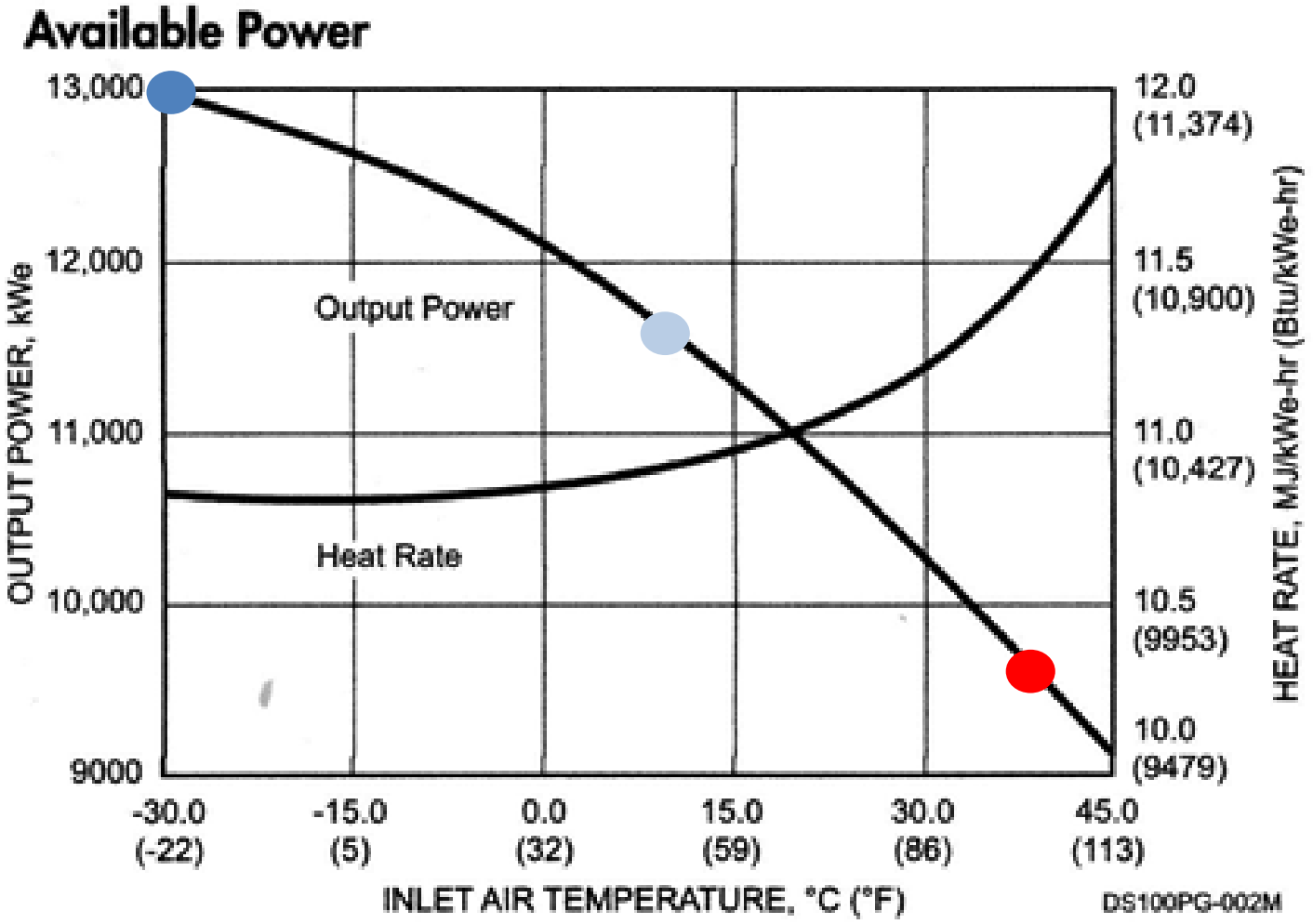
## OBJECTIVE OF INNOVATIVE SYSTEM #1



## OBJECTIVE OF INNOVATIVE SYSTEM #1

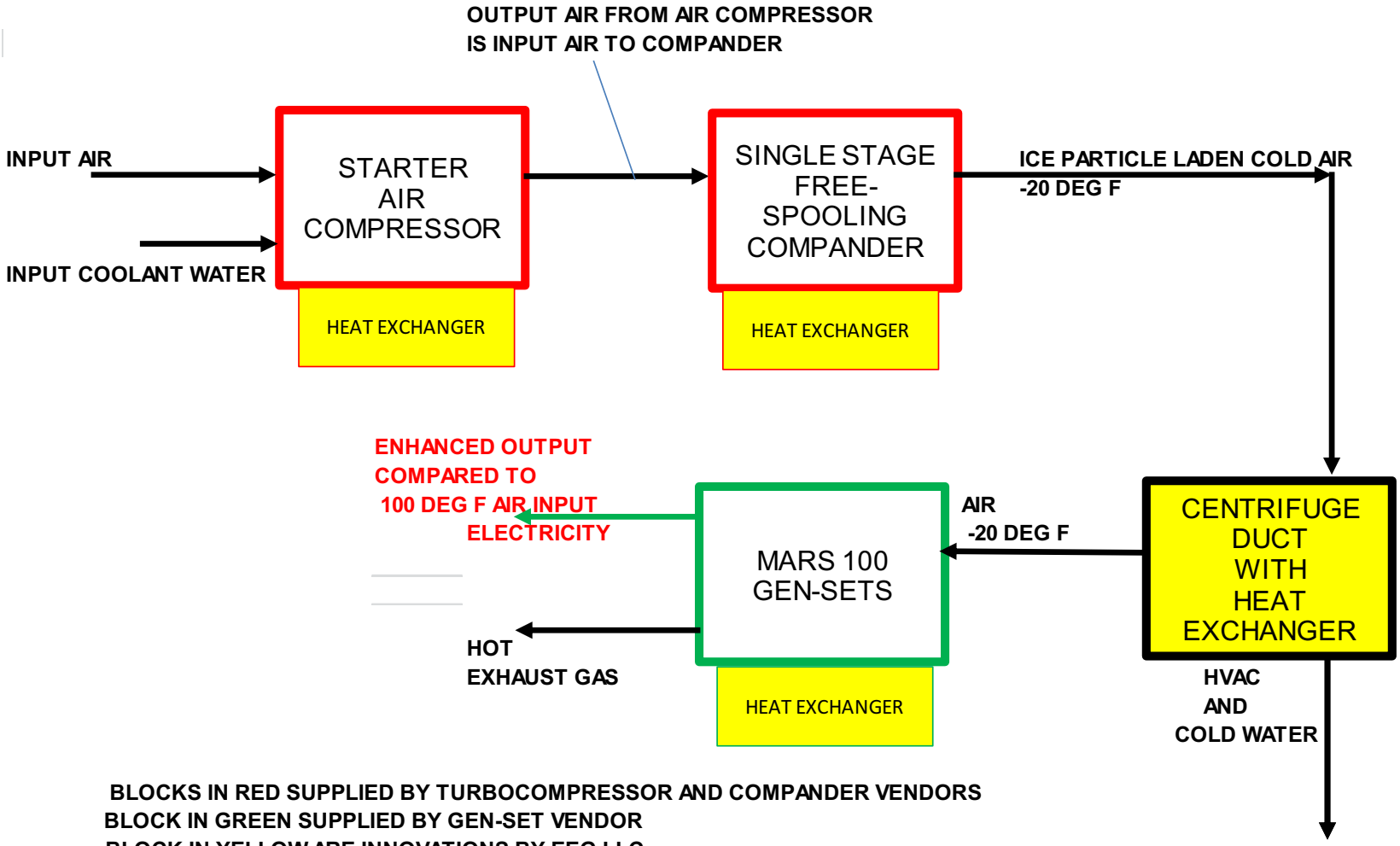
**CURRENT FOGGER AND OTHER COOLING SYSTEMS (LIGHT BLUE CIRCLE):**

(1) BRING 100°F AIR TO 45°F AIR FOR THE INTAKE OF AIR OF THE TURBOCOMPRESOR OF THE GEN-SET.
(2) MORE ELECTRICITY PRODUCED
(3) LARGE QUANTITIES OF WATER ARE CONSUMED.

**PROPOSED INNOVATIVE SYSTEM #1 (DARK BLUE CIRCLE):**

(1) BRING 100°F AIR TO -22°F AIR FOR THE INTAKE OF AIR OF THE TURBOCOMPRESOR OF THE GEN-SET.
(2) EVEN MORE ELECTRICITY PRODUCED
(3) NO WATER USED

# INNOVATIVE SYSTEM #1




BLOCKS IN RED SUPPLIED BY TURBOCOMPRESSOR AND COMPANDER VENDORS
BLOCK IN GREEN SUPPLIED BY GEN-SET VENDOR
BLOCK IN YELLOW ARE INNOVATIONS BY EEG LLC

# INNOVATIVE SYSTEM #1

## EFFICIENT STARTER AIR COMPRESSOR

- IT IS NECESSARY TO DESIGN THE COMPANDER WITH HIGH EFFICIENCY SO THAT THE SMALLEST "START AIR COMPRESSOR" DRIVES THE COMPANDER.

