

**SMI JKMRRC**

Julius Kruttschnitt Mineral  
Research Centre



So what does a Professor of  
Comminution lie awake thinking about?

**Malcolm Powell**

# DRIVERS

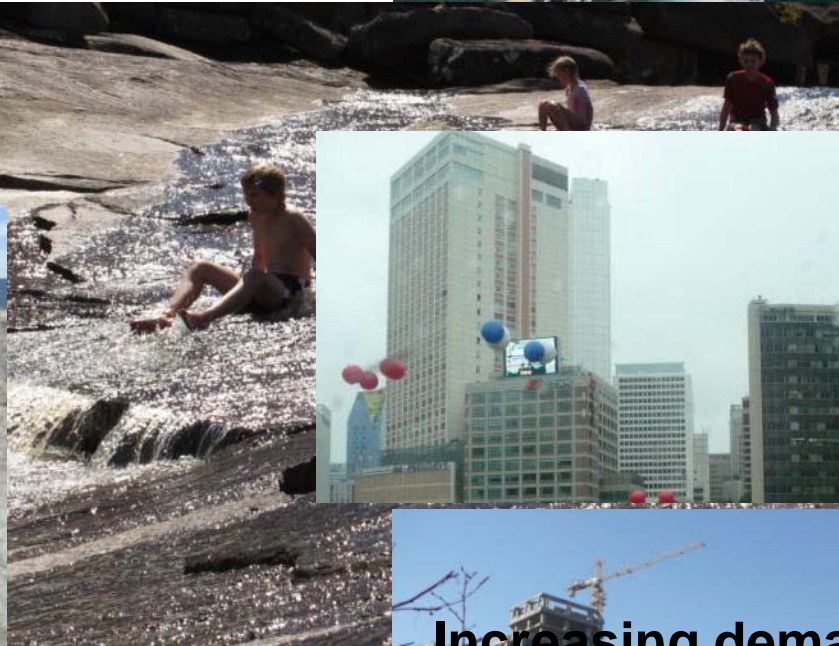
