Innovation Agenda

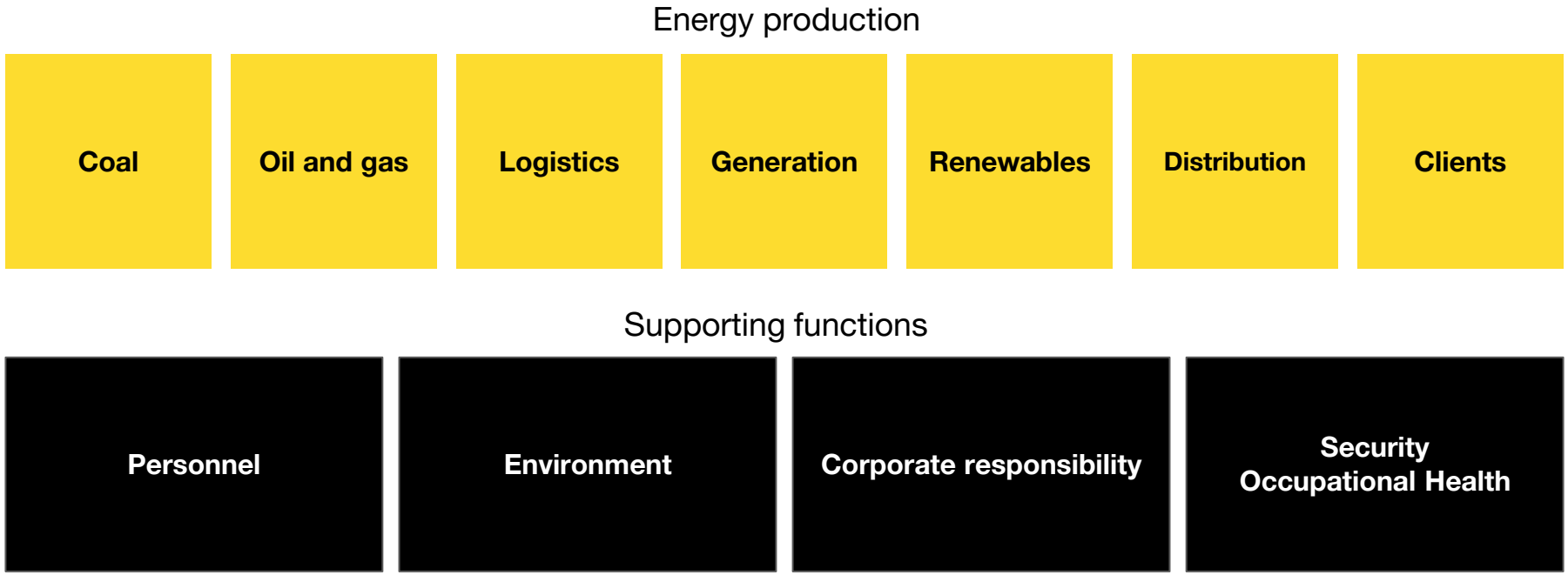
Preamble

The purpose of this document is to present Innovation priorities of the corporation, namely, those areas for finding new technologies, partners, talents and ideas, with which DTEK will be able to solve existing business tasks and find opportunities for greater efficiency.

The preparation of Innovation Priorities is an integral part of the Open Innovation process, which seeks to create new values at the cross-section of industries and technology in the form of open dialogue.

The first steps in the Open Innovation process in 2018 will be the launch of a corporate accelerator program with RADAR TECH and opening of the DTEK Innovation Hub at UNIT.City.

Innovation Agenda covers the core value chain and supporting functions



DTEK RADAR TECH CIVITTA

The company is interested in working not only with startups, but also mature companies and scientific institutions

- **Significant reduction in price of technologies** (sensors, batteries, cameras, IT development) opens the way for startups, even in such traditional industries as coal mining or electricity.
- Most of the business needs in Coal, Generation and Distribution business units **are related to Industry 4.0 and are the subject of expertise of specialized companies** or startups in the field of industrial automation
- At the same time, much of the business needs throughout the production chain remain to be **complex engineering or scientific tasks, the solution of which is not inherent to most startups.** In this area there is potential for more mature companies, engineering agencies and research institutions.
- Other important innovation areas include c**orporate responsibility, personnel, occupational safety, environment and safety.**

