Nuclear Fuels – Past, Present, and Future

Presented by
Dale Greer
Women in Nuclear Region II Conference
Oak Ridge, Tennessee

TVA Nuclear

Women In Nuclear
OAK RIDGE

A Brief History of Commercial Nuclear Power…

TVA Nuclear

- Atomic Energy Act of 1954, made the development of commercial nuclear power possible
- Energy Reorganization Act of 1974 created the Nuclear Regulatory Commission

A Brief History of TVA Nuclear Power

TVA Nuclear

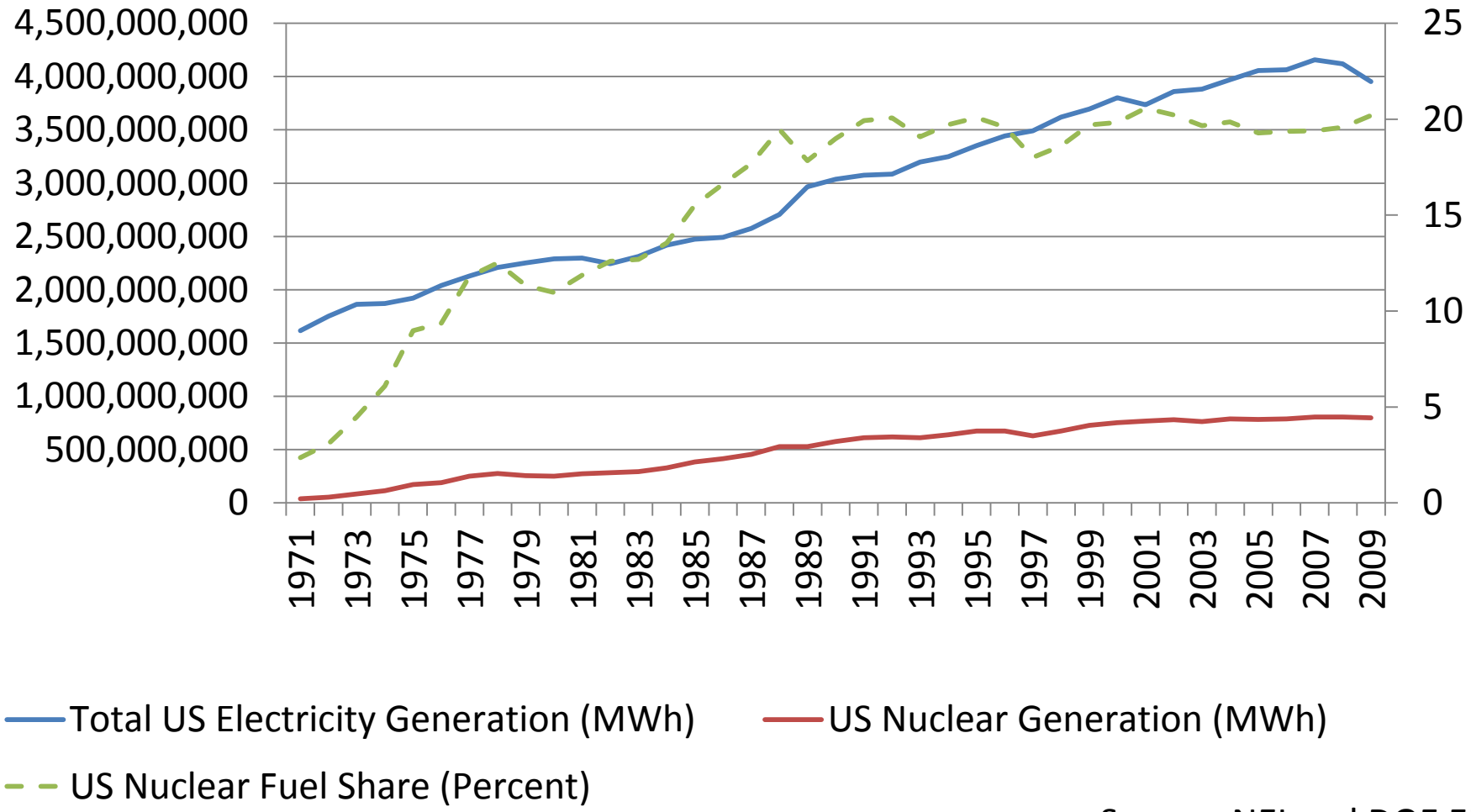
- 1916: United States Federal Government purchases a Tennessee River site in Muscle Shoals, AL for dam construction—to become part of the TVA
- 1933: The TVA Act passed by US Congress
- 1959: The US Congress passes legislation making TVA a self-financing agency
- 1966: The TVA develops a plan to create a system of nuclear power plants (17 nuclear plants)
- 1975: Fire at the TVA's Browns Ferry Plant
- 1985: Five functioning TVA nuclear reactors shut down due to regulatory concerns
- 1995: Termination of three remaining TVA nuclear reactor construction projects

