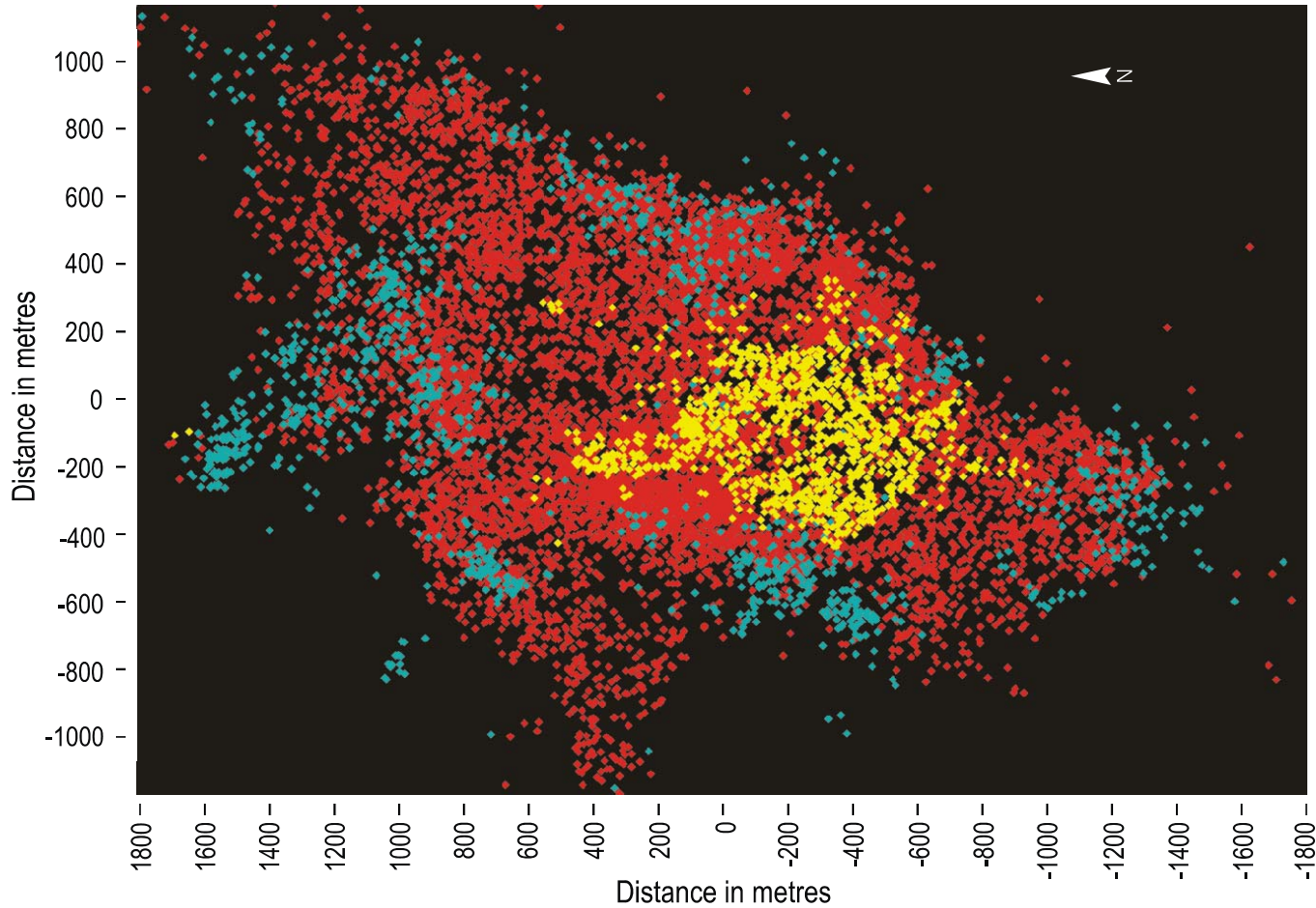


# Reservoir Creation



# What are we aiming for?

e.g.		Flow rate kg/sec		
		1MW	10MW	50MW
200°C	Single flash	20	195	975
250°C	Double flash	8.5	85	426
For > 30 years				

