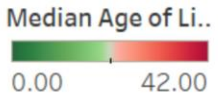
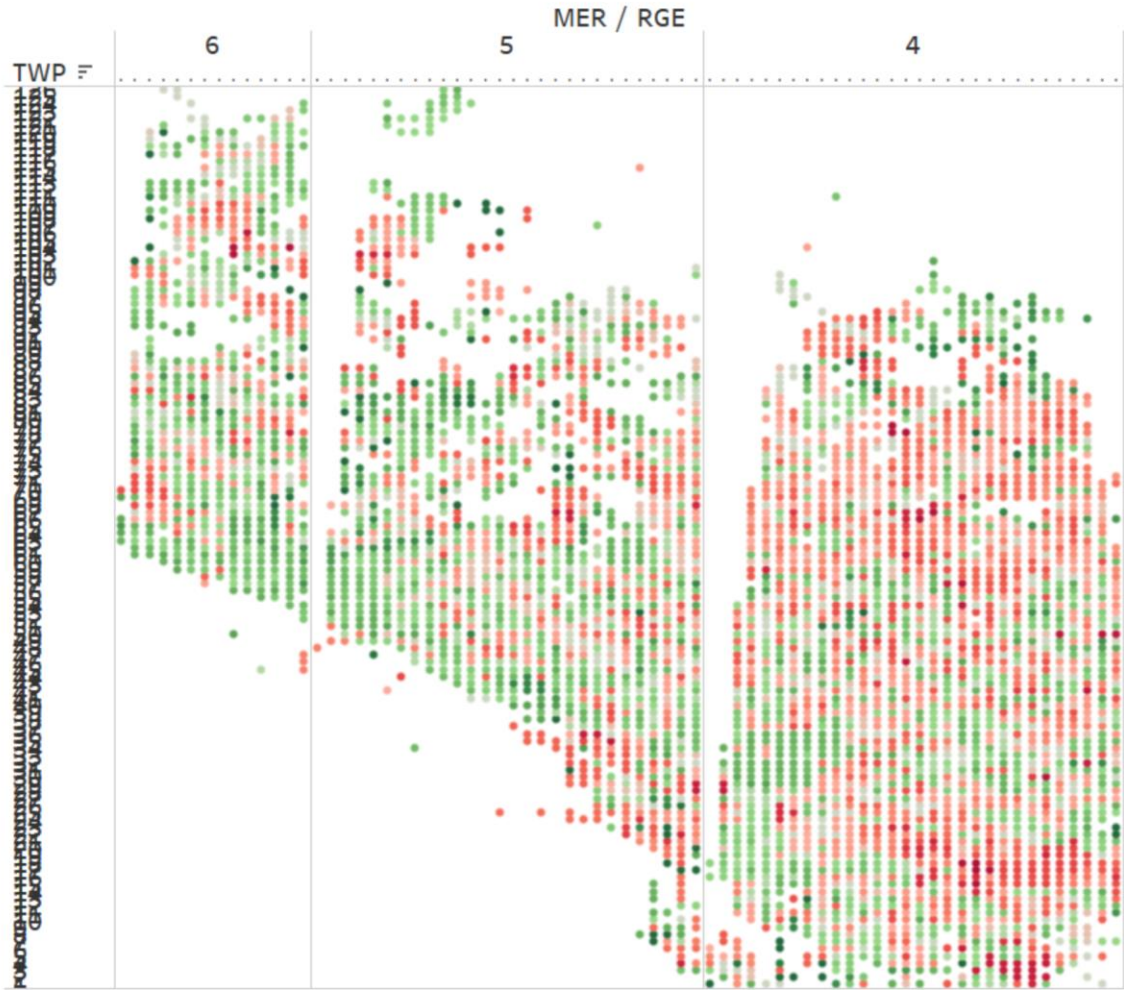


Objectives

- ▶ What factors contribute to FAILURE of aging infrastructure?
- ▶ What factors contribute to the EFFICIENCY of aging infrastructure?



