

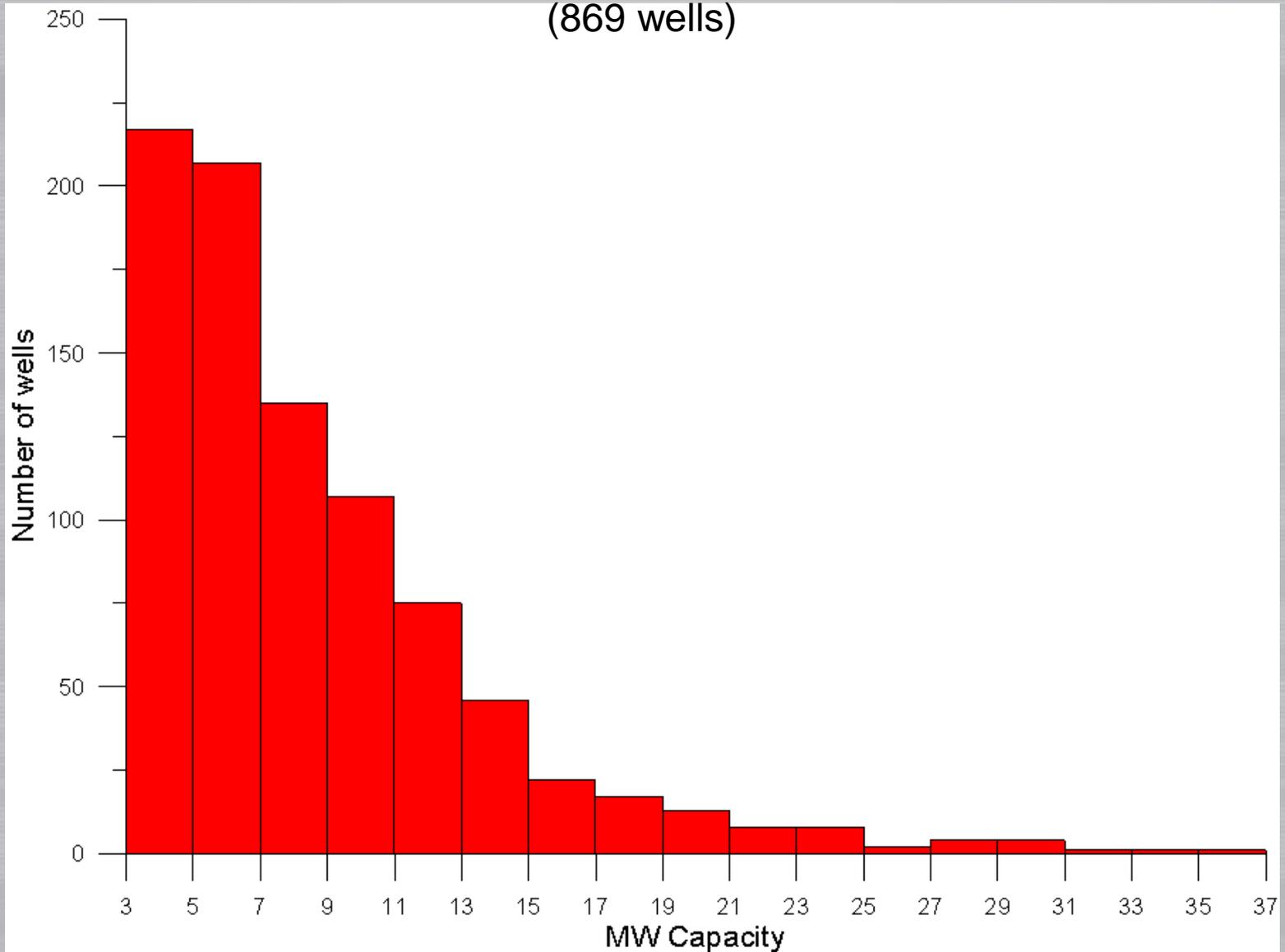
Drilling Success Rates Based on International Experience