The request for a DTEK startup ecosystem meets the main world trends

Solar energy

Electric mobility

Other alternative sources

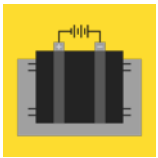
Consumer efficiency

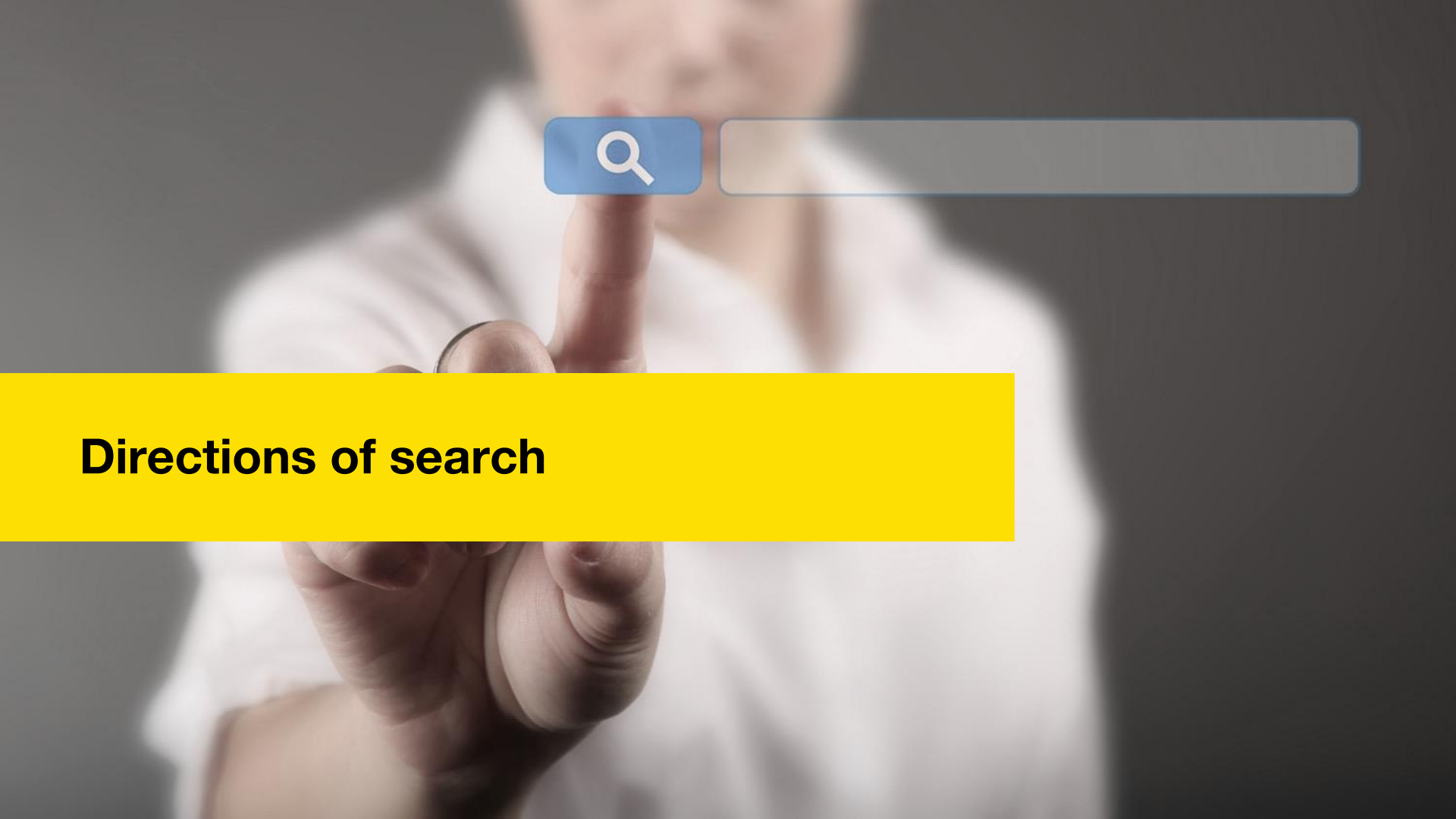
Powerhouse

Traditional improvements

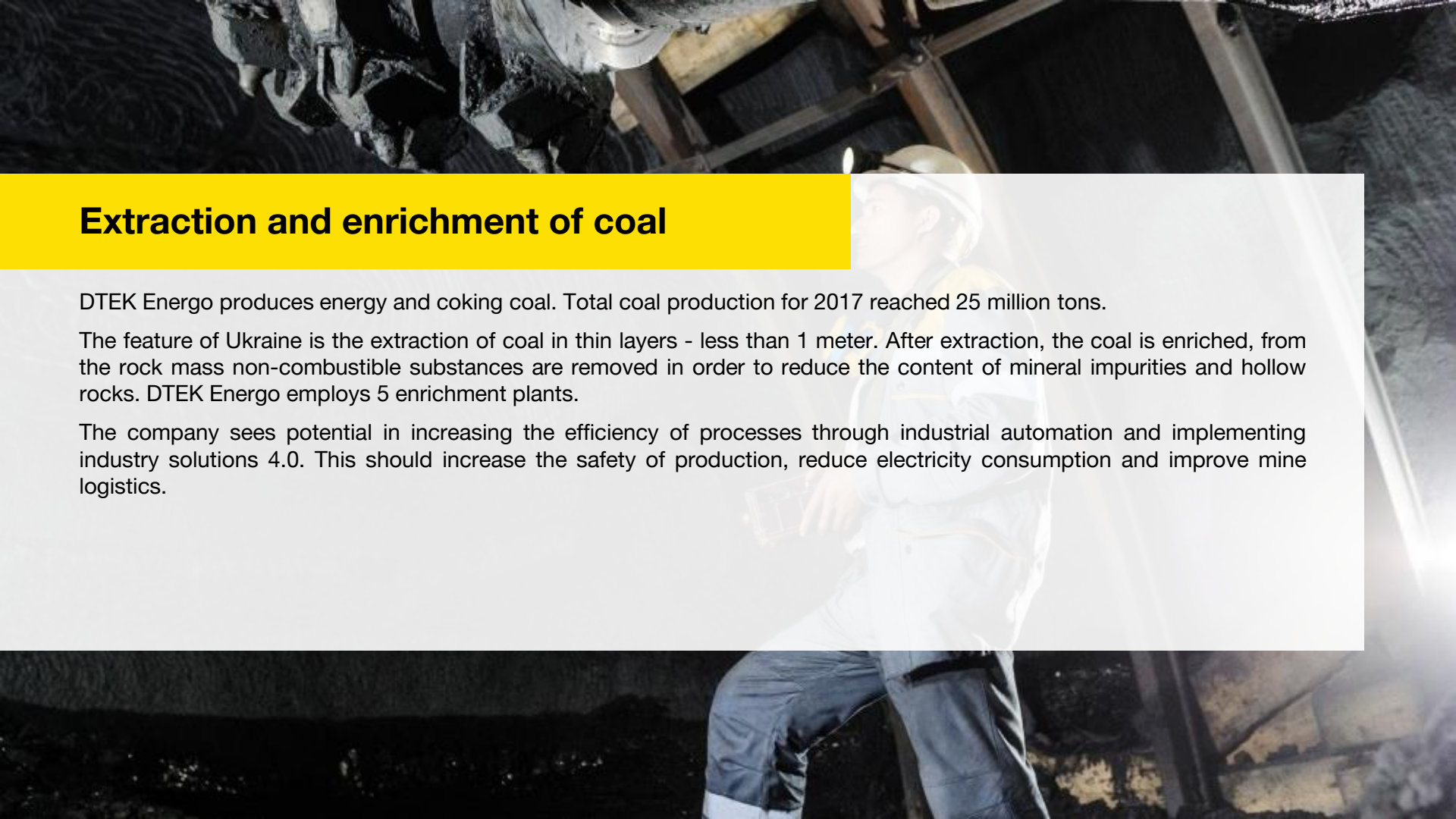
Energy infrastructure

Fuel cells





Directions of search



Extraction and enrichment of coal

DTEK Energo produces energy and coking coal. Total coal production for 2017 reached 25 million tons.

The feature of Ukraine is the extraction of coal in thin layers - less than 1 meter. After extraction, the coal is enriched, from the rock mass non-combustible substances are removed in order to reduce the content of mineral impurities and hollow rocks. DTEK Energo employs 5 enrichment plants.

The company sees potential in increasing the efficiency of processes through industrial automation and implementing industry solutions 4.0. This should increase the safety of production, reduce electricity consumption and improve mine logistics.

General list of needs: Coal extraction and enrichment

Scanning

- Digital mine - automation of control through sensors, networks, remote control tools; mobile solutions
- Predictive analytics: sensors - network - models (fragmentation of equipment, repair planning, turnover of spare parts)
- Condition of the working environment: concentration of gases, parameters of equipment operation, activation of treatment equipment
- 3D simulation of mines and geological conditions

Partnership

- Automation of quality control and coal ash content for each line of extraction and logistics
- Efficient use of conveyors: frequency regulators and intelligent controls
- New technologies of coal enrichment, including in the mine; reduction of ash content during extraction
- 3D simulation of mines and geological conditions
- New ways of using mine waste (building materials, rare metals, other ideas)

Build

- Digital mine - automation of control through sensors, networks, remote control tools; mobile solutions
- Technologies of extraction on thin layers (less than 1 meter), including autonomous (robotic) slot
- Efficient use of conveyors: frequency regulators and intelligent controls
- Geological exploration, assistance in making decisions in the process of penetration
- Optimization of internal logistics in the mine

Industry 4.0

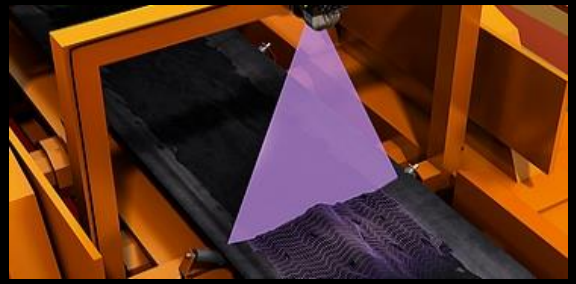
DTEK RADAR TECH CIVITTA

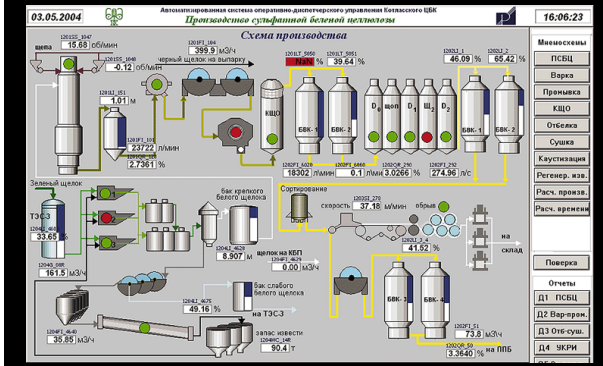
Automation of mine control (sensors, cameras, network, positioning, etc. (SMART MINE)

Available software and hardware products on the market for monitoring technical characteristics of equipment and mechanisms are usually very expensive and require the involvement of contractors.