**Water**



**Energy**



**Massive low-grade ore bodies**

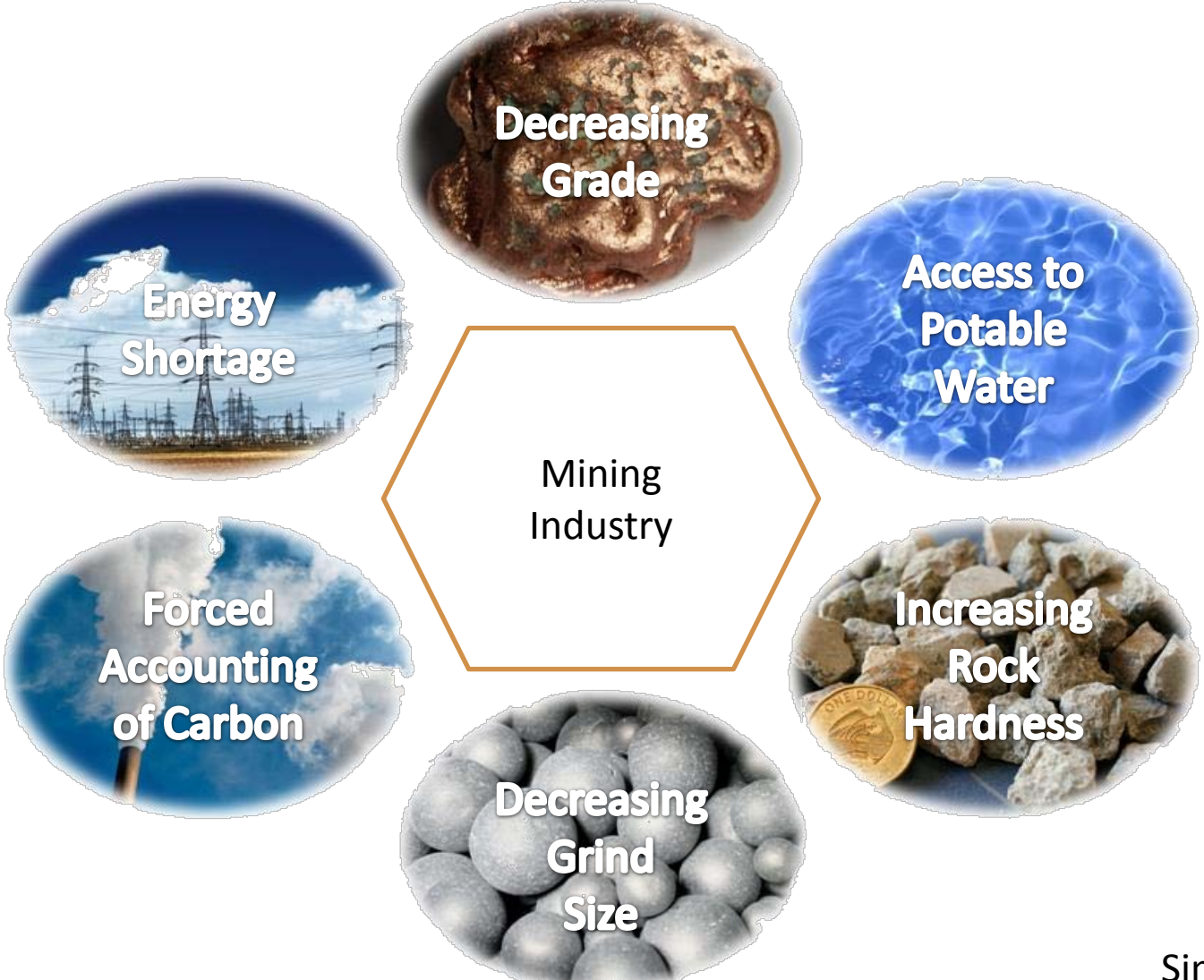


**Increasing demand**





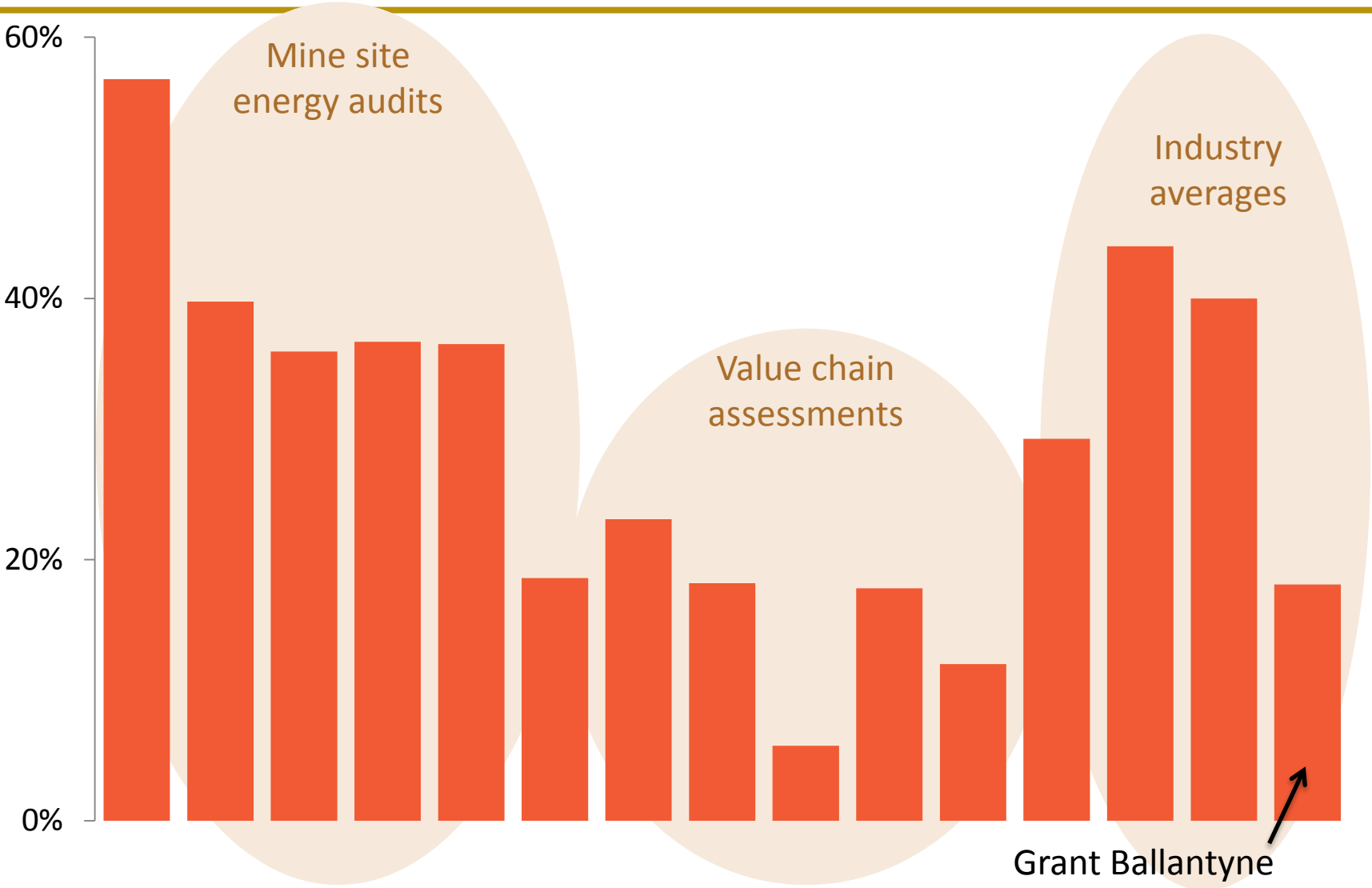
# Six caveats that will change mining culture & design



