



GE Power

# POWERING EVERYONE

## Flange to Flange

Creston Dempsey, Senior Engineer Fleet Management

6B USERS CONFERENCE | JUNE 13-16, 2016  
PALM BEACH GARDENS, FLORIDA

**© 2016, General Electric Company.**

GE Proprietary Information - The information contained in this document is General Electric Company (GE) proprietary information. It is the property of GE and shall not be used, disclosed to others or reproduced without the express written consent of GE, including, but without limitation, in the creation, manufacture, development, or derivation of any repairs, modifications, spare parts, or configuration changes or to obtain government or regulatory approval to do so, if consent is given for reproduction in whole or in part, this notice and the notice set forth on each page of this document shall appear in any such reproduction in whole or in part. The information contained in this document may also be controlled by the US export control laws. Unauthorized export or re-export is prohibited. This presentation and the information herein are provided for information purposes only and are subject to change without notice. NO REPRESENTATION OR WARRANTY IS MADE OR IMPLIED AS TO ITS COMPLETENESS, ACCURACY, OR FITNESS FOR ANY PARTICULAR PURPOSE.



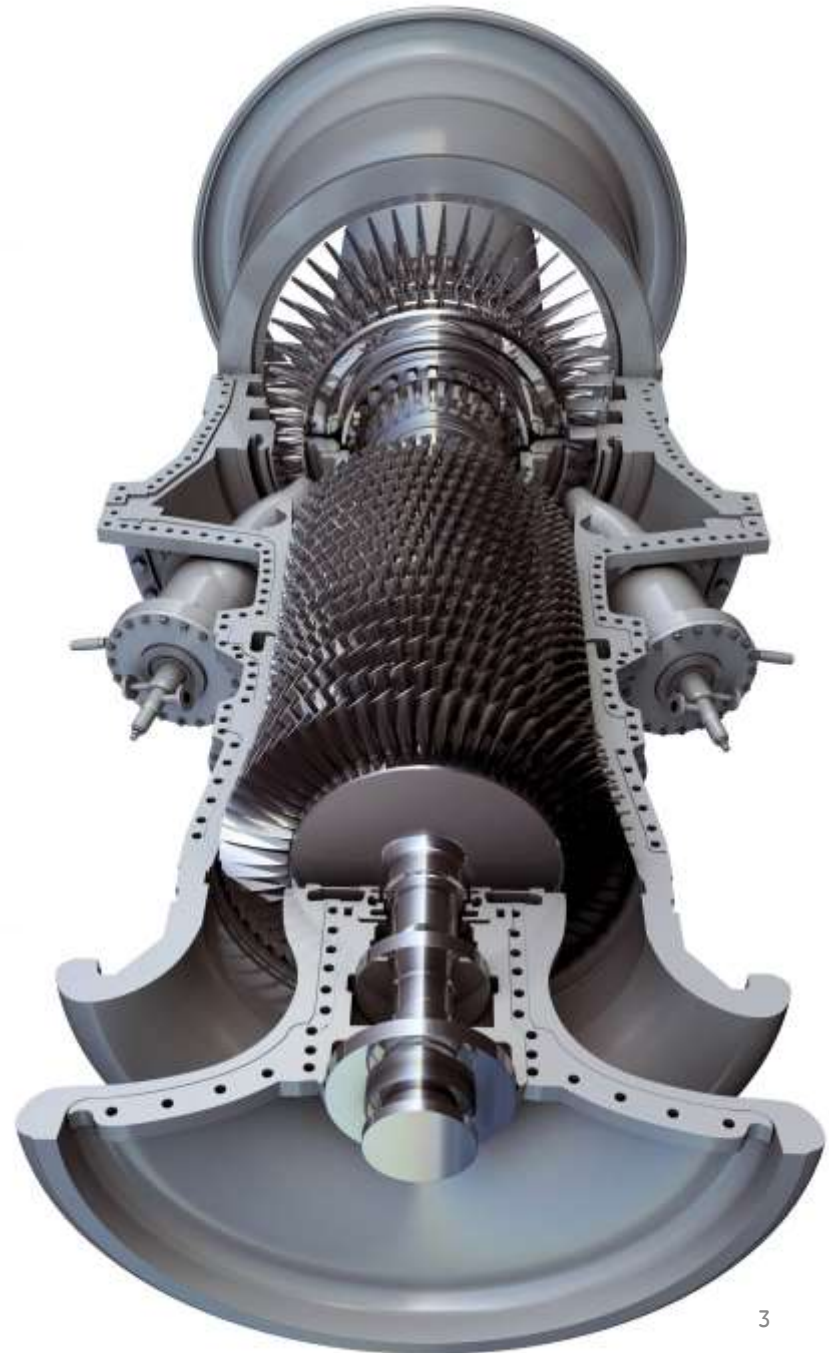
# Agenda

6B Overview

System Detail

Flange to Flange Planning

Summary





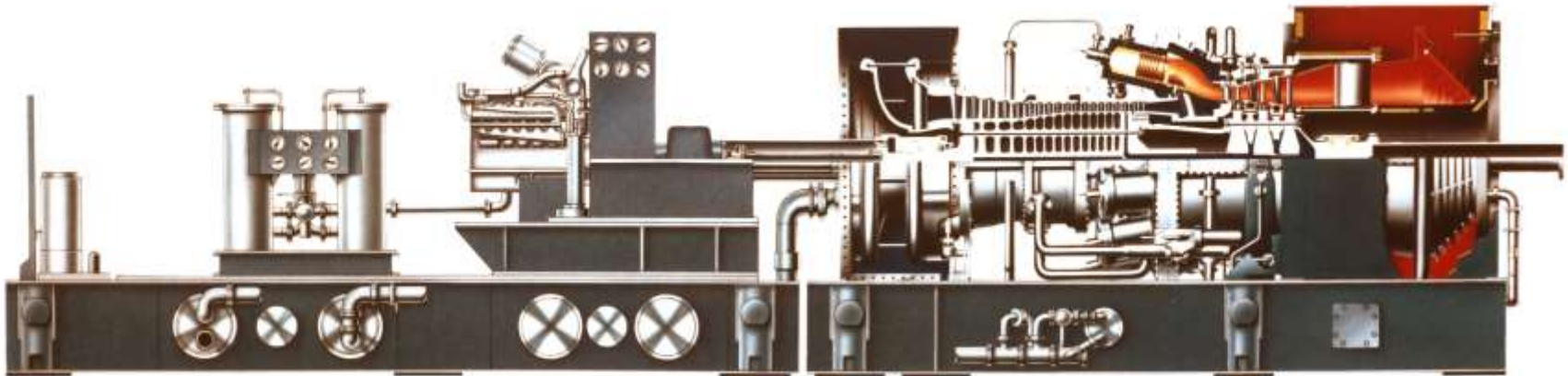
# Gas turbine overview

## Items to consider

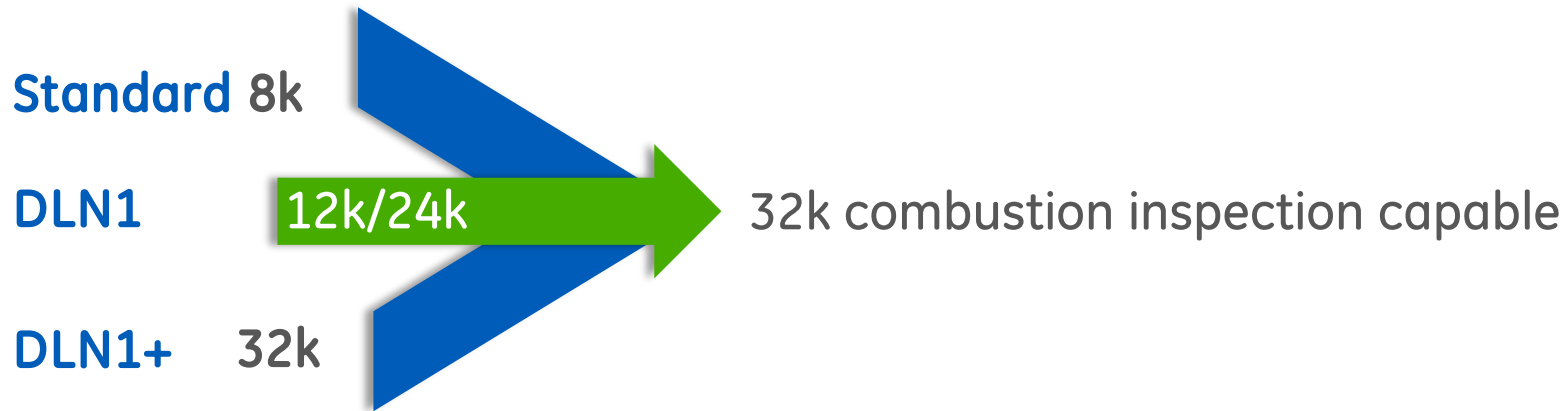
- Inlet (Bypass, Bleed Heat, Filters, Filters, Filters)
- Compressor
- Controls and software
- All Outages Align (32k or ?)
- Rotor life extension and outage alignment
- Casing/Rotor train alignment

## Questions that are a must know for next stage planning for your 6B

- What reliability is acceptable for your 6B?
- What is my current configuration and T Fire?
- When will rotor life extension occur?
- A “Super Major” on the horizon for your plant?
  - Rotor life extension or rotor replacement
  - All combustion and HGP parts to be swapped?
  - Replace compressor blades and stators?
  - Controls and/or software will make you more viable?



