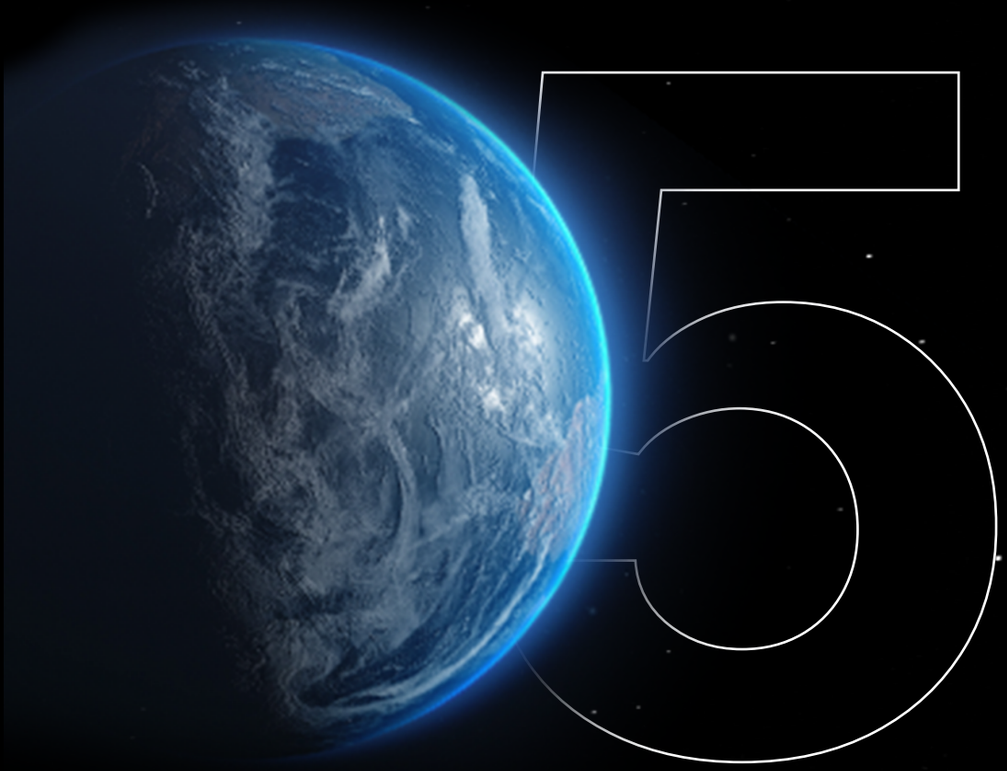
FINULENT SOLUTIONS
PAR EXCELLENCE, PAR KNOWLEDGE



5 THE ELEMENTS OF NATURE

FIND INSIDE

NEWSLETTER ISSUE 06

Fire*, *Water*, *Air*, *Earth* & *Space

are fundamental aspects of nature that are used to harness renewable energy production.

is associated with transformation and energy. Fire and heat are the main components of biomass energy when biomass is burned to produce steam.

is associated with flow & movement. Water is the key resource for hydroelectric power generation, which harnesses the movement of water to produce electricity.

is associated with movement & communication. Air represents the movement of the wind and its use in wind turbines to generate electricity.

is associated with grounding and energy. The heat from the earth represents the energy created to produce geothermal power.

is associated with openness and change. The change represents gravity being used as a fossil fuel substitute.

BIOMASSRISE

THE BURNING PROCESS IN BIOMASS LEAVES BEHIND ASH AND CHAR. WOOD ASH IS MOSTLY CALCIUM CARBON (CaCO3) AND IF USED WITH THE PLANT NUTRIENTS IN POTASH, AND CHAR, IT WOULD MAKE WOOD ASH AN EXCELLENT FERTILIZER FOR AGRICULTURE. SUSTAINABLE BIOENERGY PROVIDES LOW-CARBON HEAT AND POWER TO AROUND 50 MILLION EUROPEAN HOUSEHOLDS. THIS WILL DOUBLE BY 2050. BIOMASS HAS PROVEN TO BE A LEADER IN INNOVATION AND APPLYING BREAKTHROUGH TECHNOLOGIES IN DELIVERING NEGATIVE EMISSIONS. THE ROYAL SOCIETY AND ROYAL ACADEMY OF ENGINEERING HAVE ESTIMATED THAT BIOENERGY CARBON CAPTURE AND STORAGE (BECCS) COULD ENABLE THE UK TO CAPTURE 50 MEGATONNES OF CO2 PER YEAR BY 2050.

