

NH Joint Engineering Societies Conference
Investing In Infrastructure

Electric Power Distribution

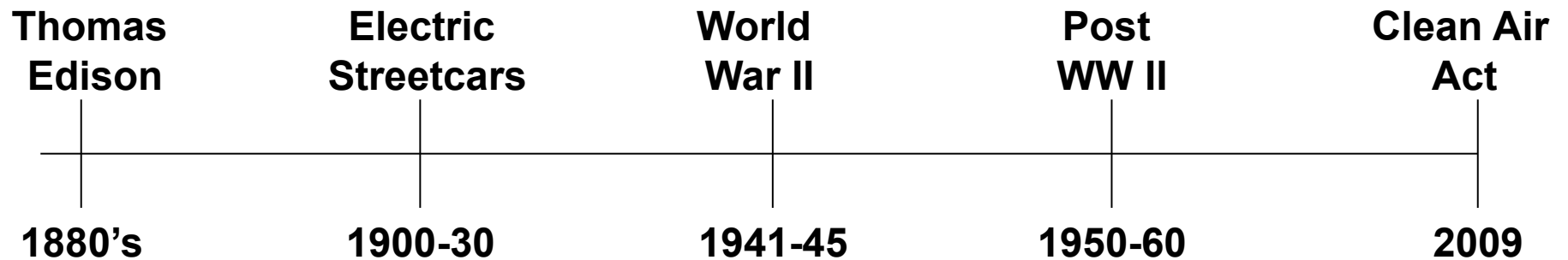
Thelma J. Brown, P.E.

PSNH Manager of Engineering & Design

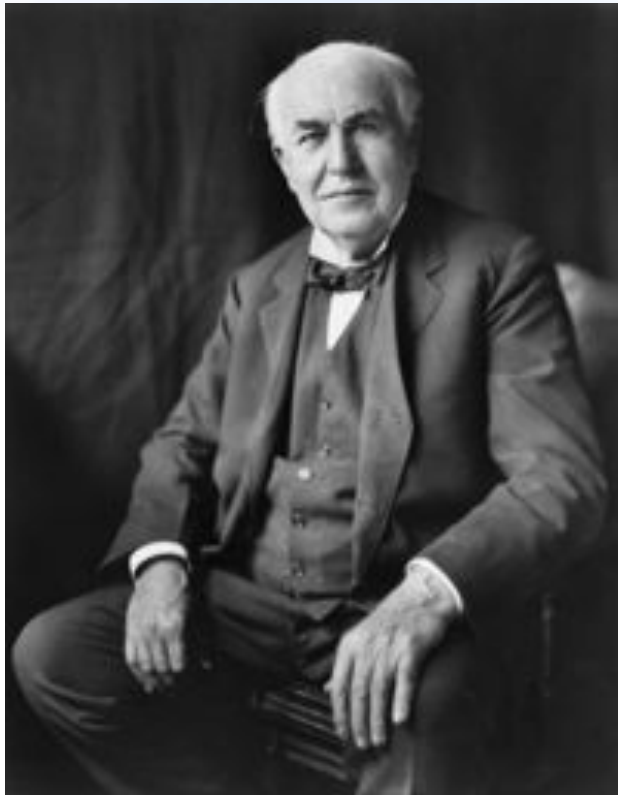
October 8, 2009

Electric Power Distribution

- Major Milestones



Thomas Edison



Thomas Edison – January 1922



Thomas Edison's first successful light bulb model, used in public demonstration at Menlo Park, December 1879

