petrobras • Praxair • Port Lincoln • Portland Gas & Electric • Pratt & Whitney • Procter & Gamble • Public Power Greece • PTTGC Thailand • Quail Run • Raffineria di Milazzo • Reliance Energy • Rolls-Royce • SESCO Malaysia • Sha Steel Shanghai • Caojing Power • Shell Refinery • Stanton Energy • Solar Turbines • Samutprakarn Cogen • Tait Electric • Tampa Electric • Tenaga Nasional • TC Power • Thai National Power • Thai Oil • Tonen General • U.S. Borax • Unidad Electrica de Guayaquil • Utilicorp Energy • Victoria WLE • Vietnam Electricity • Watson CoGen • Wellhead Electric • Wisconsin Public Service • XCEL Energy •

Up to 25% power boost

10% more with wet compression overspray fogging

Evaporative cooling is effective in all climates, from areas with cool summers to the high heat and humidity of the Tropics. MeeFog gas turbine inlet air cooling utilizes the most effective and economical technology available. Wet compression overspray fogging gives an additional 10% power boost. The chart below shows the power boost on various turbines when cooling 20°F with MeeFog. To receive a report detailing the benefits of using MeeFog Systems for your gas turbines, contact Mee Industries. The provided report will give an accurate prediction of annual power gains, monthly power gains, and peak/average water consumption.