Simon Michaux

What are the economic implications of all this?

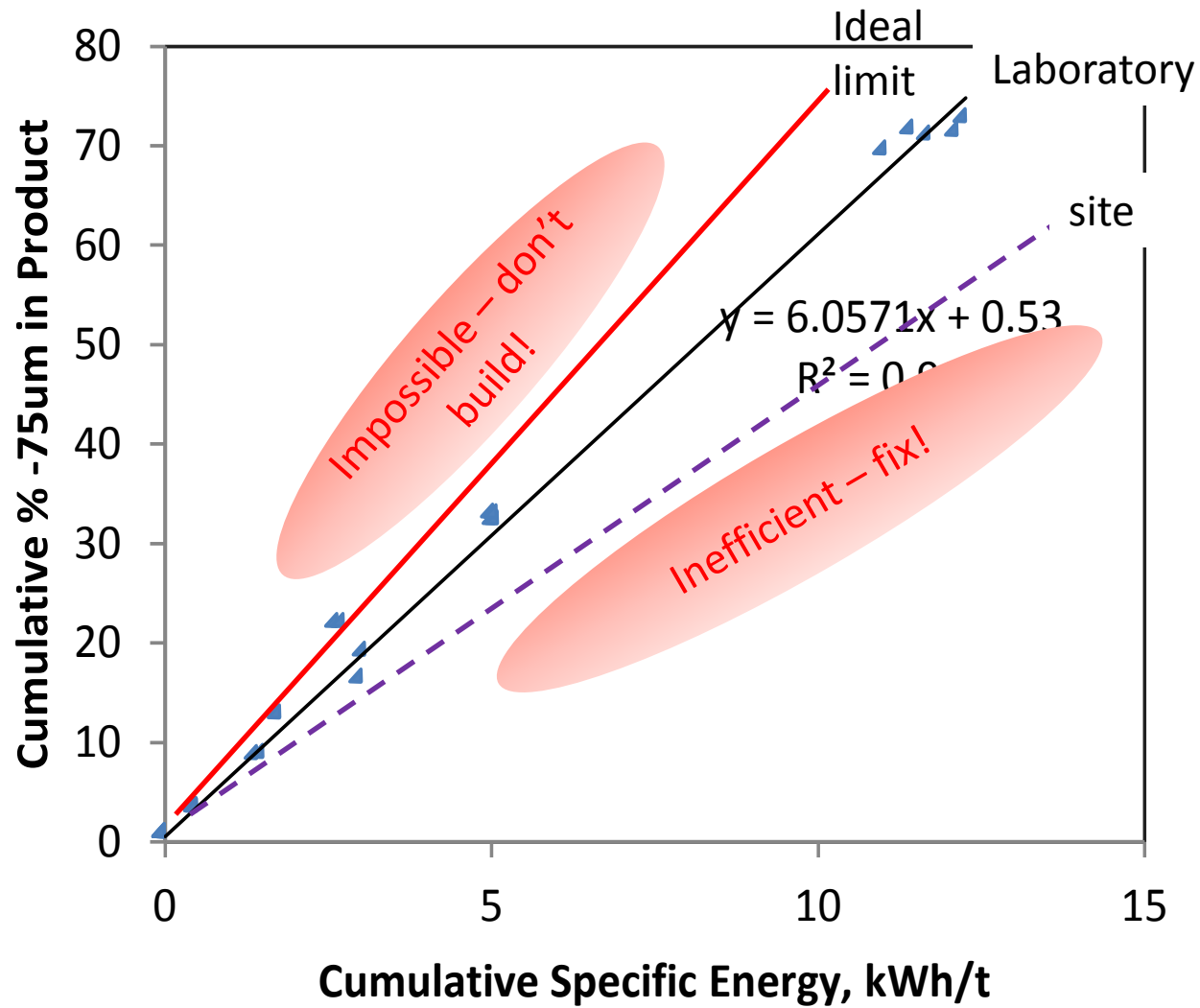
# % comminution energy



No cheating

The fixed relationship of Energy per production of surface area

# No short cuts



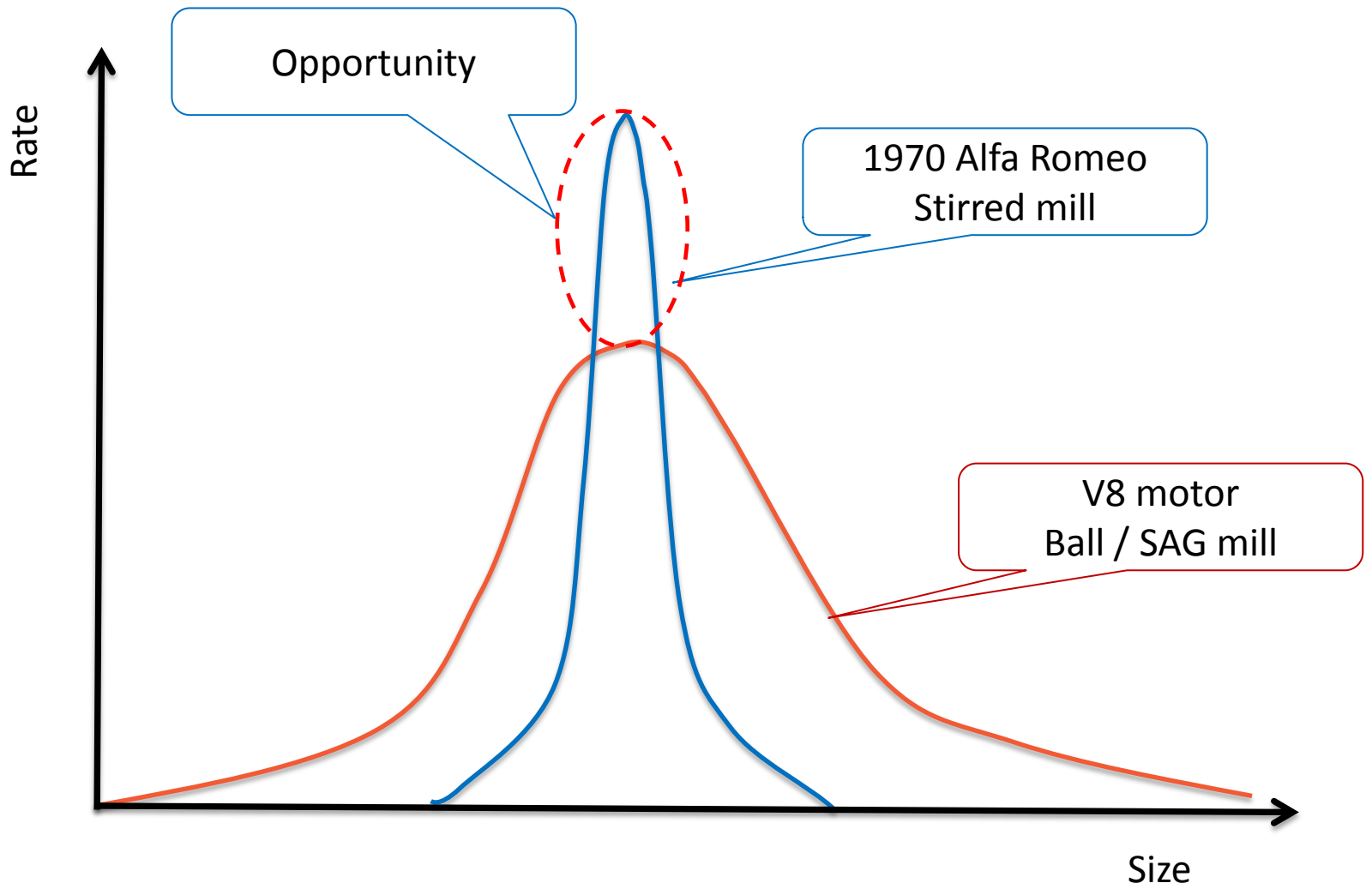
Hilden





Robust





Robustness  
Vs  
performance

