WIND PANEL

THE NEXT GENERATION OF LAND WIND TURBINES

ISSUES OF WIND TURBINES AND OTHER RENEWABLE ENERGY SOLUTIONS

1. LOW WIND SPEEDS ON LAND ARE PRACTICALLY NOT USED FOR ENERGY PRODUCTION. THE REASON OF THAT IS A SMALL AMOUNT OF ENERGY IN LOW SPEED WIND AS COMPARED TO THE HIGH COST OF A TURBINE. THEREFORE, **ENERGY IS PRODUCED MAINLY FROM HIGH WIND SPEEDS ABOVE 10-15 m/s** BY TURBINES INSTALLED AT HIGH MASTS (MOSTLY BY HAWTS > 1 MEGAWATT)

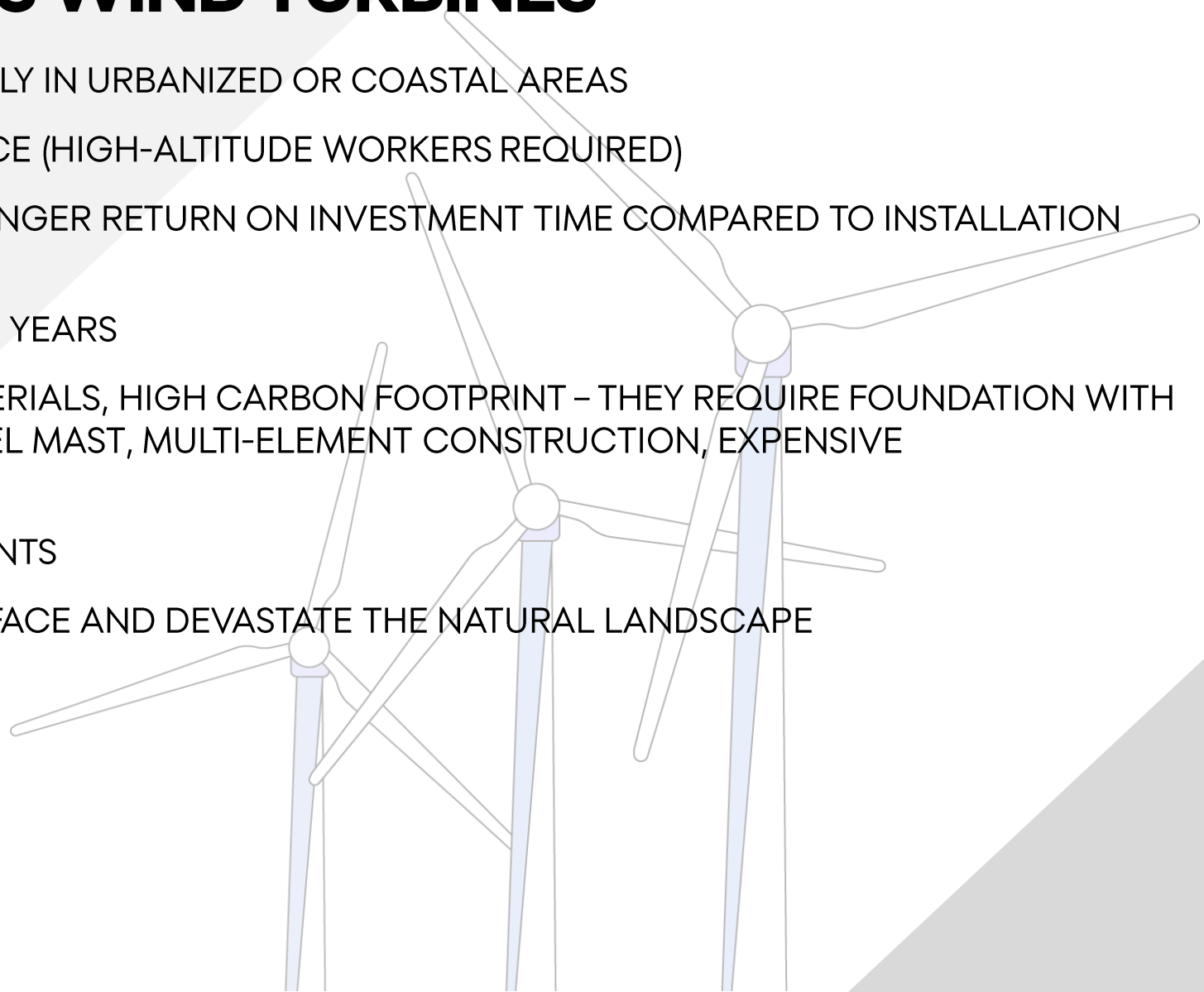
2. LACK OF ENERGY STORAGE IN A RATIONAL AND ECONOMIC WAY. THIS APPLIES TO ALL RENEWABLE ENERGY SOLUTIONS