BIOCUBE

BIOCUBE CORPORATION – THE CREATORS OF BIO-CUBE SAY IT'S A TYPE OF BIODIESEL MINI REFINERY. THIS IS A BIODIESEL PROCESSOR WITH A MODIFIED 20-FOOT SHIPPING CONTAINER. IT WEIGHS ONLY 3.5 TONS WHICH MAKES IT EASY TO TRANSPORT BY ROAD, SEA, AND RAIL. FEEDSTOCK OIL IS FED INTO THE DEVICE, WHICH THEN PRODUCES BIODIESEL WITHIN HOURS. IT CAN ALSO TURN OFF ITS BIO-DIESEL AND ELECTRICITY FROM THE GRID. ONCE PROCESSED, BIODIESEL CAN BE USED IN ANY MODERN DIESEL ENGINE.

HYDROIMPACT

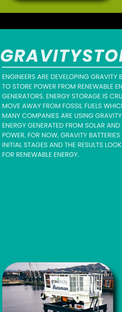
HYDROPOWER HAS A HISTORY OF ALMOST 150 YEARS AND INNOVATION HAS NEVER STOPPED. CURRENTLY, IT IS FOCUSING ON INCREASING THE FLEXIBILITY OF ITS PLANTS THROUGH CHANGES IN TURBINE DESIGN AND OPERATIONAL PATTERNS, ALL THIS THROUGH DIGITALIZATION. THE AIM IS TO ALLOW HYDROPOWER PLANTS TO BETTER FULFILL THE NEEDS OF MODERN POWER SYSTEMS WITH HIGHER DEMANDS AND INCREASING PENETRATION OF INTERMITTENT RENEWABLES.

MINI HYDRO

HYDROPOWER PROJECTS ARE RANKED AMONG THE MOST EXPENSIVE INFRASTRUCTURE PROJECTS. THE UNCERTAINTIES AROUND FUNDING AND REGULAR APPROVAL MAKE IT CHALLENGING TO START THE PROJECTS. GEOGRAPHIC RESTRICTIONS ALSO LIMIT THE WIDESPREAD USE OF HYDROPOWER. SMALL-SCALE HYDROPOWER CAN ERADICATE THESE LIMITATIONS. IT CAN SUPPLY RELIABLE RENEWABLE ENERGY TO RURAL COMMUNITIES. THESE MINI HYDROPOWER PLANTS RELY ON THE NATURAL FLOW OF WATER WITH NO DAM OR WATER STORAGE. THE DESIGNS INCLUDE HYDRAULIC GRAVITY MACHINES LIKE THE ARCHIMEDES SCREWS, TURBINES, AND RUNNING PUMPS AS TURBINES.

WINDVISION

WIND ENERGY HAS THE POTENTIAL TO SUPPORT OVER 600,00 JOBS IN MANUFACTURING, MAINTE-NANCE, INSTALLATION, AND SUPPORTING SERVICE IN THE UNITED STATES ALONE. BY 2050, WIND ENERGY CAN AVOID THE EMISSION OF 12.3 GIGA-TONS OF GREENHOUSE GAS AND SAVE 260 BILLION GALLONS OF WATER. IT CAN EVEN HELP LOCAL COMMUNITIES IN THE U.S. AS THEY CAN COLLECT ADDITIONAL TAX REVENUE FROM LAND LEASE PAY-MENTS AND PROPERTY TAXES, READING $3.2 BIL-LION ANNUALLY BY 2050.

