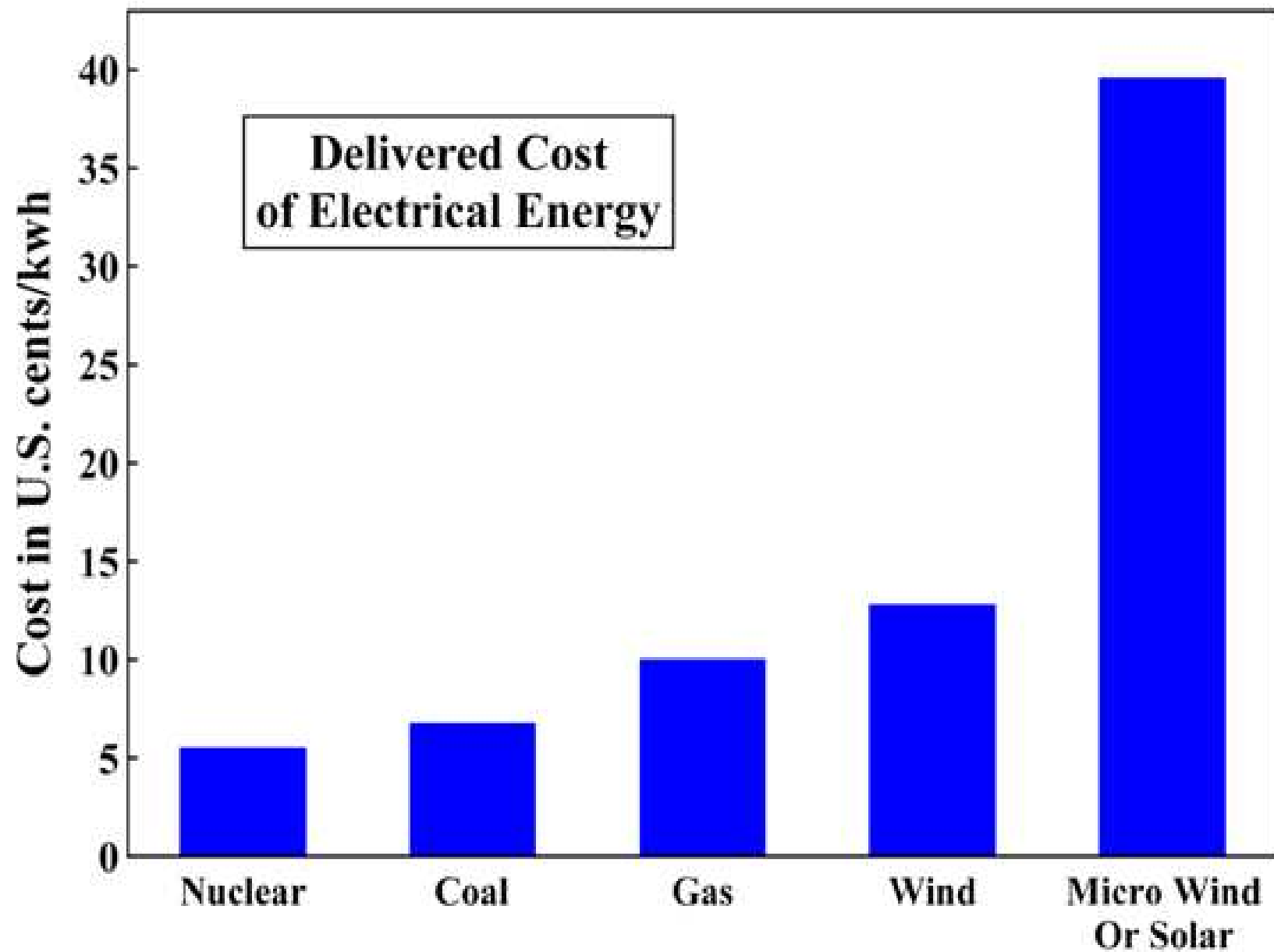