3. LACK OF TECHNOLOGY CAPABLE OF EFFICIENT ENERGY PRODUCTION FROM WIND IN THE URBANIZED AREA

WE WANT THE WIND PANEL TO SOLVE THE ABOVE ISSUES.

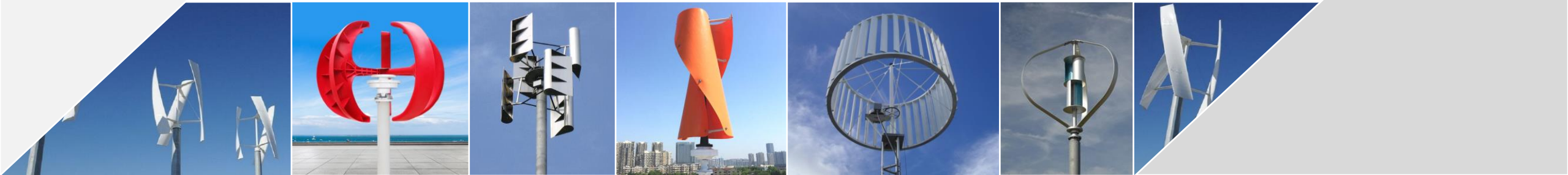
HIGH POWER HORIZONTAL AXIS WIND TURBINES

- PROBLEMATIC LOCATION - ONLY IN URBANIZED OR COASTAL AREAS
- EXPENSIVE TECHNICAL SERVICE (HIGH-ALTITUDE WORKERS REQUIRED)
- LAND WIND FARMS HAVE A LONGER RETURN ON INVESTMENT TIME COMPARED TO INSTALLATION IN COASTAL AREAS
- PRODUCT LIFESPAN BELOW 25 YEARS
- LARGE AMOUNT OF RAW MATERIALS, HIGH CARBON FOOTPRINT – THEY REQUIRE FOUNDATION WITH REINFORCED CONCRETE, STEEL MAST, MULTI-ELEMENT CONSTRUCTION, EXPENSIVE AND DIFFICULT LOGISTICS
- NON-RECYCLABLE COMPONENTS
- THEY TAKE A HUGE LAND SURFACE AND DEVASTATE THE NATURAL LANDSCAPE
- HIGH NOISE GENERATION
- BIRD KILLERS