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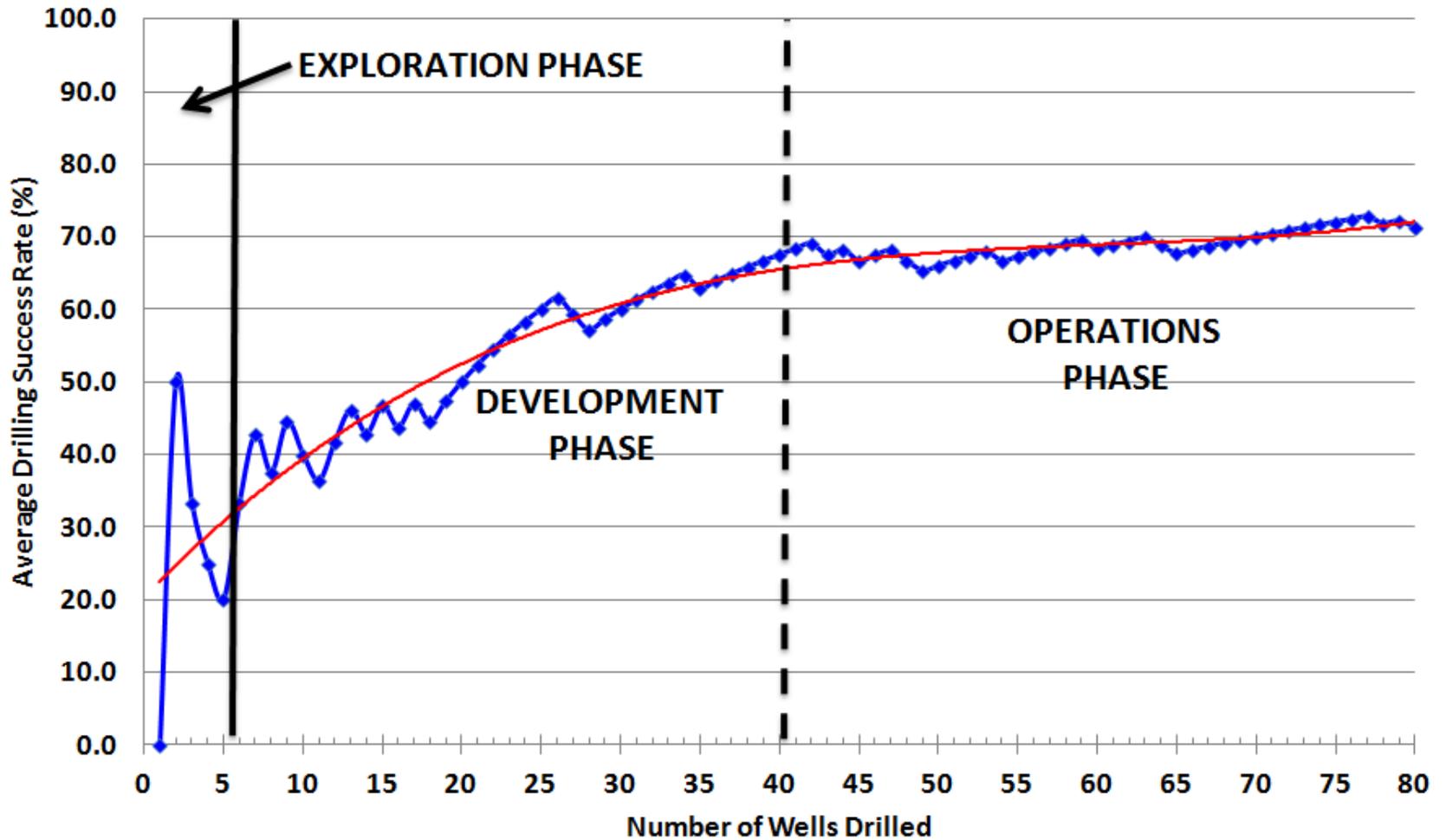
Presented at the
Global Geothermal Development Plan Roundtable
Session 1
Copenhagen, Denmark
23 October 2014

Histogram of Capacities of Productive Wells (3 MW or Higher Capacity) Worldwide

(869 wells)



Average Drilling Success Rate vs. Number of Wells Drilled in Kamojang Field, Indonesia (from Sanyal and Morrow, 2011)



EXPLORATION MATURITY INDEX (E):

It is defined as an index (between 0 and 1) based on credits for the following elements of exploration (each on a scale of 0 to 5):

