

Powering a decarbonized
world for everyone

Services

Supporting your journey to a more sustainable future



Here for a cleaner, greener you

Welcome to Sumitomo SHI FW, SFW for short, and to this brief introduction of our core services.

Here you'll find everything you need to service a successful, forward-looking energy operation – from preventative monitoring, maintenance, replacement parts and digital optimization, to full upgrades and conversions.

How we'll help

Right now, almost every industry leader and government around the world is trying to work out how to tackle the technological, economic and regulatory hurdles presented by climate change – without compromising energy security.

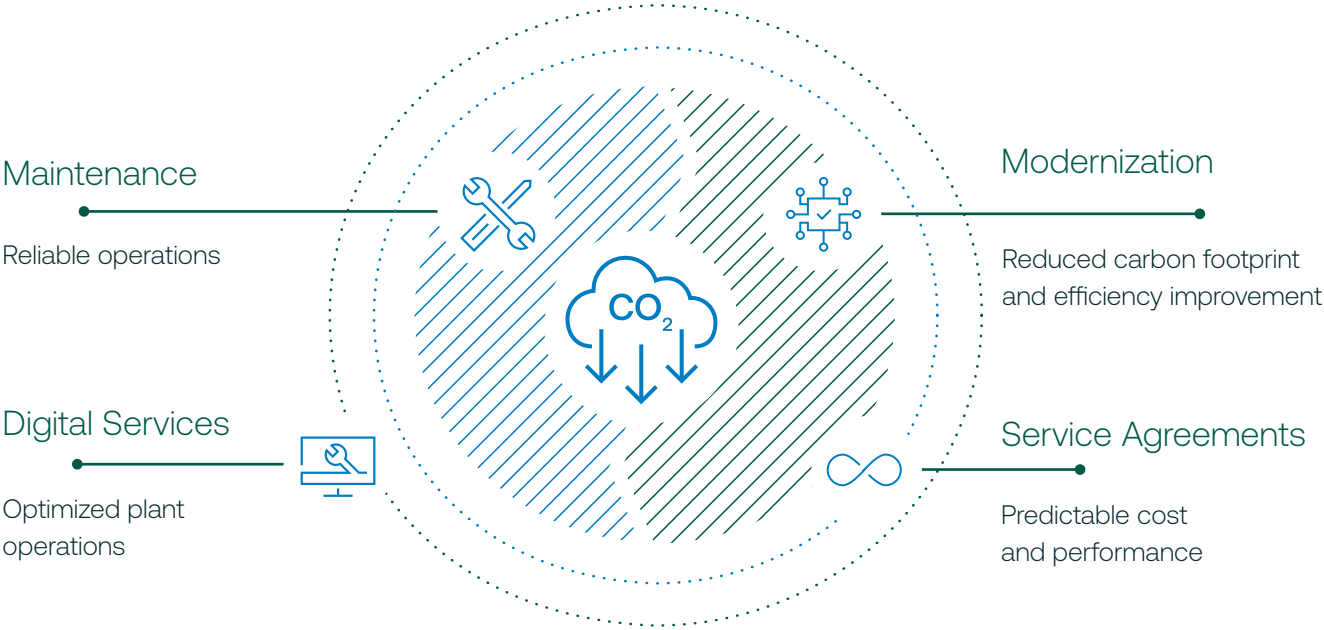
Our unique experience and capability mean we can help – assessing the efficiency of your current operation, recommending improvements, and predicting the impact on performance before any fieldwork is started.

Whether you're making your first ever clean energy modifications, re-configuring an entire plant around a more sustainable fuel, or building a brand-new plant from scratch, our services will support you – every green step of the way.

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Integrated Services



Our mission

The transition to a net zero world is reshaping industries and even entire economies. Our mission is to support this transition. One solution at a time.

Peace of mind



"As individuals and as businesses, we need to rethink our relationship with energy, now. It's a daunting task. But we're here for you. With our vast experience and knowledge of solid fuels, SFW offers peace of mind; helping you make the transition to more sustainable energy choices - without compromising energy security and profitability."

Mats Ohls
Senior Vice President, Global Services

Our approach

Many corporations talk about partnership, but for us it's fundamental. Because we know that working collaboratively with our customers is the best way to help them solve their problems. It means our services are designed to ensure you have support beyond the point of delivery, helping you optimize across your Asset's lifetime.