LOW POWER
VERTICAL AXIS WIND TURBINES

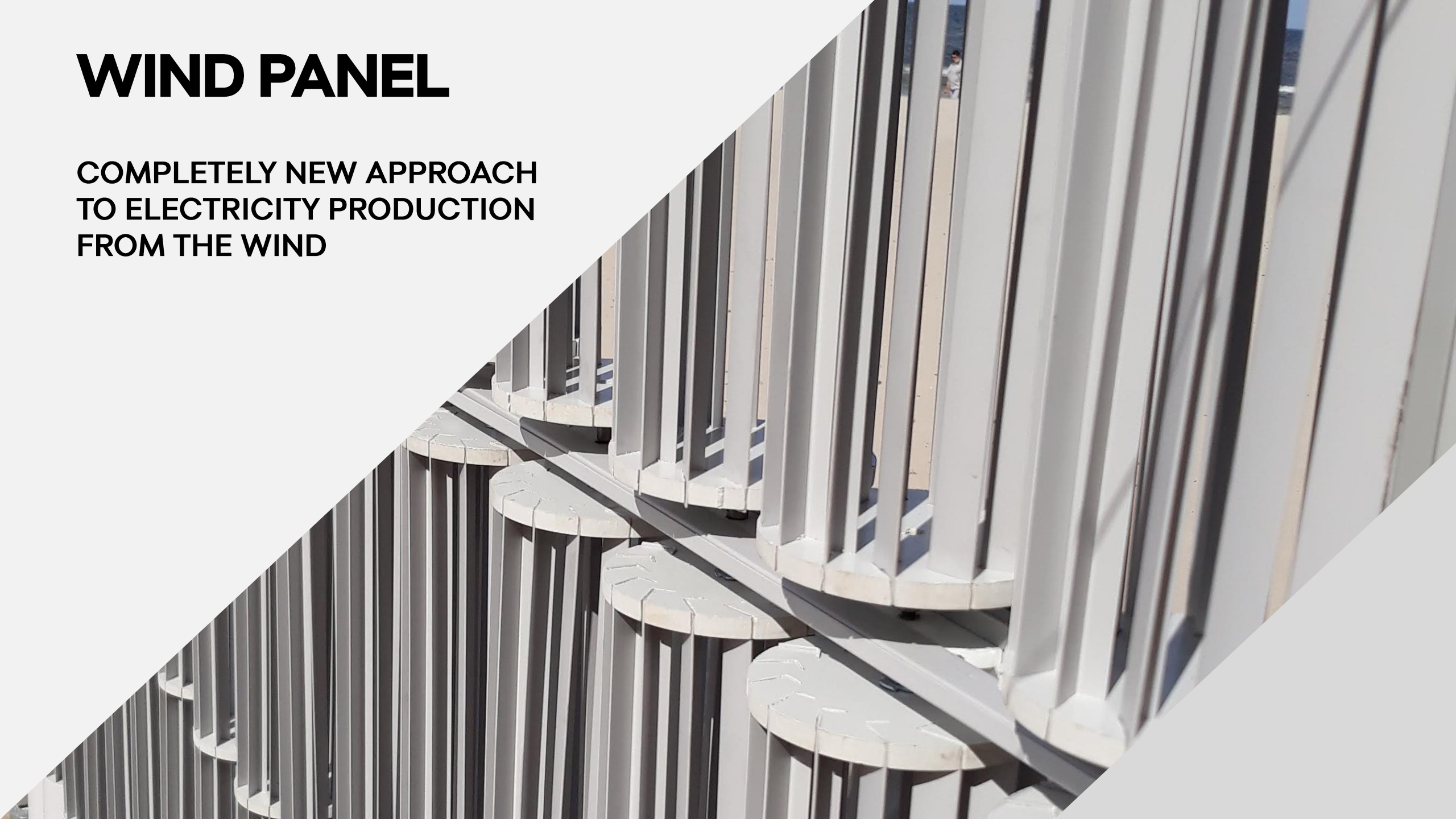
- THEY REQUIRE A STEEL OR CONCRETE MAST
- DEVASTATION OF THE NATURAL AND URBAN LANDSCAPE
- NOISE GENERATION ABOVE 40 dB – THE LARGER TURBINE DIAMETER, THE BIGGER NOISE
- UNHEALTHY FOR HUMANS "FLASHING" EFFECT DURING ROTATION OF THE TURBINE
- THEY POSE A THREAT TO ANIMALS
- COMPLICATED TURBINE STRUCTURE
- LIMITED INSTALLATION POSSIBILITIES IN URBAN AREAS
- PRODUCT LIFESPAN UNDER 25 YEARS



PREVIOUS COMMERCIALIZATION ATTEMPTS

WIND PANEL

COMPLETELY NEW APPROACH TO ELECTRICITY PRODUCTION FROM THE WIND



OUR MISSION

THE **"WIND PANEL"** STARTUP WAS ESTABLISHED TO INVENT THE NEXT GENERATION OF LAND WIND TURBINES, EXCEEDING THE CURRENT WIND ENERGY TECHNOLOGIES. WE WORK ON HIGHLY SCALABLE WIND TURBINE SYSTEM, WHICH CAN EFFECTIVELY GENERATE ELECTRICITY FROM LOW SPEED WINDS TYPICAL FOR CONTINENTAL EUROPE. IT CAN GENERATE ENERGY ALMOST ANYWHERE – INSIDE AND OUTSIDE OF URBAN AREAS – WITHOUT A NEGATIVE IMPACT ON HUMAN HEALTH, ENVIRONMENT AND LANDSCAPE. THANKS TO VERSATILE APPLICATIONS AND LOW MANUFACTURING COSTS, THE PRODUCT IS CAPABLE OF DECENTRALIZING THE POWER GRID, ACCELERATING THE ELECTRIFICATION OF ROAD TRANSPORT AND REDUCING AIR POLLUTION IN THE CITIES.