1. To develop cost-optimal unified solutions, which allow combining into one ASUPP a list of automation and control tools available at the mine.
2. Develop top-level software for visualizing and archiving information with automatic reporting.
3. Develop cost optimal sensors for underground use in explosive performance:
    - Discrete sensor;
    - Current load sensor;
    - Sensor "terminal";
    - Air flow sensor;
    - Bunker Loading Control Sensor.

Provide expansion of the system using sensors to detect signs of fire, throttling degassing system, gas control and prevention of gas-dynamic phenomena. This will allow for the implementation of the calculation algorithm to obtain an automated plan for the elimination of the accident and to reduce the risk of an accident to virtually zero level.





D.TEK RADAR TECH CIVITTA

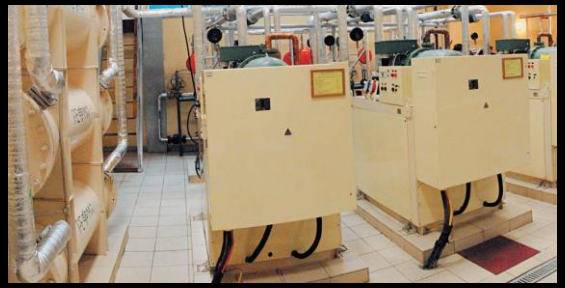
Energy saving

When working in mines, warm air (15-20 ºC) and warm mine water (10-15 ºC) are formed - which are sources of low-temperature heat.

Every year, every company's mine spends about 2 million hryvnias on the work of boiler shops to cover its own needs for hot water supply.

The company sees the following opportunities for energy saving:

- technical solutions for the use of low-potential heat mine ventilating jet, as well as "warm" mine water (for example, the installation of heat pumps).
- Low-cost hot water supply solutions for the summer (alternative to installing solar collectors and storage tanks for heating water with the help of the sun).



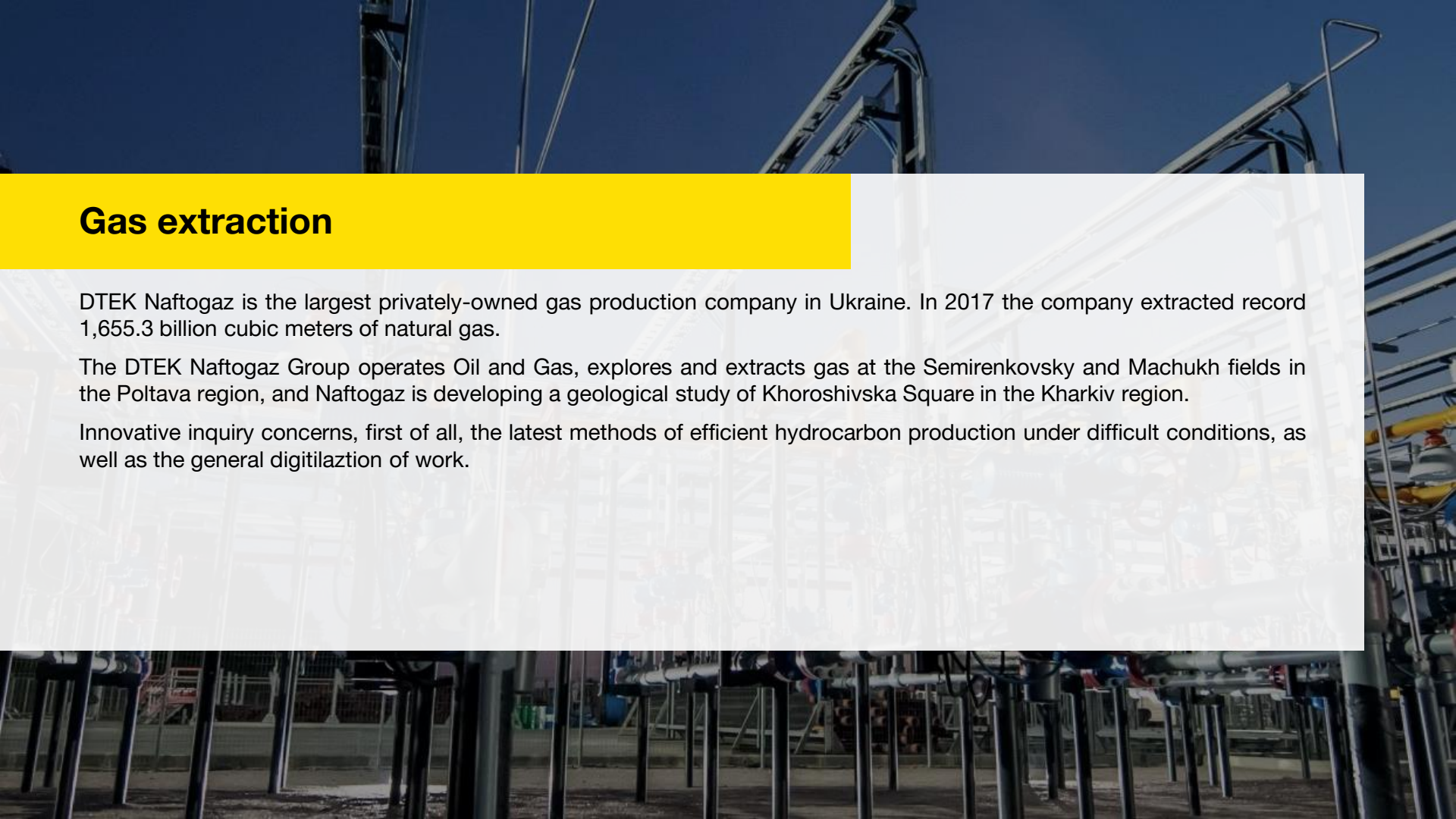
Efficient use of conveyors: Frequency controllers and intelligent control

The mine performs coal mining work for 12-18 hours per day. To reduce the accident, the mining manager launches a chain of belt conveyors, which work practically around the clock without stopping. At the same time, 20% of the working time conveyor doesn't actually do any real work.

The company sees a potential of creating an automatic control system for the operation of conveyors in order to prevent the operation of equipment without load, taking into account the safety requirements of production. The equipment must be adapted to work in an explosive environment.

Solutions can be offered using:

1) CCTV cameras to monitor people on the line;
2) Current sensors for controlling the load of electric motors;
3) Volume scanners of loading tape;
4) Radar levelers for controlling the loading of bunkers.



