COMPLEX ENGINEERING of 1—100 MW PROJECTS CONSTRUCTION ON TURNKEY BASIS

MKC®

GROUP OF COMPANIES

SINCE 2005

About the Company

MKC® Group of Companies is

- International power generating company
- Modular power plants turnkey construction
- Industrial engineering
- Implementation of projects of any degree of complexity
- Implementation of projects under energy service agreements
- Research and development
- Extensive geography of works
- Ecologically friendly power production

MKC GROUP OF COMPANIES

MKC® Group of Companies in Figures

- Engineering of power facilities
- Turnkey modular power plants
- Integrated solutions
- Implementation of energy service agreements
- Integrator of effective power solutions
- Team of manufacturers and engineers
- 3D design, teamwork at BIM server
- Computer-aided manufacturing
- Unit production
- Research and development

since 2005
IN THE MARKET

244MW
OF COMMISSIONED CAPACITIES

54
IMPLEMENTED PROJECTS

OFFICIAL DEALER AND SERVICE PARTNER OF MWM®

20,000
ITEMS AVAILABLE IN THE COMPANY'S WAREHOUSE

20 types
OF PRODUCED INNOVATIVE EQUIPMENT

4,200m²
OF PRODUCTION FACILITIES

9
BRANCHES

2
INTERNATIONAL AWARDS

MKC® Group of Companies is an Offical Dealer and Service Partner of MWM®

MKC® Group of Companies is an official dealer and service partner of MWM®, a leading brand in the sphere of cogeneration installations for autonomous power supply production. Since 2017 MKC® Group of Companies has been No.1 Dealer in Russia by the results of MWM® engines sales.

The official dealer and service partner of MWM® allows MKC® Group of Companies to resolve the whole scope of the issues related to sales and further technical maintenance of engines of the brand. All engineering personnel of MKC® underwent the certified training at the manufacturing plant in Germany. MKC's specialists can perform commissioning works of any degree of complexity. Which is more, the official dealer status allows MKC® to significantly reduce MWM® equipment delivery timeframe and also to organize an expanded warehouse of MWM® spare parts based on the production facilities located in the cities of presence.

Caterpillar Energy Solutions GmbH

MWM
Energy. Efficiency. Environment.

Confirmation

herewith we confirm that the company

MKS Group of Companies LLC
Viktorenko street 5, bld. 1, 9th floor, office 8A
125167 Moscow
Russian Federation

is an authorized

MWM Sales & Service Distributor

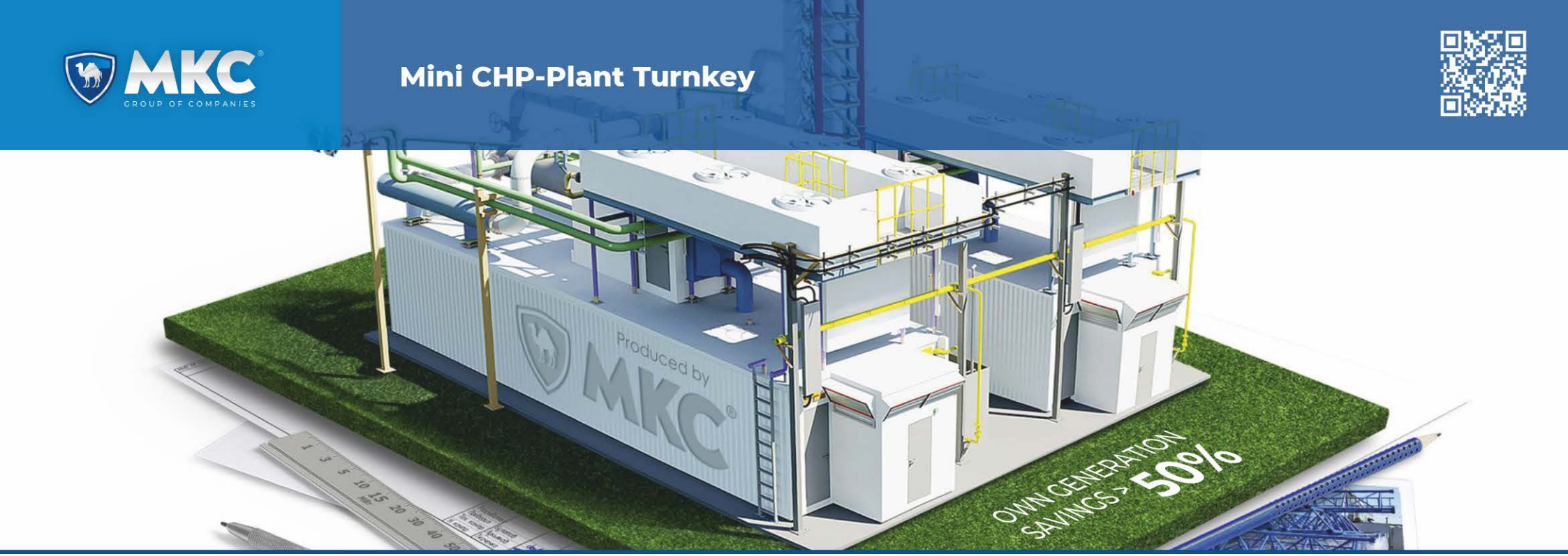
in the Russian Federation for the series TCG 2016, TCG 3016, TCG 2020, TCG 3020 and TCG 2032 gas generator sets.