Gas Turbine Power Boost

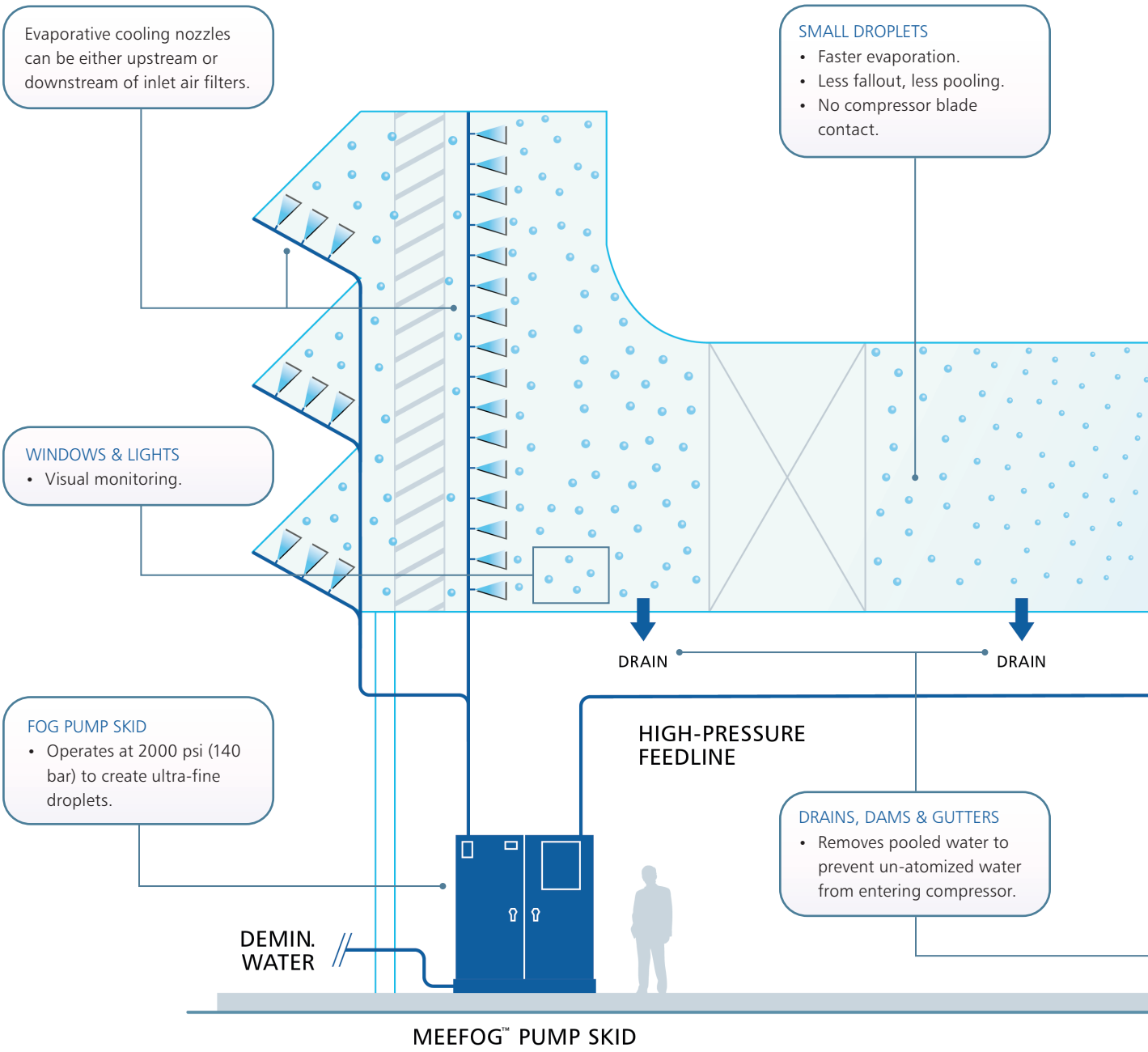
For 20°F (11°C) of cooling

Gas Turbine Model Number	ISO Output	Output 100°F (38°C)	Fog Flow		Output 80°F (27°C)	Power Increase	
	MW	MW	GPM	LPM	MW	MW	%
ALSTOM GT 8C	52.6	41.2	12.1	45.9	46.1	4.9	11.9%
GE GT11N	83.9	70.4	21.7	82.2	75.3	4.9	7.0%
GE 6541B	39.6	33.9	10.5	40.0	36.7	2.7	8.0%
GE 7111EA	84.9	70.0	20.2	76.6	75.6	5.6	7.9%
GE 7221 FA	161.7	129.7	29.0	109.9	141.3	11.6	8.9%
GE 9171E	125.6	103.1	28.2	106.7	112.0	8.9	8.6%
GE 9FA	259.5	209.8	43.8	165.8	230.8	21.0	10.0%
GE LM2500PH	21.6	15.8	4.3	16.3	18.3	2.5	15.6%
GE LM2500+PK	27.1	20.0	5.4	20.3	23.0	3.0	15.2%
GE LM6000PA	41.0	25.3	8.0	30.4	33.5	8.2	32.5%
Solar Mars	10.0	8.1	2.6	9.9	9.0	0.9	10.9%
SGT6-3000E (W501 D5A)	109.3	88.7	25.0	94.7	96.7	8.0	9.1%
SGT6-5000F (W501F)	171.8	140.6	30.2	114.1	151.9	11.3	8.1%
S 701F/ MHI 701F	252.6	206.7	44.7	169.1	223.8	17.1	8.3%
SGT5-2000E (V94.2)	148.8	122.0	34.8	131.7	132.0	10.0	8.2%
Ansaldo GT-26	331.6	255.5	48.2	182.3	287.6	32.1	12.6%
Ansaldo AE94.3	340.1	268.6	51.1	193.6	305.1	36.6	13.6%

"When Venice becomes very humid, we still achieve up to 5°C of cooling on average. The turbine presents benefits of up to 100 KW per degree Celsius."

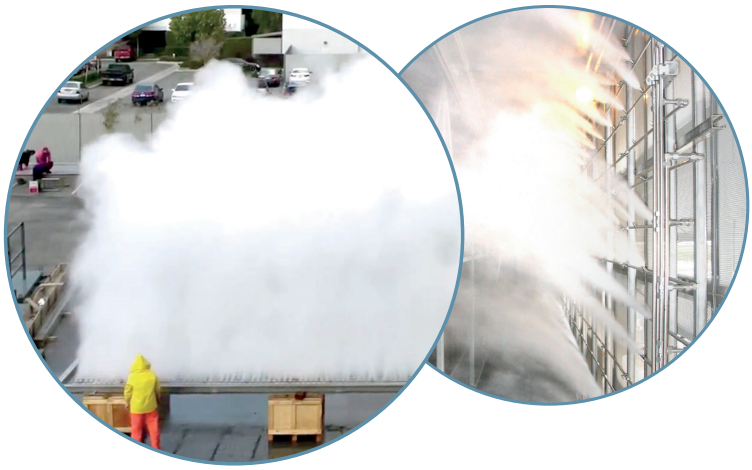
— Massimiliano Bettin, Downstream and Industrial Operations Manager, ENI Venice Refinery.