Gas extraction

DTEK Naftogaz is the largest privately-owned gas production company in Ukraine. In 2017 the company extracted record 1,655.3 billion cubic meters of natural gas.

The DTEK Naftogaz Group operates Oil and Gas, explores and extracts gas at the Semirenkovsky and Machukh fields in the Poltava region, and Naftogaz is developing a geological study of Khoroshivska Square in the Kharkiv region.

Innovative inquiry concerns, first of all, the latest methods of efficient hydrocarbon production under difficult conditions, as well as the general digitilaztion of work.

General list of needs: Naftogaz

Scanning

- Prescriptive analytics: sensors - network - models (fragmentation of equipment, repair planning)
- Digitalization of inventory accounting of material production inventories
- Creation of a digital database of field development parameters

Partnership

- Carrying out repairs of wells without muffling
- The development of reserves of hydrocarbon deposits, some of which are associated with sealing sandstone type "Tight gas"
- Increase the efficiency of development of deposits with cracked carbonate collectors
- Search of highly effective technologies for intensification of production of productive horizons of existing deposits with reduced reservoir pressure
- Application of highly effective technologies for the intensification of carbonate reservoirs under conditions of abnormally high reservoir pressures and temperatures
- Fastening of productive intervals of deep wells under conditions of abnormally high and abnormally low reservoir pressures and temperatures using special tamponage materials
- Laying and finishing technology of deep wells under conditions of abnormally high and abnormally low reservoir pressures and temperatures
- Application of high-efficiency equipment for reduction of the time of casing collapse during the construction of wells
- Digitalization of inventory accounting of material inventories
- Technologies for exploitation of the operation of gas condensate wells under conditions of retrograde condensation of hydrocarbons in the catchment zone of the formation
- Small-scale production of liquefied natural gas (LNG)
- Creation of a digital database of field development parameters

Build

- Carrying out repairs of wells without muffling
- The development of reserves of hydrocarbon deposits, some of which are associated with sealing sandstone type "Tight gas"
- Increase the efficiency of development of deposits with cracked carbonate collectors
- Search of highly effective technologies for intensification of extraction of productive horizons of existing deposits with reduced reservoir pressure
- Application of highly effective technologies for the intensification of carbonate reservoirs under conditions of abnormally high reservoir pressures and temperatures
- Laying and finishing technology of deep wells under conditions of abnormally high and abnormally low reservoir pressures and temperatures
- Fastening of productive intervals of deep wells under conditions of abnormally high and abnormally low reservoir pressures and temperatures using special tamponage materials
- Technologies for exploitation and intensification of the operation of gas condensate wells under conditions of retrograde condensation of hydrocarbons in the catchment zone of the formation

Industry 4.0

DTEK RADAR TECH CIVITTA

Predictive analytics for repairs, mobile solutions (engineer tablet)

In order to maintain efficiency while detecting breakdowns, repairs and maintenance of fixed assets, taking into account the growth of material and technical resources of the enterprise, there is a need for modern methods and approaches in planning and conducting maintenance and repair of technological equipment.

The company is currently looking for a solution of the following nature:

1. Solution of intellectual diagnostics and predictive analysis of the state of technological equipment based on industrial data of operation.

2. Solution for constructing simulators and variational models for detecting anomalies in equipment operation and the reasons for their occurrence.

3. Solution for forecasting crashes and failures in equipment operation.

Also, in order to minimize the influence of the human factor, facilitate inventory, inventory accounting, to propose solutions for warehouse automation in order to obtain complete, timely and reliable information on the following directions: acceptance of goods for storage, storage; issue of goods from the warehouse, registration of the corresponding accounting documents.

Business-case

Building a digital parameters database of field development

At modern oil and gas enterprises, the management of the field development with the maximum efficiency, the minimum loss of production and minimum costs, is achieved through work only with actual information (real-time data transmission), integrated modeling of production processes of the deposit, and by creating environment for decision making process in multifunctional groups.

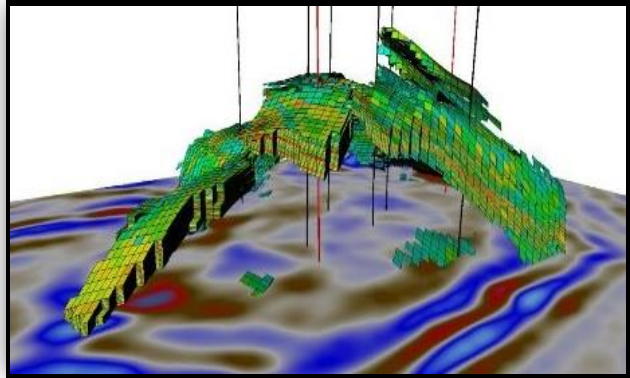
This approach provides a comprehensive analysis and forecast of the main technological indicators of the field development, calculation and optimization of the technological modes of operation of wells, loops and process equipment.

The company is currently looking for a solution:

1. Modern intelligent systems of inhibitor for hydrate formation

2. Highly reliable wireless systems for in-well monitoring for gas condensate wells with a depth of more than 5500 m

3. Precision measuring systems for multiphase flows at the mouth of gas condensate wells with high liquid phase content



Logistics

Logistics division of DTEK Energo interconnects the functions of extraction and enrichment of coal, as well as generation of energy. The group of companies affiliated with DTEK generally provides over 40% occupancy rate of all half-wagons in Ukraine.

The main challenge of the unit is to optimize the use of rolling stock, based on more complete and harmonized data on the quality and volume of coal in specific wagons and on the transport model that minimizes the empty mileage of wagons.

Key requests include digitalization of loading and weighing wagons, developing monitoring systems and models for optimal distribution of wagons.

A separate idea is the construction of an open exchange of wagons for the entire market.

General list of needs: Logistics

Scanning

- Interoperability platform IoT for data collection from various systems (weight, quality, conveyors, wagons)
- Solutions for monitoring of wagons, for own wagon park and wagons of other carriers
- Data analysis and model creation for optimization of logistics on railroad. Visualization of logistics data and simplification of decision making with incomplete data. Electronic map of logistic flows, their forecasting
- Creation of an open exchange of wagons for efficient use of wagon resources

Partnership

- Automation of wagon weighing
- Solutions for monitoring of wagons, for own wagon park and wagons of other carriers
- Data analysis and model creation to optimize wagon work without load
- A quick and effective way to check the quality of the coal (express analyzers)
- Creation of an open exchange of wagons for efficient use of wagon resources

Build

- System (dispatch center) for loading in mines
- Data analysis and model creation to optimize wagon work without load
- A quick and effective way to check the quality of the coal (express analyzers)

Industry 4.0

DTEK RADAR TECH CIVITTA

Automation of wagon weighing

In coal mines and concentrating factories (CF), coal is loaded into half-wagons. In the process of loading the wagons they are weighed on the railway scales, then the wagons are sent to the consumer (to CF, to TPS). Weights are displayed only on the controller's display. Next, the number of each wagon and the weight of the goods are fixed by the employees of the enterprises in manual mode (on paper) on the basis of weight notes, with subsequent manual input of these data into the accounting system (SAP ERP). Lack of automation can lead to inaccurate accounting of cargo in the warehouses of mines/CF/TPS, human factor available.

Request:

- Develop a unified software / solution for automatic determination of the wagon weight, with the subsequent automated transfer of this data to the SAP ERP system.
- Suggest devices for determining the number of the wagon and subsequent transfer of this data to the SAP ERP system.