This certificate is valid for a period of 4 years from the date of signature.

Mannheim, 8 April 2019

Daniel Sundell
General Manager Caterpillar Energy Solutions GmbH

Mini CHP-Plant Turnkey



MKC® Group of Companies is one of the leaders of distributed power generation industry of the Russian Federation. Its main activity is construction of turnkey power facilities. The company designs, builds and operates gas genset power plants. Since 2005 the company has constructed over 50 mini CHP-plants in the Chelyabinsk, Sverdlovsk, Kurgan, Tambov and Yaroslavl regions, Krasnodar territory, Khanty-Mansyisk autonomous district and the Republic of Kazakhstan. The total capacity of the implemented power generation projects is over 240MW.

DESIGN — FINALIZING AND APPROVAL — MANUFACTURING — CONSTRUCTION — ASSEMBLY

COMMISSIONING — DISPATCHING — SERVICING

Customer-Oriented Approach

Own production facilities, quality control at every stage

Using the materials of the highest quality

Development of a technical and commercial offer for each specific order

Turnkey construction

We take responsibility for delivery of the equipment

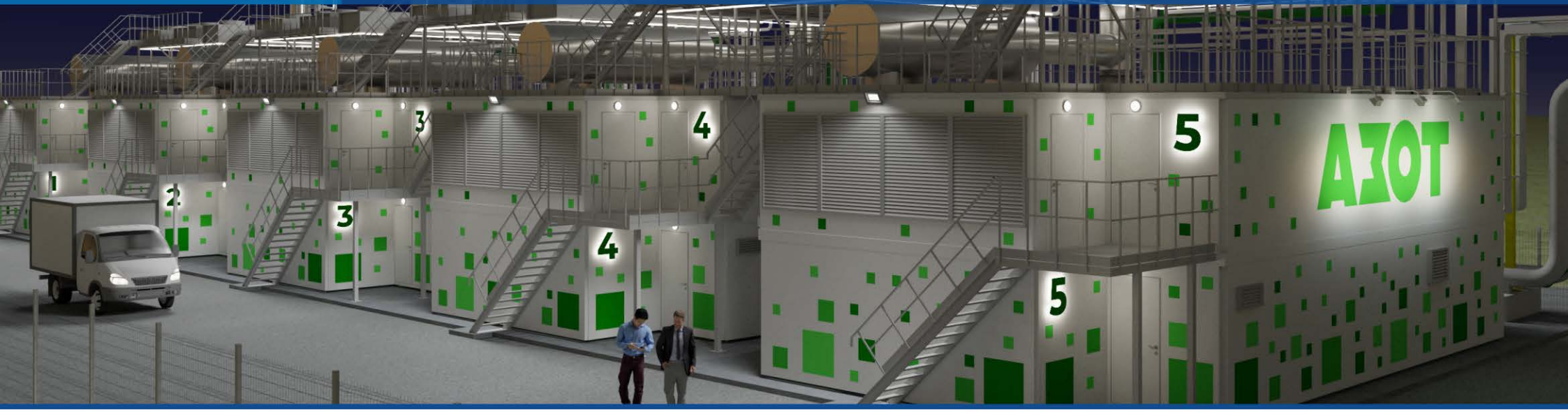
Agreeing of each production stage with the client

Offical dealer of MWM®, German quality

Support and servicing of the implemented projects

MKC GROUP OF COMPANIES

Our Construction Capabilities



The unchanging principle of MKC® Group of Companies is turnkey engineering. MKC® has admission to perform a wide range of design and construction works and offers the customer integrated and effective solutions. MKC® carries out all types of work from site preparation to construction, commissioning and servicing of a facility.