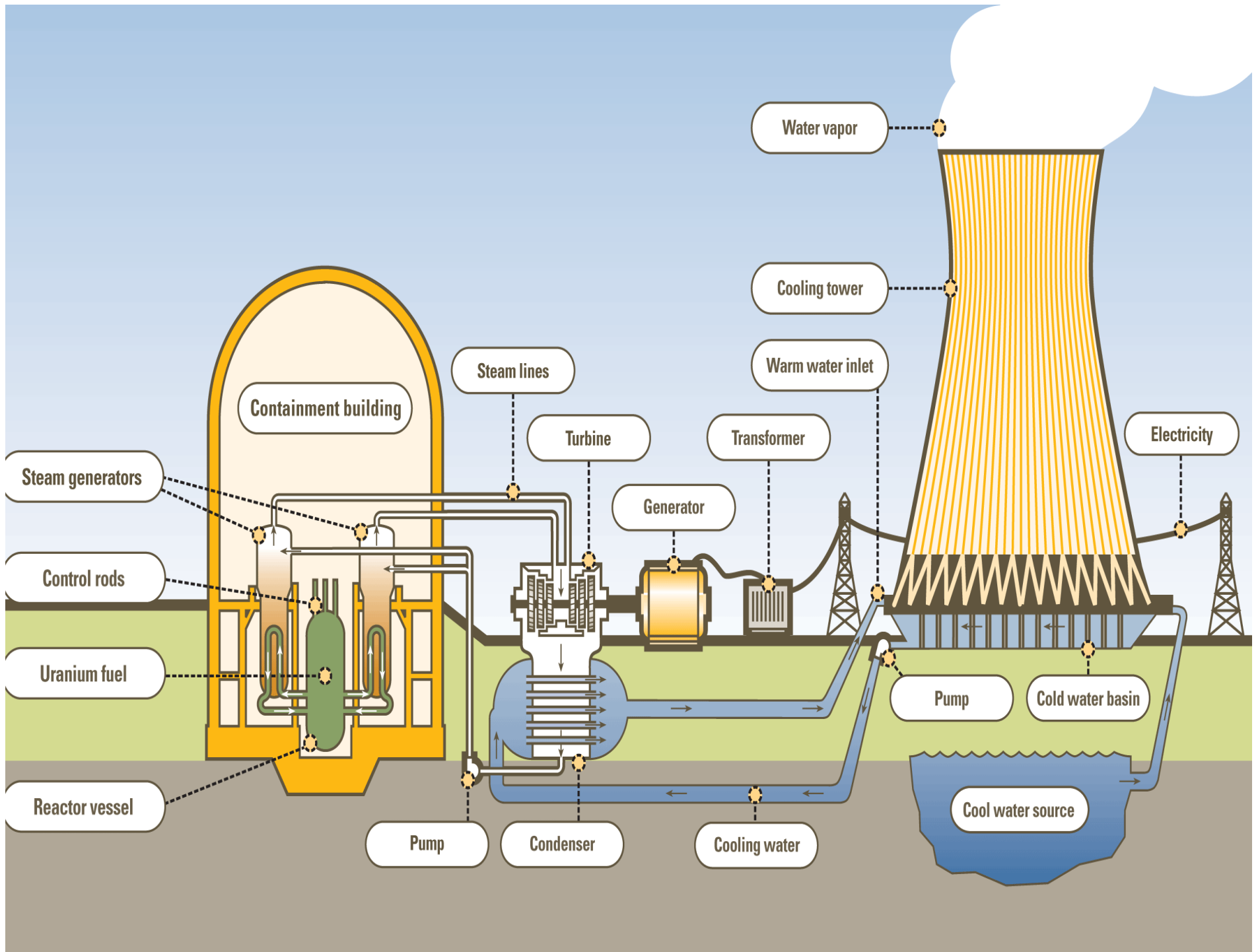