Expert

Over 100 years of energy generation experience means we can start answering your complex technical queries and adding value from day one.

Tailored

We take time to understand your unique plant and needs, and strive to develop tailored solutions that will grow with you.

Available

As a customer, you'll have access to a dedicated support team offering one-to-one support whenever you need it.

Long term

We're here for the journey, offering proactive support from project ideation to the end of your solution's lifetime.



Service Agreements

When you choose SFW, you choose the peace of mind that comes with knowing you're supported for the duration of your project.

Our long-term service agreements (LTSA) include comprehensive and cost-effective maintenance programs, ranging from boiler inspections to outage equipment supply and construction services - so you get maximum reassurance, and minimum unplanned repair work.

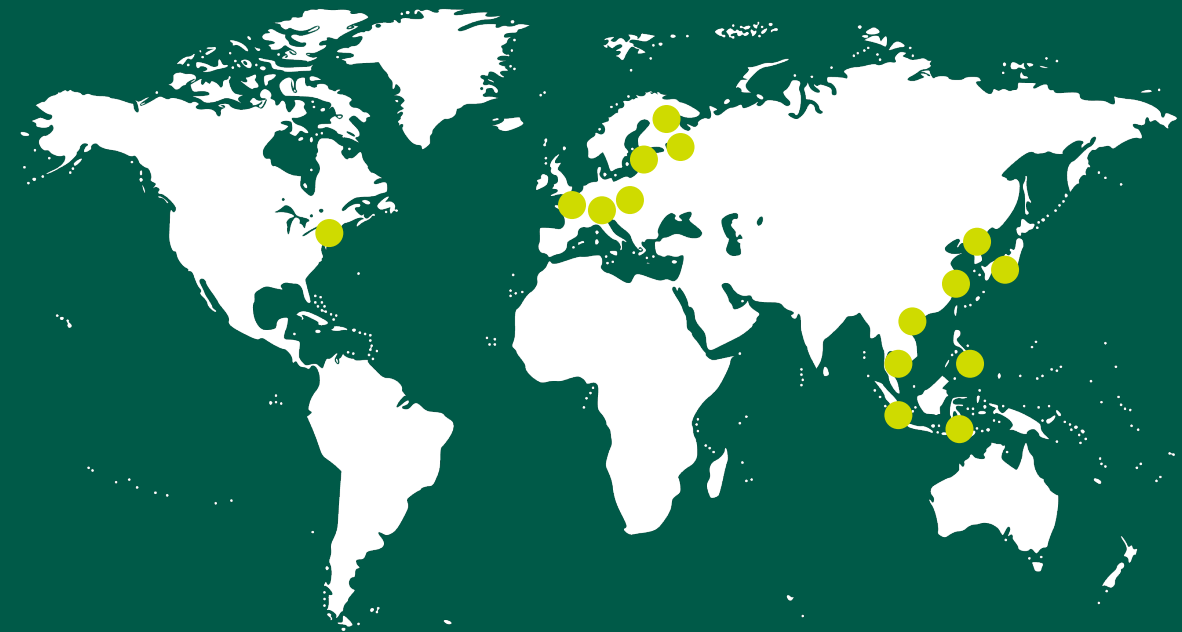
And because everyone's different, we'll tailor your service agreement to meet your exact needs - whether that means an off-site support arrangement or having your very own resident engineer on site for expert support on a daily basis.

LTSA's allow our customers to:

- Achieve the full potential from your new boiler investment
- Ensure resources are always available for each task needed in boiler maintenance, ranging from experienced pressure vessel welders up to world-class technical experts
- Ensure plant operators are up to date with our latest product improvements and accumulated know-how from new boiler projects.
- Ensure high plant availability

Global that feels local

We're a large global company but our customers and colleagues talk about us in terms of "close relationships", "care" and "being there when needed". Our global service centres and workshops are supported by a robust manufacturing and supply network. It means we can offer **rapid response** repairs and replacement parts, so your plant stays productive, wherever it's located.