- Buildings and constructions
- Main step-down substations
- Gas distribution integrated objects
- Units for gas purification and treatment and obtaining associated petroleum products
- Integrated power distribution facilities
- Linear facilities of gas network infrastructure
- Linear facilities of power grid infrastructure
- Linear facilities of heat network infrastructure

Modular Execution

MKC® Group of Companies offers services in turnkey construction of both stationary (in a building) and modular (container) mini CHP-plants. The choice of construction technology depends on technical specifications requirements.

Benefits of modular mini CHP-plants:

- **Versatility** ▸ Combines benefits of a container (fast installation) and a building (sufficient area for servicing).
- **Fast launch** ▸ A 4MW mini CHP-plant can be constructed and launched in 15 days.
- **Cost effectiveness** ▸ Modular assembly and advance-prepared modules allow to considerably reduce cost of a project.
- **Mobility** ▸ Possibility of a prompt relocation of a mini CHP-plant to a new installation site.
- **Easy capacities expanding** ▸ Modular execution allows to quickly increase a mini CHP-plant capacityby installing additional modules.
- **Easy maintenance** ▸ Modular execution allows for prompt servicing.
- **Easy shipment** ▸ Modules are manufactured in the dimensions providing fast and inexpensive shipment.

Manufacturing of Modules

MKC® Group of Companies manufactures the modules (containers) for cogeneration units of various capacities turnkey at its own production facilities:

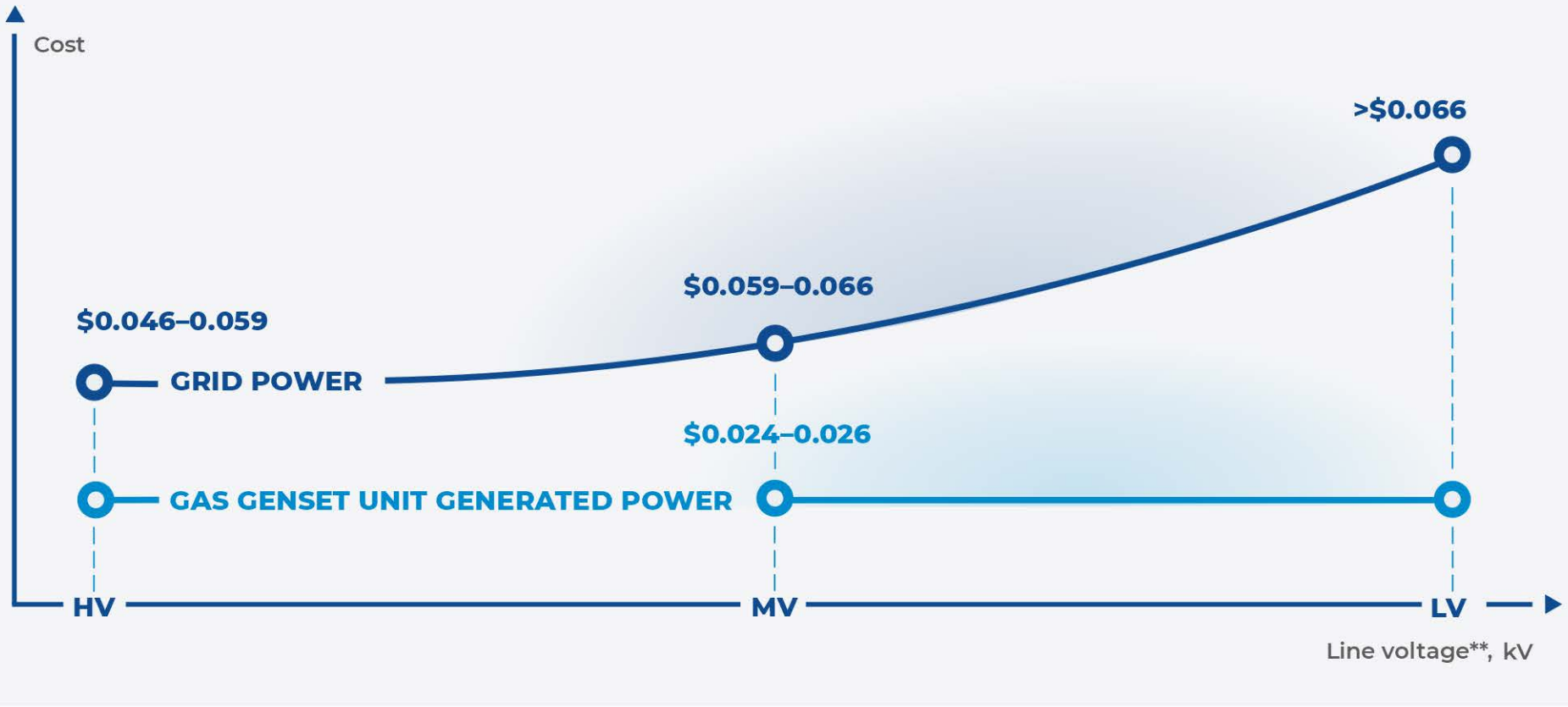
4.5MW **2MW** **1MW** **0.6MW**

- High quality materials
- Reliable operation of units in harsh environmental conditions and at open sites
- Smooth equipment operation

In 2018–2019, MKC® Group of Companies was the first in Russia to design a module for 4.5MW TCG 2032B V16 engine and started the facility with total power capacity of 18MW in the Chelyabinsk region. Dimensions of one 4.5MW are 18m x 12m. Time of one module installation does not exceed 20 days.

