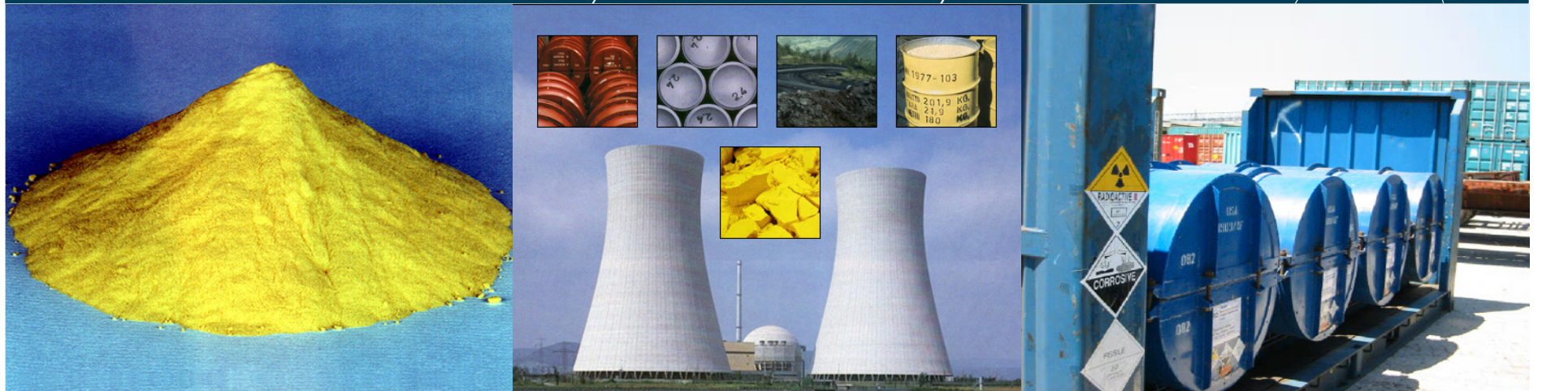


# Market Presentation: Uranium, Conversion, SWU

Alzenau, March 2016



## Overview

### NUKEM's Business

- NUKEM at a Glance

### The International Uranium Market

- Historical Uranium Production
- Supply and Demand
- Spot and Medium-/Long-term Market

### Conversion & Enrichment

## NUKEM at a Glance (1)

### Over 50 Years Experience in the Nuclear Sector

#### Offices:

- NUKEM GmbH, Alzenau (Germany)
- NUKEM Inc., Danbury (USA)
  - relocating to Westport, CT in March 2016

