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# IMPACTS OF CLEAN AIR REGULATIONS ON COMPRESSOR / DRIVER SELECTION

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AN ONGOING TREND KEEPS GETTING TIGHTER

AND TIGHTER

AND TIGHTER

AND !!!!!.



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- **REDUCING COMPRESSOR ENGINE EMISSIONS STARTED MANY YEARS AGO WITH THE LEGACY 2-CYCLE ENGINES AND CLEAN BURN TECHNOLOGY AND PRE-COMBUSTION CHAMBERS**
- **LATER IT BEGAN TO IMPACT THE GAS TURBINES WITH THE ADVENT OF TECHNOLOGIES SUCH AS SOLONOX IN THE EARLY '90S**
- **IT WASN'T LONG AFTER THE REDUCED EMISSIONS TECHNOLOGY WAS BEING APPLIED TO NEW ENGINES AND TURBINES THAT REQUIREMENTS TO MODIFY SOME OF THE EXISTING FLEET OF RECIPROCATING ENGINES WERE BEING IMPLEMENTED**
- **SINCE THAT TIME THE REQUIREMENTS ON ENGINES AND TURBINES HAVE BECOME MORE RESTRICTIVE AND THE NUMBER OF EXISTING UNITS WHICH ARE REQUIRED TO BE MODIFIED HAS BECOME GREATER**



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- **WHEN COMBUSTION TECHNOLOGY ALONE WAS NOT SUFFICIENT, POST COMBUSTION TREATMENT SUCH AS CATALYST IS BEING IMPLEMENTED**
- **OXIDATION CATALYST ARE BECOMING MORE COMMON PLACE ON RECIPROCATING AND GAS TURBINE ENGINES**
- **EVEN WITH THE NEW LOWER NO<sub>x</sub> CAPABILITIES OF ENGINES AND GAS TURBINES SOME OWNERS HAVE BEEN REQUIRED TO OR HAVE DECIDED TO ADD SCR CATALYST UNITS TO ENGINES AND GAS TURBINES FOR FURTHER REDUCTION OF NO<sub>x</sub> EMISSIONS**



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- **AFTER ALMOST FOUR DECADES OF CONTINUOUS IMPROVEMENTS IN COMBUSTION AND POST-COMBUSTION TECHNOLOGY, THE INCREMENTAL REDUCTIONS IN EMISSIONS ARE BECOMING MORE DIFFICULT TO OBTAIN**
- **NEW REDUCTIONS IN EMISSIONS WILL CONTINUE TO BE REQUIRED**
- **THE ALTERNATIVE TO THE ENGINE OR GAS TURBINE IS THE ELECTRIC MOTOR**
- **WHILE IT ELIMINATES THE ON SITE SOURCE OF EMISSIONS THERE IS STILL A PERMITTING PROCESS WHICH DEPENDING ON THE SIZE OF THE ELECTRICAL SERVICE REQUIRED AND THE DISTANCE TO A VIABLE SOURCE CAN BE QUITE EXTENSIVE – AS LONG AS TWO YEARS**



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- **THE EMISSIONS REQUIREMENTS HAVE HAD AN IMPACT ON DRIVER SELECTION OR AT THE VERY LEAST, DRIVER CONFIGURATION**
  - **POTENTIAL IMPACTS TO PROJECT SCHEDULES HAVE CAUSED OWNERS TO START THE AIR PERMITTING PROCESS AND THUS THE COMPRESSOR SELECTION EARLIER TO AVOID DELAYING THE PROJECT**
- OR**
- **THEY HAVE MADE THE DECISION TO USE AN ELECTRIC MOTOR DRIVER AND AVOID THE POTENTIAL AIR PERMIT DELAY ALTOGETHER**
  - **IN SOME CASES THE SCHEDULE PRESSURES MAY MAKE IT DIFFICULT TO DO THE FULL DUE DILIGENCE THAT IS NORMALLY ACCORDED TO COMPRESSOR SELECTION**



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- **DRIVER SELECTION IS NOT ONLY IMPACTED BY THE REGULATIONS**
- **CONCERNS ARE BEING RAISED BY ENVIROMENTAL GROUPS, CONCERNED CITIZENS, LANDOWNERS AND OTHER NGOs**
- **THESE ARE HAVING AN INCREASING IMPACT ON DRIVER CONFIGURATION OR SELECTION**
- **MOST OF THESE CONCERNS ARE BEING RAISED AS PART OF THE COMMENT PROCESS DURING THE PERMIT APPLICATION**
- **PROJECT OPEN HOUSES ARE ANOTHER VENUE THRU WHICH THE NGOs ARE RAISING THEIR VOICES**



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- **EMISSIONS ARE NOT THE ONLY CONCERNS ABOUT WHICH TYPE OF COMPRESSOR AND MORE SPECIFICALLY WHICH TYPE OF DRIVER SHOULD BE USED**
  
- **SOME OF THE OTHER ISSUES RAISED ARE**
  - **NOISE**
  - **GROUND WATER**
  - **HEALTH**
  - **SAFETY**
  - **GREEN HOUSE GASES**
  - **PROPERTY VALUES**
  
- **RESOLUTION OF THESE COMMENTS DURING THE PERMIT PROCESS ARE CAUSING DELAYS TO PROJECT SCHEDULES**





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- **WE SELECT OUR COMPRESSORS AND DRIVERS BASED ON THE APPLICATION AND OTHER PARAMETERS**
  - **OPERATING CONDITIONS**
  - **REQUIRED POWER**
  - **EXPERIENCE OF THE OPERATIONS PERSONNEL**
  - **SAFETY / RELIABILITY**
  - **ENVIRONMENTAL COMPLIANCE**
  - **FLEXIBILITY**
  - **CAPEX / OPEX**
  - **UTILIZATION RATE**
  - **SCHEDULE**



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- **ARE SOME OF THE TRADITIONAL PARAMETERS TO SELECT COMPRESSORS AND DRIVERS BEING PUSHED TO THE BACKGROUND?**
- **ARE POTENTIAL SCHEDULE DELAYS CAUSING DRIVERS TO BE SELECTED THAT ARE NOT THE MOST OPTIMAL FOR THE TASK?**



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- **HOW ARE THESE OBJECTIONS BEING RAISED AFFECTING THE SELECTION OF COMPRESSORS AND DRIVERS?**
- **SOME COMMENTORS HAVE STATED A PREFERENCE FOR GAS TURBINES OVER RECIPROCATING ENGINES**
- **IN OTHER CASES, COMMENTORS HAVE STATED THE PREFERENCE FOR ELECTRIC MOTOR DRIVERS**



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# FINDING A WAY FORWARD

## QUESTIONS?