NUCLEAR POWER

UNDERSTANDING THE ISSUES





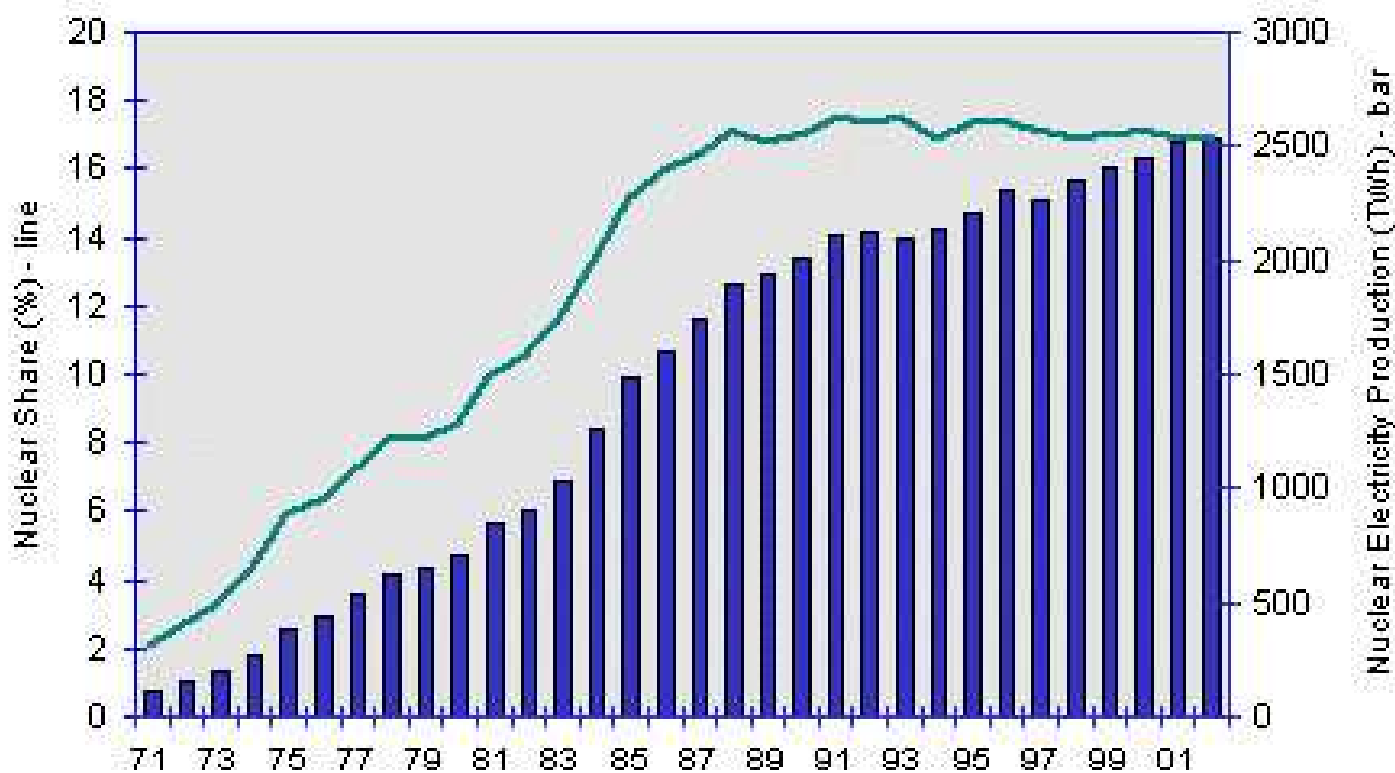
CONCERNS

- UNDERSTANDING NUCLEAR REACTOR TECHNOLOGY
- CONFUSION REGARDING TERMS USED TO MEASURE RADIATION
- URANIUM MINING
- CONSTRUCTION COSTS
- LICENSING
- SAFETY
- WASTE MANAGEMENT