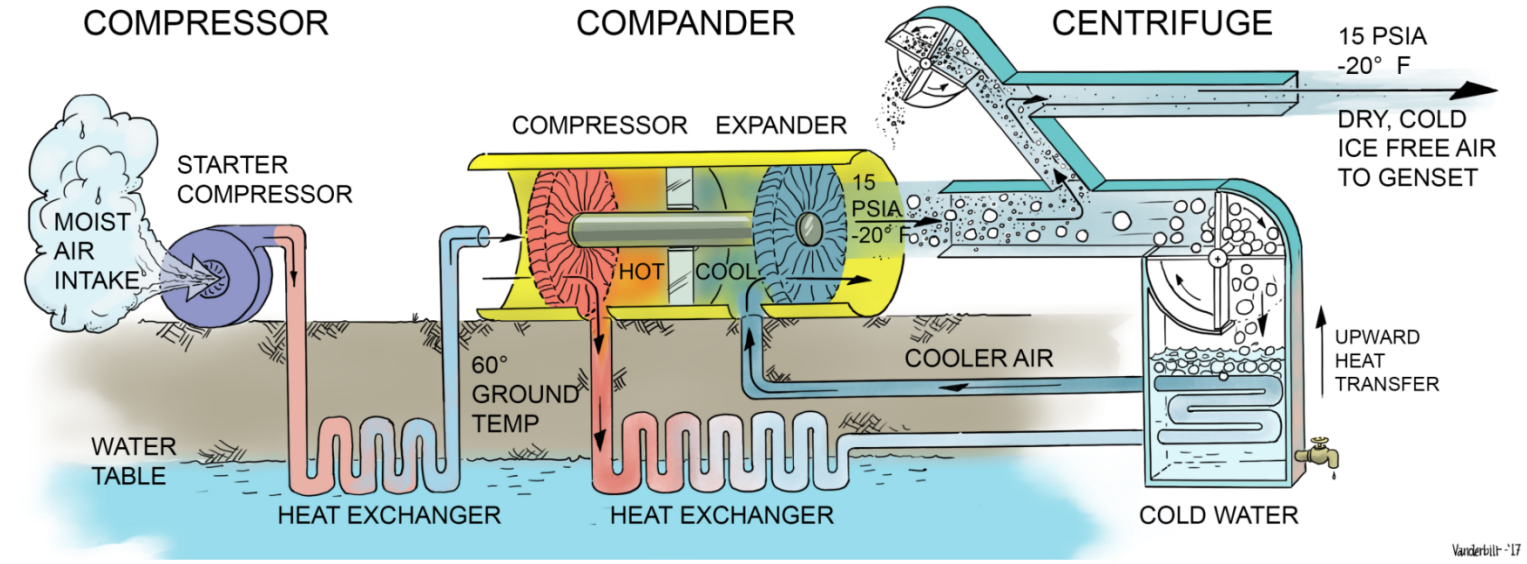
## HEAT EXCHANGERS

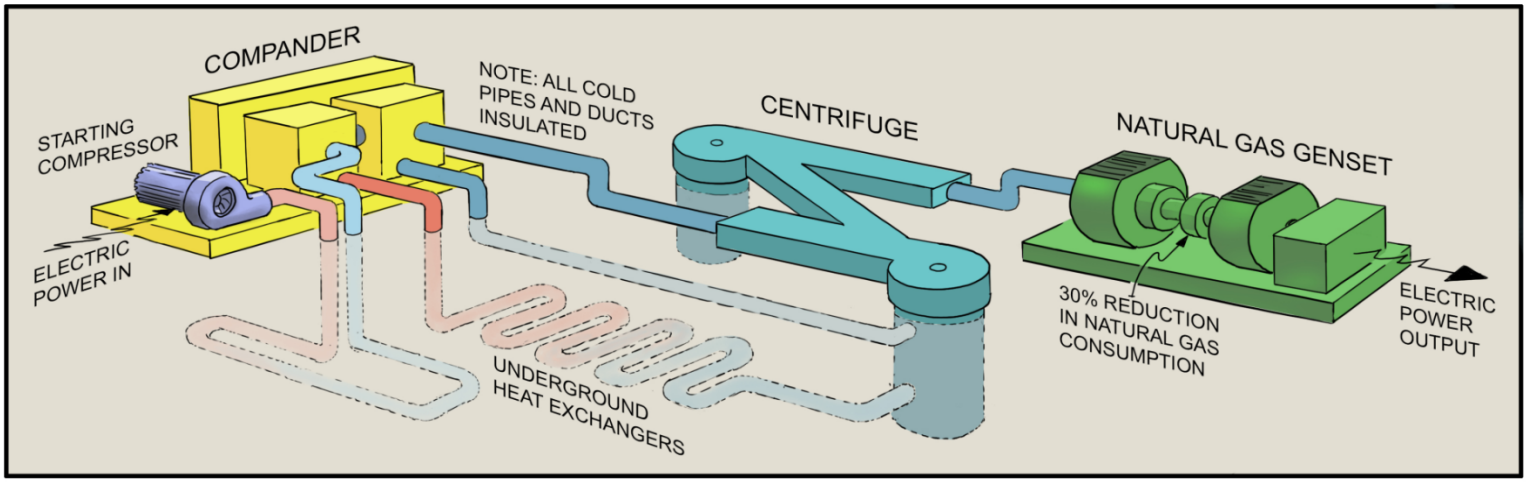
- COMPANDER VENDORS OFFER THE TURBINE SYSTEMS BUT NOT THE HEAT EXCHANGERS
- SUCCESSFUL HEAT EXCHANGERS REJECTION HEAT AS WELL AS USE PRACTICAL DESIGNS EASILY IMPLEMENTED
- HEAT EXCHANGERS ARE DESIGNED FOR SITE SPECIFIC LOCATIONS ACCORDING TO AVAILABLE HEAT REJECTION SINKS
- HEAT EXCHANGERS ALSO USE THE WASTE ENERGY AT ONE POINT IN THE SYSTEM FOR USE ELSEWHERE IN THE SYSTEM