Source: Wikipedia

Electric Streetcars

Manchester, New Hampshire



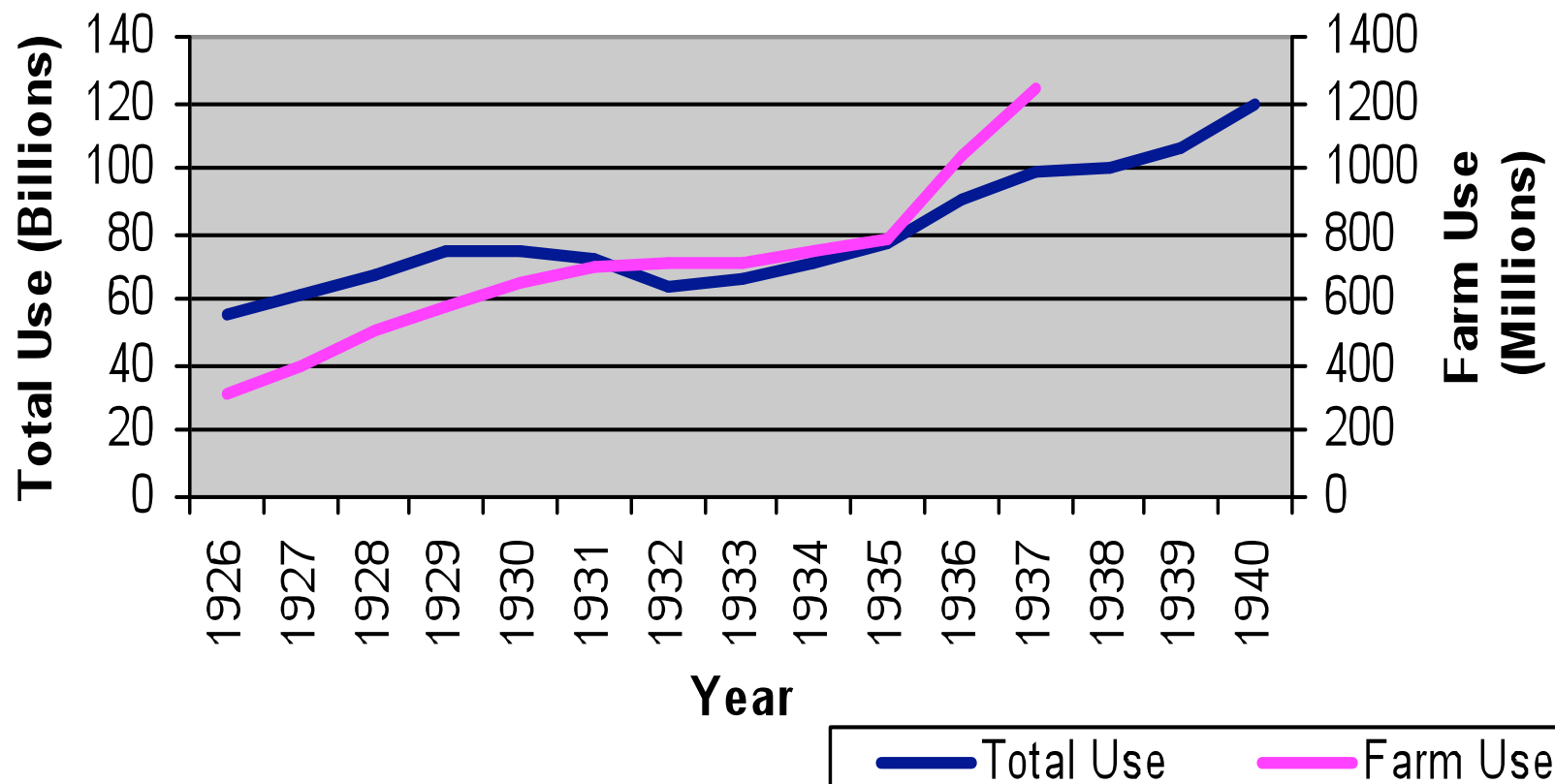
Circa 1877



Circa 1905

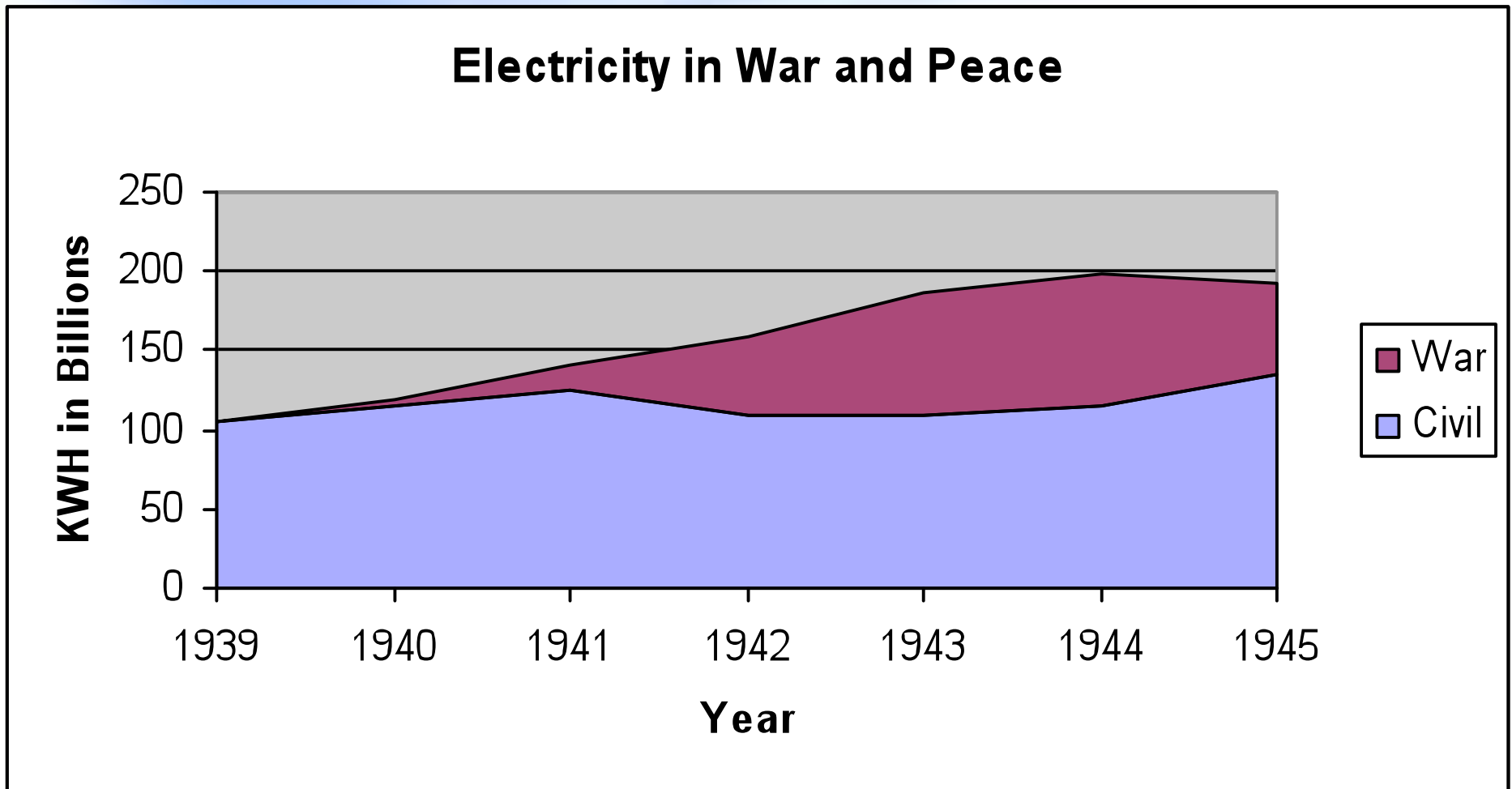
1926-1940

Kilowatt Energy Sales