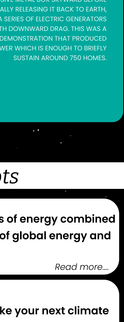


RECYCLED WIND TURBINE BLADES

CARBON RIVERS, THE ENERGY TECHNOLOGY COMPANY, COLLABORATED WITH THE UNIVERSITY OF TENNESSEE, KNOXVILLE, AND THE WIND ENERGY TECHNOLOGIES OFFICE (WETO) TO CREATE A NEW PROCESS TO RECOVER 99.9% PURE GLASS FIBER FROM DECOMMISSIONED FIBERGLASS WIND TURBINE BLADES. THIS COULD HAVE A GLOBAL IMPACT ON THE SUSTAINABILITY OF WIND ENERGY BECAUSE EARLIER, MATERIALS THAT ENDED UP IN POST-CONSUMER WASTE STREAMS CAN GO DIRECTLY INTO NEXT-GENERATION TURBINE BLADE MANUFACTURING.

GEOPOWER

GEOTHERMAL HEAT AND POWER OFFER A STRATEGIC PLAN TO BOOST THE DEPLOYMENT OF THESE RESOURCES. THE ELECTRICITY PRODUCTION FOR GEOTHERMAL POWER WILL GO FROM 67 TWH (TERAWATT HOUR) TO 1400 TWH BY 2050. GEOTHERMAL POWER PROVIDES BASIC-LOAD ELECTRIC GENERATION SO INTEGRATION OF NEW POWER PLANTS INTO EXISTING POWER SYSTEMS WON'T POSE A CHALLENGE. SOME CONFIGURATIONS ALLOW GEOTHERMAL ENERGY TO BE FLEXIBLE, LIKE THE ABILITY TO INCREASE OR DECREASE PRODUCTION.



THE ENHANCED GEOTHERMAL SHOT

EAVOR TECHNOLOGIES HAS PIONEERED AN UNPOWERED LOOPING FLUID DESIGN THAT DOES NOT NEED HOT WATER RESERVOIRS TO PRODUCE ELECTRICITY. WATER IS PUMPED THROUGH A CLOSED-LOOP NETWORK OF PIPES THAT IS 3 - 4 KM BELOW THE SURFACE WHERE IT'S HEATED, CREATING UNDERGROUND RADIATION. THIS HOT LIQUID IS THEN CONVERTED INTO ELECTRICITY OR TRANSFERRED TO A DISTRICT HEAT GRID.

GRAVITYSTORAGE

ENGINEERS ARE DEVELOPING GRAVITY BATTERIES TO STORE POWER FROM RENEWABLE ENERGY GENERATORS. ENERGY STORAGE IS CRUCIAL TO MOVE AWAY FROM FOSSIL FUELS WHICH IS WHY MANY COMPANIES ARE USING GRAVITY TO STORE ENERGY GENERATED FROM SOLAR AND WIND POWER. FOR NOW, GRAVITY BATTERIES ARE IN THE INITIAL STAGES AND THE RESULTS LOOK PROMISING FOR RENEWABLE ENERGY.

GRAVITY BATTERY

IN APRIL 2021, THE EDINBURGH-BASED GREEN ENGINEERING START-UP GRAVITRICITY CREATED THE FIRST GRAVITY BATTERY PROTOTYPE- A 15M (49FT) STEEL TOWER SUSPENDING A 50-TONNE IRON WEIGHT. THE ELECTRIC MOTORS HOISTED THE MASSIVE METAL BOX SKYWARD BEFORE GRADUALLY RELEASING IT BACK TO EARTH, POWERING A SERIES OF ELECTRIC GENERATORS WITH DOWNWARD DRAG. THIS WAS A SMALL-SCALE DEMONSTRATION THAT PRODUCED 250KW OF POWER WHICH IS ENOUGH TO BRIEFLY SUSTAIN AROUND 750 HOMES.

FINUShots

The five main sources of energy combined harness around 30% of global energy and it is likely to rise.

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