CURRENT STATUS

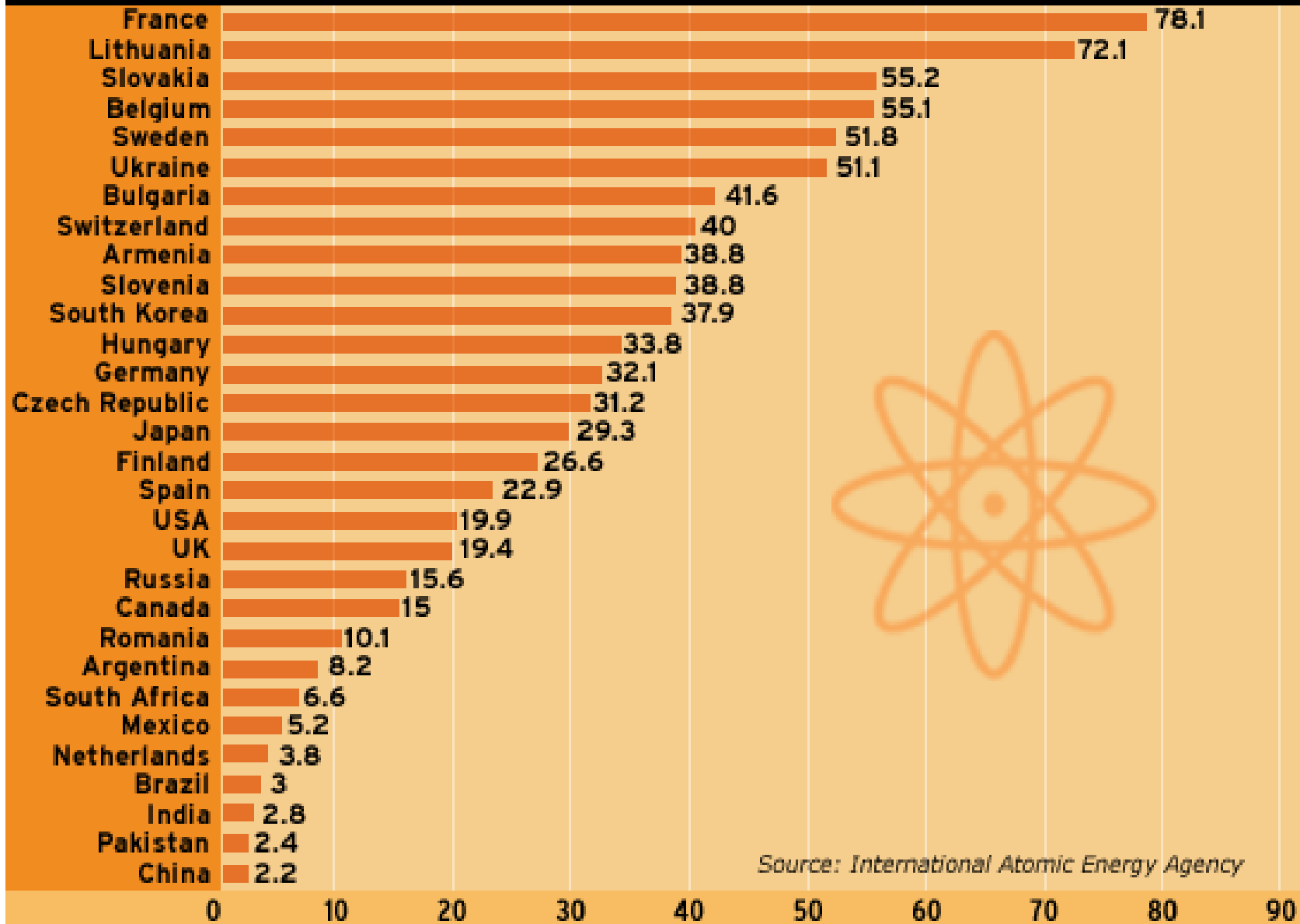
- 104 OPERATING PLANTS IN UNITED STATES
- OVER 90% UPTIME
- JUST STARTING TO BUILD NEW PLANTS
- 19% OF ELECTRIC GENERATION