Source: Edison Electrical Institute
Statistical Bulletins 1935 & 1955

World War II

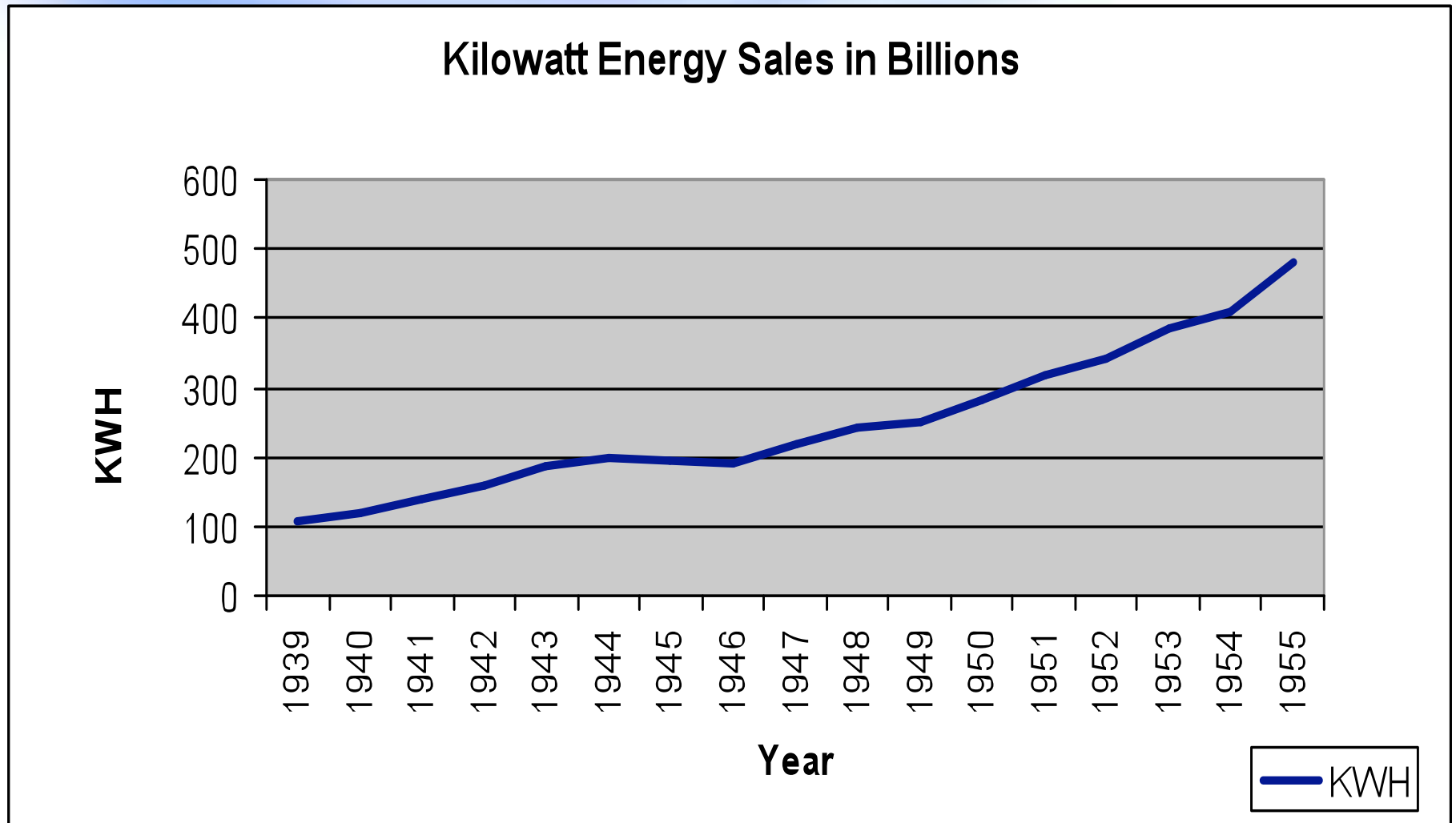


Source: Edison Electrical Institute
Statistical Bulletins 1945

Post WWII