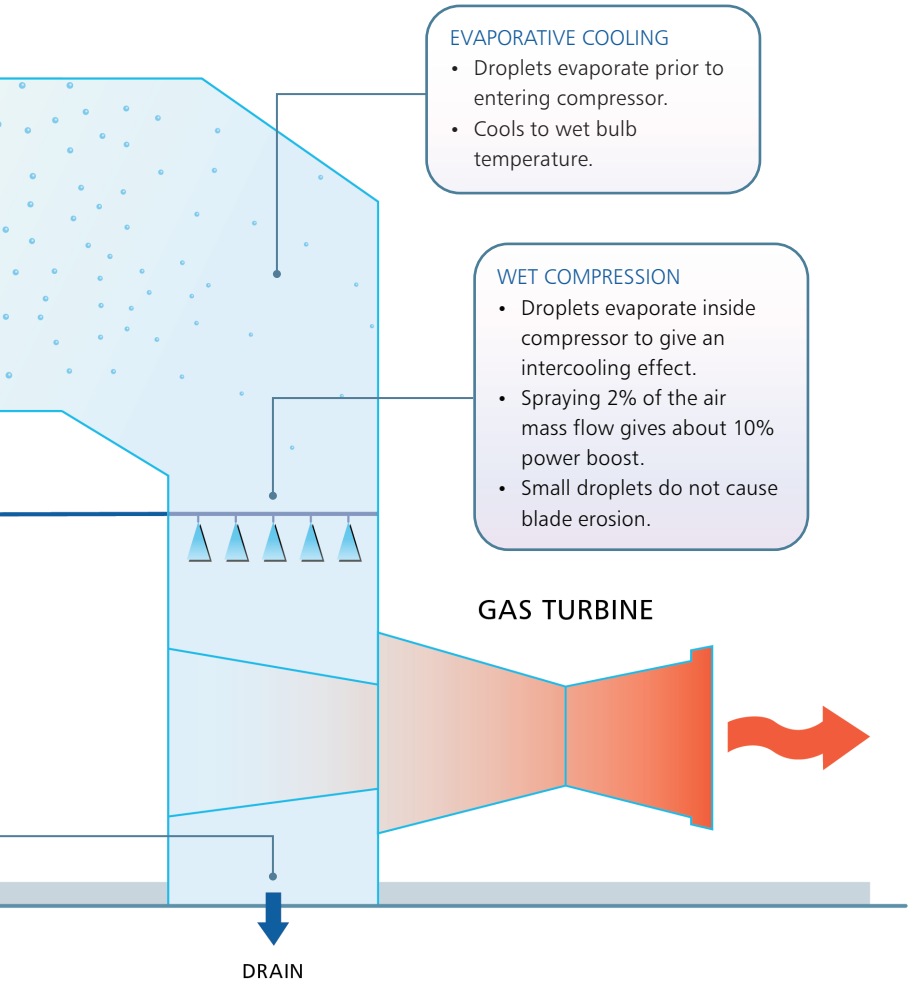
Cool down, power up, with MeeFog



"MeeFog is a relatively inexpensive way to get additional MW, and to be able to quickly respond to pricing changes. It also appears from the boroscopes that the wet compression keeps the compressor clean so intervals between water washes can be extended."

- Jeff Zelik, Plant Manager, Eagle Point Power Generation, LLC.





Comparison of cooling technologies

	Fog	Chiller	Media Type
Installation Cost	$	$$$	$$
Maintenance Cost	$	$$$	$$
Fuel Costs	$	$$$	$$
Parasitic Load	$	$$$	$$
Inlet Pressure Drop	low	high	high
Evaporative Efficiency	100%	N/A	85%

Operational benefits of MeeFog

- Increase existing generating capacity.
- Improve heat rate up to 5%.
- Approach 100% saturation with virtually zero inlet pressure drop.
- Significant fuel savings compared to other systems.
- Reduction in NOx emissions by up to 30%.
- Reduced emissions per kW of power.
- Lowest capital costs and fastest payback compared to other cooling technologies.