4.5MW
FIRST IN RUSSIA

Average Decrease in Cost of Electricity during Transition from Grid to Own Generation at Gas Genset Unit (per 1kWh)



** Voltage levels: HV — high voltage, MV — medium voltage, LV — low voltage

MKC GROUP OF COMPANIES

Advantages of Applying Gaseous Fuel for Power Generation at a Gas Genset Unit

Ecological Friendliness

Gas applied as a fuel for electrical power generation is considered to green fuel and does not have significant negative impact on the environment

Low fuel cost

Reduction of pollutant emissions during gas genset operation compared to diesel generator unit

Pollutant emissions during diesel generator unit operation:

- Nitrogen oxides (Nox)
- Hydrocarbons (CH)
- Formaldehyde (CH2O)
- Benzapyrene
- Carbon monoxide (CO)
- Sulphur dioxide (SO2)
- Soot

Pollutant emissions during gas genset operation:

- Nitrogen oxides (Nox ≤ 500 mg/Nm3)
- Carbon monoxide (CO ≤ 300 mg/nm3)

Engineering Design

MKC® Group of Companies being a pioneering engineering enterprise provides for high quality services in the sphere of engineering gas genset power plants of any degree of complexity. By today, the engineering department has developed more than 53 projects of mini CHP-plants for the customers from various regions of Russia and abroad.

Pre-design package

Development of individual technical requirements

Development of design specifications and estimates

Designer supervision

Technical supervision

Guiding while passing the governmental expertise

МКС
GROUP OF COMPANIES

Own Production

- Gas supply modules
- Ventilation modules
- Switchboard equipment
- Automation control panels
- Smoke exhaust systems
- Cooling modules
- Modules
- Heatmechanical modules
- Metal structures
- Gas treatment units
- Gas distribution units
- Silencers for gas genset units

Construction

MKC® Group of Companies has its own construction department possessing a considerable experience of turnkey installation of power supplying facilities. MKC® carries out all types of installation and construction works from site preparation up to equipment commissioning on the site.

Professionalism ▸ Specialists of the capital construction department perform all works in strict compliance with the work execution plan approved by the customer.

Provision ▸ The department is provided with the tools, consumables, individual protective means, devices, machinery and special equipment necessary for work.

Safety ▸ Specialists of the capital construction department (engineering and technical personnel, working personnel) have valid protocols and certificates for passing the necessary types of certification in Rostekhnadzor.

Mini CHP-Plant Turnkey. Stationary Execution

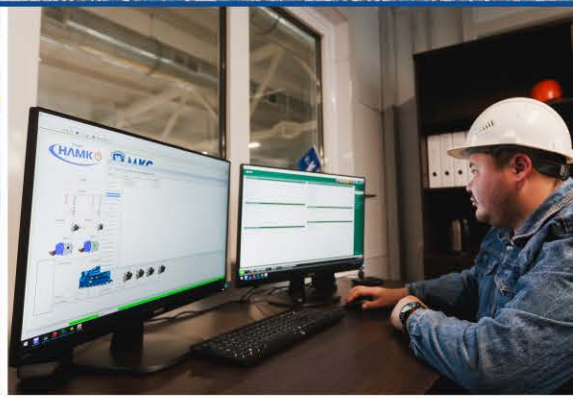
Facility:

A mini CHP-plant (boiler room) of turnkey stationary execution
of total 4.5MW electrical power capacity
and 25.2MW heat power capacity

Main equipment:

MWM TCG2032B V16
cogeneration gas genset (1 unit)
of 4.5MW rated unit
electrical capacity;

Termotechnic TT100
hot water boilers (3 units)
of 7MW rated unit
heat capacity



Mini CHP-Plant Turnkey. Modular Execution

Facility:

A mini CHP-plant of turnkey modular execution
of 22.5MW total electrical and heat capacity

Main equipment:

MWM TCG2032B V16
cogeneration gas genset (5 units)
of 4.5MW rated unit
electrical capacity

Commissioning and Servicing

Specialists of MKC® Group of Companies have extensive experience in the commissioning of power equipment. The company provides high quality service maintenance of its facilities in various regions of Russia due a number of advantages, ensuring reliable and efficient operation of power plants.