# Combustion and HGP migration to 32k



## HGP hardware

32k Hot Gas Path inspection/64k major inspection

## Rotor major inspection

150k-200k inspection  
Will this align with HGPI or MI of the future?

## Generator inspection

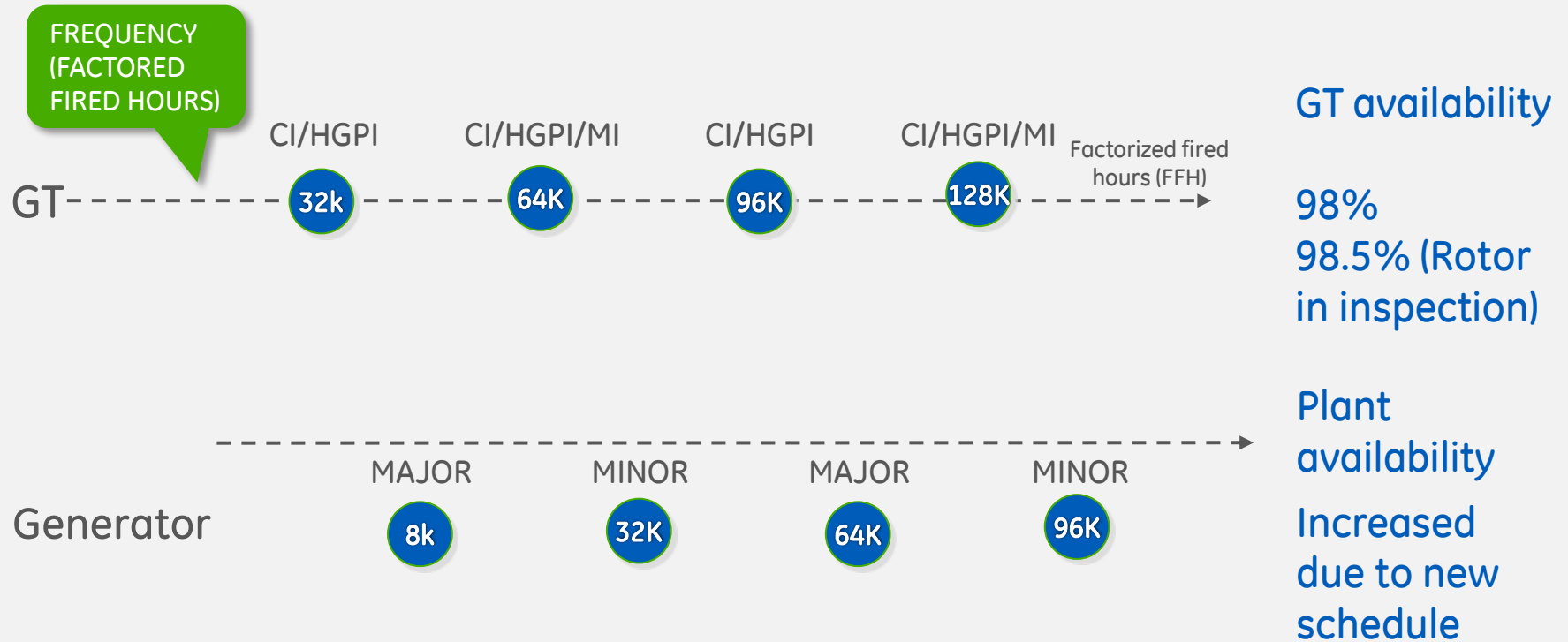
Will this align with HGPI or MI of the future?

## HRSB/other plant constraints

Is the GT outage the reason for shutdown?