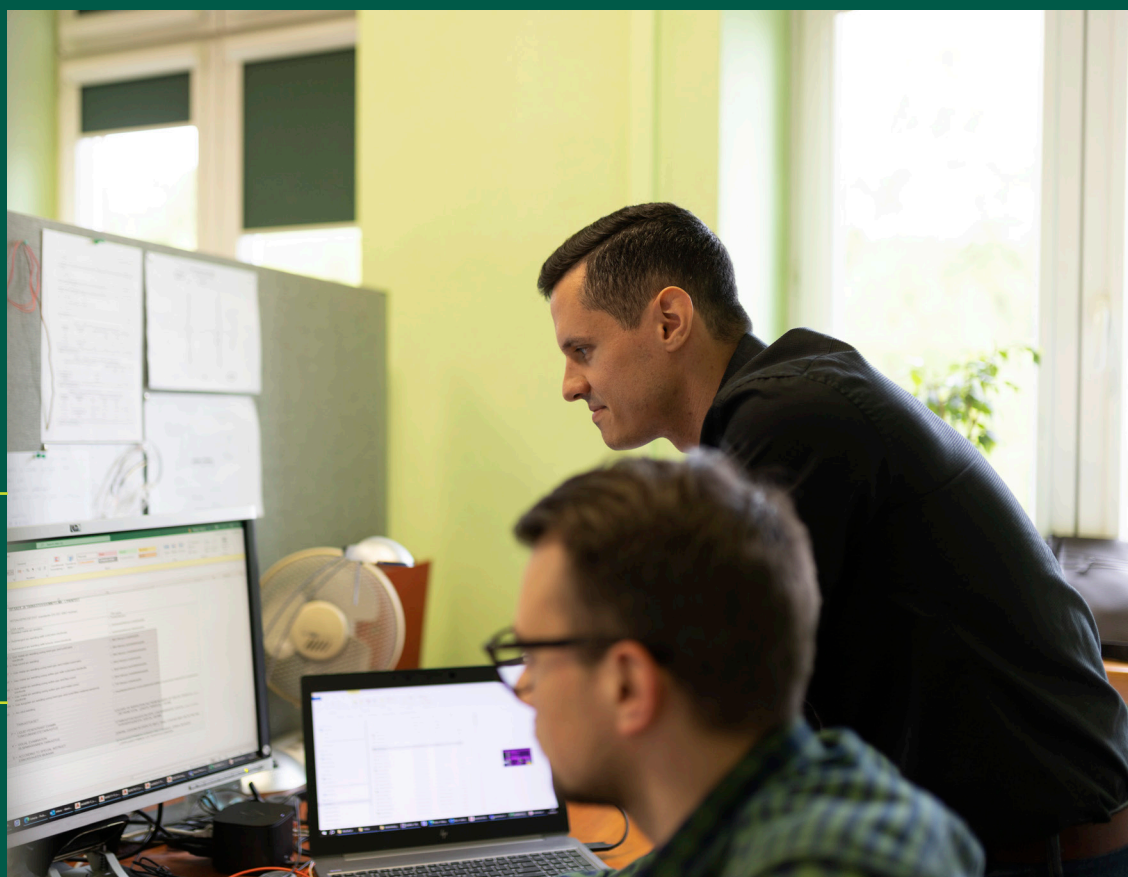


Global service centres:

- Bangkok, Thailand
- Darmstadt, Germany
- Hampton, New Jersey, USA
- Hanoi, Vietnam
- Makati City, Philippines
- Norrköping, Sweden
- Seoul, South Korea
- Shanghai, China
- Sosnowiec, Poland
- Varkaus, Finland

Workshops:

- China
- Finland
- Poland
- Thailand



Keeping you moving

As a lifelong energy technology partner, we offer support during your plant's highs, lows, and everything in between. It means we're here to help you keep up with regular maintenance and timely part replacements, to iron out day-to-day niggles with our trouble-shooting service, and to be there - fast - when you have an emergency.

It's a comprehensive offering that's delivers huge returns in terms of reliability, availability, and efficiency. And that matters to the environment just as much as it does to your business, because a more efficient plant, is a more sustainable one.



Emergency repairs

Call our 24/7 emergency response team. We'll be there to get you back online as soon as possible.

Troubleshooting

Automation not working as it should? Unexpected bed agglomeration? Tube leak? We'll look closely at your problem and data and work with you to find the best solution to get you back on track. Can be provided on or off-site as required.