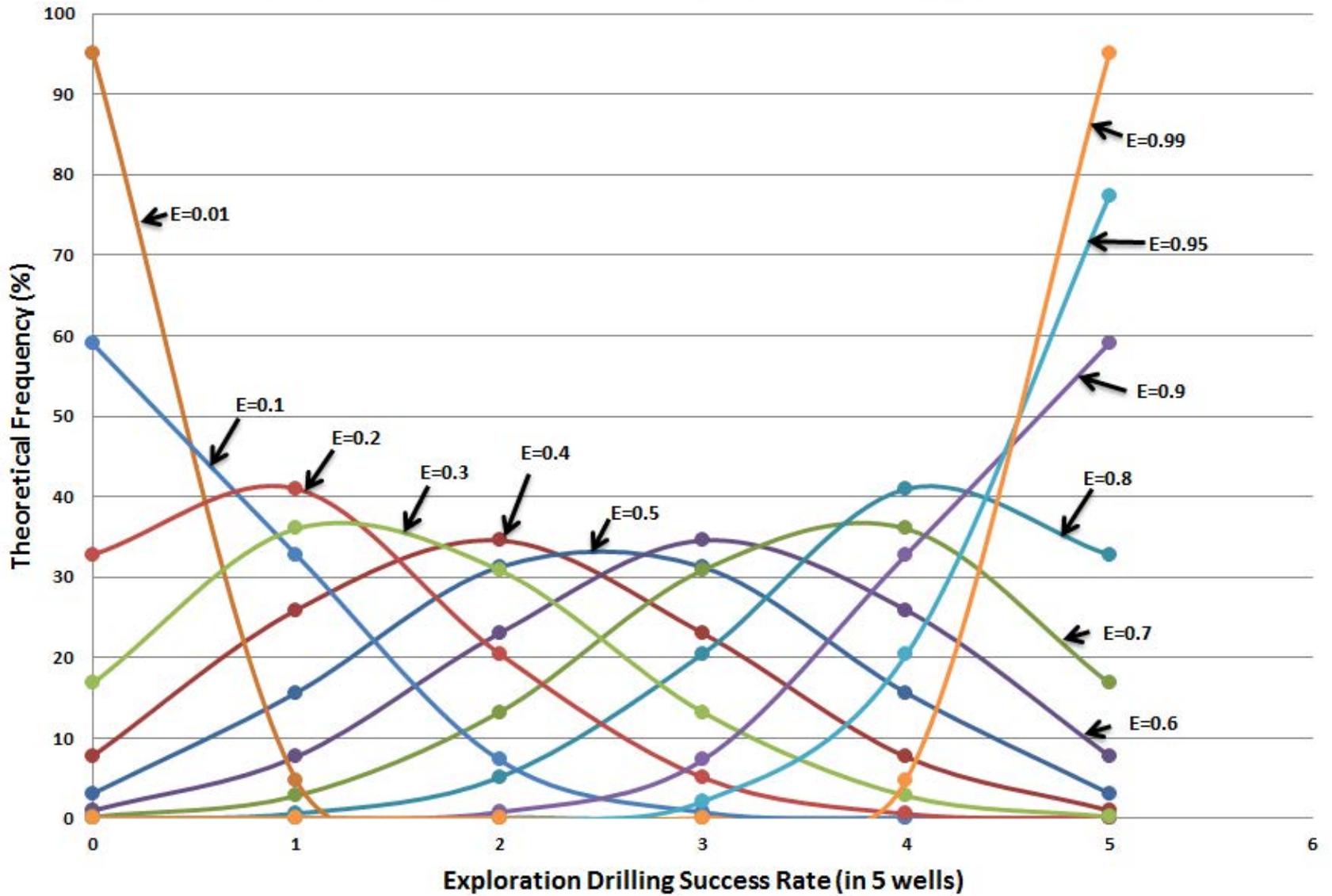
- Geological Understanding
- Geochemical Exploration Results
- Geophysical Exploration Results (MT /heat flow and occasionally gravity/magnetic)
- Slim-hole Drilling Results
- Conceptual Modeling

$$E = \text{Total Credits} / 25$$

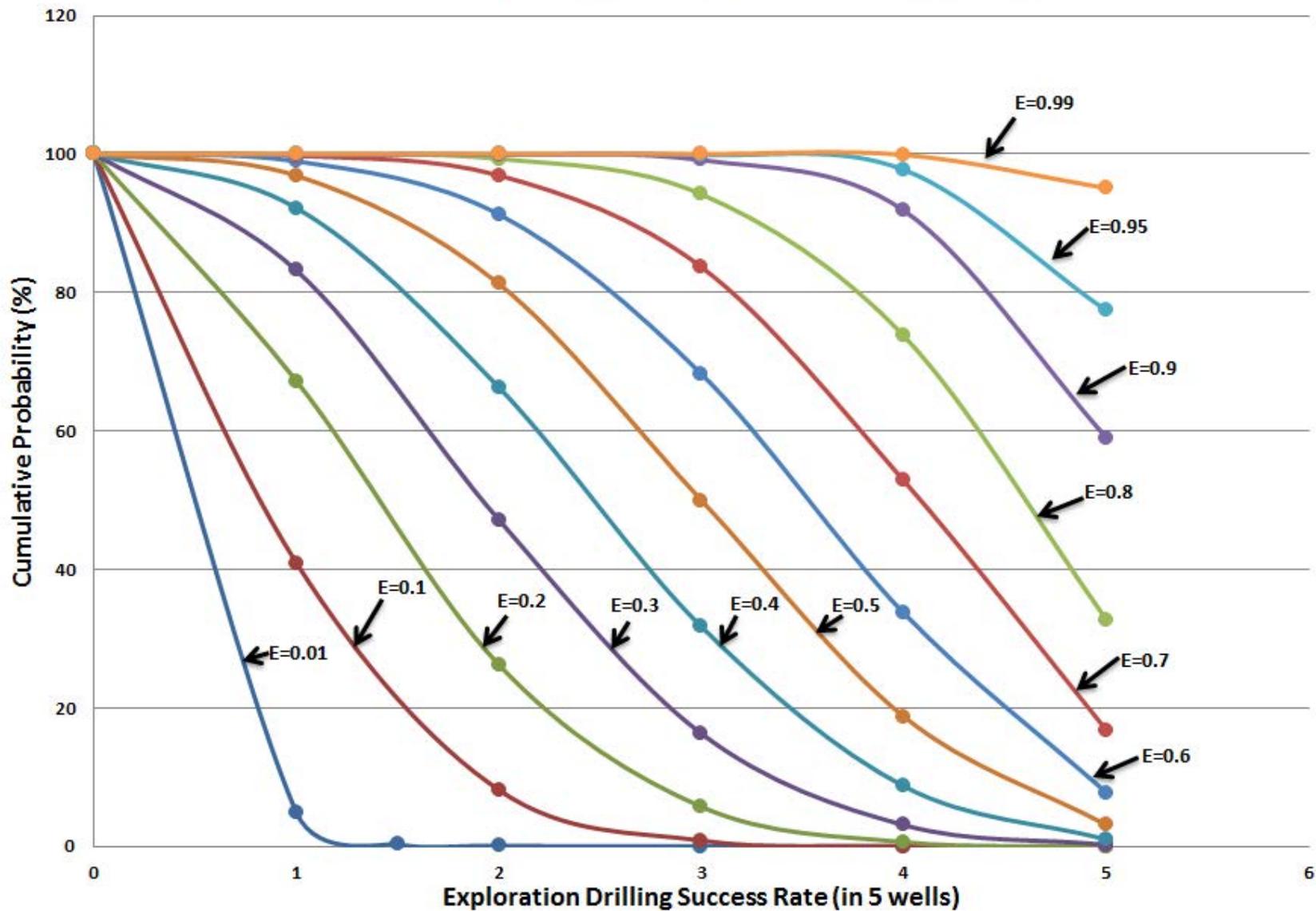
Assuming E to be numerically equivalent to the probability of r wells out of n exploration wells being successful:

$$p = \frac{n!}{r!(n-r)!} (E)^r (1-E)^{n-r}$$

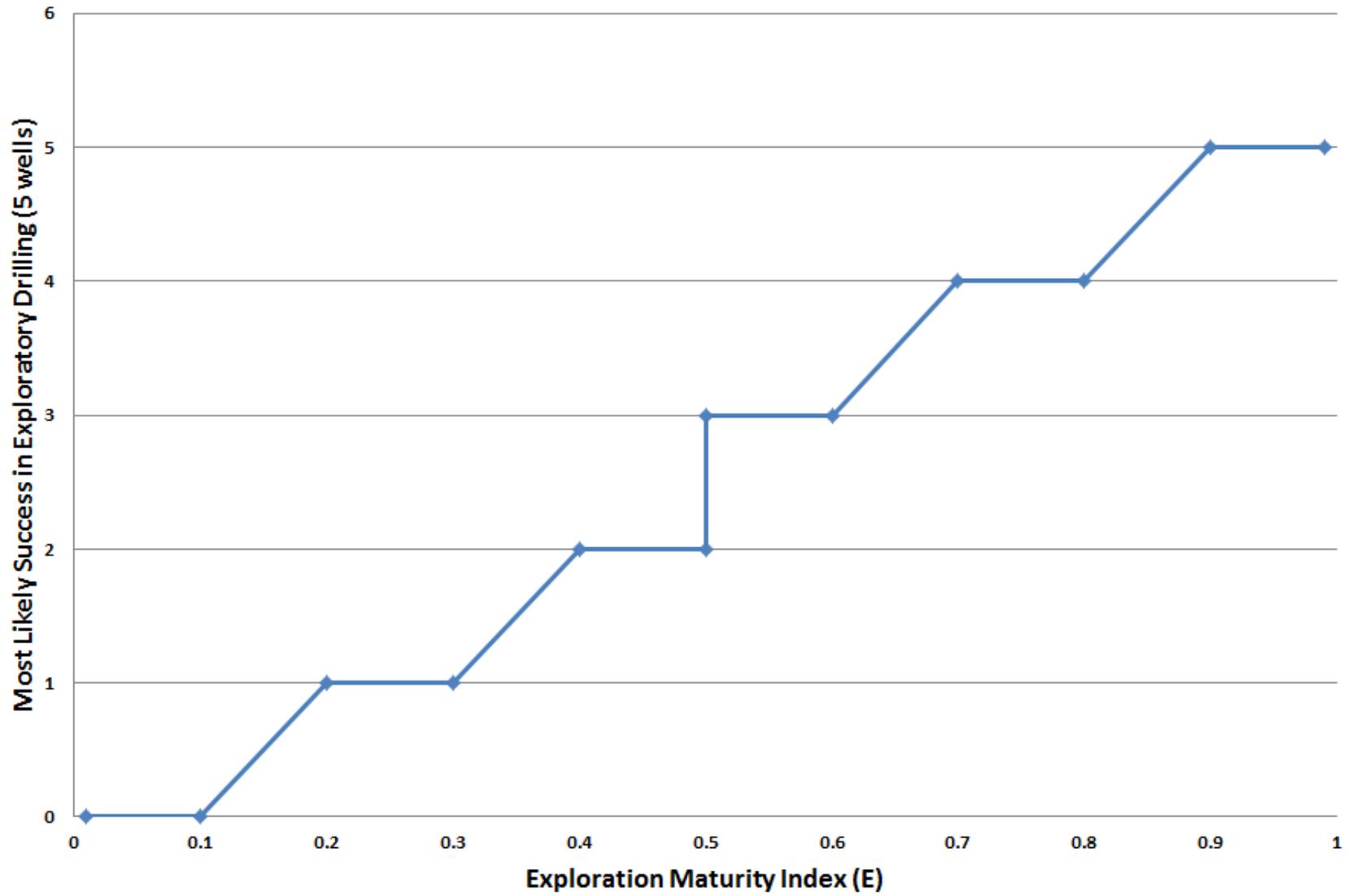
Theoretical Frequency versus Exploration Drilling Success Rate