# B/E future centerline outage model



*GEK103566 Rev J now aligns Generator outages to hours based operation*

Migration to one schedule for long duration outages to align with plant

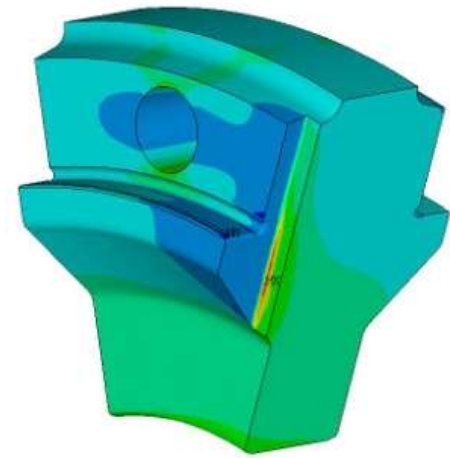


# Component life details

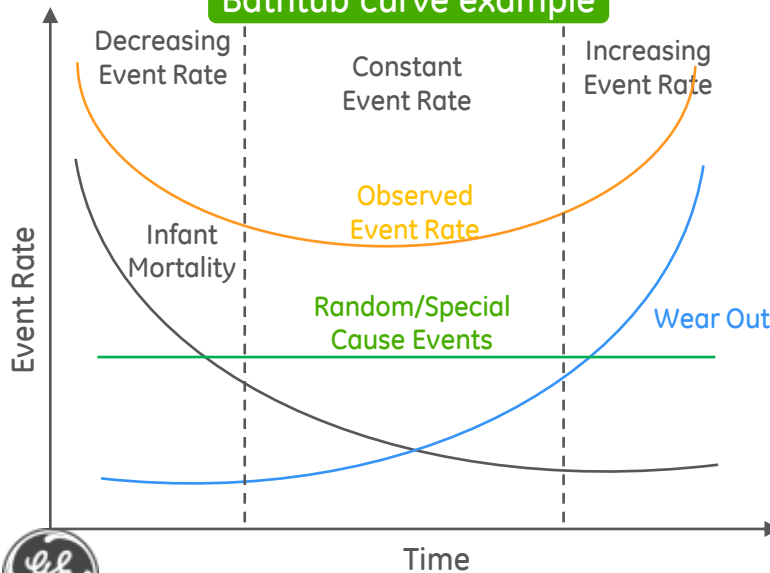
## How long is the Gas Turbine intended for?

- Operation environment
- Frequency modeling after 30 years of operation
- More typical low cycle fatigue and creep
- Equipment settling over time