Our solutions portfolio

Inspection

- Visual inspection
- Tube wall thickness measurements
- 3D membrane wall laser scanning
- Tube and membrane wall diagnostics
- Robotic inspections

Optimization

- Design improvements
- Material selection
- Boiler and auxiliary equipment tuning
- Digital services

Laboratory

- Failure and damage analyses
- Material studies
- SEM and EDS analysis

Protection

- Weld overlay solutions
- Metal spray coating
- Refractory maintenance and upgrades

Advisory

- Maintenance planning and staffing
- Construction support and supervision
- Erection and commissioning
- Boiler operation and maintenance training

Replacement parts

When a part comes to the end of its lifetime, we know you need to act fast to get a reliable replacement in place. It's why we're committed to world class manufacturing quality, fast delivery and comprehensive warranties.

So you know you'll have the full support of our friendly customer care team, for as long as your replacement part is in use.

Our spare parts portfolio examples

Belts	Mandoors
Conveyors	Nozzles
Drum internals	Nuts and bolts
Elbows	Rotors / Motors
Expansion joints	Tubes / Pipes / Plates
Instruments	Valves
Chutes for BA	Vortex finders
Bags & Cages	Heat Exchanger bundles

Engineered pressure and non-pressure parts

SFW has been designing and fabricating steam generation equipment for over 100 years. We can fabricate virtually any steam generator pressure part - from highly complex redesigned coils and panels, to simple in-kind replacements.

We also offer a full line of high-quality replacement boiler and air pollution control equipment parts, both for our own units, as well as those manufactured by other providers.

Our best-in-class-quality manufacturing capability and worldwide sourcing of tubing, piping and attachments means we can meet your needs at a highly competitive price point.

Our key pressure part replacement services portfolio

Superheater, reheater and economizer coils

- Horizontal and vertical
- Optional 360° spiral weld overlay

Tubes

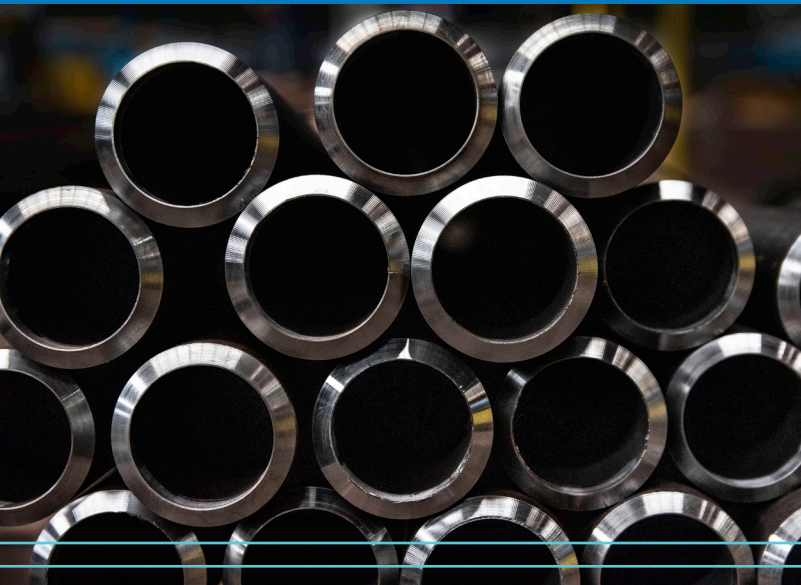
- Bends, openings, panels, loose / straight tubes

Membrane walls

- Furnace walls and roof
- Furnace grid
- Wing walls
- Backpass walls
- Optional 360° Stepless™ or 180° fireside overlay welding

Headers

- All circuits



Maintenance

SFW offers a broad range of services covering all types of boilers and air quality control systems (AQCS). Our high level of technical competence ensures you can maximize plant productivity, availability and efficiency, year after year.

Each of our maintenance services can be tailored and is available to you locally through our extensive network of friendly service partners.

Typical maintenance cases

Systems tuning

Regular tuning of equipment ensures you get the very best out of your plant. It's about optimizing its heat rate and capacity, helping you stay on top of regulatory compliance, and reducing the need for unexpected repairs. It's good for the environment too, reducing emissions and the consumption of additives.

Refractory upgrades

If your refractory has been running for years without a check-up, it's likely that it's no longer operating at its best. We can review the health of your refractory and create customized solutions to help you optimize your applications and even upgrade your current formulations and installation methods. We can also inspect and evaluate known failures so that you can learn from past problems and move forward with greater confidence.

Ash system improvement

We can help you assess and improve your current ash cooler set up. This includes retrofitting your existing system with drum and screw cooler solutions that allow you to expand your fuel range to include more demanding and cost-efficient fuels.