KEY FEATURES AND BENEFITS

- THE PRODUCT CAN REPLACE THE FENCE AROUND A PROPERTY AND TRANSFORM IT TO AN ELECTRICITY GENERATING ASSET – THE INVESTOR DOES NOT NEED TO BEAR THE COST OF THE TRADITIONAL FENCE
- ELECTRICITY PRODUCTION AT LOW SPEED WINDS, STARTING FROM **1 m/s (2.2 mph)**
- HIGHEST ENERGY EFFICIENCY AT WIND SPEED IN THE RANGE **4-6 m/s (2.5 – 3.7 mph)**
- EFFECTIVE ENERGY PRODUCTION **FOR 75% TIME IN THE YEAR**
- SIMPLE CONSTRUCTION – LOW RISK OF PRODUCT FAILURE, LOW PRODUCTION AND SERVICE COST
- IT WORKS WITH ALMOST EVERY WIND DIRECTION (RANGE OF APPROX. **300 DEGREES**)
- INSTALLED POWER: **100 W IN ONE LINEAR METRE OF THE INSTALLATION**
- OFF-GRID ENERGY STORAGE INSIDE EVERY TURBINE
  (NO ADDITIONAL SPACE FOR ENERGY STORAGE REQUIRED)

DETAILED TECHNOLOGICAL ASSUMPTIONS

- USE OF RAW MATERIALS FROM RECYCLING IN THE PROCESS OF PRODUCTION AND, AS A CONSEQUENCE, INTRODUCTION OF A CLOSED CIRCULATION OF RAW MATERIALS (CIRCULAR ECONOMY)
- THANKS TO EASY-TO-WORK MATERIALS, PRODUCTION LEAVES LOW CARBON FOOTPRINT
- AESTHETIC LOOKS – THE INSTALLATION BECOMES THE INTEGRAL PART OF ENVIRONMENT
- NOISELESS OPERATION DUE TO THE SMALL DIAMETER OF WIND TURBINES (<40 dB)
- NOT HARMFUL TO HUMAN, NOT HARMFUL TO WILDLIFE
- LIGHTWEIGHT, MODULAR, EASILY SCALABLE CONSTRUCTION
- MOISTURE AND HURICANE TYPE WIND RESISTANCE
- RETURN ON INVESTMENT IN THE PERIOD OF APPROX. 4 YEARS, LOW ENTRY BARRIER FOR INVESTOR
- PRODUCT PRICE COMPARABLE TO PHOTOVOLTAIC PANELS WITH THE SAME YEARLY ENERGY PRODUCTION
- LONG PRODUCT LIFESPAN (UP TO 50 YEARS)

WIND PANEL AND PHOTOVOLTAICS – COMPARISON

- BOTH SYSTEMS COMPLEMENT EACH OTHER AND ALLOW THE DIVERSIFICATION OF RENEWABLE ENERGY PRODUCTION. THEY OCCUPY COMPLETELY DIFFERENT SPACES AND DO NOT DISTURB ONE ANOTHER: PHOTOVOLTAIC PANELS ARE A HORIZONTAL INSTALLATION, AND THE WIND PANEL IS A VERTICAL ONE
- PHOTOVOLTAICS PRODUCE ENERGY ONLY DURING THE DAY, AND PRODUCTION EFFICIENCY DROPS IN WINTER AND ON CLOUDY DAYS. A WIND PANEL, WITH A LOW SPEED WINDS, CAN EFFECTIVELY PRODUCE ENERGY 24 HOURS A DAY – NO MATTER WHAT THE CURRENT SEASON IS AND WHAT IS THE CLOUD LAYER ABOVE
- DURING THE WINTER SEASON, ENERGY PRODUCTION FROM PHOTOVOLTAICS DROPS. AT THE SAME TIME, ENERGY PRODUCTION FROM WIND PANEL RISES, BECAUSE AIR MASSES ARE MOVING MORE EFFICINETLY WHEN THE VEGETATION IS LESS ABUNDANT
- WE CONSIDER PHOTOVOLTAICS A WIND PANEL'S OLDER BROTHER. TOGETHER, THEY CREATE A FAMILY OF HIGHLY SCALABLE PRODUCTS