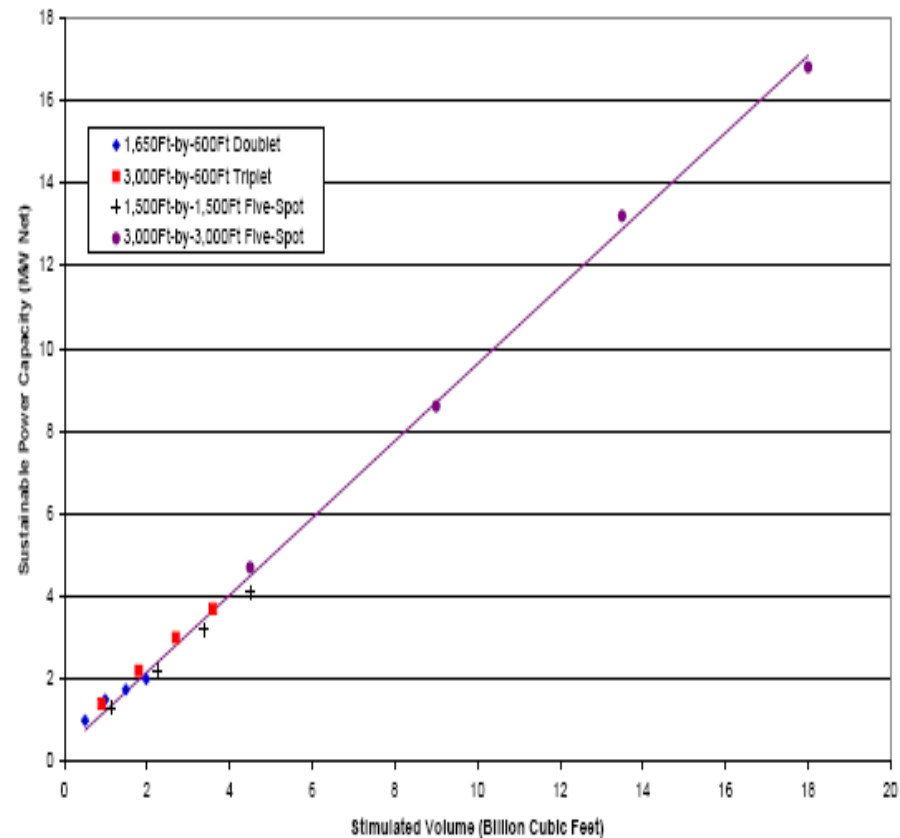
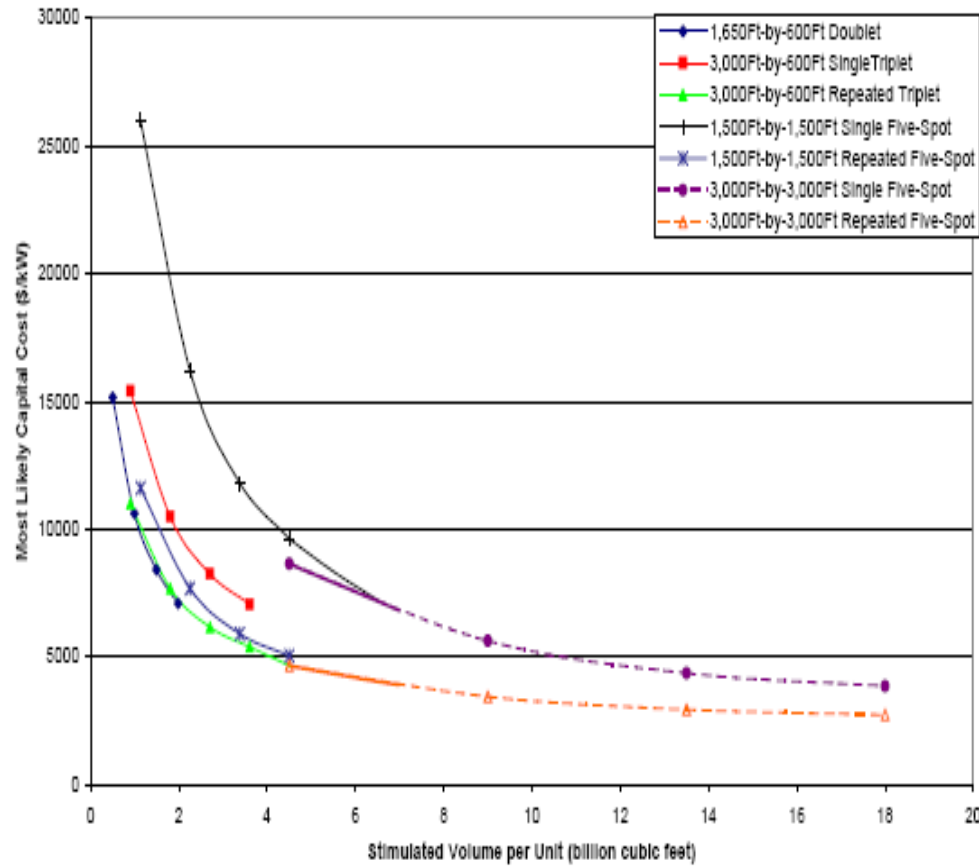
How do we achieve targets?