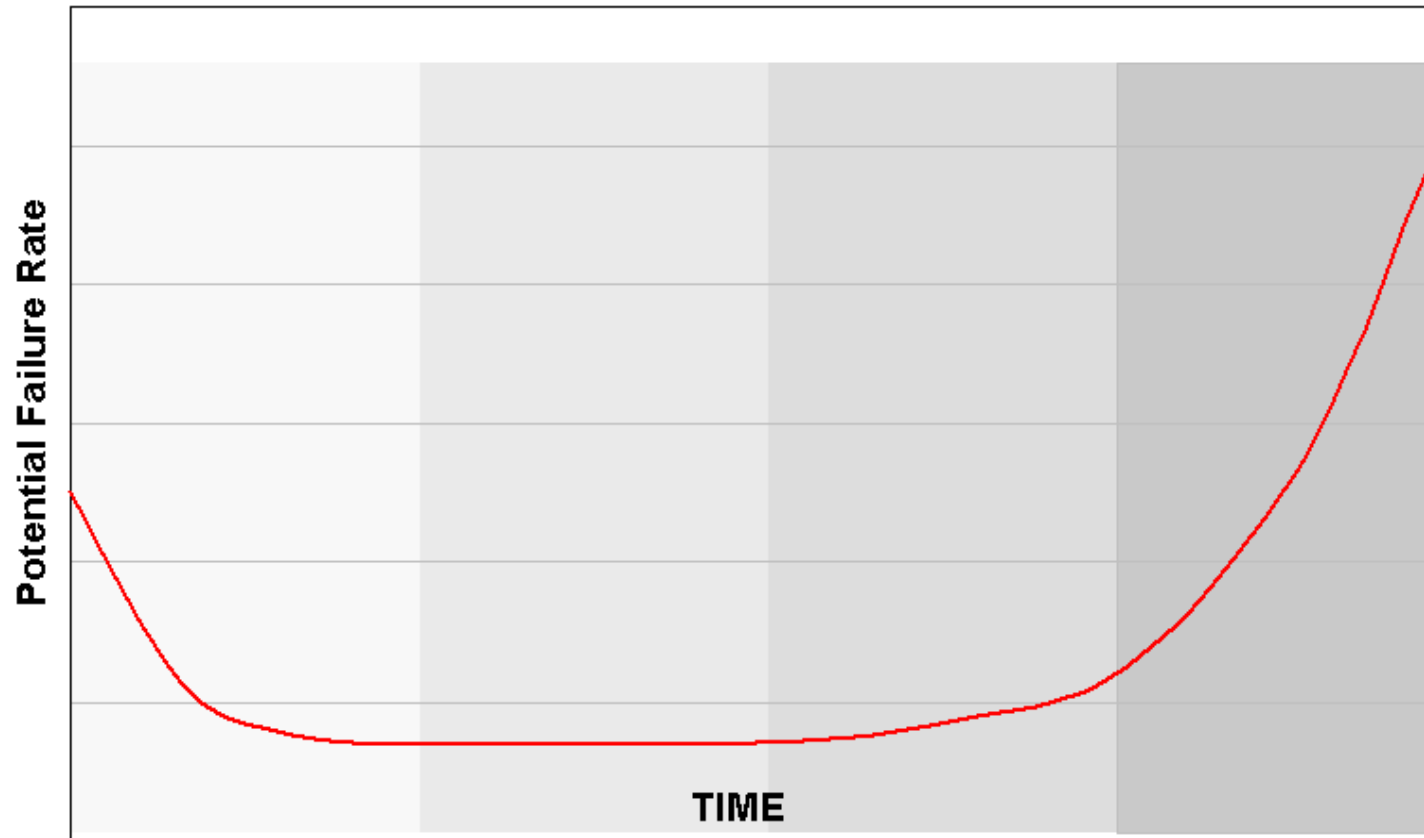
- The Readjustment Period
 - End of wartime demand
 - Preparation for increased electrical use
 - Stores
 - Homes
 - Industries
 - Revert from wartime use to civilian use.