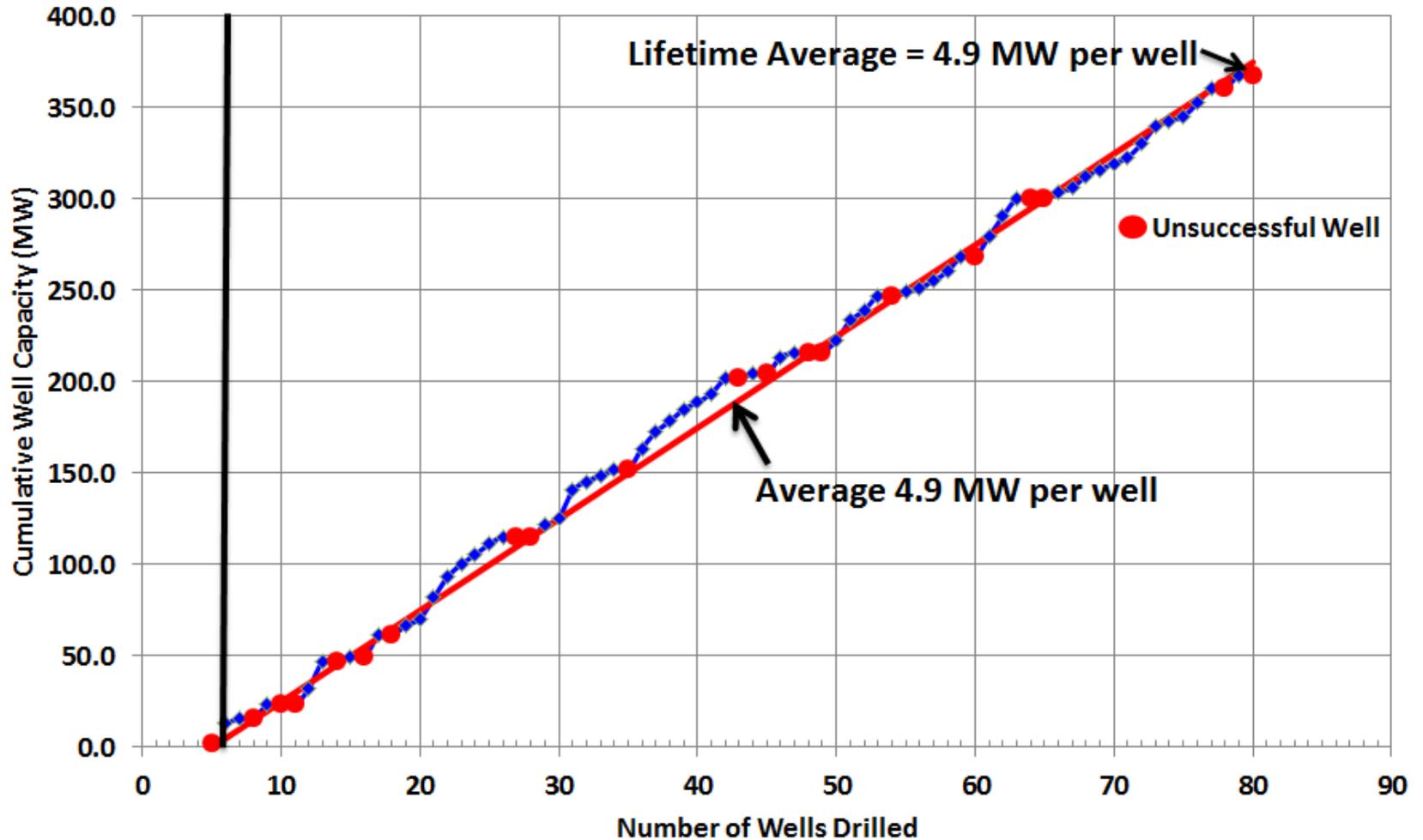
Cumulative Frequency vs. Exploration Drilling Success