- ▶ Productivity
- ▶ Reservoir volume



# Targets

## 1. Techno-economic optimisation models



After Sanyal et al

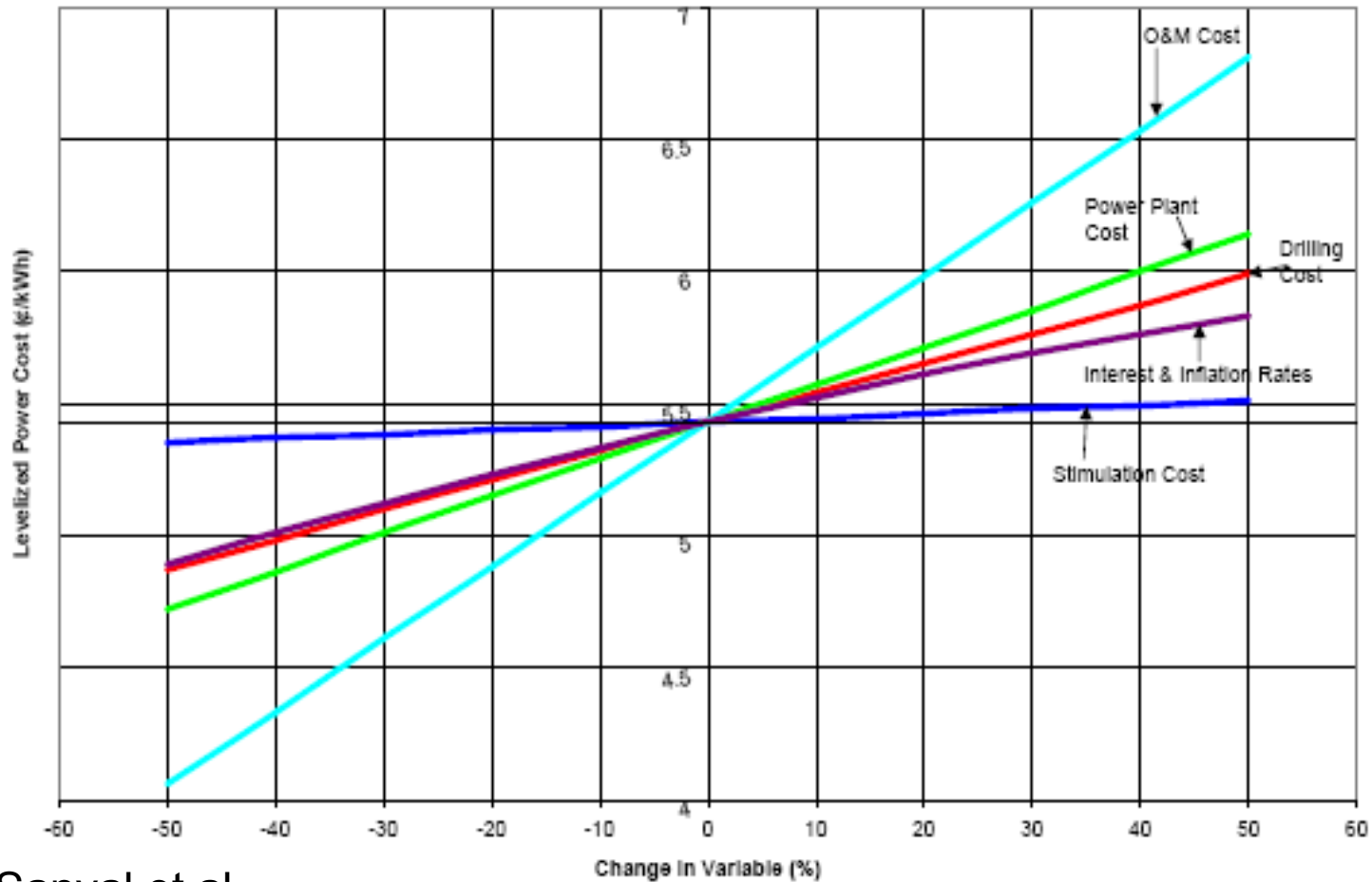
# Creation

Objectives:

- ▶ Volume
- ▶ Productivity index (l/sec/bar)
  - max  $k_h$
- ▶ No unacceptable induced seismicity

# We can afford to spend

Figure 6: Sensitivity of Levelized Power Cost



After Sanyal et al

# Issues and Opportunities

## 2. Hypotheses pre stimulation

- ▶ What does the reservoir look like?
  - Natural fault/fracture system?
  - Stress condition/major faults (OK)
  - Vertical connection?
  - Improved geophysics?
  - Develop analogues - see granite fractures project?
- ▶ Amenability to effective stimulation
  - Share experiences
  - Develop analogues

# Issues and Opportunities

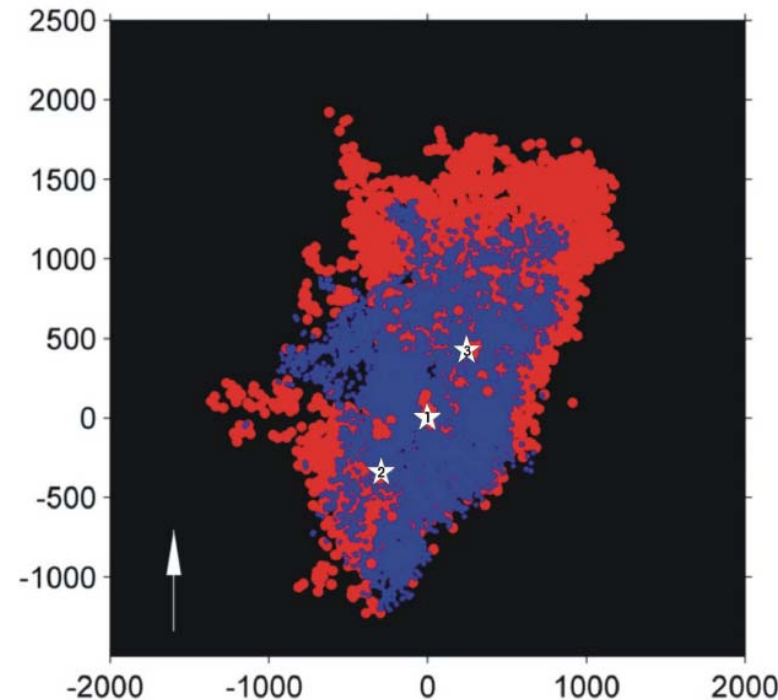
## 3. Stimulation Procedures

- ▶ Fracture clean-up pre-stimulation
  - See temporary sealing materials
  - Re-mobilise muds that have been static
  - HPHT clean-up technology and experience
- ▶ Injection fluid design
  - Theory + products + share experience
- ▶ Pump rates/pressures/cycling
  - Theory + share experience

# Issues and Opportunities

## 3. Procedures cont:

- ▶ Cross-well/dual stimulation
  - Share experience
- ▶ Value in stimulating second wells or re-treatment?
  - Share experience
- ▶ Quick assessment of performance
  - Theory needed?



# Issues and Opportunities

## 4. Equipment

- ▶ Single/straddle packers
  - 300°C, inside liners/open hole
  - New elastomers/materials/concepts
  
- ▶ Zonal control (see drilling and reservoir management)

# Issues and Opportunities

## 5. Monitoring and interpretation

- ▶ Micro-seismic monitoring is OK
- ▶ How to interpret events
  - Indicators of permeability, eg displacement map?
  - Warning of unacceptable seismicity?
  - Theory + share experience?