Expansion joint improvement

Expansion joints are subject to significant pressure and can become weak over time, reducing their efficacy. We can support you with customized solutions that simplify the retrofitting of upgraded CFB loop seal expansion joints, allowing you to make ash-packing-resistant modifications, and to upgrade materials for increased tolerance to extreme temperatures and expansion.

Vortex finder improvement

Expert maintenance and upgrades can significantly increase the reliability and lifespan of your CFB vortex finder. We can help you with simple design upgrades or implement complete flexible cast-segmented retrofits.

Grid nozzle enhancements

Fluid bed grid nozzles are highly susceptible to erosion and corrosion. We can provide spare parts and cost-effective grid retrofits to various Original Equipment Manufacturer (OEM) grid solutions as needed.

Pressure part redesign

Pressure part redesign starts with detailed Computational Fluid Dynamics modelling (CFD) and engineering including fuel combustion and heat absorption modelling, heating surfaces fouling analysis, metal temperature analysis and CFB 3D furnace modelling.



"SFW's high level of technical competence ensures you can maximize plant productivity, availability and efficiency, year after year. Each of our maintenance services is customizable for your needs and is available to you locally through our extensive network of friendly service partners. We deliver significant long-term reductions to the cost of ownership for our clients. SFW helps to improve the reliability and adaptivity of your operations and reduce your maintenance costs with our solutions for preventive and proactive maintenance. While you concentrate on crucial daily plant operations, we take the early steps you need for proactive boiler maintenance, tailored to meet your requirements."

Siwapol Wuttipongprasert
Sales & Marketing Manager, Asia Services



Taking you forward

As global energy innovators, we can guide you through the selection and adoption of new energy generation, analysis and optimization technologies that will shape a more efficient future – for the good of your business, and for generations to come.



Technology Modernizations and Upgrades TMUs

"As the world's fuel needs and emission regulations change, SFW can help you understand, assess and implement the technologies that will help you get the best possible value from your existing asset."

Timo Aspelin
Director, Asia Services



Our experienced service team provides a full range of Technology Modernization and Upgrade services globally. These include:

- Fuel range expansions and conversions including full combustion technology retrofits
- Capacity upgrades and process improvements
- Maintenance and operation optimization
- Pressure parts life time evaluation and extension
- Plant optimization and feasibility studies

Every project is tailored to your needs to help you achieve optimized and cost-effective solutions for cleaner power, steam, and heat production.



A typical modification journey

SFW offers partnership and support throughout your modification journey, from feasibility evaluation to implementation and fine tuning.

1 Study phase

A typical fuel conversion project might consist of about a year at the study phase. This is where we work with you to select fuels based on economic and technical feasibility and arrive at a concept that all stakeholders are happy to move forward with.

2 Proposal phase

The proposal phase follows. Over the course of a year or so we work with you to define your requirements, a manageable budget, and formalize the scope, timeline and conditions for your project.

3 Project execution phase

Once the project has been officially awarded, we move to the project execution phase. This 1–2-year delivery-focused period closes with full hand-over after commissioning.

4 Partnership

This is just the beginning: as an SFW customer, you now enter the partnership phase and can benefit from our range of support services for the full life cycle of your asset.

Plant optimization and feasibility studies

SFW can guide you in the application of the best practices of the industry to optimize your plant and create measurable improvements in your operations.

Featured project: SFW's CFB retrofit for Solvay Sodi

SFW embarked on a sustainability journey with Solvay's operations in Sodi, Bulgaria, by transforming an old petcoke and coal-fired boiler with a cutting-edge multi-fuel retrofit that embraces both local and imported renewable agro-biomass feedstocks. The results are game-changing; CO₂-neutral steam and electricity that power the sodium production process for Solvay Sodi.



We can help you advance the efficiency and profitability of your performance, as well as the reliability and availability of your equipment. We offer you ease of operation and maintenance with concrete solutions, while taking into account the environmental requirements of today. We have helped hundreds of plant owners carry out feasibility studies to help them assess the likely results of various change projects. Focus topics include:

- The economic and technical impact of using a new fuel type
- Remedial plans for reliability issues
- Combustion and emission control
- Process efficiency
- Corrosion, erosion, and fouling mitigation

Key elements of SFW's 220 MW Thermal CFB Retrofit delivery:

- New superheater
- Upgraded fuel feeding system
- Enhanced bottom ash recirculation
- Dry sorbent injection systems

Fuel conversions

With over 100 years of solid-fuel expertise and a database of 1500 alternative fuels, SFW is well equipped to help you modify your existing boiler assets to run more sustainably.