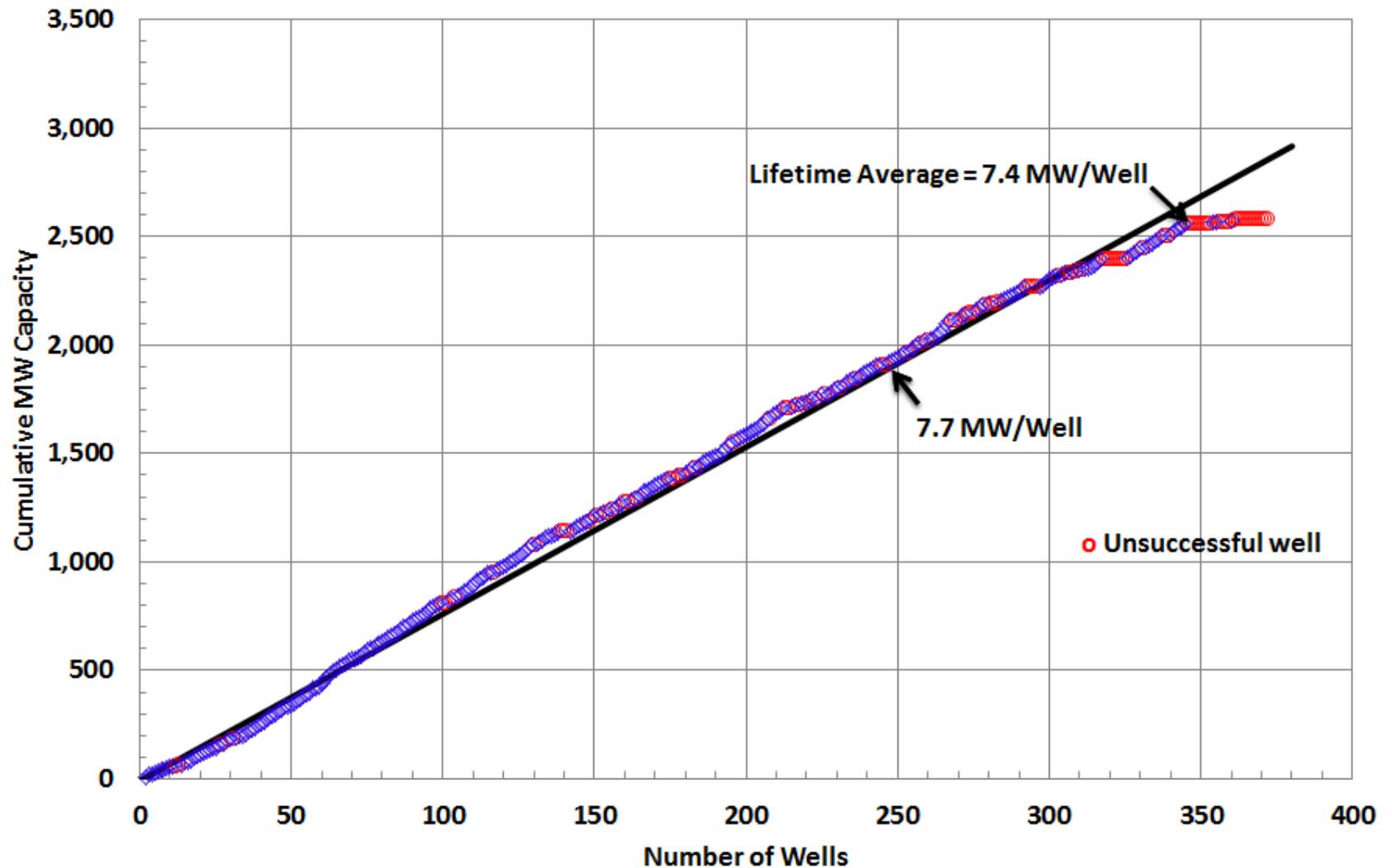
Most Likely Success in Exploratory Drilling vs. Exploration Maturity Index



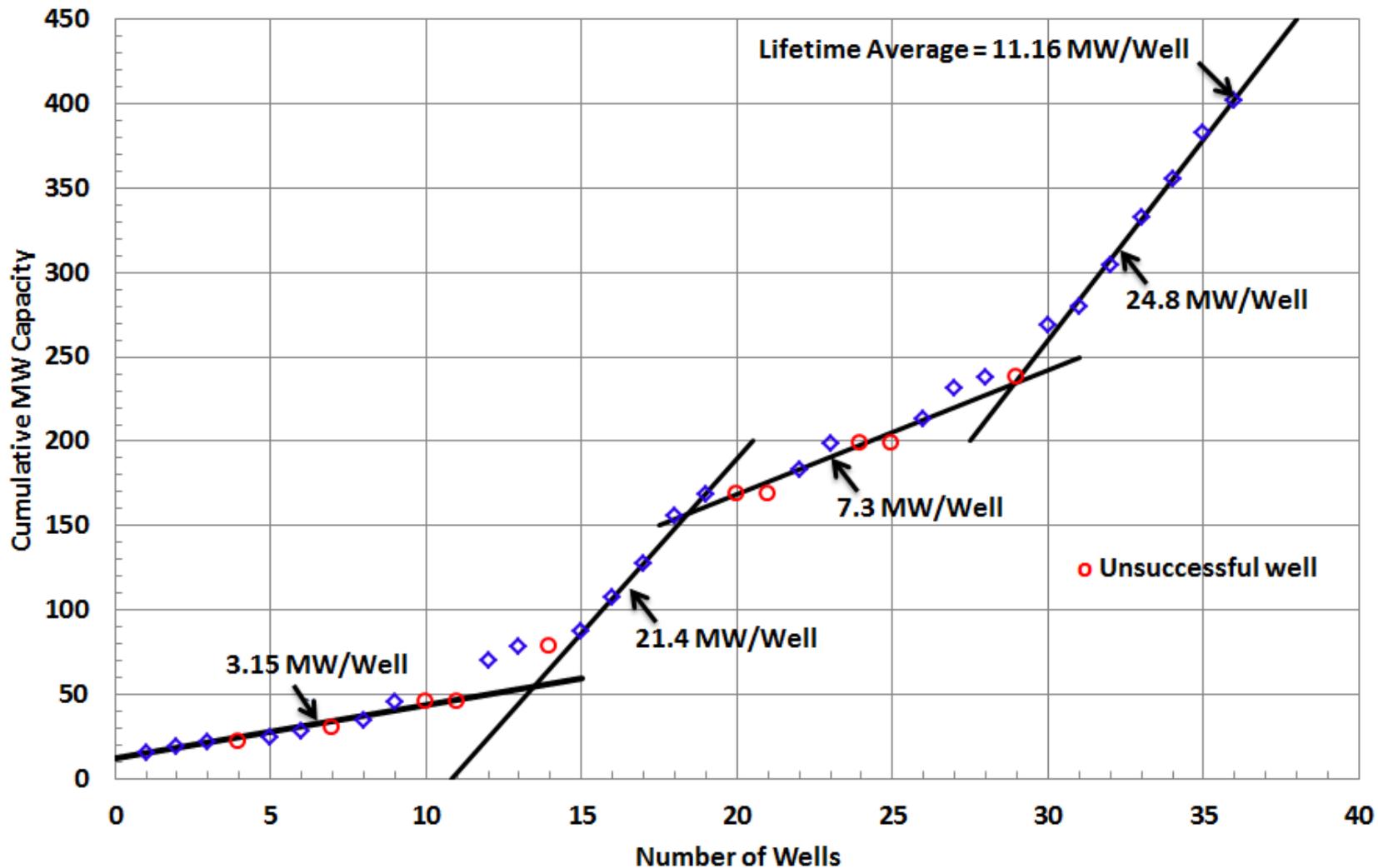
Cumulative Well Capacity versus Number of Development Wells Drilled, Kamojang Field, Indonesia (after Sanyal and Morrow, 2011)