## CENTRIFUGE

- WATER VAPOR IN THE AIR CONDENSES INTO DROPLETS AND ICE CRYSTALS WHEN SUBJECTED TO EXTREME COLD
- LARGE SIZE ICE CRYSTALS IN THE AIR INTAKE OF THE TURBOCOMPRESSOR WILL IMPACT AND ERODE TURBINE BLADES
- IT IS NECESSARY TO REMOVE ALL MEDIUM AND LARGE SIZE ICE PARTICLES BEFORE AIR IS FED TO GEN-SET TURBOCOMPESSOR VIA AN EFFICIENT CENTRIFUGE SYSTEM
- SMALL SIZE ICE CRYSTALS TRACK THE AIR INTAKE STREAMLINES AND NEVER IMPACT THE TURBINE BLADES
- SMALL SIZE ICE CRYSTALS (ESPECIALLY AT -22$^{o}$F) IN THE AIR ARE BENEFICIAL BECAUSE THEY MAKE THE INTAKE AIR COLDER
- ICE COLLECTED FROM THE CENTRIFUGE IS USED TO FURTHER CHILL THE AIR INTAKE

# SCHEMATIC OF INNOVATIVE SYSTEM #1



## SCHEMATIC OF INNOVATIVE SYSTEM #1

### HEAT EXCHANGERS

- HEAT EXCHANGERS CONNECT THE AIR FLOW TO THE UNDERGROUND HEAT SINK (~+60$^{o}$F)
- HEAT EXCHANGERS CONNECT THE AIR FLOW TO THE THAWED ICE MASS FROM THE PADDLE WHEEL (<+60$^{o}$F BUT MORE THAN ~+32$^{o}$F)
- HEAT EXCHANGE CONNECTS THE PADDLE WHEEL VANES WITH ATTACHED ICE MASS (-22$^{o}$F) TO THE COLD WALLS OF THE ICE WATER VESSEL (<+60$^{o}$F BUT MORE THAN ~+32$^{o}$F) TO ASSURE ICE DETACHMENT FROM PADDLE
- ICE WATER LEVEL WILL CONTINUALLY RISE IN ICE WATER VESSEL SO THAT IT WILL BE TAPPED TO ASSURE A CONSTANT LEVEL AND ALSO SUPPLY COLD WATER
- IN A “ZERO” RELATIVE HUMIDITY CLIMATE THE SYSTEM WILL STILL OPERATE

### CENTRIFUGE

- DATA FOR AEROSOL DEPOSITION IN DUCTS WITH BENDS IS EFFICIENT IN REMOVING LARGE SIZED PARTICLES WITH HIGH EFFICIENCY
- THE LINEAR EXTENSION OF THE DUCT BY AT LEAST FOUR-DIAMETERS DOWNSTREAM OF THE BEND CREATES A DEAD VOLUME ZONE. THIS PROVISION AND THE USE OF A 135 DEGREE BEND WILL REMOVE MIDDLE- AND LARGE-SIZED ICE PARTICLES WHILE PERMITTING HARMLESS SMALL SIZED PARTICLES TO TRACK THE FLOW TOWARD THE GEN-SET
- THE USE OF TWO DEAD-ZONES AND TWO 135 DEGREE BENDS ASSURES ONLY SAFE SIZED ICE PARTICLES ENTER THE TURBCOMPRESSOR AIR INTAKE
- PADDLE WHEEL DESIGN ASSURES THAT THE DEAD-ZONE OF COLD AIR REMAINS DEAD AS THE ICE IS COLLECTED AND REMOVED
- PADDLE WHEEL DESIGN USES THE GROUND/WATER HEAT SINK TO TRANSMIT HEAT TO THE PADDLE WHEEL VIA THE THICK STEEL STRUCTURE BETWEEN THE WATER VESSEL AND PADDLE WHEEL STRUCTURE