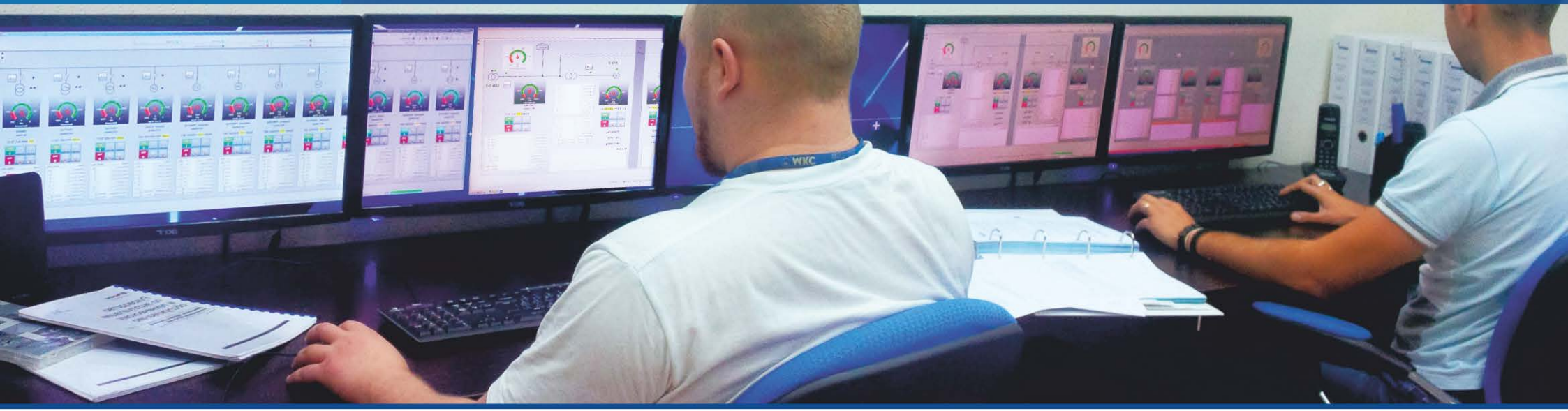
We perform:

- commissioning
- diagnostics
- scheduled and reconstructive maintenance and upgrade
- remote monitoring
- formation of spare parts fund
- consulting of customer's operating personnel

Our advantages:

- Expanded spare parts warehouse
- Original spare parts for MWM® engines available in stock
- Service engineer arrival time of 3 hours (urban territory)
- Modern maintenance shop
- Remote dispatching of a facility
- Highly qualified personnel certified at the MWM® factory

Dispatching and Monitoring



MKC® Group of Companies is ready to offer remote dispatching and monitoring services of new and already operating gas genset power plants. At the headquarters of MKC® we have an own dispatching center which ensures the shortest response time of operating personnel.

Dispatching center

- Remote monitoring
- Round-the-clock observation
- Dispatching control

MKC GROUP OF COMPANIES

Solutions for Oil and Gas Industry

One of the main activities of MKC® Group of Companies is implementation of power generation projects using associated petroleum gas (APG). The company's specialists are ready to offer integrated turnkey solutions based on fuel gas treatment units (GTUs) using various APG compositions for fuel supply to gas gensets. Such solutions make it possible to maintain operability and autonomy of the generating equipment.

Advantages of mini CHP-plants fueled with APG:

- **cost effectiveness** ▸ savings on fuel delivery. Fuel gas from APG is produced locally
- **self-sufficiency** ▸ independence of the enterprise in matters of heat and power supply
- **versatility** ▸ treatment of fuel for mini CHP-plants and production of associated oil products (natural gas liquids, natural gasoline, etc.)
- **ecological friendliness** ▸ reduction of pollutant emissions and reducing of negative impact on the environment

Flares Extinguishing and Gas Treatment

Major challenge:

Extinguishing of APG flares,
improving of the environmental conditions.

Reviewed solution:

APG injection into the formation.

- worsens the environment;
- a technologically complicated and very expensive solution to implement.

