**Existing downhole camera technology** requires the geothermal well to be cooled. Cooling a geothermal well is every expensive and significantly ages the well’s steel casing bond to the formation by changes in thermal expansion. Consequently, geothermal well owners rarely image inside their wells because no cameras exist for well temperatures greater than 200°C.

### Project Objective

**Develop a 250°C wellbore camera that...**

1. Requires no well cooling, allowing inspection of active production and injection wells
2. Uses conventional, single conductor, 600°F wireline up to 12,000 ft long to greatly reduce deployment cost and triple the depth capability of existing cameras
3. Provides imaging of either the wellbore wall or downhole

### Technical Challenges

1. No video chip is rated for temperatures over 125°C.
2. Imaging rock fractures requires high-definition images.
3. Most logging tools will not work on 12,000 ft of 600°F wireline.

**Solution** – Video chips and flash memory are very small, so actively cool them. Use flash memory to store HD images and transmit lower resolution. Operate other electronics at geothermal temperatures using RelChip’s 32-bit 300°C microprocessor and PermaWorks’ existing electronics.

In short, we are developing a camera with a **hot side** and a **cold side**, using CO₂ cooling.

### Optical modeling and deconvolution algorithms promise high-resolution wellbore images...

**Conclusion** – Our first-generation tool will be completed in Year 1. Year 2 plans are to field test and develop design improvements for a second-generation tool.