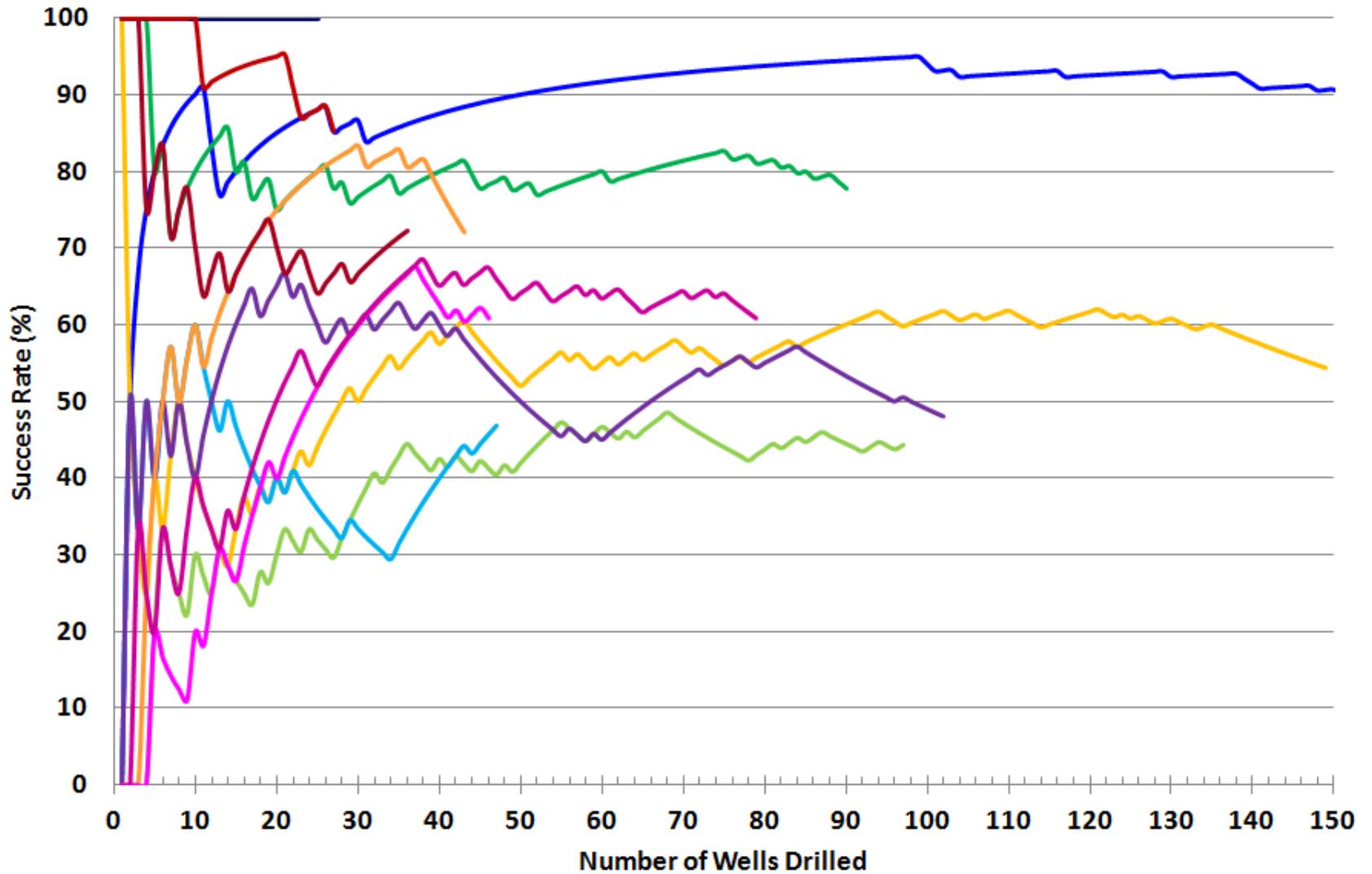
Cumulative Megawatt Capacity versus Number of Wells Drilled in The Geysers Steam Field