Proposed solutions from MKC:

Flares extinguishing

We process APG instead of combusting it, thus improving the ecology

APG collection

We collect the whole APG volume

APG processing

1. We produce methane for further utilization
2. We produce technical propane butane mixture for sale (return of investments)

Gas genset power generation

1. Power generation at gas-fired power plants from methane (cheap fuel).
2. We solve the issue of power supply with our modern solutions and staff.
3. We provide a discount on electricity

Replacement of DGUs

We replace ineffective and non-environmentally friendly diesel generator units with new gas gensets, thus improving the environment

Additional offers

1. Desalination systems.
2. Refrigeration systems.

Renewable Power Generation

A promising business line of MKC® Group of Companies is alternative power engineering. MKC® Group of Companies cooperates with the leading research institutions implementing research and development results in the sphere of both distributed and alternative power generation. This allows the company to bring the most efficient solutions to the market.

Specialists of MKC® are ready to perform works on turnkey implementation of alternative power engineering projects (solar energy, wind power, small-scale hydro power, bio power, etc.)

- Development of project documentation
- Supply of innovative equipment and components
- Construction, installation and adjusting of the equipment

Hybrid Power Supply Facility

Out-line diagram of the Hybrid Power Supply Facility:

HYBRID POWER SUPPLY FACILITY

Diagram explanations:

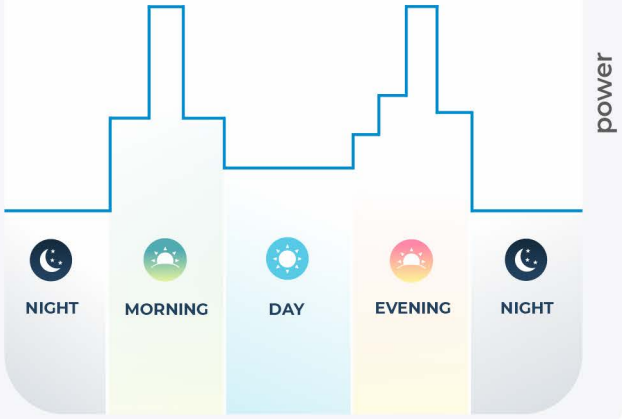
The Hybrid Power Supply Facility consists of the main power generator, gas gensets mini-MPP, and alterative energy sources: solar panels (SES), wind power stations (WPS) and accumulators. Different combinations of energy sources are available depending on the conditions and requirements.

Gas genset is fueled by liquefied (LNG) or compressed (CNG) natural gas. LNG (CNG) is supplied and stored at the Hybrid Power Supply Facility site in special reservoirs.

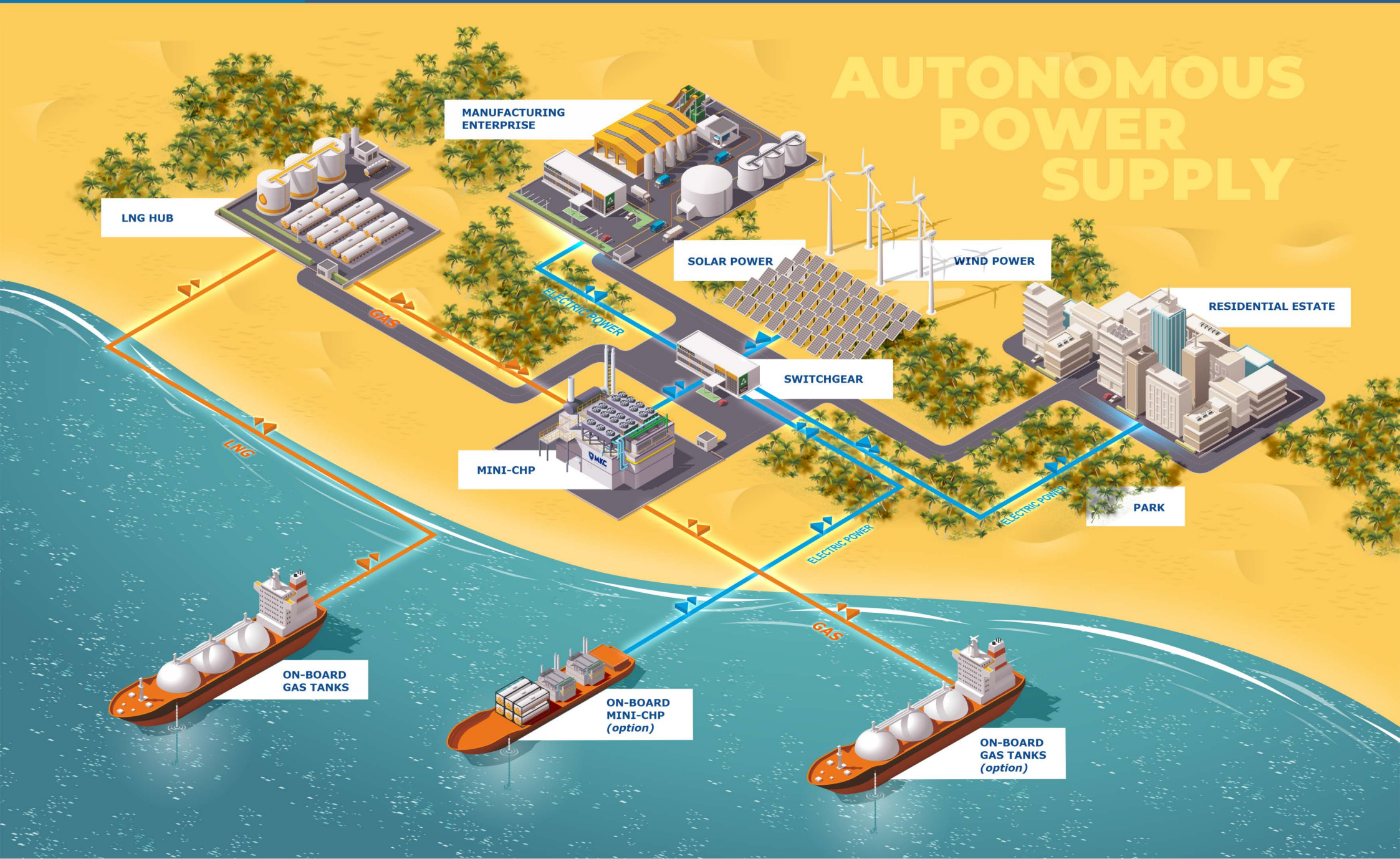
Power distribution scheme of the Hybrid Power Supply Facility can be adjusted to the existing energy consumption schedule in the most advantageous mode due to availability of alterative sources.

