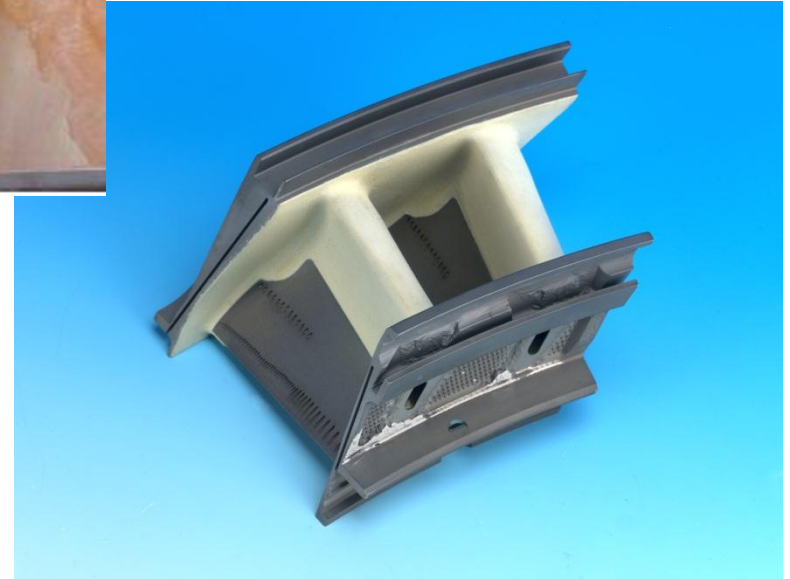




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# THERMAL BARRIER COATINGS

Ron van Gestel, Chromalloy

# Thermal Barrier Coatings

Performance enhancement

Increase of turbine inlet temperature

Efficiency improvement

## Thermal Barrier Coatings

□ Seems the **buzz** word nowadays!

- Interest at the stakeholders level is overwhelming
- Topic is very broad
  - Materials
  - Performance
  - Inspection

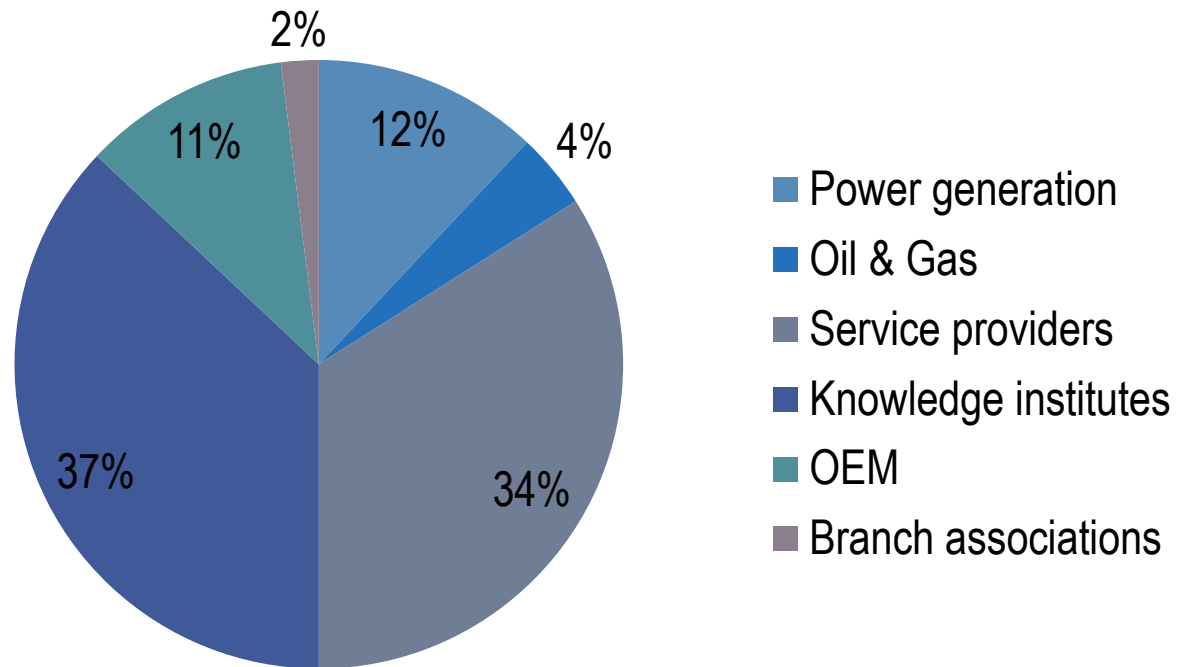


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# Thermal Barrier Coatings

Prioritization query forwarded December 21, 2011  
to member base 92ea organizations



**Feedback up to now: 3ea organizations**

Work group chair & co-chain not counted



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# Thermal Barrier Coatings

## Materials Topics

1. **Evaluate the different ceramics that can be used as TBC for the application in the HS of a GT**
  - Effect of stabilizing constituents, like Mg, Y, Ce etc.
2. **Evaluate different application technologies for the specific fields of interest**
  - Study must restrict itself to the technical side only
3. **Means to control the TGO to reduce spallation**
  - Bond coat system

	Power Generation	Oil & Gas	Knowledge Institutes	Service providers	OEM
1	.	.	H	H	H
2	.	.	L	H	H
3	.	.	H	-	H

# Thermal Barrier Coatings

## Performance Topics

1. **Determine the effect of a TBC on the component metal temperature in relation to the gas temperature**
  - Parameter: TBC thickness, local curvature, .....
2. **Degradation mechanisms of TBCs and their effect on performance**
3. **Effect of surface roughness of the TBC on overall performance of the GT**
4. **Graded TBC's**
  - Parameter: structure, morphology, ...
5. **TBC's in liquid fuel environment**

	Power Generation	Oil & Gas	Knowledge Institutes	Service providers	OEM
1	.	.	L	L	H
2	.	.	H	H	H
3	.	.	L	H	L
4	.	.	H	-	-
5	.	.	-	H	-



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# Thermal Barrier Coatings

## Inspection Topics

1. NDT techniques to determine premature degradation

	Power Generation	Oil & Gas	Knowledge Institutes	Service providers	OEM
1	.	.	-	L	H



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# Thermal Barrier Coatings

## Conclusions

- Given feedback, interest member base questionable
- Common interest – High priority
  - Alternative TBC system for use in the HS of a GT
  - Degradation mechanisms and their effect on performance
  - (Means to control the TGO to reduce spallation)
  - (Different application techniques)
- Materials received highest overall prioritization
  - Materials 1.33
  - Performance 1.80
  - Inspection 2.00



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# Thermal Barrier Coatings

**Next steps:**

.....



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