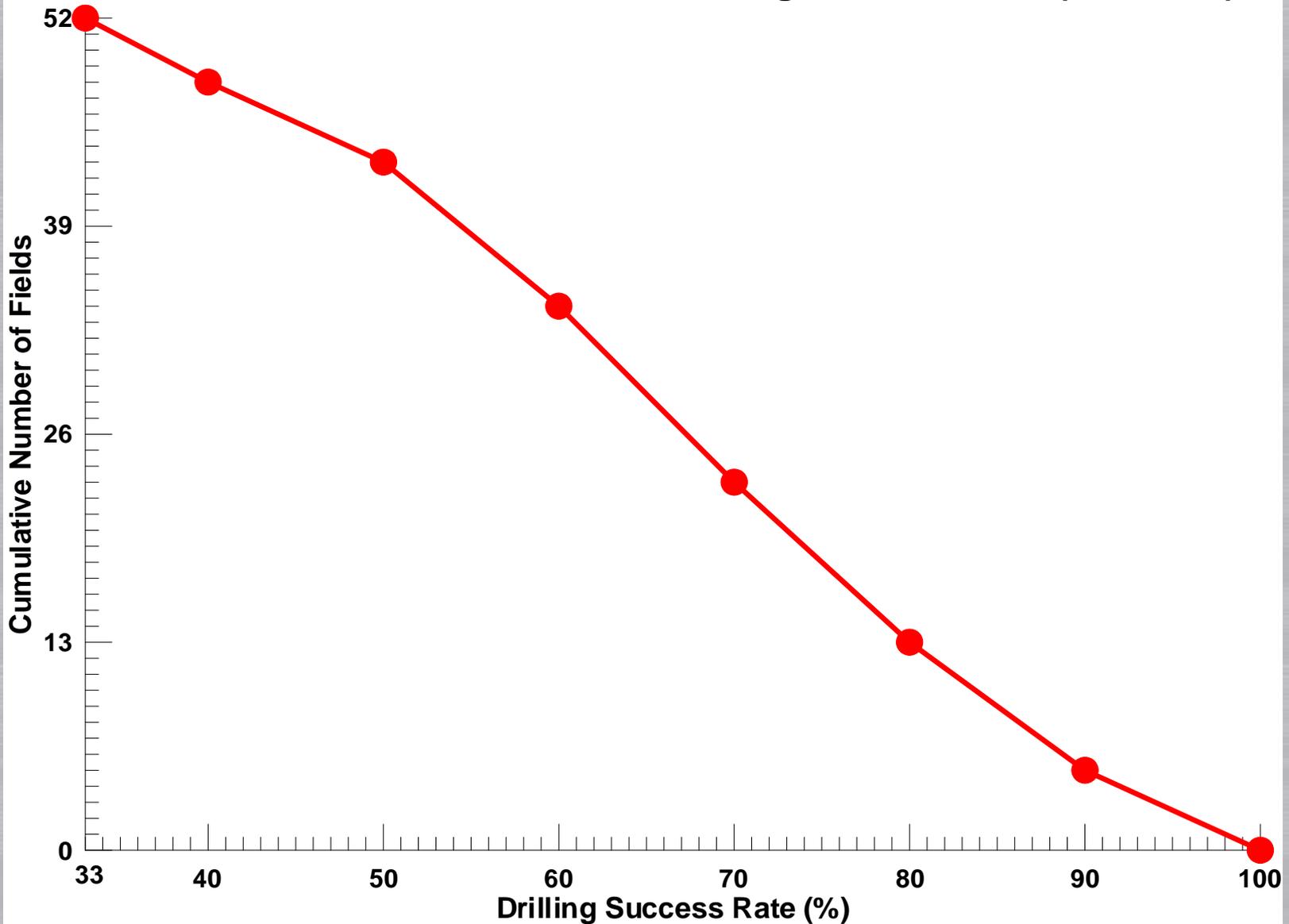
Cumulative Megawatt Capacity versus Number of Wells Drilled in a High-temperature Field



Average Success Rate in 12 Fields Worldwide



Cumulative of Number of Fields vs. Drilling Success Rate (52 Fields)



Average Drilling Rate vs. Number of Wells Drilled in Kamojang Field, Indonesia