Fast project execution

Pre-engineered skids, small enough to be air-freighted. Skids and feedlines can be installed while the gas turbine is in operation. Nozzle manifold installation requires outage of 1 to 7 days. Mee Industries can provide turnkey installation or supervision for your installation team.

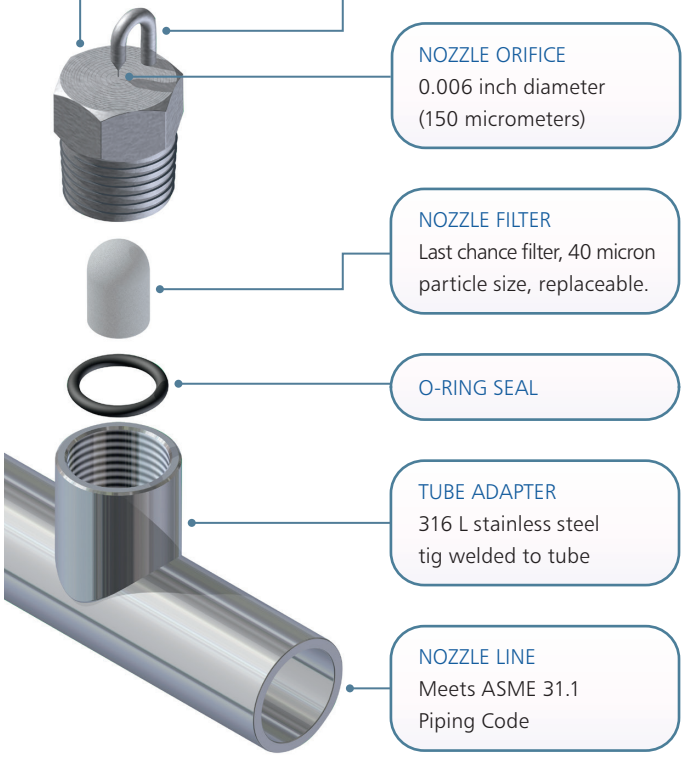
10 micron droplets

Micro in size. Macro in benefits.

The tiny droplets from a MeeFog nozzle evaporate quickly, and 100% efficient evaporative cooling can be accomplished in just a few seconds. Air pressure drop through the nozzle manifolds is negligible.

The average droplet produced by a MeeFog nozzle is less than 10 microns, about one tenth the diameter of a single strand of hair. Typical operating pressure is 2000 psi (138 bar).

The MeeFog nozzle has been shown to consistently outperform other high-pressure nozzles. They have a useful life of more than 30 years when used with properly treated water.



Tie wire installed to prevent FOD.

MeeFog high pressure pump skid

Pump skid

- Stainless steel welded frame – easy access for maintenance.
- Oversized inlet water filter, with 0.35-micron cartridge filters.
- Discharge water filters (10 micron).
- All wetted parts are non-corrosive material.

Controls

- Weather station for automatic operation.
- Programmable logic controller (PLC) with interface panel.
- Easy to use, open-source software.
- Easy connectivity to DCS and/or PC in control room.

"We are probably the longest running wet compression user in the world in terms of total hours, having successfully used wet compression for more than twenty years. We run the MeeFog Systems round the clock during the peak period of electricity generation from June to September and anytime the ambient temperature is as above 50°F."

— Steve Ingistov, Principal Engineer, Watson Cogeneration
(Fog systems installed in 1998.)

The MeeFog Advantage: Experience Based in Science and Innovation

For over 50 years Mee Industries Inc. has been the leader of innovative water fog technology. MeeFog Systems are used to humidify and cool industrial, commercial, and agricultural processes and to create dynamic special effects.

Thomas Mee Jr. who founded Mee Industries in 1969 started his career as a Cornell University research scientist. The company originally manufactured high-tech, meteorological instruments. The first MeeFog Systems were used to study natural cloud phenomena. By the early 1980's, high-pressure water fogging had become the company's main focus. Active research & development effort ensures MeeFog's continual technological improvement.

Today the company is owned and operated by Thomas Mee III and D'Arcy Mee Sloane, who continue their father's tradition of running an innovative and ethical company for the benefit of customers and team members.

The MeeFog team looks forward to discussing your project with you.

MeeFog Systems

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CELEBRATING 1969 50 2019 Fifty Years of Fog