In fact, we've been carrying out successful fuel conversions since 1977. Today, the work continues; galvanized by the pressing need for change in a world too reliant on fossil fuels.

To date our decarbonization mission has seen us help dozens of customers globally (40 by the end of 2023) to achieve their net zero targets, with many more projects in progress and in the pipeline.

With SFW at your side, you really can achieve your net zero targets and navigate success in the changing energy market environment.

100% renewable fuels

Our work allows businesses to break their reliance on fossil fuels with a staged approach that involves phasing-out the use of a fossil and culminates in complete replacement with 100% renewable fuels such as biomass and recycled fuels. The growing circular economy, which brings solid recycled fuels into markets where landfilling is prohibited, has increased the availability of recycled fuels, making this type of change an increasingly attractive option for many customers.

Lower-CO₂-emitting alternatives

If a switch to 100% renewable fuels is not currently feasible or appropriate to your situation, we can support you with conversion to lower-CO₂-emitting alternatives, like natural gas.



Paper mill residuals and biomass conversion

Boiler K11 upgrade, Sappi, Austria, 2022
Upgrade to fuels: Bark, Biomass, Sludge, Process gases, Natural gas



Olive residues and sunflower pits to fuel portfolio

DEVEN K7, Solvay, Bulgaria, 2021
Upgrade to fuel: Agro biomass



Biomass and Recycled Wood increase

Neve CFB Rovaniemi, Finland, 2020
Upgrade to fuels: Biomass 40-100%, Recycled Wood max 30%



Step Grid upgrade

GS EPS, Dangjin, Korea 2018
Upgrade to fuel: Demolition wood



Gas boiler BFB retrofit

Vantaan Energia, Finland, 2019
Upgrade to fuels: Forest residues, recycled wood, peat



Wood dust firing system addition to CFB Boiler

A&S Energie Oostrozebeke, Belgium, 2017
Upgrade to fuels: Demolition wood, Wood dust 30%

Retrofits

SFW can modify the combustion technology of your existing asset to allow you to access a wider range of solid fuel firing options.

If you're currently using fluidized bed technology, fuel conversion allows you to take advantage of the widest possible fuel portfolio. It's easily upgraded to work with carbon neutral fuels to facilitate decarbonization of the energy production within your existing fleet.

For those units that are not able to utilize the full range of renewable fuels, we can retrofit the combustion technology to fluidized bed. In fact, SFW has successfully converted over 30 pulverized coal, stoker-fired, gas or oil-fired boilers and recovery boilers to bubbling fluidized bed (BFB) units, greatly expanding their fuel flexibility and economic life.

Featured project:
BFB retrofit: Vantaan Energia, Martinlaakso, Finland

SFW delivery included the 110 MW thermal BFB retrofit with:

- new furnace, step grid, superheaters, economizer and air heating system
- new fuel feeding, bottom ash handling, sand feeding, flue gas cleaning
- other auxiliary equipment

The multi-fuel steam generator is designed to use up to 100% biomass, which will consists mainly of wood chips from forest residues, recycled wood up to 40% and peat 30%. Natural gas will be used as start-up fuel and back-up fuel up to 50 % Maximum Continuous Rate(MCR).

Capacity upgrades and process improvements

If your plants' power demands change, SFW can help you modify your boiler capacity; whether you need to address a demand increase, decrease, or fluctuating levels that require energy preservation.