The basic part of the load schedule is covered by the operation of the gas genset (as well as SES and WPS, depending on external conditions). During short-term consumption peaks, energy storage devices (UPS with storage batteries) are put into operation, which increases operational stability of the Hybrid Power Supply Facility.

Approximate schedule of power consumption



LNG Solutions Options



Small-scale hydropower generation

Among the renewable generation activities performed by MKC Group of Companies, **small-scale downstream and submersible hydropower stations** are of the greatest interest. We are considering options for implementation of similar pilot projects in various countries, with the subsequent organization of modular small-scale hydropower plants production.

MKC Group of Companies is a reliable partner of the largest hydropower generating companies, leaders of this industry in their countries.

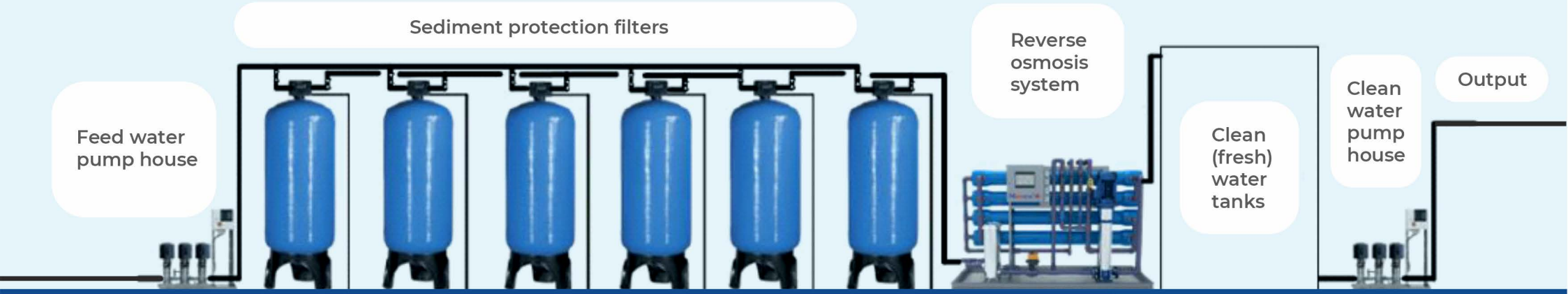
While developing solutions and rendering services for implementation of small-scale downstream and submersible hydropower stations projects, the specialists of MKC Group of Companies together with their partners are ready to perform the following scope of works:

- Technical and economic assessment and development of design solutions.
- Construction, assembly and commissioning of the equipment and systems.
- Supply of innovative equipment and spare parts.
- Consulting services.

Water Treatment & Desalination

MKC Group of Companies' offers for water treatment and desalination:

Offered solutions (design decision variant):



Implemented solutions:

All solutions are modular and mobile. In each case, a specific proposal will be formed based on the project, various technical solutions will be worked out, which is the best way to meet the current needs and tasks of the client. We are ready to discuss each specific case individually.