A Brief History of TVA Nuclear Power

TVA Nuclear

- 1996: Watts Bar Nuclear Unit 1 started after delays
- 2002: TVA Board approves restart of Browns Ferry Unit 1
- 2007: Browns Ferry Nuclear Unit 1 restarts
- 2007: TVA Board approves the completion of Watts Bar Nuclear Unit 2

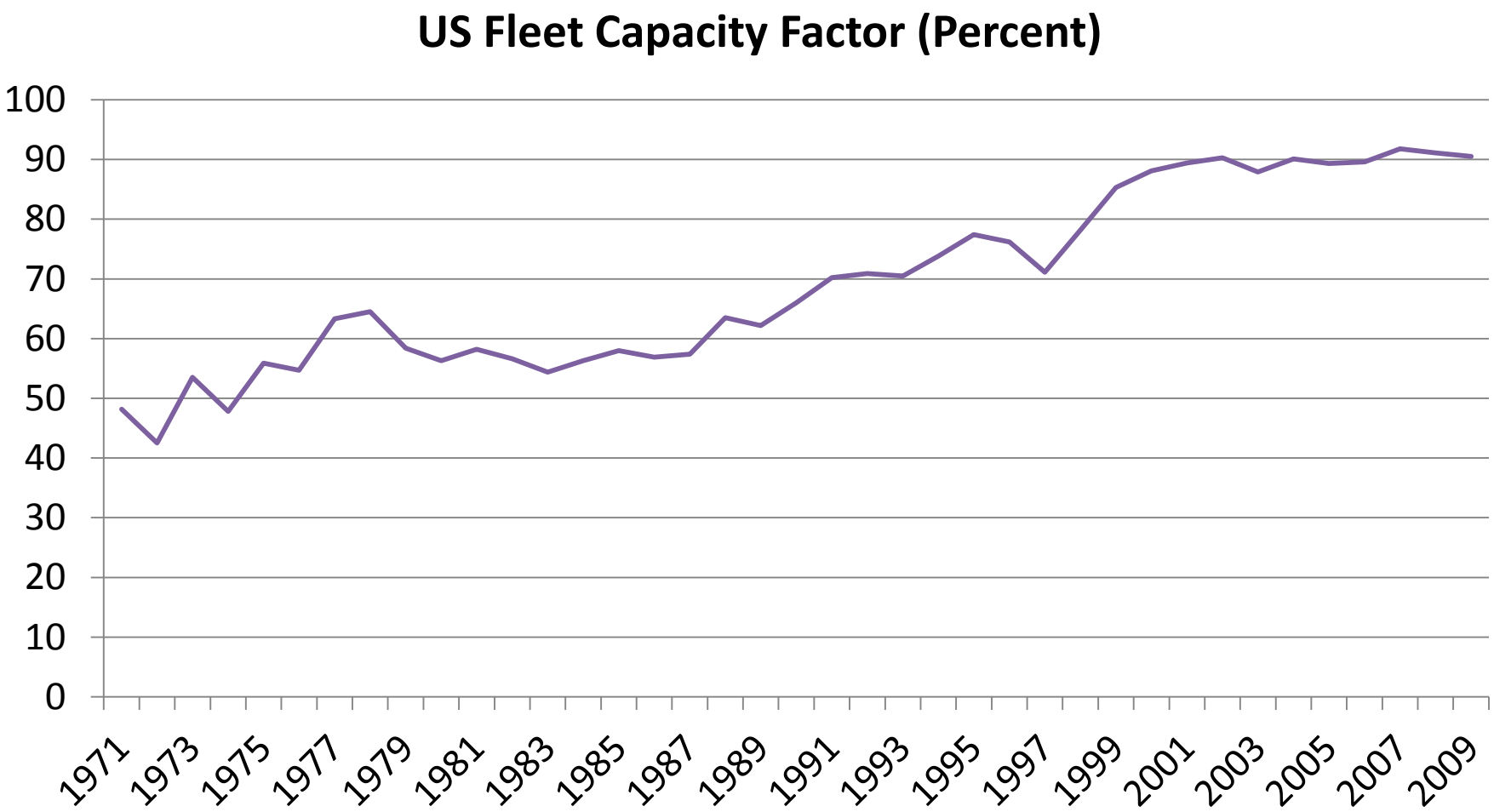
Nuclear Power has become more important over time