WIND PANEL
CREATES A NEW RENEWABLE ENERGY NICHE

BIWT
BUILDING
INTEGRATED
WIND TURBINES
IIWT
INFRASTRUCTURE
INTEGRATED
WIND TURBINES


FENCE AROUND PHOTOVOLTAIC FARM,
AIRPORT, INDUSTRIAL AREA, PARKING LOT


INSTALLATION IN THE CROWN OF THE OFFICE BUILDING


MOTORWAY FENCE

INVESTMENT EXAMPLE

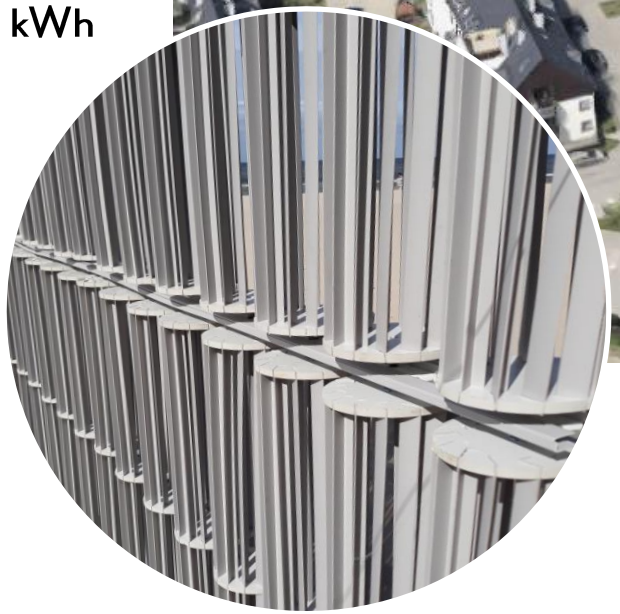
- WIND PANEL AS A FENCE AROUND THE HOUSE,

  LENGTH: **32 FOOT / 10 METRES**
- INSTALLED POWER: **1 KILOWATT**
- COST: **1 500 EUR**
- PRODUCED ENERGY WITH WIND SPEED **4 m/s**

BLOWING 50% OF TIME OF THE YEAR: **3 000 kWh**

- YEARLY ENERGY SAVINGS IN POLAND:

  400 EUR
- RETURN ON INVESTMENT: **4 YEARS**



PRODUCT DEVELOPMENT PLAN

STAGE #1
DESIGNING MINIMUM VIABLE PRODUCT (MVP), LAUNCHING SALES IN POLAND / ESTIMATED COST: 500 000 EUR

- VERTICAL TURBINE
- POWER GENERATOR
- OFF-GRID ENERGY STORAGE
- MODULAR FRAME
- “EASY INSTALLATION” SYSTEM
- OUTSORCING PRODUCTION OF THE ABOVEMENTIONED COMPONENTS
- INTEGRATED SENSOR AND MEASUREMENT SYSTEM, LIVE DIAGNOSTICS MOBILE APPLICATION, PRODUCTION AND SERVICE MANAGEMENT SYSTEM, ONLINE RESERVATION AND SALES SERVICE
- PRODUCT DOCUMENTATION, ASSEMBLY INSTRUCTIONS, TRAINING PROGRAM FOR INSTALLATION SERVICES COMPANIES
- PL / EU PATENT

ESTIMATED STAGE TIME: **12-18 MONTHS**

STAGE #2
PRODUCT ADVANCEMENTS, EXPANSION TO WEST MARKETS

- EXPANSION TO WEST MARKETS
- R&D OF ADDITIONAL PRODUCT FEATURES
- PATENTS: EPO, PCT, USA
- MANAGEMENT OF PRODUCTION MODELED ON THE COMPANIES: TOYOTA, TESLA, IKEA (AUTOMATED AND EFFICIENT PRODUCTION, PRODUCT DESIGNED FOR EASY ASSEMBLY))
- LAUNCHING COMPANY'S OWN PRODUCTION LINE
- ESTIMATED STAGE TIME: **12-24 MONTHS**