The main questions to pay attention to and to work through with participants:

1.There are different models of weights (static-dynamic, static, strain gauge) for each DTEK manufacturing enterprise.

2. Different software is installed on each model of weights, or it is absent at all.

3. Mandatory integration of weight / wagon software with accounting system (SAP ERP)

Model of optimization of logistic flows, visualization

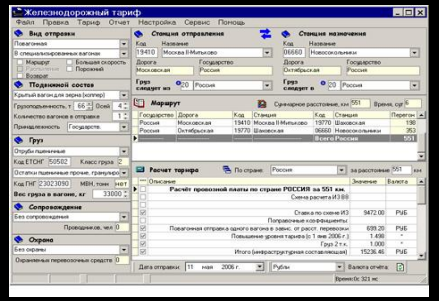
The accessible half-wagon fleet is distributed at load stations in manual mode based on data on the presence of empty rolling stock in a specific day.

Distribution of wagons of different owners of rolling stock in directions of shipment (routes of carriage) is also in manual mode (in Excel). The calculation of the complex cost of transportation in the context of the carriers for each route is also determined in manual mode.

The company is looking for a solution of the following nature:

- The tool for automatic calculation of transportation cost on a specific route on the specific owner of the rolling stock based on contractual conditions: profitability per wagon per day, operator's ratio, turnover of the wagon on the route, type of contract (lease / operation), the presence of a dual operation (simultaneous unloading and load of the car)

- Optimization algorithm (software) for the distribution of an existing rolling stock of wagons in a specific period on a fixed set of routes, based on the complex cost of transportation for each owner of the rolling stock and on each route. Optimization criterion - minimizing transportation costs.



D.TEK RADAR TECH CIVITTA

Wagons exchange

In Ukraine, there is no efficient electronic platform for searching / offering, selling / renting freight cars, as well as transportation services in freight wagons (freight forwarding service).

There are no mechanisms for forming market indicators for the cost of engaging / leasing cars, making it difficult to determine the optimal cost of rail transport.

Taking into account that DTEK and Metinvest together provide a significant part of the half-wagons market in Ukraine, there are such opportunities for start-ups:

- Develop an electronic platform for placing applications for rail freight transportation / placing a fleet of cars / buying / selling cars.
- Provide the possibility for management of cost, the number of available fleet of cars, special conditions of contractual relations for each operator in Ukraine. The service will enable any shipper to order necessary fleet of wagons for any kind of cargo, in any form of rolling stock from each route followed by a binding to a transparent pricing model for transportation.
- Such electronic platform will allow the creation of a single and transparent mechanism for the formation and fixation of the cost of half-wagons in Ukraine

Generation of electricity

The total installed power of DTEK generating facilities exceeds 17 GW.

DTEK Energo manages thermal generating companies - DTEK Skhidenergo, DTEK Dniproenergo, DTEK Zakhidenergo, Kyivenergo. The company sees an opportunity to increase the efficiency of work in thermal generation through the use of Industry 4.0 technologies. This can be done for accurate understanding of the efficiency of power units, assessing the quality of coal at each step of the generation process and predictive analysis with the recommendation of further actions for operators.

The development of renewable energy sources is one of the key priorities of DTEK. By 2020, it is planned to increase the installed capacity of helium and wind power production up to 1 GW. DTEK's biggest challenge is the adaptation of world trends and developments in clean energy for the Ukrainian market.

General list of requirements: Generation

Scanning

- Warehouse evaluation. Convenient and effective measurement of coal volume in open warehouses, operational analysis of coal quality
- Methods of estimating the efficiency of the TPP in real time or with high frequency
- New methods for assessing the status of boilers and heating surfaces (robots, boiler diagnostics with drones, new types of diagnostics)
- Prescriptive analytics for TPS operators to select modes of operation
- Predictive analytics of equipment break down, repair planning (sensors - network - models)
- New technologies for processing / scanning a large number of old paper drawings, digitizing information from diagrams, a platform for rapid changes
- Creating a digital copy of large energy centers

Partnership

- Warehouses evaluation. Convenient and effective measurement of coal volume, chemical analysis
- Technology of weighing (volume estimation) of coal dust before burning
- Methods of estimating the efficiency of the TPS in real time or with high frequency
- Prescriptive analytics for TPS operators to select modes of operation
- Innovative ways of waste utilization of TPS (ash-slag)
- New pipe cleaning technologies

Build

- Extension of the on-line functionality of the TPS management system (data collection, automated recommendations for engineers, optimization of modes, mobile solutions)
- Automation of balancing of coal mining, generation and network needs

Industry 4.0

DTEK RADAR TECH CIVITTA

New methods for diagnosing and assessing the state of TPS equipment

The main reason for stopping the units is damage to the heating surfaces of boilers. The visual inspection of the surfaces of the heating boilers during the operation is performed during their stop and requires the construction of scaffolding .A more detailed survey with the use of instrumental measurements (ultrasound diagnostics, laboratory examination of scissors, etc.) is performed with a frequency of 50,000 hours of work, or in the terms defined by the preliminary survey.

In this regard, the company is looking for a solution of the following nature:

- Technologies and equipment for the operational execution of visual inspections of hard-to-reach heating surfaces of boiler units during short-term standstill in the reserve.
- Technical solutions for the equipment of boilers by means of automatic control of metal surfaces of heating surfaces in order to prevent their damage and prediction of the resource.
- Newest types of metal diagnostics with the method of determining the residual life of boiler elements and turbines.

Creation of an innovative on-line TPS management system

Engineers of power units (operators) determine the mode of operation of equipment in accordance with the developed mode maps. Operational switching is carried out manually, according to the schedule of work of the auxiliary equipment.

Some of the equipment parameters are automatically maintained at the operator-specified level, a number of protection and locking of hazardous modes is set up, and the automatic equipment reserve is included. There is no automatic start system and no optimal composition of the supporting equipment of power units.

As a result, the company has the following search interests:

- Technical solutions for the automatic formation of the recommended equipment composition (including the supporting one) for the actual mode of operation of the TPS (power unit) and the network for maximizing the efficiency.
- Automation of the process of starting the power unit with integration into the existing systems of ACS and ensuring the reliability criteria (compliance with the required temperature parameters of equipment, etc.).

Express checking of coal quality (up to 1-2 hours), as well as revealing cases of layered coal shipment

Every day 700 to 1000 wagons of coal com to the TPS. Input control includes checking the quality of coal (ash content, moisture, sulfur) by sampling and conducting analyzes in the laboratory. Some TEPs are not equipped with mechanical samplers and can only take samples from the surface of the wagon.

There are cases of layer load of coal in wagons (lower part of the car - poor quality, and on the surface of coal - stated in the documents of quality). Thus by taking samples of coal from the surface of the wagon, analysis of the coal quality shows the normal (declared) quality of the fuel.

It is necessary to propose ways of express checking of coal quality (up to 1-2 hours), as well as revealing cases of layered shipment of coal, as well as cars with deliberately defective quality.

Potential ways to solve the problem:

1. Methods of acoustic and ultrasonic diagnostics of the contents of the car, on the density of the bulk cargo.
2. Spectral analysis methods.
3. Radiation and / or radioisotope analysis.