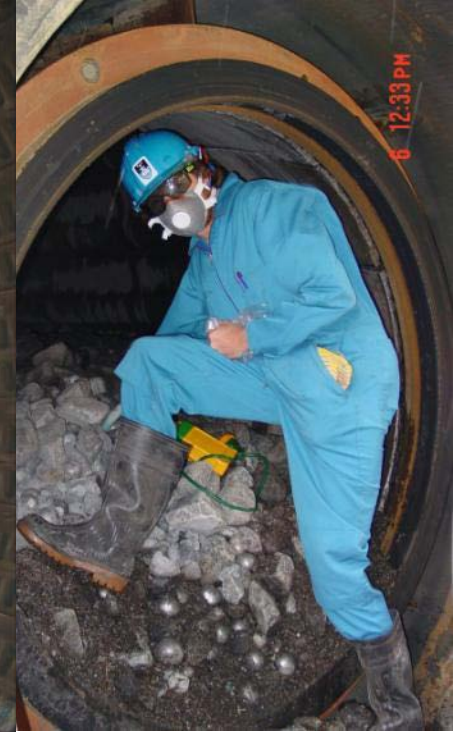




Connection to reality on site







On-site reality  
Δ  
design to  
reality

JKMRC  
Struttschmitt Mineral  
Tech Centre

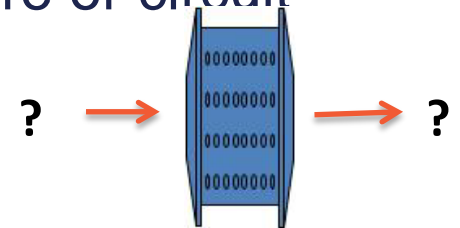


# Circuits

Individual machinery is useless



Individual models don't provide the full picture or circuit performance



**Circuit response**





# Autogenous Hybrid + screen classification

## Simulation / design input

- Multi-component Ore characterisation
- Grade differential
- Liberation
- Competence range
- Sorting on Mineralogy
- Change in competence
- Fine grinding
- Fine classification
- Multi-comp HPGR
- Bimodal SAG feed
- Abnormal ball mill feed
- Multi-comp cyclone
- Fine screen