Energy Service Agreements

Another promising business area of MKC® Group of Companies is implementation of energy service agreements as both direct supply of the produced power resources contracts and (or) generating equipment lease agreements.

The simplest and most mutually advantageous form of cooperation is the equipment lease agreement: the equipment is rented out and the cost of rent is calculated depending on electric (and heat) power consumption volume and taking into account discounted current price. The equipment lease agreement has a number of advantages:

Mutually advantageous cooperation

The customer gains a cost advantage immediately after the equipment is put into operation. The investor gets an actively developing and highly profitable type of business.

Provision

Currently, the pool of MKC® investments (own and external) for the purpose of energy service agreements implementation amount to $21.3 million.

Flexibility

The Customer is given the right to choose the further development of the project upon expiration of the term of the energy service agreement.

Scalability

The energy service agreement scheme allows to increase the volume of investments and the cost advantage from implementation of projects through a single operator.

МКС GROUP OF COMPANIES

We Are Trustworthy

Partners of МКС® Group Companies

ГОСУДАРСТВЕННАЯ ДУМА РОССИЙСКОЙ ФЕДЕРАЦИИ

МИНИСТЕРСТВО ЭНЕРГЕТИКИ РОССИЙСКОЙ ФЕДЕРАЦИИ

ДЕЛОВАЯ РОССИЯ

Ассоциация малой энергетики

РОССЕТИ

МРСК УРАЛА

MWM Energy. Efficiency. Environment.

BOSCH

Clients of МКС® Group of Companies

Сфортум

ЮГК

НЛМК

KRATA

Тандер

Увелка

ГЕОТРОН Геофизическая аппаратура и оборудование

МАКФА

ЧЕЛИНДБАНК

РАВИС

РИФ

ЗАО ЗАВОД ЭЛЕМЕНТОВ трубопроводов

уралсвязьинформ

АЛОТ

ЮУрГУ

РЕГИНАС

РОСАТОМ

ЭЛТЗА Объединенные Электротехнические Заводы

ГОСБРОСТ

БОВИД

ЛЕГИОН строительная компания

ЧМЗАП

RADIOEXPORT

ЮЖУРАЛКОНДИТЕР

Челябинский кузнечно-прессовый завод

УРАЛТРУБПРОМ ОАО "УРАЛЬСКИЙ ТРУБНЫЙ ЗАВОД"

Modern Glass

КОНАР

ЛУКОЙЛ НЕФТЯНАЯ КОМПАНИЯ

АГАТ

Team of Professionals

Today MKC® Group of Companies unites highly qualified personnel: young specialists and professionals with over 15 years experience in the industry. Most employees underwent the certified training at the power equipment manufacturing plants in Germany and the Czech Republic.

Management

Maksim Zagornov

- CEO at MKC® Group of Companies
- President of the Distributed Power Generation Association
- Member of Business Russia General Council
- Business Ambassador of Business Russia to the UAE
- Assistant to the First Deputy Chairman of the Power Committee of the State Duma of the Federal Assembly of the Russian Federation
- Business ombudsman on power and natural monopolies in the Chelyabinsk region

MKC GROUP OF COMPANIES

WE PERFORM ALL
TYPES OF WORKS TURNKEY!
LOOKING FORWARD TO COOPERATION!

WWW.MKS-GROUP.RU

Contacts

Abu Dhabi
Marina Business park Villa, A03
Tel.: +9 71 50 667 5445
E-mail: mks@mks-group.ae

Dubai
P.O. Box: 48800, Dubai, UAE
Unit No: 3142, DMCC Business Centre Level No 1,
Jewellery & Gemplex 3
Tel.: +971 54 363 7700
E-mail: mks@mks-group.ae

Mannheim
Theodor-Heuss-Anlage, 12,
68165 Mannheim, Germany
Tel. +49 89 38 03 53 33
E-mail: mks@mks-group.de

Moscow
Victorenko Str. 5, building 1, Business Centre
«Victory Plaza», 9th floor, office 8a
Moscow, 125167, Russia
Tel.: +7 (351) 222-06-36
E-mail: mks@mks-group.ru

Nur-Sultan
Kunaeva Str., 12/1,
Business Centre «Na vodno-zelenom bul'vare»,
Nur-Sultan, 010000, Republic of Kazakhstan
E-mail: mks@mks-group.kz

Ph. D. Alaa Zourob
MKC for Power Solutions CEO

Tel.: +9 715 066 75 445
Email: zourob@mks-group.ae

Maksim Zagornov
MKC Group of Companies CEO

Tel.: +7 922 639 0000
Email: zm@mks-group.ru

MKC®

GROUP OF COMPANIES

WWW.MKC.AE