Post WW II



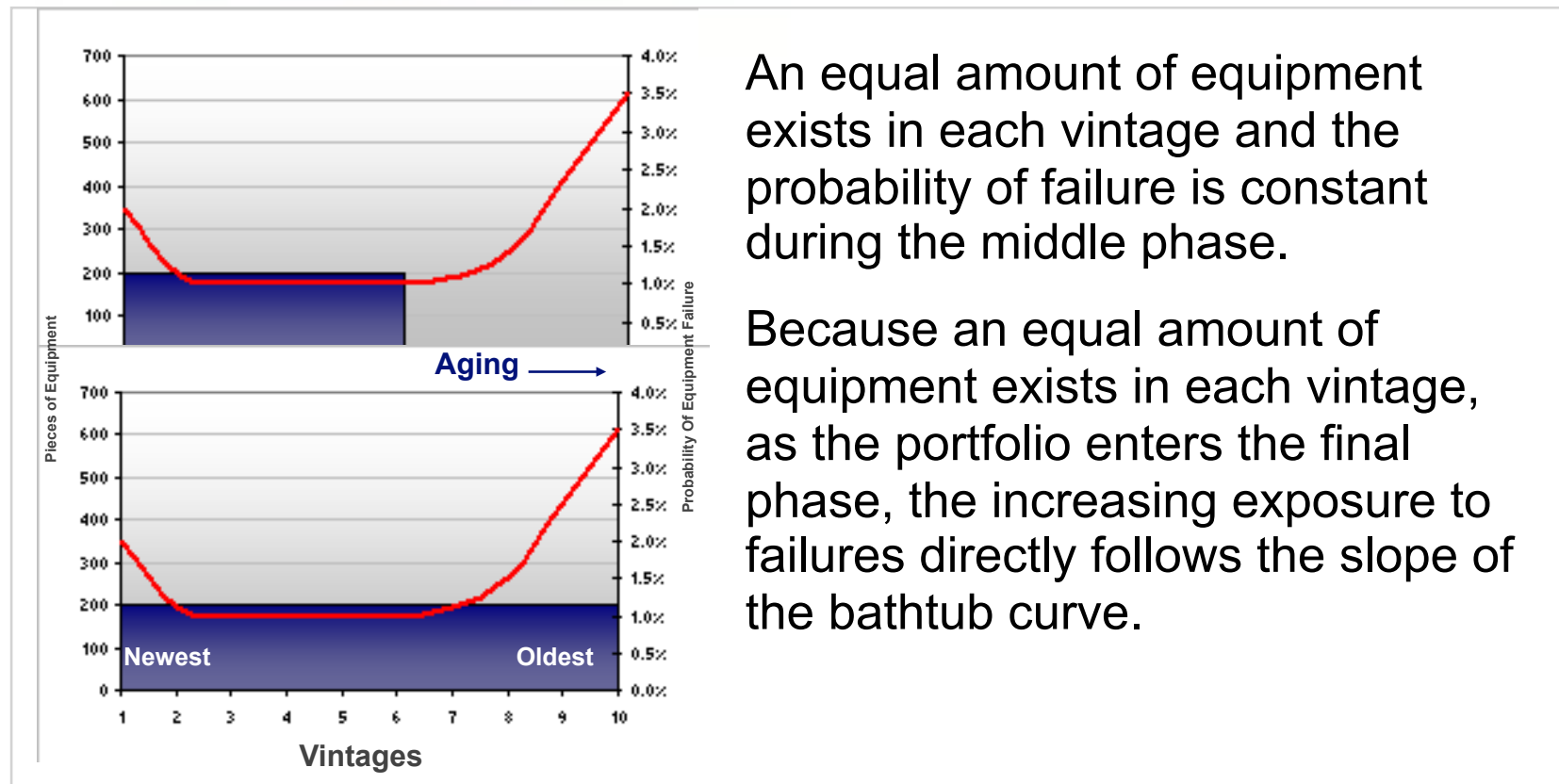
Source: Edison Electrical Institute
Statistical Bulletins 1955