General list of needs: Renewables

Scanning

- Energy storage on the client side
- Optimizing the operation of equipment depending on different conditions
- Consumer solutions based on clean energy (technical solutions)
- Energy-independent household
- Scanning the status of solar panels, detecting and cleaning the contamination

Partnership

- Energy storage on the client side
- Autonomous regions, electricity cooperatives
- Consumer solutions based on clean energy (technical solutions)
- Energy storage on an industrial scale

Build

Industry 4.0

DTEK RADAR TECH CIVITTA

Renewable energy sources, service automation

DTEK operates Trifanovskaya SES with a capacity of 10 MW (37 thousand solar panels). In 2018, an additional 200 MW of Nikopol SES is planned to be commissioned. Maintenance of a large number of solar panels for timely correction of defects requires automation.

It is necessary to automate the maintenance of solar panels (possibly with the help of drones).

The main issues to be addressed are:
1. Detection of non-functioning elements of solar panels;
2. Cleaning of solar panels from dust and other substances;
3. Protection of SES territory.

Distribution of electricity

Distribution companies of the company serve 3.6 million customers - metallurgical, coal and machine-building factories, as well as enterprises and population in Kyiv, Donetsk and Dnipropetrovsk regions. The total length of the networks of distribution companies is 100 thousand km.

The key tasks of distribution companies is to increase the time of continuous supply of electricity to end users and to reduce electricity losses.

Preparing for the conditions of the open market is the priority for working with clients. The request for a startup ecosystem is the search for services for the entire user's journey: from attraction and payment to additional services and recommendations for energy efficiency.

General list of needs: Distribution

Scanning

- Predictive and prescriptive power grid service
- Innovative ways to analyze the state of the grid (camera, robots, drone, etc.)
- Automation of the grid (AI and data models, intelligent measurement technology)
- Quick diagnostics of accidents, remote control of technical support, reducing the time of non-power supply

Partnership

- Optimization and balancing of distributed generation
- Quick diagnostics of accidents, remote control of technical support, reducing the time of non-power supply
- Automation of the grid (AI and data models, intelligent measurement technology)
- Initiatives or startups aimed at developing the market of electric vehicles as a distributed storage
- GIS system for positioning network elements and associated infrastructure
- Energy storage on the client side

Build

- Digital solutions for operators of transmission and distribution systems of electric power - automation of network management, collection of analytics, diagnostics of network status
- An electronic platform for a new electricity generation market, aimed at building a model "platform as a business" (organizing the interaction of electricity distribution system operators and clients / proxies)

Industry 4.0

DTEK RADAR TECH CIVITTA

General list of needs: Customers

Scanning	Partnership	Build
Solutions for a smart home, integrated into the analytical platform of the operator	Collection of customer data on consumption, home device tracking, data analysis	Solutions for retail clients:: – Onboarding clients – Internet portal of services – Payments – Multi-channel communication – Stimulating energy-efficient behavior
Solutions for retail clients:: – Onboarding clients – Internet portal of services – Payments – Multi-channel communication – Stimulating energy-efficient behavior	Solutions for retail clients:: – Onboarding clients – Internet portal of services – Payments – Multi-channel communication – Stimulating energy-efficient behavior	
Decision to collect customer data and analyze client preferences with further development of individual solutions.	Initiatives or startups aimed at developing the market of electric vehicles as a distributed storage	
Energy-independent household	Autonomous power regions, electric power cooperatives	

Industry 4.0

Digital solutions for operators of transmission and distribution systems of electricity

The company carries out maintenance of its networks as a result of emergency situations and scheduled technological repairs through the departure of repair teams. The total length of electric networks of the company is 100 thousand km.

This opens up the following opportunities for start ups, entrepreneurs and vendors:

- Develop and offer digital solutions for the organization of predictive maintenance of networks (using sensors integrated into the general monitoring system) to prevent artificial intelligence offsets;
- To propose technological solutions that will increase the efficiency and speed of the work of the repair teams (using drones with thermo-, heat sensors and video cameras, scanners), as well as analytical programs that will reduce / eliminate human involvement in the process of analyzing the state of equipment, networks;
- Other digital solutions for maintenance of networks and equipment that will reduce the impact of the human factor, provide cost savings and will increase security.

Solution in the direction of Smart metering

At present, the monthly calculation of the actual electricity consumption by customers of the electricity supply company (oblenergos) occurs in two scenarios:

1. For clients with "smart" devices, the taking of evidence takes place using the automated electricity accounting system (ASECA), mainly for large consumers.
2. For clients without "smart" devices, taking testimony is carried out by staff (controllers) at intervals of six months. For monthly payments, data transmitted by customers is accepted.

In the new electricity market, there will be a need for hourly accounting of the actual consumption of electricity by customers.

Needed to offer:

- A device that allows for effective removal of testimony from existing counters that are not equipped with "smart" systems. The cost of such devices should be less than the cost of a "smart" meter and do not involve large-scale work on the installation of such equipment on the operating instrument of accounting. The device must allow the removal and transmission of readings from counters of different types.
- The method of determining the locations of the random installation of remote hourly removal devices and their optimum amount required for correct segmentation and effective user profiling.

Increased efficiency of balancing distributed generation e/e

Distributed generation in Ukraine is at the stage of formation. However, the general trends of the industry show that the fate of private distributed generation will grow and there will be a large class of new type of clients - "proxies" that will not only consume but also generate power in the network. Network energy flows will be difficult to predict, and therefore it will be difficult to manage modes, switching, planning losses in networks.

Therefore, it is necessary to propose and develop digital solutions for forecasting power flows in networks in the conditions of distributed generation.

Smart Home solutions

As part of DTEK's Intelligent WATT retail development strategy, there's a need to provide quality and affordable Smart Home solutions to every consumer.

One of the tasks is to improve the energy efficiency of the home (apartment, private house) by providing a reliable means of automatically adjusting the temperature of the air in the apartment by forcing adjustment of the radiators at houses. The solution should be: cheap, easy to install, do not need to make a constructive change in the current repair of the house.

Company request:

- A technical device for automatically adjusting the temperature of the air in the apartment by means of a forced adjustment of the radiator valve of the house
- This device must be modular, managed through a separate mobile application
- Have a suitable controller that can unscrew / twist the radiator valve
- Have a temperature sensor for air
- Production price of up to $ 50 per unit

Personnel

DTEK is one of the largest employers in Ukraine with a staff of 73,000 employees. The company believes that employees - one of its main competitive advantages, the basis of sustainable development of the company. DTEK is interested in developing human resources and attracting highly skilled personnel.

DTEK pays attention to the process of staff development, based on a modern model of competencies - a set of key skills and abilities needed by employees to successfully achieve the Company's strategic goals. To form and develop the entire spectrum of competencies, DTEK employees invest heavily in training.

A major challenge is to attract and retain young employees in the company's production units, as well as to deregulate the processes of human resources management and in-depth analysis of behavioral data with the ability to build relevant career maps and motivational tools.

General list of needs: Personnel

Scanning

- Gamification of training process and career growth (hints, evaluation, grading), anchoring to the "Cafeteria of privileges"
- Digitalization of staff processes (replacement of paper operations)
- Automated behavioral analytics based on HR analytics, aimed at developing and maintaining staff

Partnership

- HR analytics (more relevant data, aggregation, forecast models and dashboards)
- Assessment of role-playing ability, on-line score 360
- Solutions for e-learning, simple and inexpensive way of content production, virtual simulators

Build

- HR analytics (more relevant data, aggregation, forecast models and dashboards), correlation with business analytics
- Career maps, "advisor mode" to help you grow your career and get an education
- Automated behavioral analytics based on HR analytics, aimed at developing and maintaining staff
- Solutions for retaining employees at all levels (grading, cafeteria privileges, etc.)