THE COST OF STAGE #2 MAY BE LOWERED BY REINVESTING PROFITS FROM THE SALES OF THE MVP VERSION

FUTURE CONCEPTS 2025+

- NEW LOW TEMPERATURE PLASTIC INJECTION MOLDING METHODS FOR LOW COST TURBINE PRODUCTION
- AUTOMATION OF THE CONSTRUCTION OF LARGE INSTALLATIONS USING DRONES (E.G. ALONG MOTORWAY)
- TOTAL AUTOMATION OF THE TECHNICAL SERVICE – DEVELOPING THE SOFTWARE CAPABLE OF SELF-DETECTING DEFECTIVE COMPONENTS AND INITIATING REPLACEMENT PROCEDURE
- INDUCTIVE CHARGING OF ELECTRIC CARS ON THE MOTORWAY. THE VEHICLE WILL GET OFF FROM THE HIGHWAY WITH A FULLY CHARGED BATTERY
- OFF-GRID ENERGY STORAGE MANUFACTERED FROM CHEAP AND COMMONLY AVAILABLE MATERIALS
- HYBRID MODE – FULL SYMBIOSIS WITH PV INSTALLATIONS; WIND PANEL BECOMES A PV EXCESS ENERGY OFF-GRID STORAGE
- CAPABILITY OF QUICK ENERGY RELEASE IN CASE OF A SUDDEN INCREASE IN DEMAND - TRANSFORMATION FROM "KILOWATT PER HOUR BUSINESS" TO "MEGAWATT PER SECOND BUSINESS“, BECOMING A COMPETITIVE PRODUCER OF DECENTRALIZED AND CLEAN ENERGY
- CIRCULAR ECONOMY – REUSING ALMOST ALL USED PARTS FOR THE PRODUCTION OF NEW MODULES

THE STARTUP WAS FOUNDED IN NOVEMBER 2018 IN POLAND BY THREE INDIVIDUALS

RAFAŁ JUSZKO

Project originator. Wroclaw University of Technology graduate. Experienced project director with a strong background in the HVAC industry. A typical inventor who owns a few international patents

ARKADIUSZ ZEMLAK

An engineer with experience in graphic design, software testing and IT/banking projects.

He worked for such companies as:

IBM, Credit Suisse, Atos.

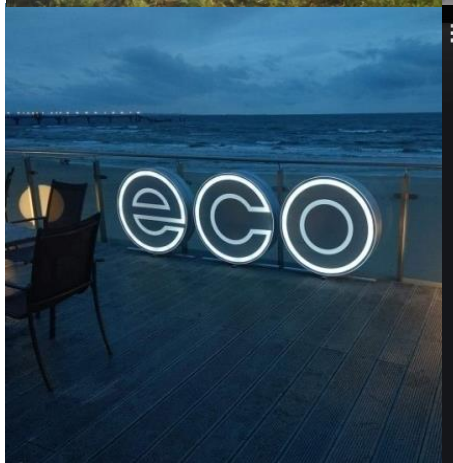
On a daily basis, he works with Rafał on the functionality and design of the product

TOMASZ GRUSZKA

Cracow University of Economics graduate. Project manager and analyst. He worked with the largest banks in the world, among others: State Street, BNP Paribas, BNY Mellon. He is the first line of contact in most cases.

ACHIEVEMENTS

1. NOVEMBER 2018 / BIRTH OF THE CONCEPT
2. FEBRUARY 2019 / THE FIRST PROTOTYPE IS CREATED
3. JUNE 2019 / WINNING THE "WARM UP YOUR BISINESS VOL. 2 " COMPETITION
   - FIRST PLACE AND MAIN AWARD 2,500 EUR
4. JULY-SEPTEMBER 2019 / CONSTRUCTION OF THE PROTOTYPE IN A FULL SCALE
5. SEPTEMBER 2019 / PRESENTATION OF THE PROTOTYPE WIND PANEL IN MIĘDZYZDROJE, POLAND
6. CURRENTLY – 1ST STAGE OF ADVANCED RESEARCH AND PRODUCT DEVELOPMENT



STARTUP PARTNERS

Park Naukowo-Technologiczny
w Opolu Sp. z o.o.

ENERGETYKA CIEPLNA OPOLSZCZYZNY SA

CONTACT INFORMATION

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