Sheet 1

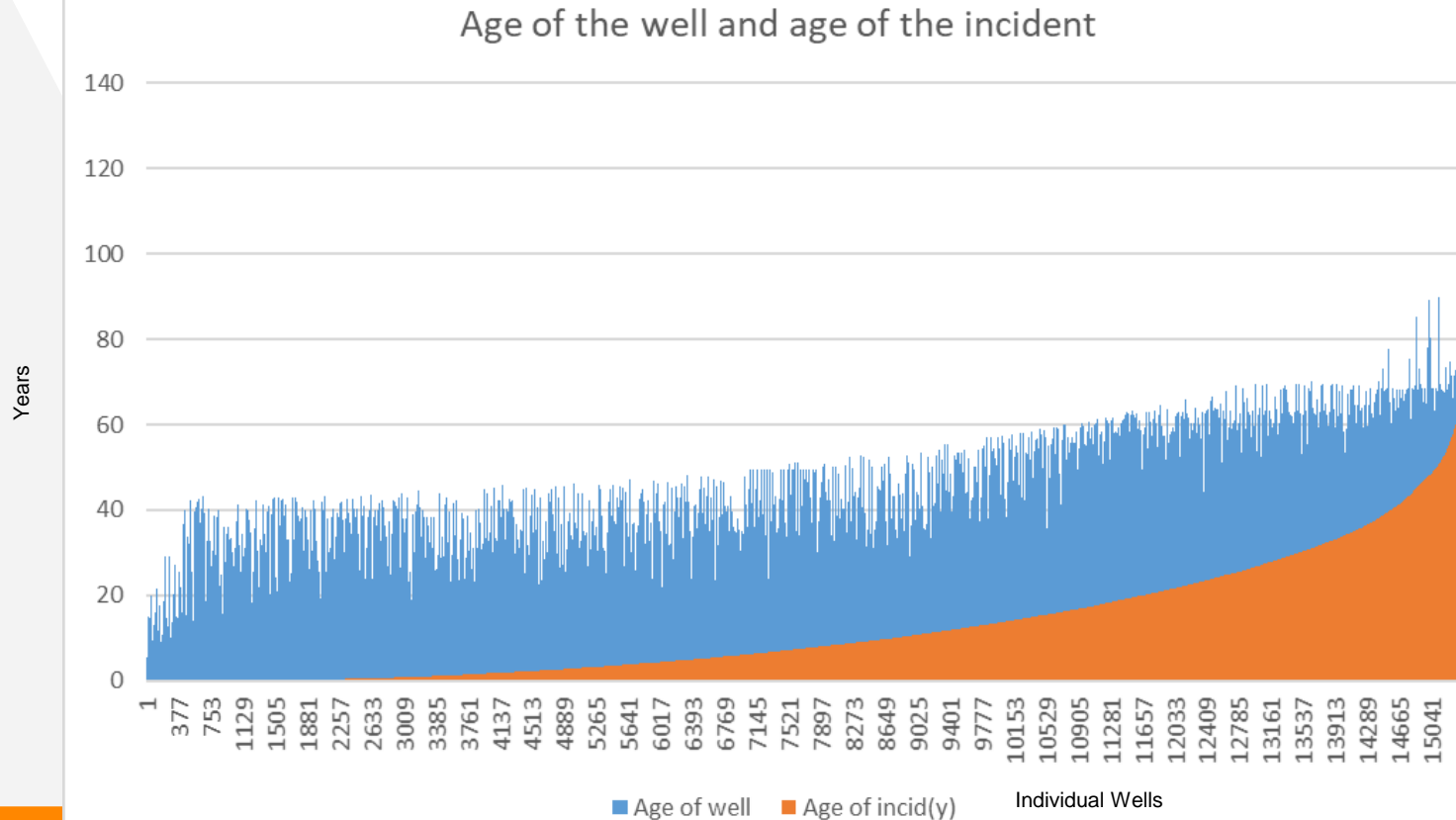


- ▶ Factors affecting Failure
 - ▶ Age did not impact failure in wells as expected
 - ▷ Most well incidents occur in the 1st year
 - ▷ Consistent across all eras
 - ▷ Pre vs. Post Drilling
 - ▷ Largest cause in post-drilling incidents