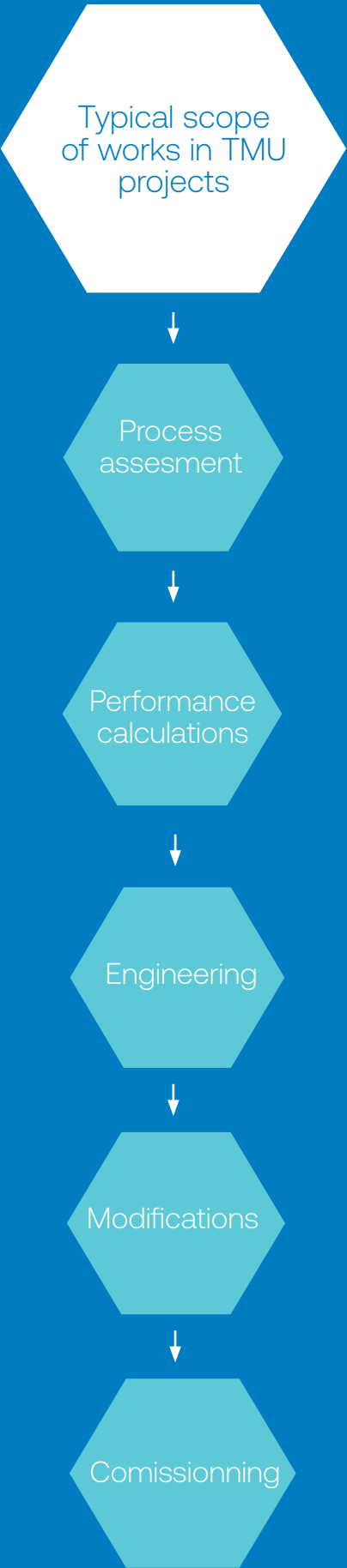
We can also help you implement process improvements to help you get the most out of your boiler or auxiliary systems in terms of:

- Fuels and additives consumption
- Efficiency
- Reliability and availability
- Environmental aspects

These projects typically start with a process assessment, the necessary performance calculations and modelling. After concept selection, the improvements are engineered.

All modification and conceptual planning work considers your specific plant environment including any limitations regarding to local legislation, plant layout, as well as likely production demands. Everything is carried out with a view to ensuring that the impact on normal plant operation and maintenance is kept to a minimum.

After modification, commissioning is carried out to secure continuous and reliable operation of the asset.



Technical parameters	
Capacity	110 MWth; 32 MWe
Steam flow	42,5 kg/s; 153 t/h
Steam pressure	115 bar; 1668 psi
Steam teperature	510 °C; 950 °F
Start up year	2019

Air Quality Control Systems upgrades (AQCS)

AQCS are key to ensuring your operation is running in the cleanest and most environmentally responsible way possible. SFW can help you carry out high quality upgrades and support you across each upgrade phase regardless of AQCS technology.

The benefits of upgrading your AQCS:

- Helps you respond to changes in emission control legislation
- Helps you manage compliance when converting to cheaper or lower quality fuels that are more challenging
- Ensures you're always operating with the best available technology (BAT) solutions
- Optimizes Operational Expenditure (OPEX) cost (for example consumption of additives feed both to AQCS technology and boiler technology)
- Decreases the OPEX cost of by-product utilization that might be contaminated and hazardous

Typical upgrades include:

- The integration of Bag House technologies with your Circulating Fluidized Bed Scrubber (CFBS) to reduce acid gas compounds, heavy metals, dioxins and furans
- The implementation of stand-alone Bag Houses technologies (BH) for dedusting and heavy metal reduction

- The use of Dry Sorbent Injection (DSI) and Activated Carbon Injection (ACI) to reduce acid gas compounds, mercury, dioxins and furans
- The addition of Selective non-catalytic Reduction (SNCR) and Selective Catalytic Reduction (SCR) systems for denitrification
- The use of wet desulphurization technologies

Support includes:

- An assessment and/or inventory of the technical condition of your existing equipment
- Technology upgrade concept development in line with corresponding emission requirements
- Ongoing service and repair works
- Spare part selection and delivery
- Feasibility studies according to your needs, guidelines and commonly agreed assumptions.

A full line of clean air quality control system solutions

Particulate control	
Dry electrostatic precipitators	Wet electrostatic precipitators
Fabric filters	Cartridge collectors
Acid gas and metal control	
Circulating fluidized bed scrubbers	Spray dry absorbers
Dry sorbent injections	Wet flue gas desulfurization
NOx reduction	
Low NOx combustion upgrades	Selective catalytic reduction
Services	
Renewal parts	Performance enhancements
Speciality products	

Featured project: Fortum Silesia CHP Plant

Multi fuel-fired CFB (Circulating Fluidized Bed Boiler) and CFB scrubber with integrated fabric filter



The Fortum Silesia CHP Plant is designed to produce 75 MWe of power from waste RDF and biomass. The plant utilizes SFW's circulating fluidized bed and CFB scrubber technology to cleanly and efficiently produce power. The plant fulfils BAT requirements and latest emission regulations for biomass combustion and waste co-incineration plants. In commercial operation since 2019.