A Bathtub Curve



Aging Example A

Age Profiles and their Influence on Failure Rates



Underground Cable



Underground Residential Developments
address Environmental Considerations

PSNH Crew installing
Underground Cable



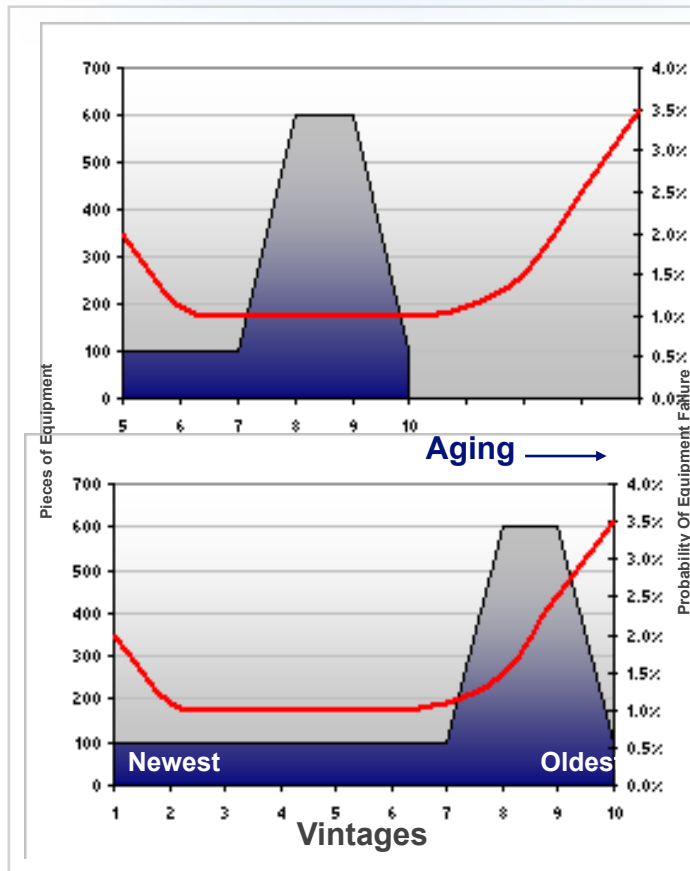
Source: PSNH 1969 Annual Report

Royal Crest Estates



Source: PSNH 1969 Annual Report

Aging Example B

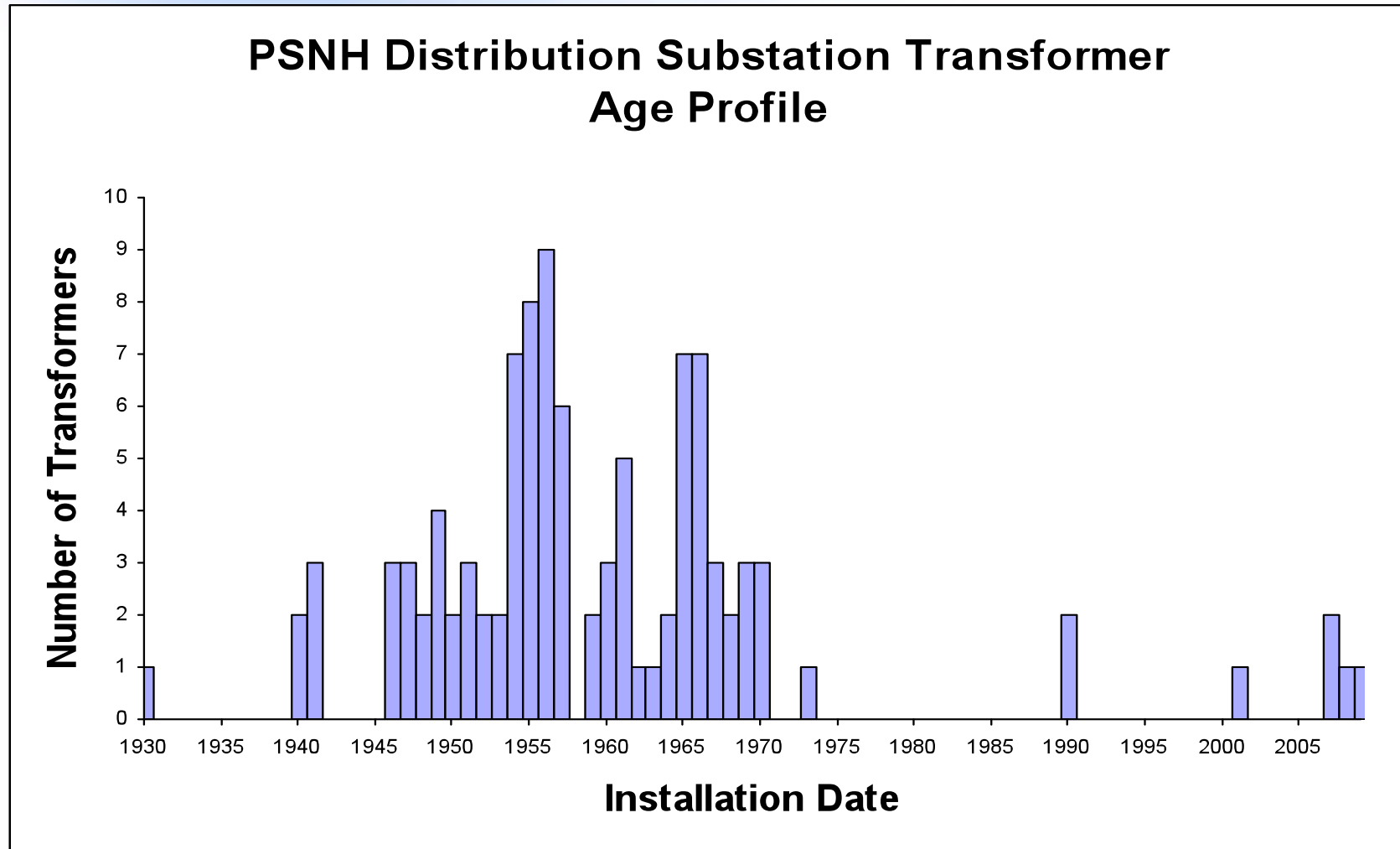


This portfolio has a concentration of equipment in a few vintages.