due to data gaps, could not repeat exercise for pipelines and facilities

POD: Aging Infrastructure

Untapped Energy

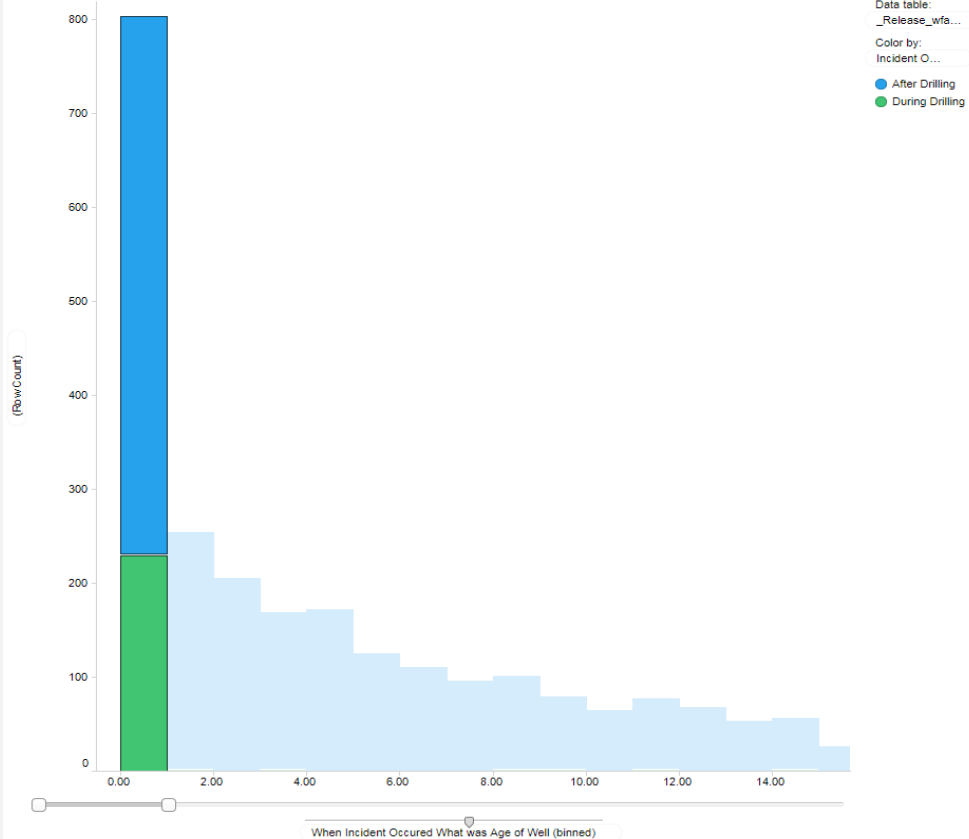


POD: Aging Infrastructure

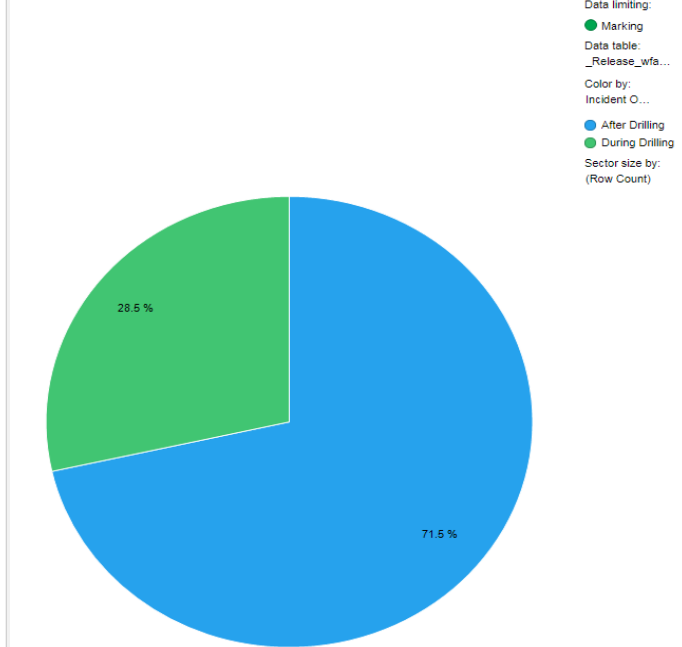
Untapped Energy



■ Histogram – When Incident Occurred What was Age of Well



■ (Row Count) per Incident Occurred During or Ater Drilling