Germany Office, Alzenau



USA Office, Danbury



## NUKEM at a Glance (2)

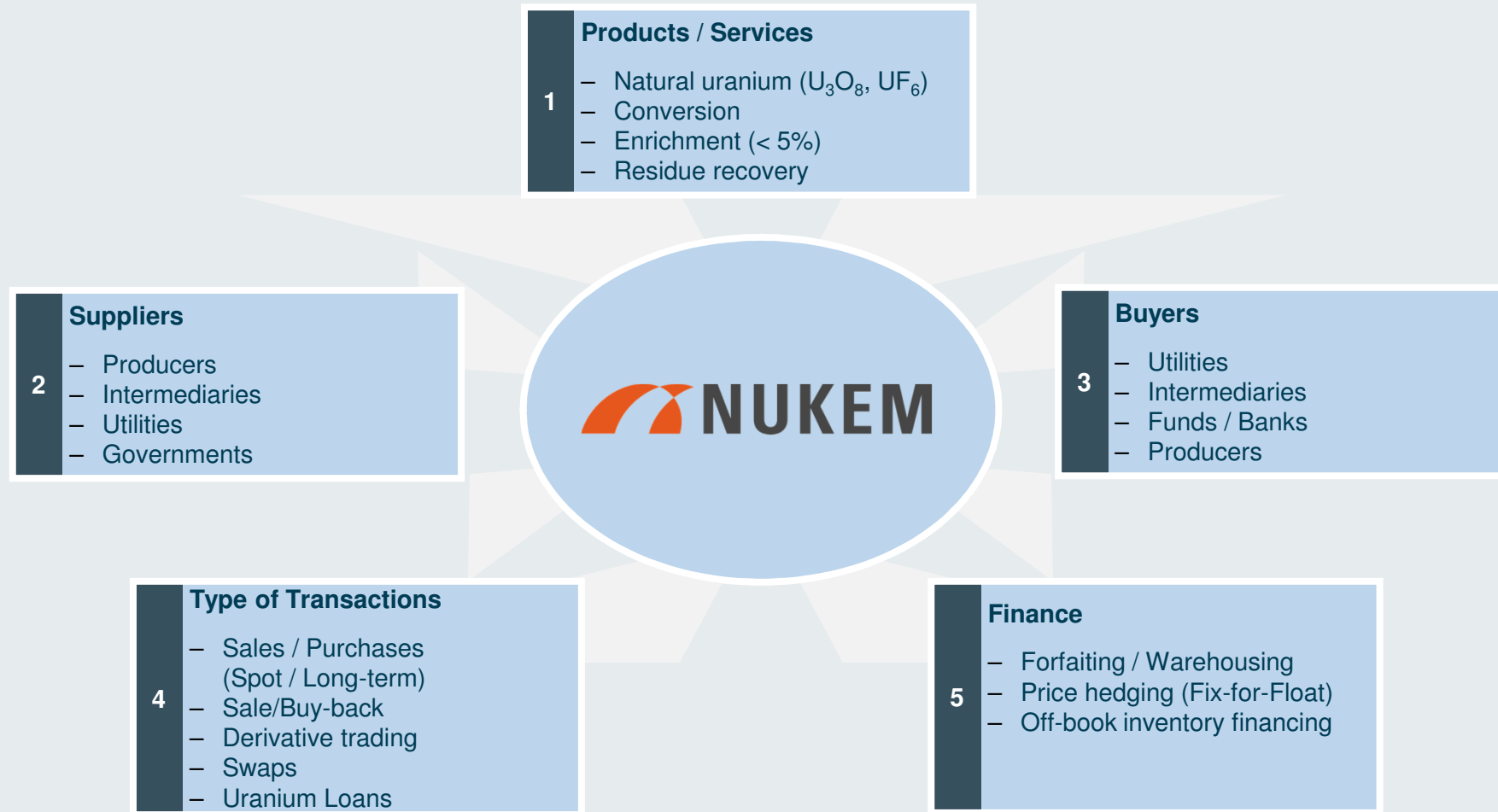
### Position & Business

One of the top five providers of uranium to nuclear power plants worldwide:

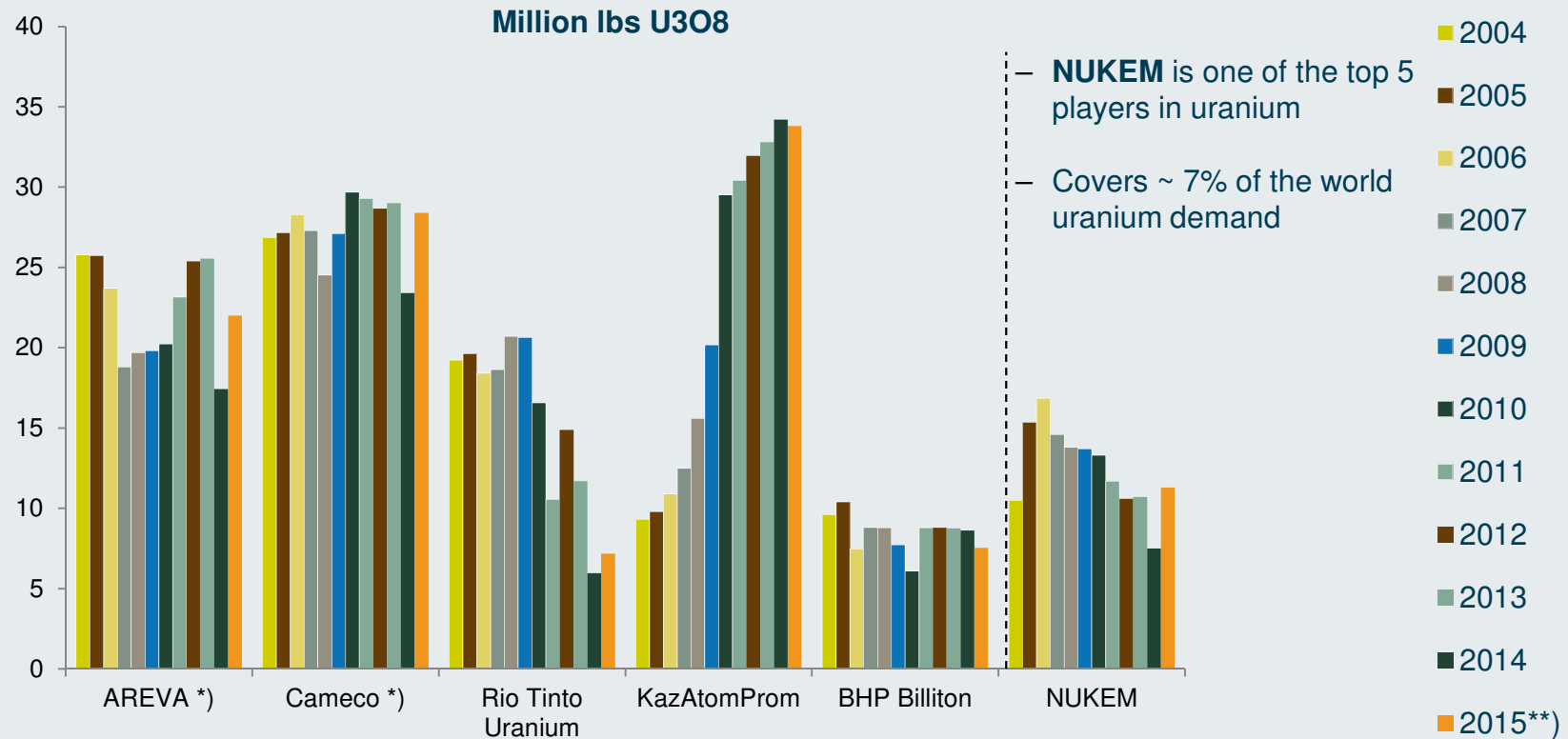
- Contracts with almost all nuclear utility in the world
- Delivering 11 m lbs  $U_3O_8$  annually
- Trading in the spot and medium-/long-term markets (U3O8, UF6, Conversion, EUP, SWU)
- Strong partnership with major uranium mining enterprises
- Recovery/recycling of non-standard uranium products