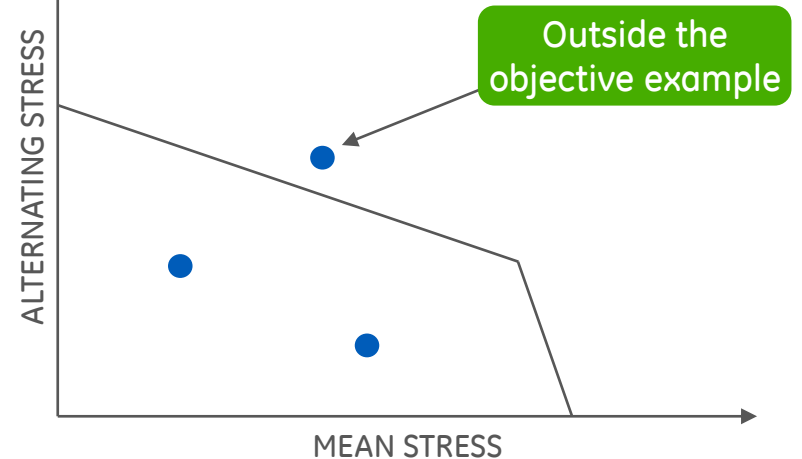
Model example



Bathtub curve example



Goodman plot example

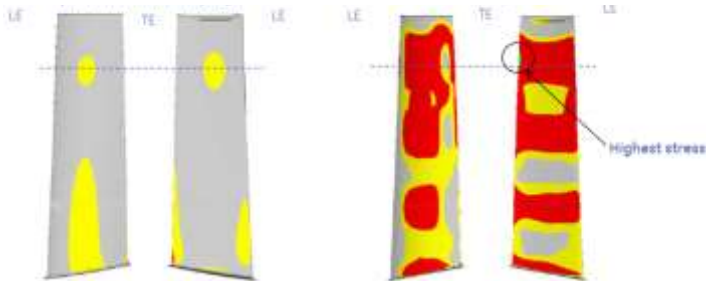


# Component life details

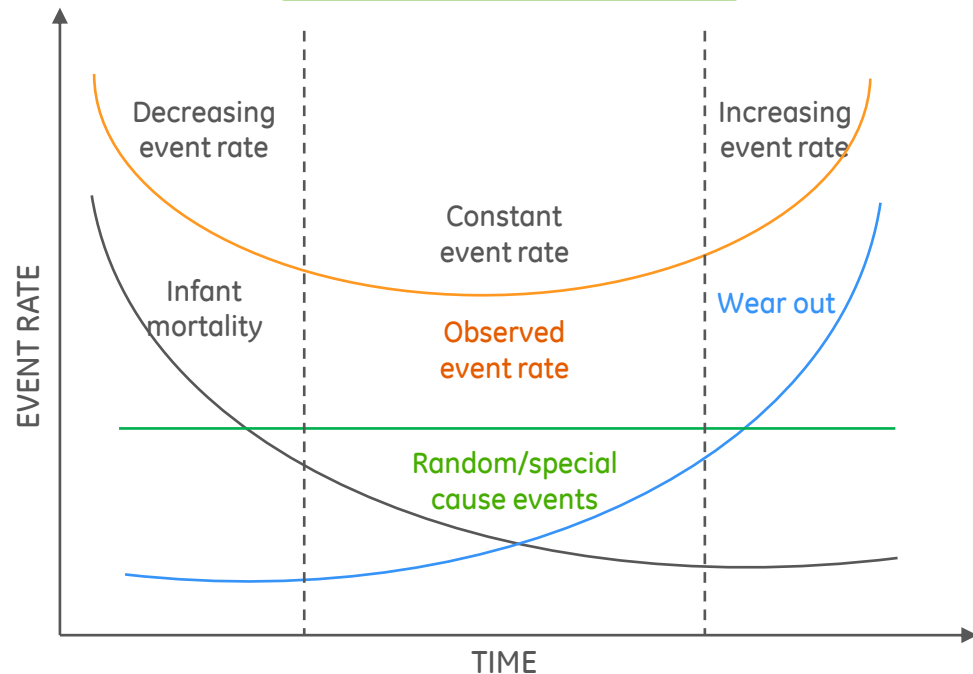
## How this relates to Flange-to-Flange swap

- Casing life reset (performance impacts and repair cost)
- Foundation/tube frame struts refresh
- Ability to address compartment challenges
- Hot day performance recovery
- Controls refresh
- Rotor life reset
- Compressor recovery

### Stator model example



### Bathtub curve example





# Rotor life extension offerings

Frame	Starts	Hours
6B	Not currently available	100,000 hours/2 major inspections
7B/E/EA	2,400 starts/1 major inspection	100,000 hours/2 major inspections
9B/E	Not currently available	100,000 hours/2 major inspections

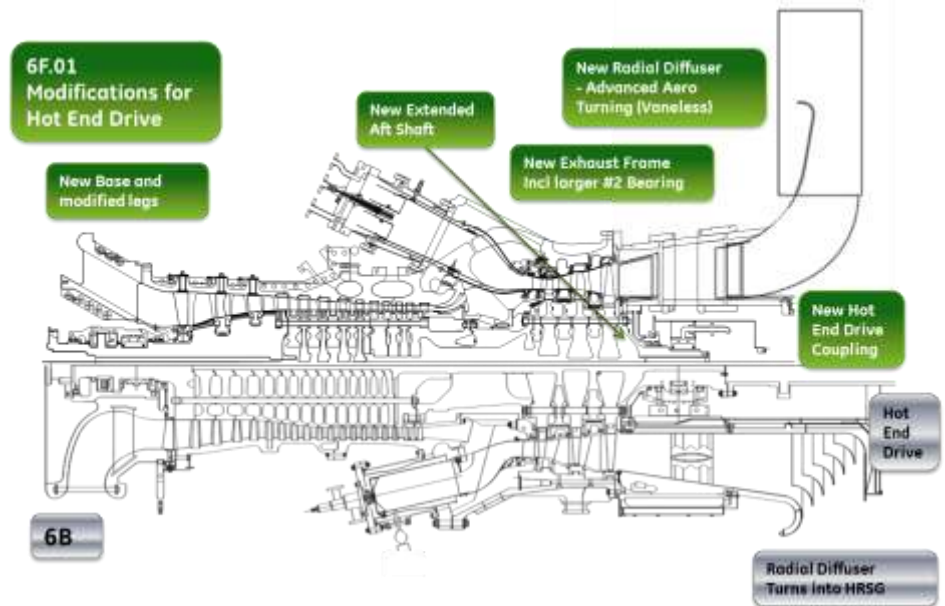
## Life extensions can occur during the prior MI/HGP with no penalty

- Hours based 150,000-200,000 hours
- Starts based extensions can occur between 4,000-5,000 starts



# 6F.01 flange-to-flange replacement

	6541B	6B.03 (2016)	6F.01
GT output (MW)	38	44	52
GT efficiency (%)	31.7	33.5	38.4
GT exh temperature (°F)	980	1,019	1,117
GT exh flow (t/h)	515	523	455
GT exh energy (MMBtu/hour)	271	289	280
1x1 CC output (MW)	59	67	76
1x1 CC efficiency (%)	48.8%	51.5%	56.6%



F-Class performance in a 6B footprint