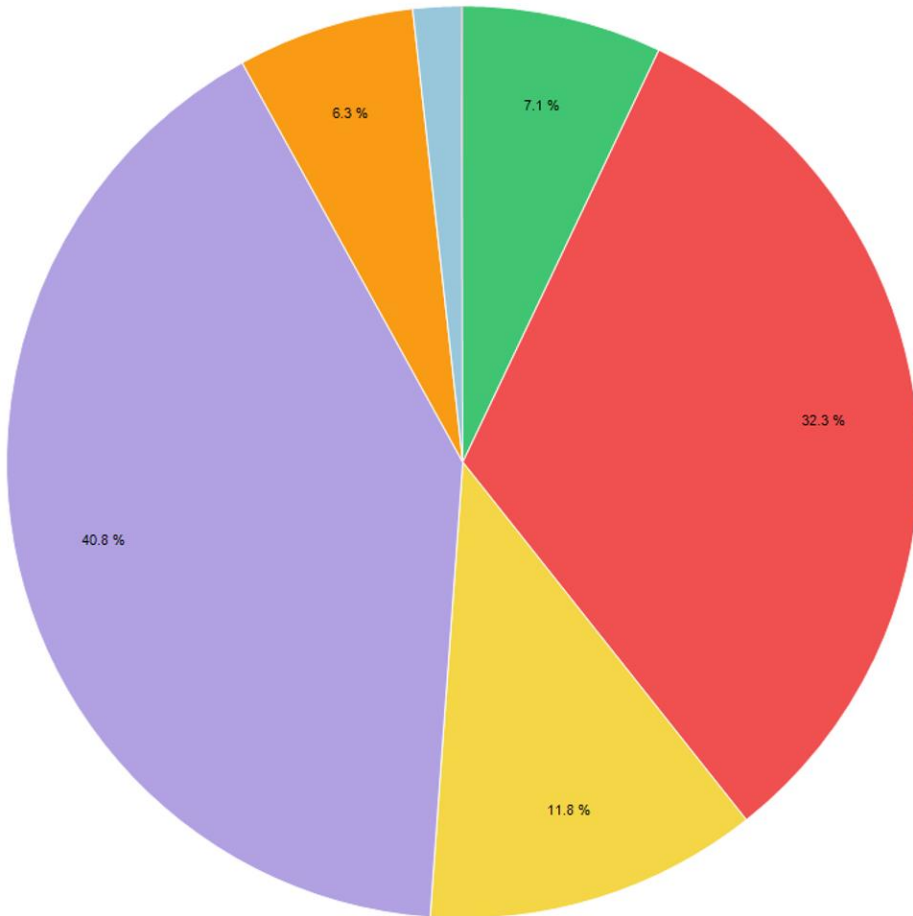
POD: Aging Infrastructure

Untapped Energy



Histogram – Wells Age At Reported Incident (Grouped by Incident Year)





Data limiting:

● Marking

Data table:

_Release_wfa...

Color by:

CauseCat...

● Conversion

● Equipment Failure

● External

● Operator Error

● Procedural or Design

● Unknown

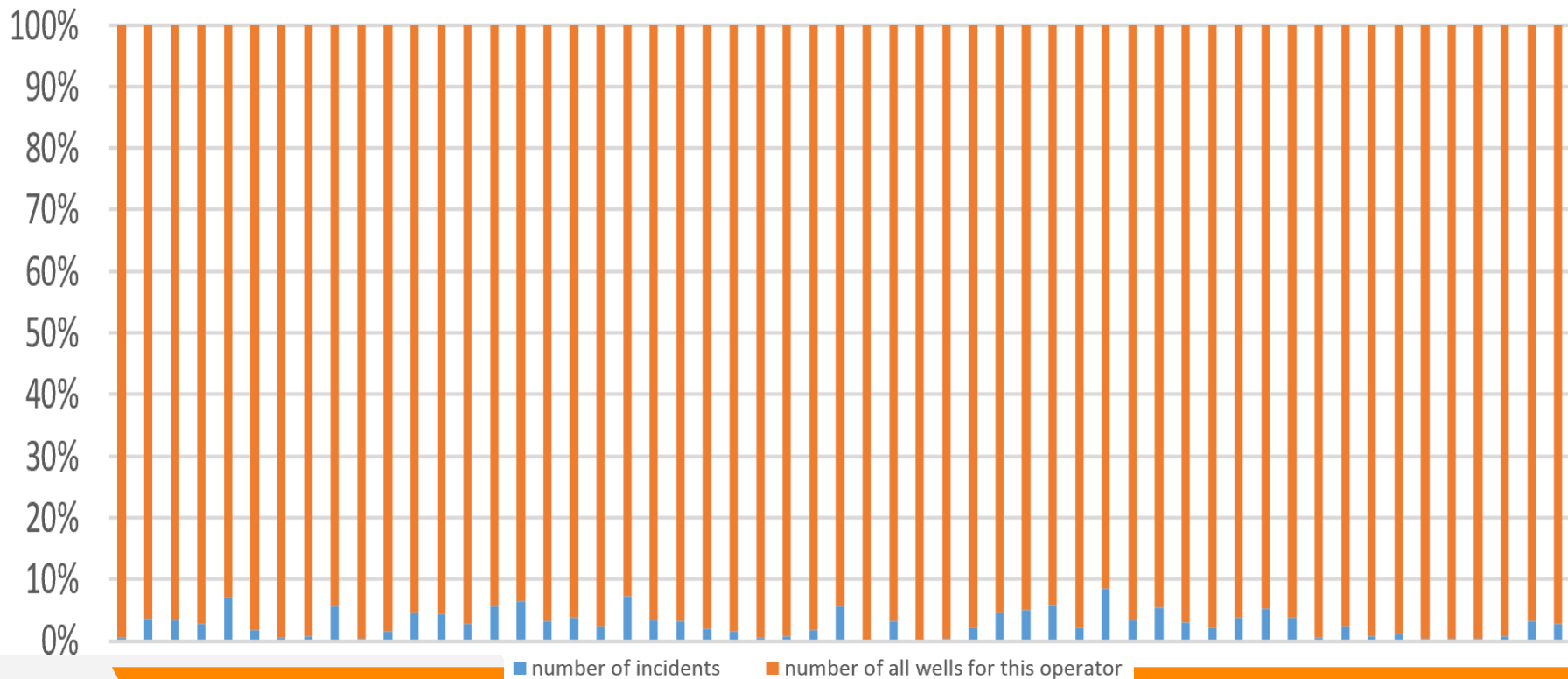
● (Empty)