Technical parameters	
Plant Electrical Output (Net)	75 MWe
Steam Flow	270 tph; 75 kg/s
Steam Pressure	92 barg; 1334 psig
Steam Temperature	536°C; 997°F
Fuel	Waste RDF (Refuse Derived Fuel), biomass,
CFB scrubber flue gas flow	298, 032 ACFM 506, 360 m³/hr
Emissions	According to BAT

Digital Solutions

SFW's Digital Solutions utilize process data 24/7, giving you access to real-time analytics that can increase efficiency and performance, lower operating costs, and improve the reliability of your plant.



Digital Services Izana™

Digital insights can give you a deeper understanding of your operations and help you quickly identify areas for improvement.

This is especially useful when it comes to meeting new environmental requirements or implementing change. The constant monitoring of critical parameters makes it possible to switch to waste-derived fuels with confidence.

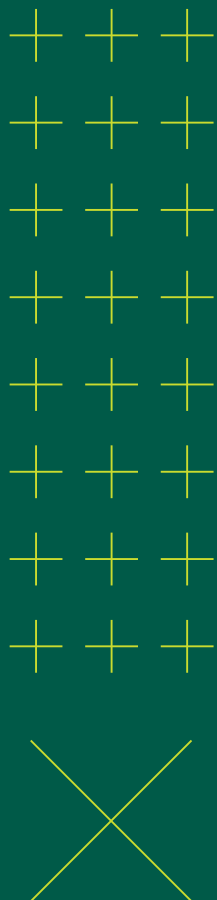
Actionable insights

SFW's analytics applications provide clear actionable insights, based on machine learning algorithms and instructions in real-time, directly to operators. It means you have a standardized way of reacting to various situations and can make sure operations are running at their very best, every single day.

We also offer a range of advisory services, where you will get optimal performance and minimum downtime with the help of SFW's expert network. We provide performance optimization with advanced analytics and, expert mentoring and training.

Our analytics applications can:

- Maximize boiler output and profitability with lower grade fuels
- Help to avoid uncontrolled downtime due to bed material sintering
- Optimize soot blowing and boiler cleaning cycles
- Detect boiler leakages faster, minimizing secondary damage



Easy access

Our digital service solution collects data from your automation system or cloud platform and then transmits, stores and processes it securely in our cloud platform. This enables SFW to provide sophisticated data analytics by combining decades expertise on boiler process and modern analytics applications.

Digital support are delivered on a 'software as a service' (SaaS) basis, allowing you full access to your web-based application in return for a monthly subscription.

Absolute security

We follow stringent security best practices throughout the development, deployment and operation of our Digital Service products. This includes offering remote access via a virtual private network (VPN) to ensure that your data is always encrypted, whether static or in transit. Single sign-on (SSO) and IP restrictions are available on demand, and security audits by industry-leading partners are part of every deployment. Data ownership is always retained by the customer.

Reference project: Digital Services for CFB boiler for recycled wood

With the Envelope technology, our customers can safely operate a boiler with a higher load and appropriate fuels. Envelope provides you with real-time information on the recommended maximum load that a boiler can safely handle with the current fuel mixture and quality.

Envelope has a high impact on optimizing electricity and heat production. It helps operators make decisions based on real-time information, rather than guesswork, and offers a user-friendly interface, which ensures high user satisfaction from the start. The technology also:

- enables full utilization of boiler capacity and unused design margins without an increased risk of additional maintenance costs,
- maintains high availability, ensures higher reliability and energy production as well as
- includes Advisory Services to support operators in optimized boiler operation and potential troubleshooting.

Featured project: Mälarenergi's heat and power plant, in Sweden Envelope and Hotloop Diagnostics





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About us

Since 1891, Sumitomo SHI FW have developed and delivered the highest quality technology solutions within the everchanging energy market. Now the transition to a net zero world is reshaping industries and economies to improve our impact on our environment.

We work in partnership with our customers, cultivating a deep understanding of their businesses, to deliver integrated energy solutions.

We want to be a life-cycle partner, bringing complementary expertise and working closely with our customers across the entire process. This is from customer value creation to design, scope, installation, execution, maintenance, and operations.

We partner with a diverse array of experts to meet rapidly evolving customer needs. With our unique knowledge, proven expertise, leading

technology, and global reach, we go further, together. By working closely with our customers, we enhance customer value and can reach decarbonization goals faster.

Whatever the customer challenge, we endeavor to find the solutions.

**Powering a decarbonized world
for everyone.**