## NUKEM at a Glance (3)

### Active in the Entire Front-end of the Nuclear Fuel Cycle



## NUKEM Delivery Commitments vs. Uranium Production of the Major Producers



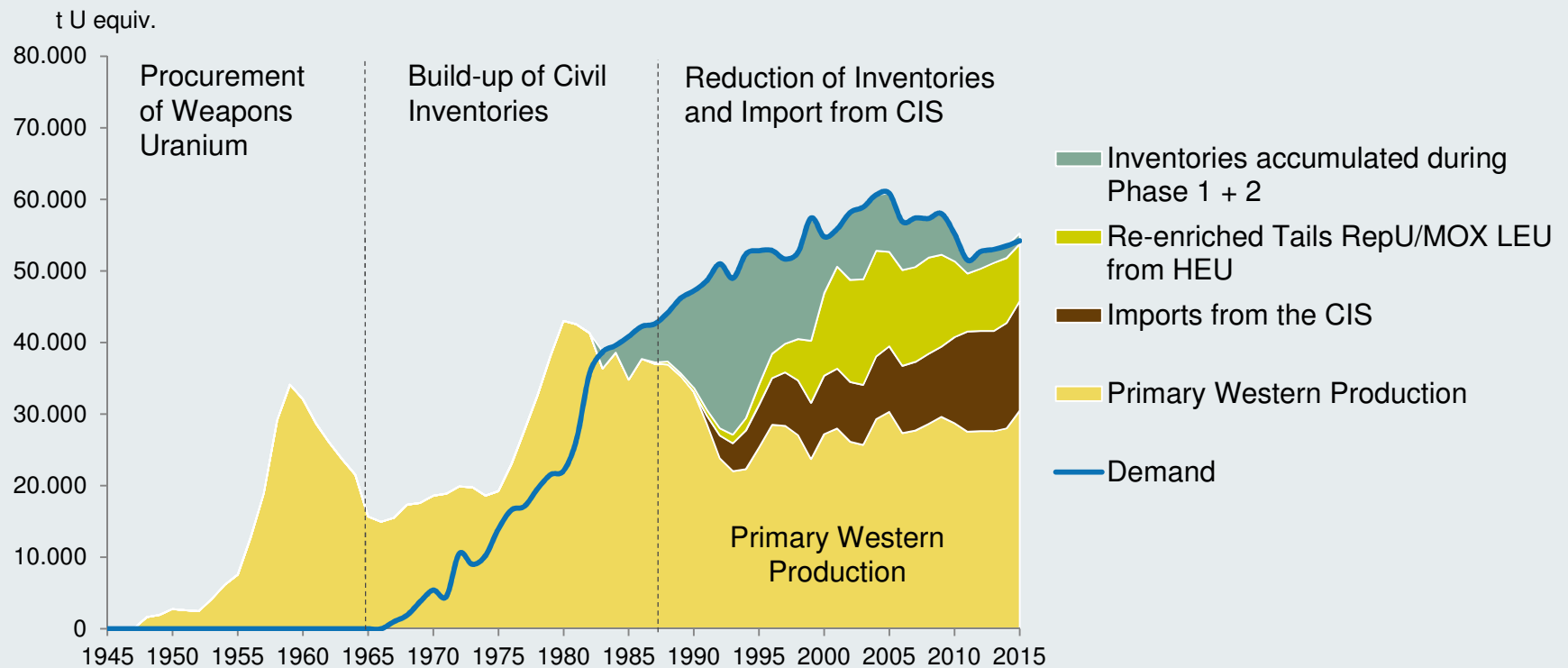
\*) HEU Feed included as "production"