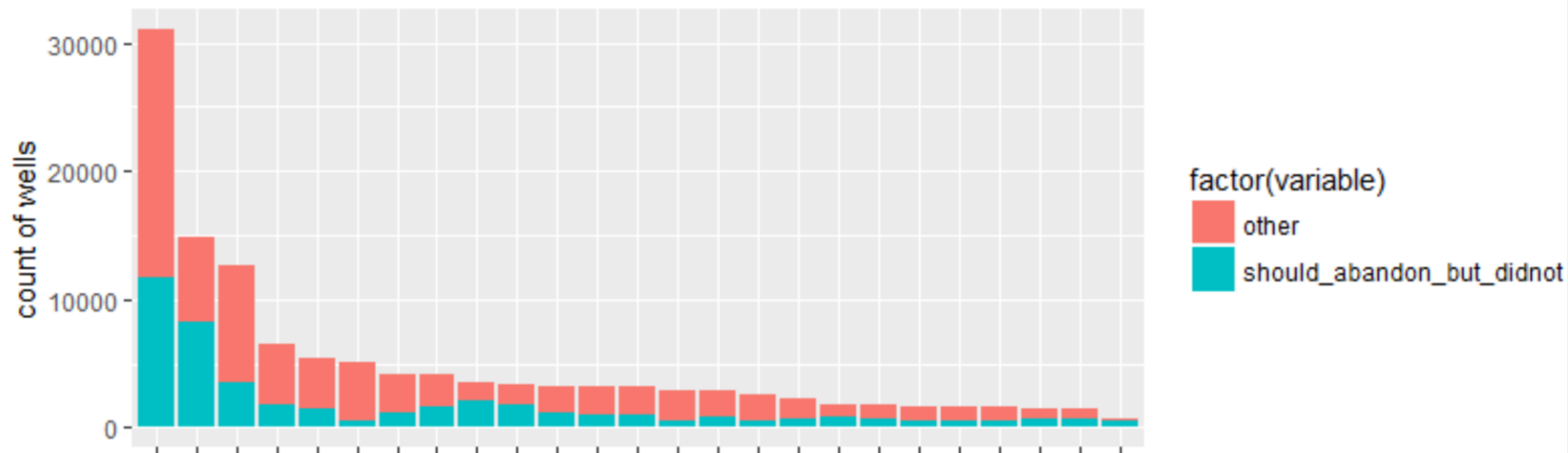
Sector size by:

(Row Count)

- ▶ Factors affecting Failure
 - ▶ Company size is not a factor
 - ▷ We hypothesize that failure rate has to do more with company culture *needs more study
 - ▷ Incentive structures influence company behavior (e.g. penalties)

POD: Aging Infrastructure





- ▶ Data Gaps and Quality
 - ▶ Data is incomplete or in a structure that renders it unusable
 - ▷ E.g. pipeline dates incomplete/wrong
 - ▶ Lots of outliers and inconsistent data
 - ▷ Machine learning and the right data could explain outliers – more factors required
 - ▶ **You cannot manage what you do not measure**