Similar to the prior example, its failure exposure is stable (although larger) during the middle phase.

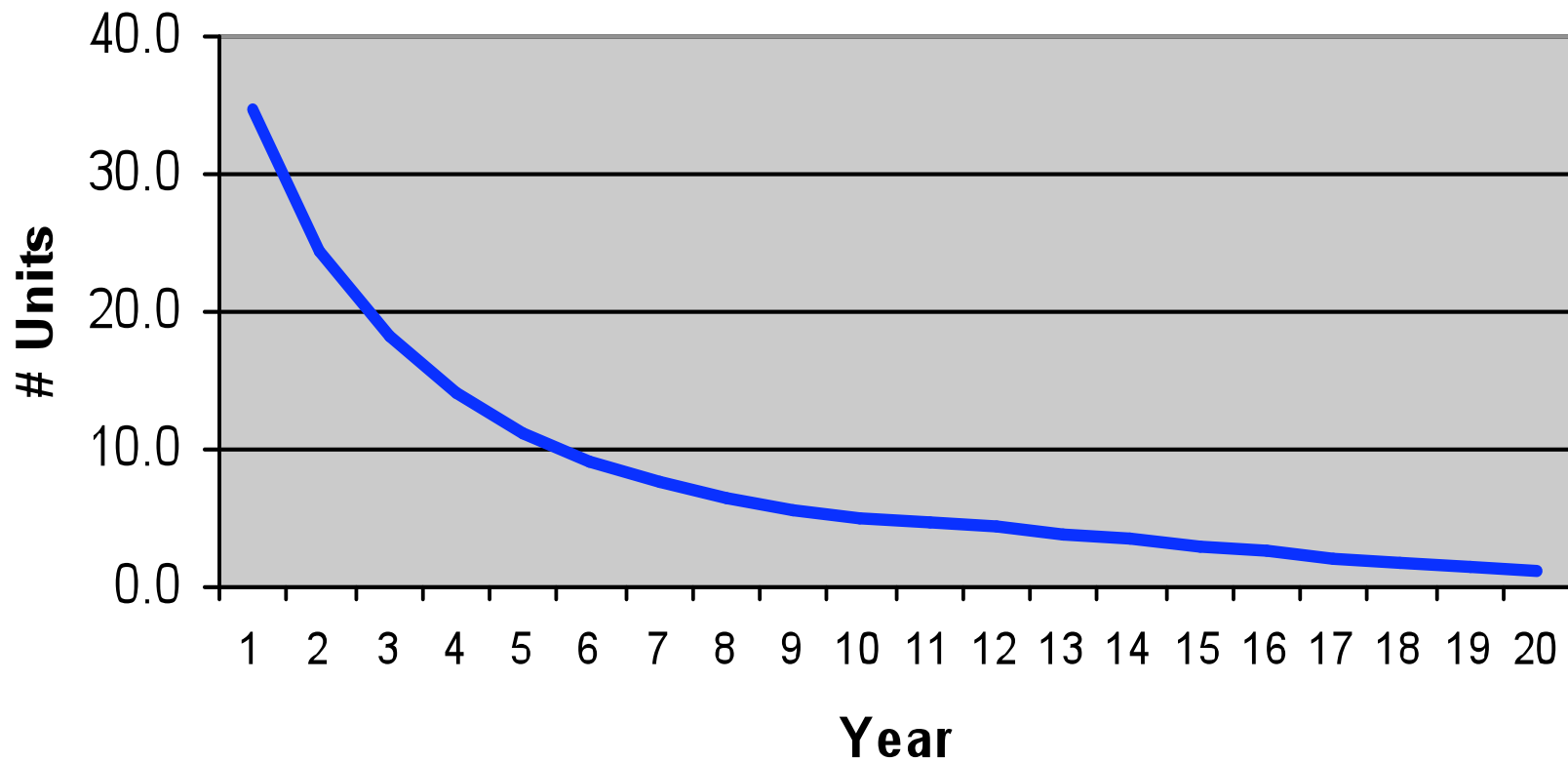
Upon entering the final phase, the concentration will drive a dramatic increase in failure exposure.

Age Profile



Failure Profile

Substation Transformer Failure Rate



American Clean Energy and Security Act

- Waxman-Markey bill passed House of Representatives on June 26, 2009.
 - “The legislation will create millions of new clean energy jobs, save consumers hundreds of billions of dollars in energy costs, promote America's energy independence and security, and cut global warming pollution,” said Chairman Waxman.