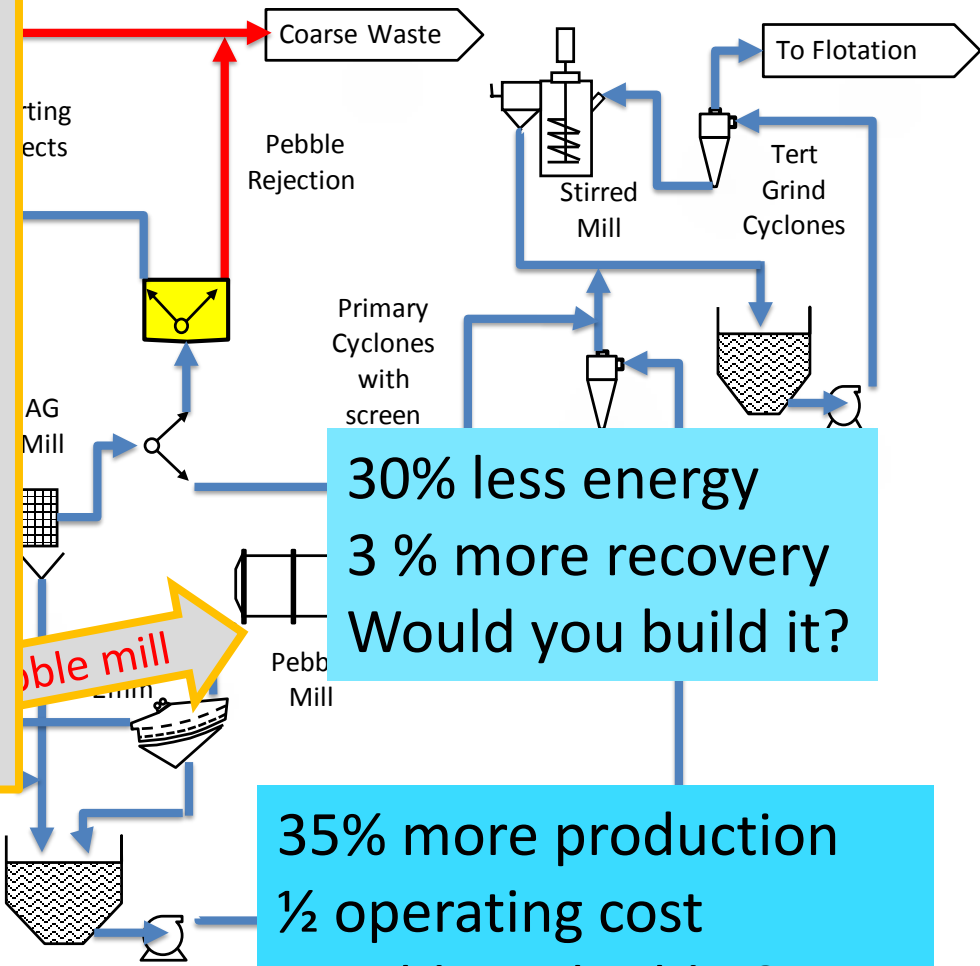
Smart



ROM

Primary Gyratory Crusher

80mm  
20mm



30% less energy  
3 % more recovery  
Would you build it?

35% more production  
½ operating cost  
Would you build it?





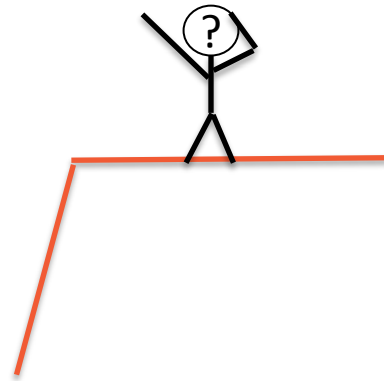
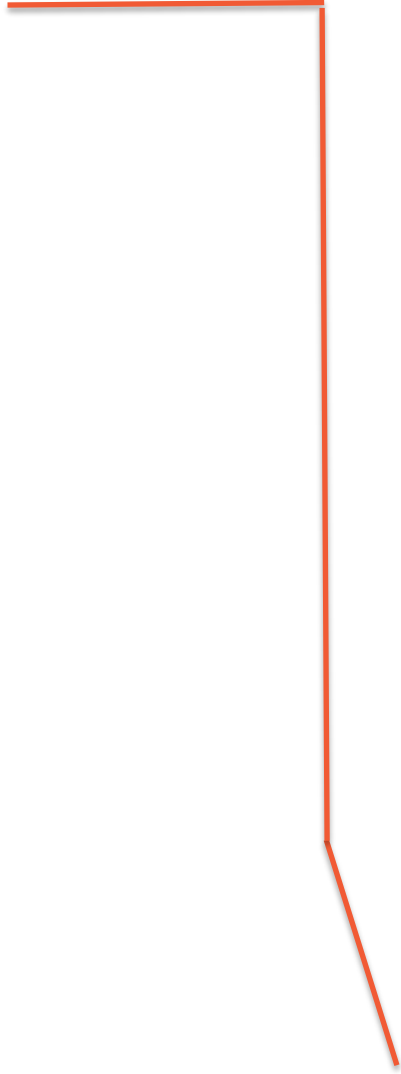
# Engineering companies