Nuclear Electricity Production and Share of Total Electricity Production



Courtesy of <http://www.world-nuclear.org/info/inf01.html>

Percentage Of Electricity Generated By Nuclear Power



UNDERSTANDING RADIATION

- MEASURING RATE AT WHICH RADIATION IS EMITTED
- AMOUNT ABSORBED OVER A PERIOD OF TIME

INTERNATIONAL AND UNITED STATES TERMINOLOGY CAN DIFFER

- MEASURE AMOUNT OF EMMITTED RADIATION
 - CURIE BEING REPLACED BY BECQUEREL
 - ONE CURIE IS EQUAL TO 37 BILLION BECQUERELS
- MEASURE RADIATION DOSE
 - HISTORICALLY MEASURED IN RADS – NEW TERM IS GRAY WHICH IS 100 RADS
- MEASURE BIOLOGICAL RISK
 - USUALLY MEASURED IN REMS BUT NEW TERM IS SIEVERT WHICH IS EQUAL TO 100 REM
 - CALCULATED BY APPLYING QUALITY FACTOR TO RADS BASED ON TYPE OF RADIATION

TYPICAL RADIATION DOSES

- CROSSCOUNTRY FLIGHT = 3 MREM
- CHEST XRAY = 10 MREM
- MAMMOGRAM = 70 MREM
- ONE YEAR EXPOSURE TO BACKGROUND = 300 MREM

BODY REACTION

- 500 REM IN SHORT PERIOD OF TIME IS FATAL TO ABOUT 50% OF THOSE EXPOSED
- 50 REM GIVES YOU 2% CHANCE OF GETTING CANCER
- NUCLEAR WORKERS ARE LIMITED TO 5 REM PER YEAR

WASTE MANAGEMENT

- LOW LEVEL GOES TO NEW MEXICO
- SPENT FUEL OPTIONS
 - STORAGE ON SITE
 - LONG TERM UNDERGROUND STORAGE
 - REPROCESSING

NUCLEAR POWER PLANTS

- EARLY ONES ALL DIFFERENT WITH MANY OPERATORS
- FEW LARGE OPERATORS TODAY
- STANDARDIZED DESIGNS
- NEW TECHNOLOGY ON HORIZON
 - FAIL SAFE
 - MINIMAL SPENT FUEL
 - EASIER TO BUILD (MODULAR)

FUKUSHIMA OVER REACTION

- WITHIN 50 MILES MAXIMUM OF 2.0 REM
- DUMB DESIGN
 - BACKUP GENERATORS IN BASEMENTS WHICH FLOODED
 - INSUFFICIENT SEAWALL PROTECTION
 - SPENT FUEL STORED ON ROOF POOLS
- POOR EMERGENCY MANAGEMENT – GOVERNMENT VS. UTILITY VS. FIRST RESPONDERS

Major Safety Advancements of AP1000

- No Reliance on AC Power; Long Term Plant Safety Assured without Active Components (Natural Forces Only)
 - For Station Blackout (SBO), AP1000 meets aggressive 72 hours coping time requirements for passive plants
 - Active plants SBO coping period requirement is 8 hours or less
 - Significant risk reduction for loss of power events:
 - For advanced active plants design, LOOP / SBO events are a dominant contributor to the Core Damage Frequency (in the range of 25+%)
 - AP1000 CDF contribution for loss of Offsite Power / SBO is 0.4%
- No Operator Action Required to Assure Safety
- In Severe Accidents, Reactor Vessel Cooling Keeps Core in Vessel
- Large Margin to Safety Limits
- Defense in Depth - Active Systems Provide ADDITIONAL first line of defense