Gamification solution of career path, mobile portal

One of the motivators for attracting young people who are potential employees of our enterprises is the possibility of career growth. The company began work on the development of career paths / career maps. At the moment, there are no engaging modern tools to demonstrate career opportunities that would enhance the motivation of young people.

New, up-to-date tools are needed to effectively engage young people in the Company's businesses, as well as adapt newly recruited staff.

Requested solution:
1. Game format for building your own career path (for students, new employees)
2. The format of an electronic career counselor (for example, chat bots)

Corporate responsibility and environmental protection

Responsibility and commitment to the principles of sustainable development are the main values and an integral part of the work of DTEK companies and manufacturing companies.

The company implements programs and invests in improving the safety, efficiency and environmental performance of their enterprises, occupational safety, health and professional development of employees, implementation of projects of social partnership, community development and improves the quality of life in towns and villages where the entity operates.

DTEK has a request for technology to reduce the negative impact of production on the environment and to improve the living standards of the population in the regions of the company's activity. The company looks for solutions for the protection of the environment with a visible, tangible and understandable result, models and solutions for improving the socio-economic situation of the regions. An additional focus is the in-depth analysis of the media space for effective communications.

General list of needs: Corporate responsibility

Scanning	Partnership	Build
Development of regions • Social development of depressed regions • Creating jobs • Innovative ideas for using non-working mines	Development of regions • Social development of depressed regions • Creating jobs • Innovative ideas for using non-working mines	Modeling of regional development, forecasting, factor analysis, increasing the efficiency of investment in social programs
Relation of energy consumption with economic prosperity, stimulation of smart energy behavior	Modeling of regional development, forecasting, factor analysis, increasing the efficiency of investment in social programs	Internal portal analysis: statistics of views and interruptions, value of the content
A platform for interaction of local entrepreneurs, cooperative platforms	Measuring the level of trust to managers of all units	
Media analytics • Working with media based on database • Semantic Contextual Analysis • Reputation audit	Media analytics • Working with media based on database • Semantic Contextual Analysis • Reputation audit	

Industry 4.0

Management of lighting of public spaces

One of the key requests from city residents where the company operates is street lighting, pedestrian crossings, central areas / alleys of cities. Within the framework of the Social Partnership Program, the company implemented a number of lighting projects by installing energy-efficient flashlights.

One of the social effects of lighting projects has been the increased safety of life and reduced crime in areas that were illuminated.

- The company is looking for a solution to managOperative detection and response to network damage
- Lighting regulation (rational energy use)
- Possibilities of functioning of the system not only in large cities, but also at the level of rural e lighting networks to ensure:
- areas.

Is there a need to install CCTV cameras on lanterns? If so, how can data from video surveillance in a city can be inegrated with street lighting design?

The decision to build a system of deep analytics portal

DTEK supports an internal portal for its employees (20,000 accounts), a news content platform and a variety of online services (HR services, vacations, documentation work, room reservation, car booking, IT support, etc.). For each employee there is an account linked to the working computer (automatic login). At the moment, there are minimal analytical tools on the portal - statistics on article / video reviews, unique visitors.

We do not currently have information about the behavior of our users.
We can not understand who reads articles, how much time they spend on the portal, what articles are of interest to users, the depth of browsing; which businesses / regions are more likely to go to the portal that they are looking at. Also, there is not enough data on the portal usage - is it a content resourceportal or portal with online services for employees.

The main issues to pay attention to for participants:

1. Building a system of deep analytics portal (content, services, user segmentation, behavior patterns)
2. Integration of analytical tools with DTEK user base - binding to OZ, personalization.
3. Comfortable and informative visualization of statistical data (for example, cabinets with dashboards)
4. Possibility of further integration with CRM systems of HR-department

General list of needs: Environment

Scanning

- Solutions / projects aimed at improving the environment as a whole
- Innovative technologies of ground and ground water purification
- Innovative technologies of air quality improvement (dust reduction, green planting, etc.)
- New technologies for the treatment of TPS emissions (sulfur purification, nitrogen cleaning)
- Innovative technologies of sewage treatment

Partnership

- New technologies for the treatment of TPS emissions (sulfur purification, nitrogen cleaning)
- Innovative technologies of sewage treatment
- Innovative technologies of recultivation of waste heaps, use of ash dumps and slurry ditches

Build

- Programs aimed at planting green areas near TPSs (own production of seedlings, etc.)

Industry 4.0

DTEK RADAR TECH CIVITTA

Innovative ways of recycling waste from dumps (ash, slag, rare earth metals)

Large-scale waste products are formed at the company's enterprises (ash-slag, coal mine, coal-mining waste - rock, sludge, coke), which requires significant territories for their placement.

Part of the waste is placed in open areas - waste dumps, ash-diggers, - which leads to the dusting of these objects. Currently, measures are being implemented to prevent dusting: wetting of surfaces (or maintaining a moisture level above the surface of the dust) and cover with a vegetation layer.

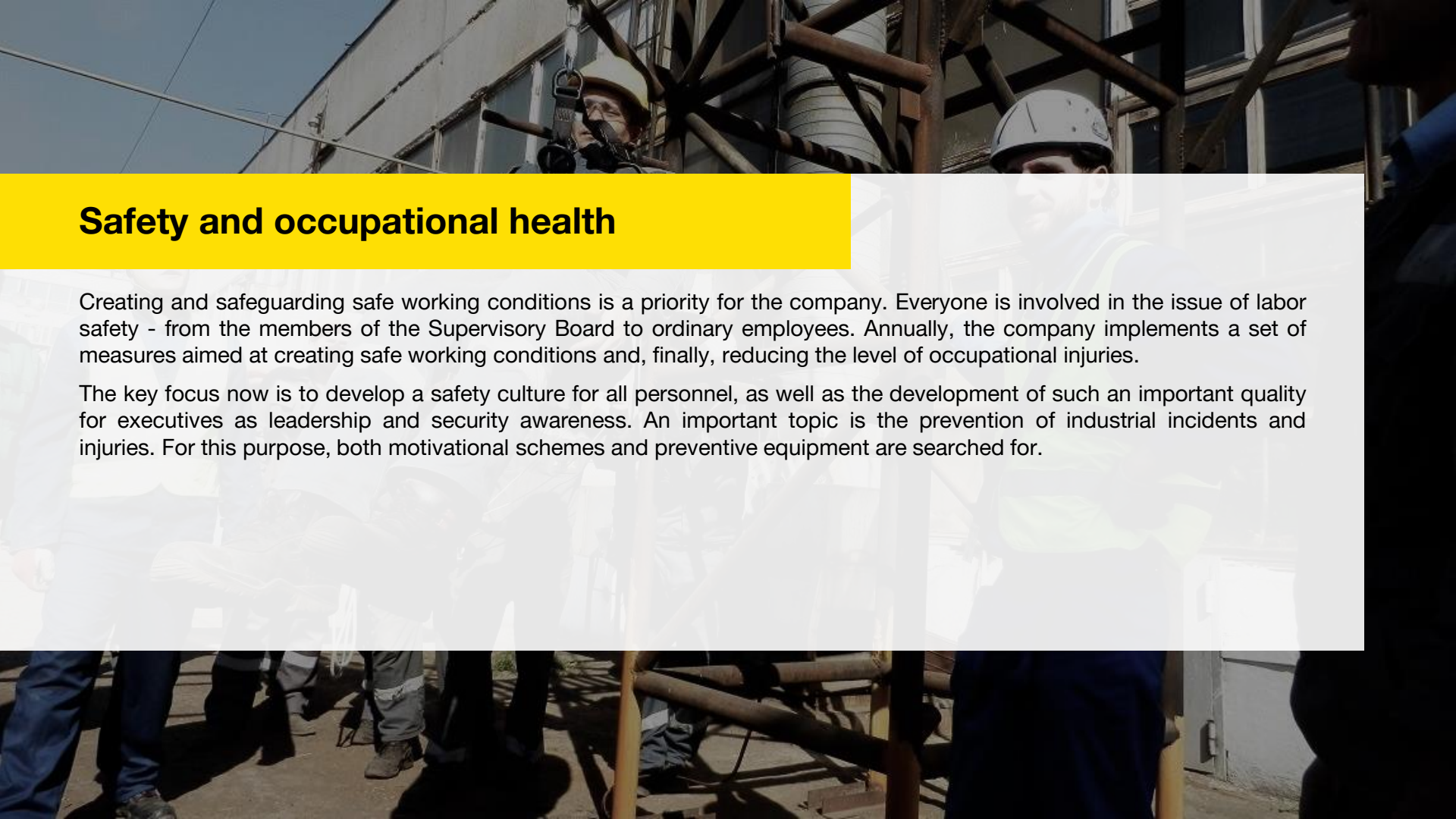
Currently, the company is looking for innovative solutions of the following nature:

- reduction of production volumes and innovative ways of their processing / use
- low cost alternative solutions for reducing / preventing the dusting of surfaces of waste disposal sites
- low-cost technologies for cleaning the mine water to achieve the set standards of dumping
- options for the decision on the possibility of building mini-hydroelectric power stations at TPS cooler reservoirs.

Mine water purification

At the enterprises of the company, large amounts of mine water are pumped during the process of coal mining. The water is cleared of chlorides, sulphates and brought to the indicators of general mineralization. Those technologies for cleaning the mine water were developed long time ago and are already outdated.

It is necessary to propose the optimal cost-effective technology for cleaning the mine water to increase the efficiency and minimize the impact of mine water on the environment.



Safety and occupational health

Creating and safeguarding safe working conditions is a priority for the company. Everyone is involved in the issue of labor safety - from the members of the Supervisory Board to ordinary employees. Annually, the company implements a set of measures aimed at creating safe working conditions and, finally, reducing the level of occupational injuries.

The key focus now is to develop a safety culture for all personnel, as well as the development of such an important quality for executives as leadership and security awareness. An important topic is the prevention of industrial incidents and injuries. For this purpose, both motivational schemes and preventive equipment are searched for.

General list of needs: Safety and occupational health

Scanning

Safety procedures gamification (creating incentives for compliance)

Automatic determination of whether the workers put on safety equipment

Mobile personal electronics to determine employee status (pulse, location, equipment kit)

Stealing coal during transportation and storage
- Supervision and supervision
- Definition
- Reaction
- The hypothesis is the use of drones

Artificial intelligence in video surveillance systems

Partnership

Innovations in territory supervision and control systems (drones, cameras, sensors)

Stealing coal during transportation and storage
- Supervision and supervision
- Definition
- Reaction
- The hypothesis is the use of drones

Measures to prevent breakdowns caused by a human factor

Access control, authorization when working with hazardous equipment, safety of work

Build

Inventory operations solution, laser marking of parts, platform for internal benchmarking and detection of anomalies

Measures to prevent breakdowns caused by a human factor

Improving the trust line
- Channels
- Automatic recognition

Industry 4.0

DTEK RADAR TECH CIVITTA

Mobile solutions for security issues

73 thousand employees work at the production enterprises of the company, and their work can be associated with health risk.
To improve the safety of working conditions in the workplace, it is necessary to introduce a number of control measures:

- of medical metrics of workers (heartbeat, temperature, pressure).
- control of admission to the territory of production facilities and separate production areas;
- control of the completeness of the equipment of the employee;
- authorized access to equipment;
- monitoing

It is necessary to offer concepts / options of electronic bracelets (or other) that will be able to solve the above-described tasks.

The main questions you need to pay attention to:

- Devices must perform a control function on the check point
- Devices should be dust and moisture-proof
- Devices must be able to transmit abnormal messages to a remote server
- Devices must be able to detect, record and transmit cases of abnormal lack of activity (sleep in the workplace, removal of the device).

Marking and Monitoring System for Inventory

Inventory enterprises use a lot of equipment (bearings, electric motors, filters). There are cases where the write-off of the Inventory occurs without replacing the worn out equipment parts.
For example, in the production for replacement, 10 bearings were written off, and in fact only 4 replaced. The remaining 6 new bearings in this case are direct losses for the company.
It is necessary to develop a marking system for the Inventory to account for the full cycle of traffic along the route warehouse-production-defect-utilization. For example, the application of laser markings on metal surfaces of large-sized units of Inventory.

The main questions you need to pay attention to:

1. Suggest a way of applying and reading marking on large-sized Inventory.
2. The marking record must be unique for each individual Inventory object (you need to be able to distinguish between identical objects of the Inventory on the marking record)
3. When marking, each individual object of the Inventory should fall into the database, with the ability to track all actions with each individual object of the Inventory.

Acceleration program with Radar Tech

DTEK provides an opportunity for startups to test their own ideas in real environment and become a part of world progress

Request for innovation for startup ecosystem: Innovation Agenda for the accelerated program

Energy production

Industry 4.0

Startups in the field of industrial automation (sensors and data analysis models for autonomy and increase of production efficiency)

Logistics

Platforms for monitoring and optimization of freight traffic, control of rolling stock.National Wagon Warehouse

Renewables

Clean energy. Startups in renewable energy, solutions for managing a smart home

Clients

Available and functional platforms for customer interaction (including on the utility market).

Energy efficiency

Dispatching, reducing energy consumption, minimizing costs.

Supporting functions

Personnel

In-depth analysis of behavioral data with the ability to build relevant career maps and motivational tools.

Environment

Real improvement of the environment and reducing the negative impact of industrial facilities

Corporate responsibility

Socio-economic development of regions, work with media analysis

Occupational health

Occupational health, anti-corruption, security, infrastructure objects

DTEK RADAR TECH CIVITTA

Value proposition for startups and partners

Feedback at the selection stage

Representatives of various business units will be invited to discuss start-ups and will participate in the jury of accelerators, startups will be able to get a direct feedback from the corporation

Mentoring for startups

Representatives of different business units will become mentors for relevant startups: weekly discussions (1-2 hours) on business development and needs

Understanding DTEK's needs

Presentation of the company's overall strategy and company's agenda at the preacceleration stage, covering important facts about the company's activities and needs during the acceleration period

Potential cooperation

DTEK intends to select and form startups during the acceleration, with which the company could count on future commercial relations

Testing ground

DTEK has the ability to provide infrastructure and personnel resources to test promising hypotheses.

DTEK RADAR TECH CIVITTA