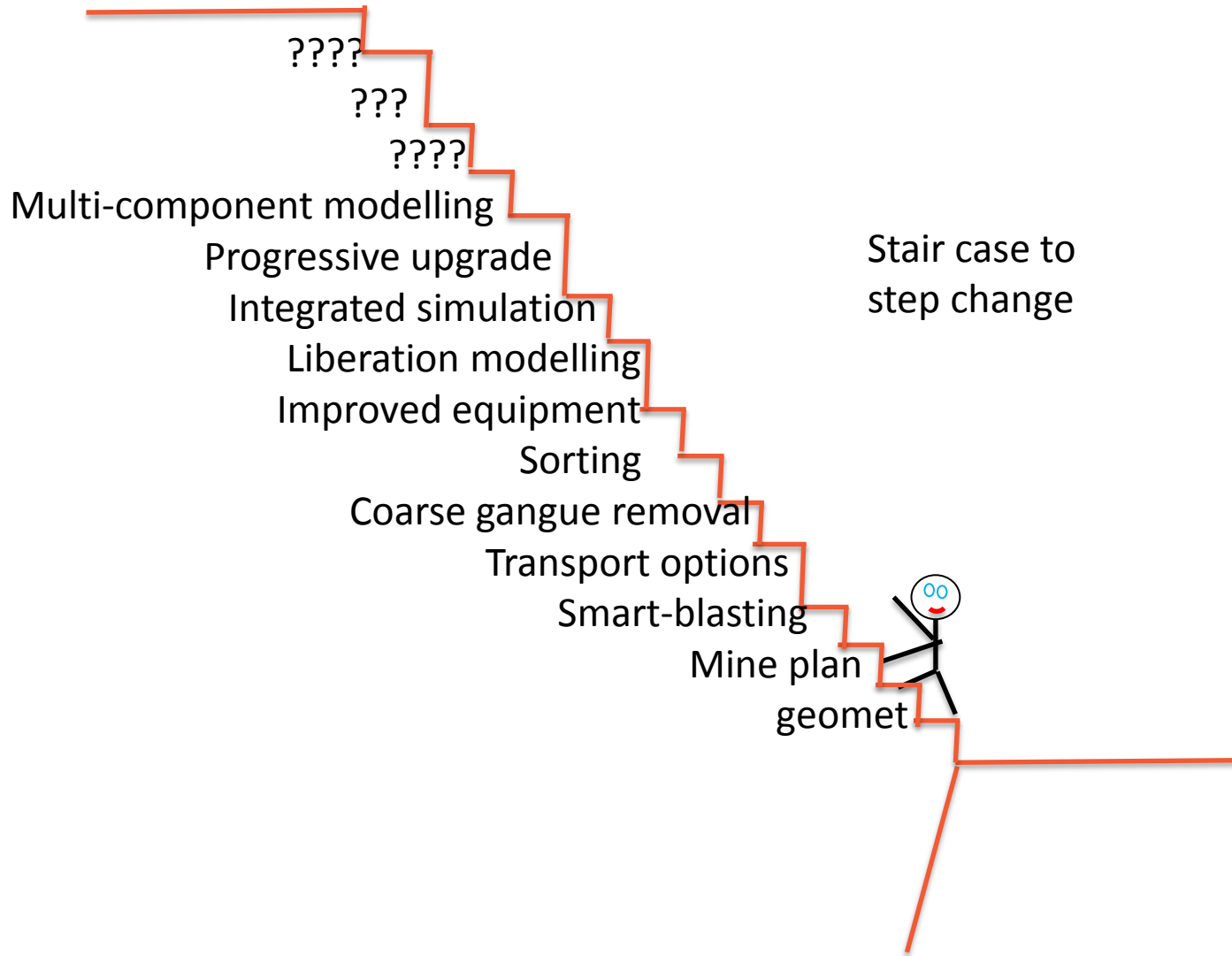


Transform complexity into elegance



Step change ?