Greenhouse Gas Reductions

- Reductions over the 2005 emission levels as proposed in the House Bill #2454

<u>Year</u>	<u>Reduction</u>
2010	3%
2020	17%
2030	42%
2050	83%

Provisions of the Act

- Energy Efficiency Initiatives
- Smart Grid Advancement
- Plug-in Electric Vehicle Incentives

Risks for Regulated Utilities

1. Environmental compliance
2. Regulatory recovery
3. Liquidity
4. Credit
5. Volatile commodity prices
6. Competition
7. Reliability-related compliance
8. Employee benefits
9. Economic downturn
10. Renewable portfolio compliance
11. Human resources
12. Capital expenditure requirements
13. Overly high debt levels

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Risks that Concern Regulators

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The Perfect Storm

Environmental Compliance

Smart Grid

Electric Cars

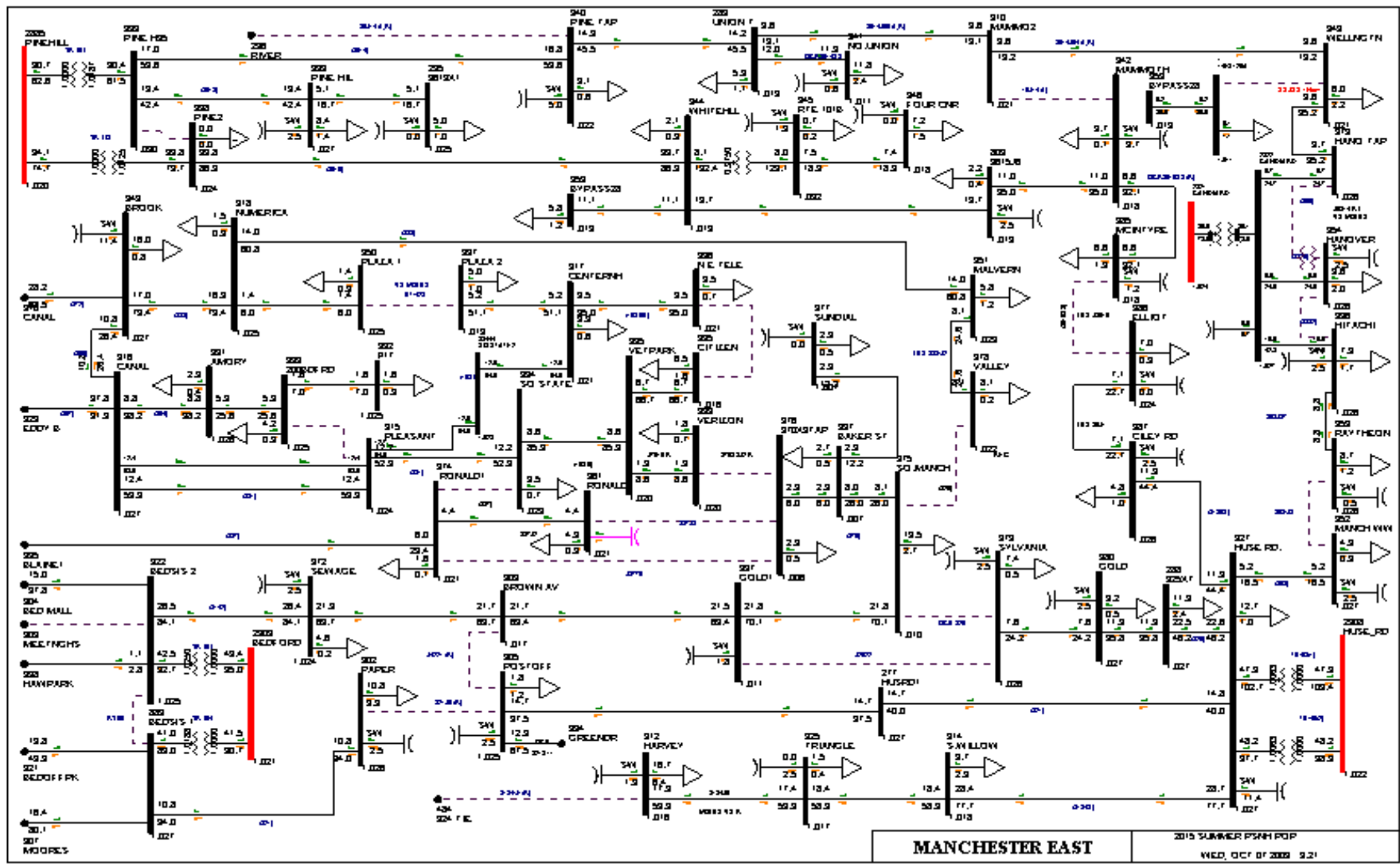
Equipment

Aging

Smart Grid Technology

1. Self Healing
2. Motivates Customers
3. Secure
4. Power Quality
5. Distributed Generation & Storage
6. Enables market
7. Optimizing Assets & Efficiency

The Future





Questions