Source: NEI and DOE EIA

Nuclear Power has become more reliable over time

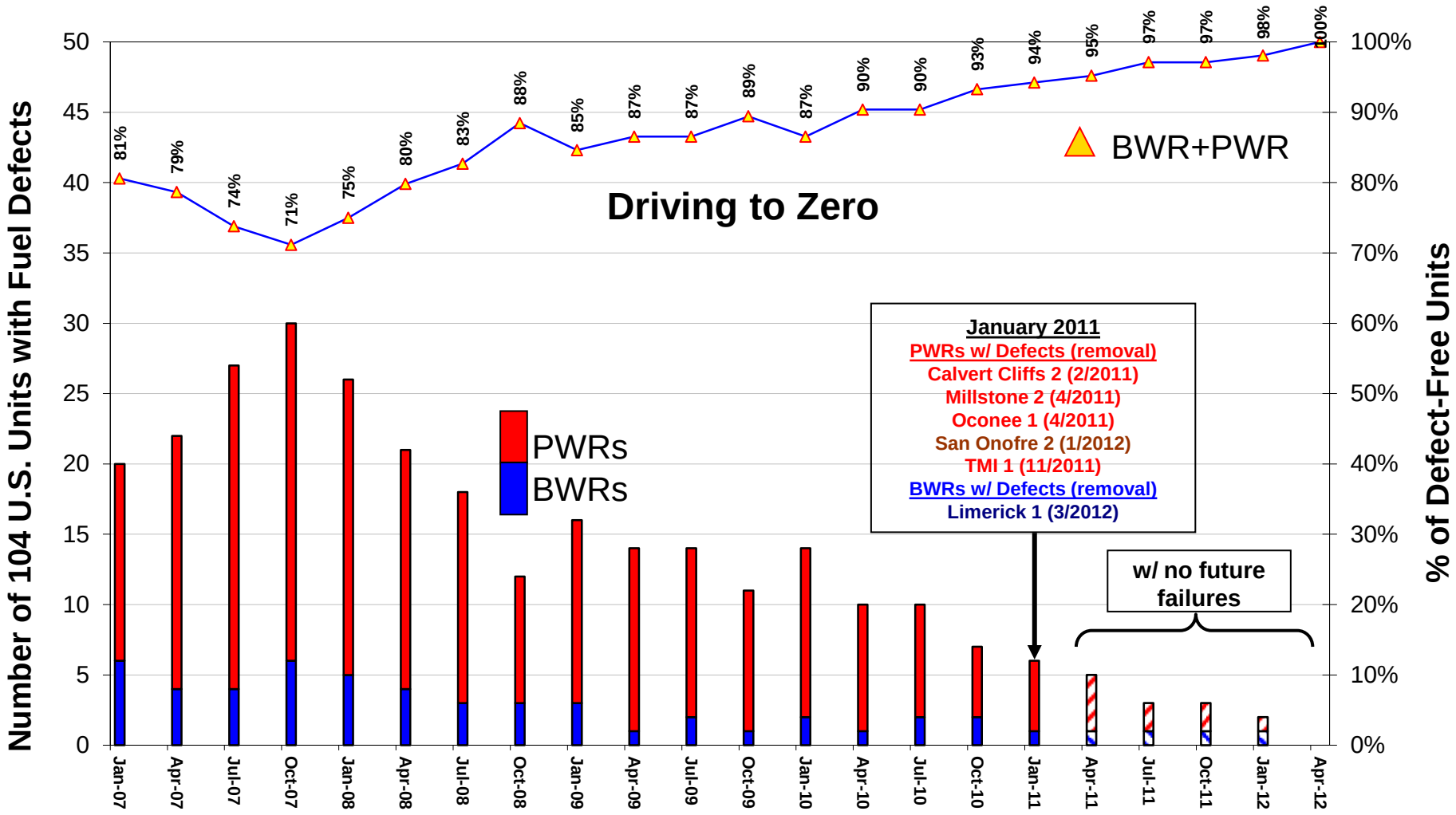
TVA Nuclear



Source: NEI and DOE EIA

Nuclear Fuel has become more reliable over time

TVA Nuclear



Source: Driving to Zero Industry Committee

Fuel failures taken seriously

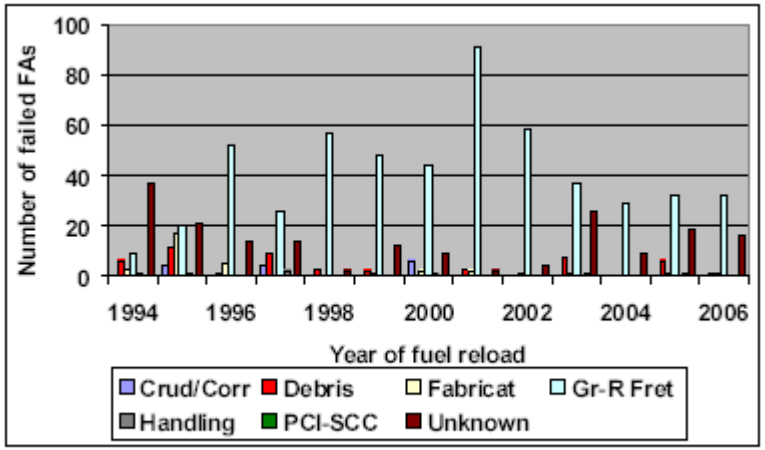


Fig. 1. PWR fuel leaker causes in the USA.

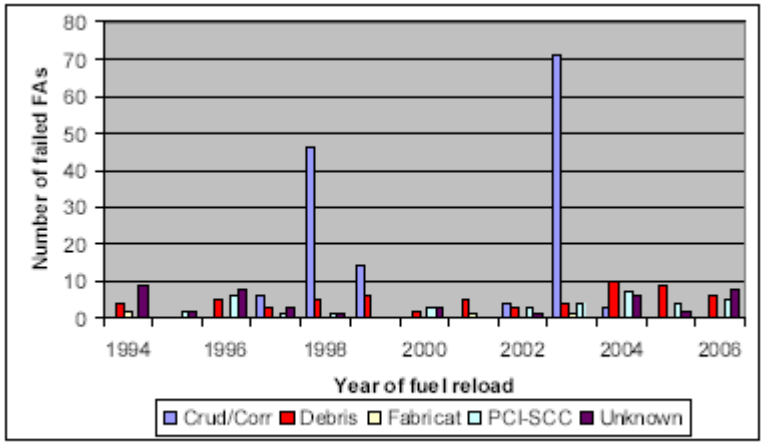


Fig. 4. BWR fuel failure causes in the USA.

Source: IAEA presentation at 2010 ANS

Summary

- Nuclear power has become a significant part of the nation's "energy mix"
- As nuclear plants have increased their reliability, nuclear fuel has had to become more reliable also
- The industry is working in parallel to increase the reliability of nuclear fuel and at the same time allow the fuel to be burned for longer cycles while squeezing more energy from it