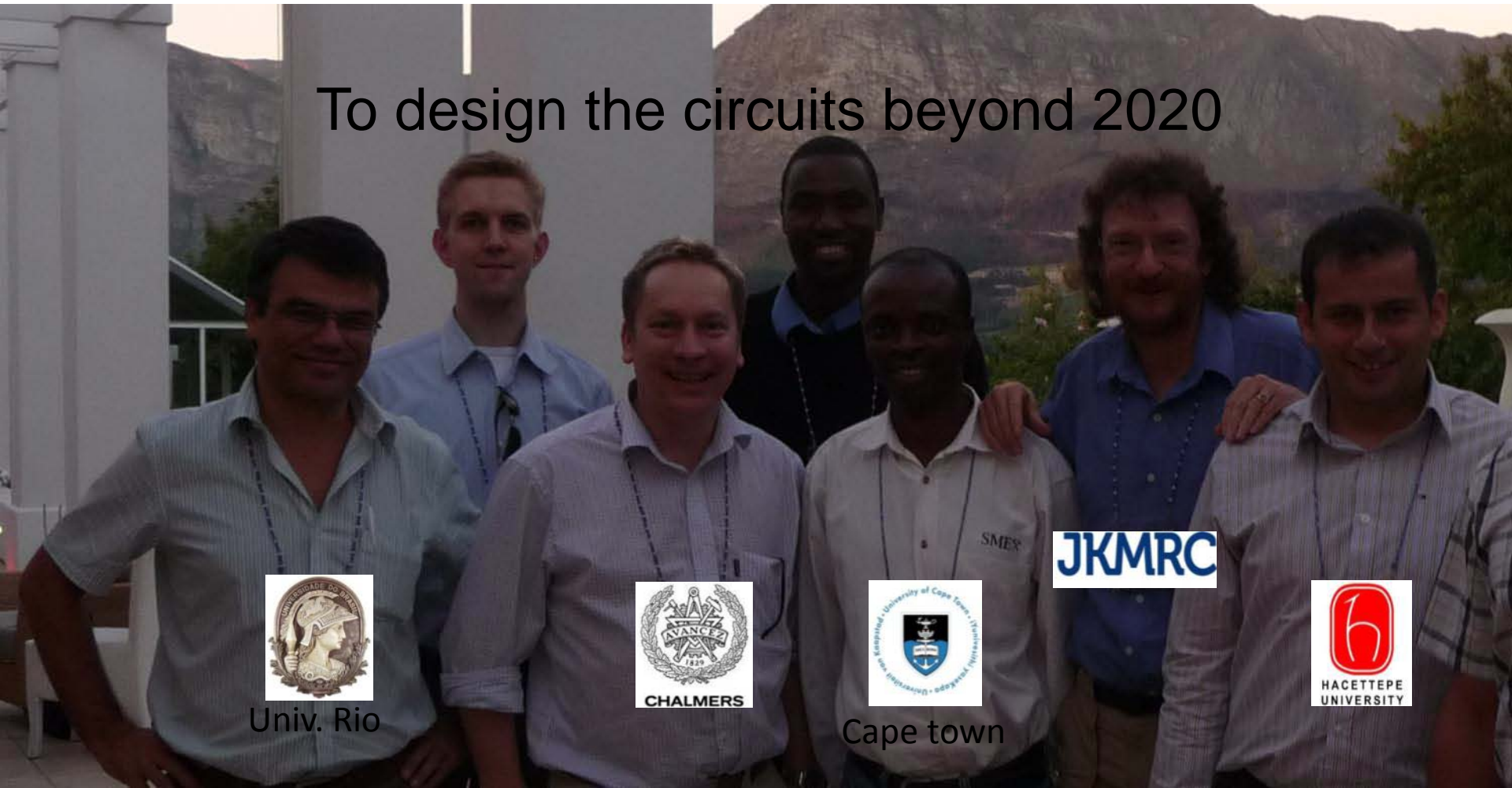
# **GCC** Global communication collaborative

Our process is in circuits

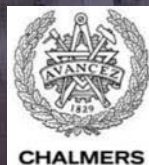
Our capability must be in total circuit modelling and simulation

Our capacity must be considerable

To design the circuits beyond 2020



Univ. Rio



CHALMERS



Cape town



HACETTEPE  
UNIVERSITY