\*\*) Preliminary data

# The International Uranium Market

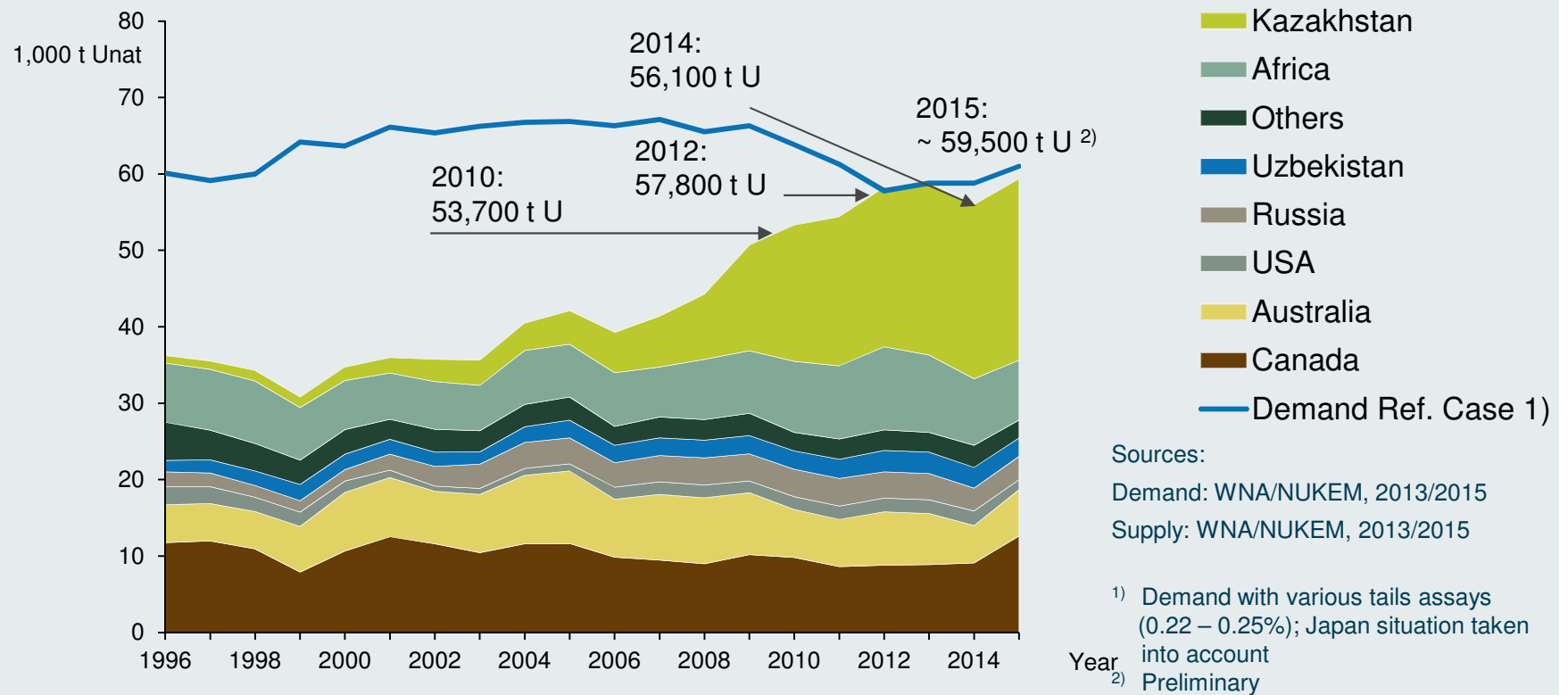
# Western World Natural Uranium Production

## Coverage of the Gap

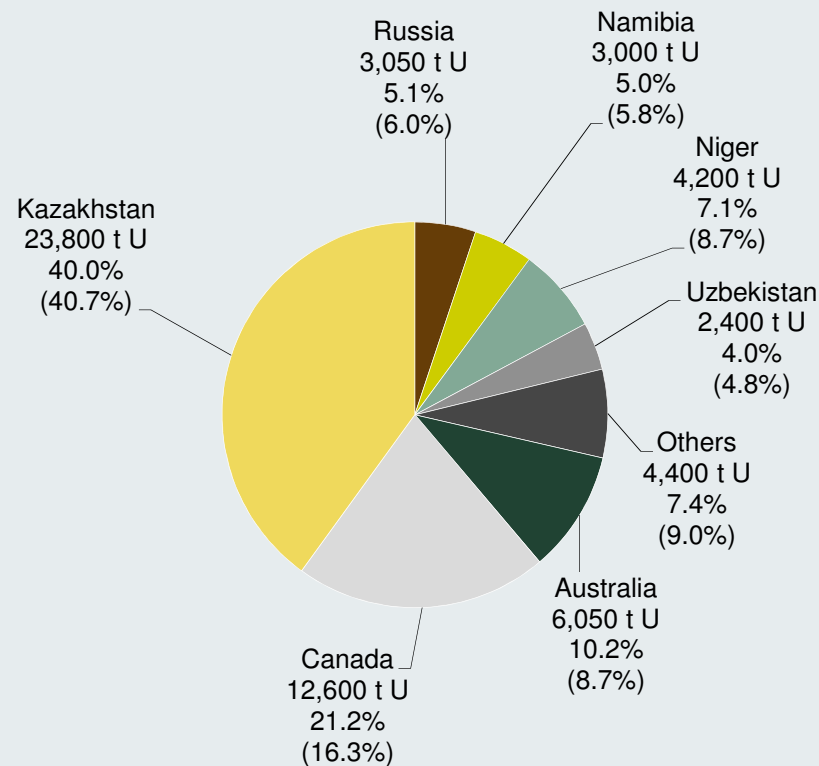




# World Uranium Production by Country/Region 1996-2015



## World Uranium Production in 2015 by Country

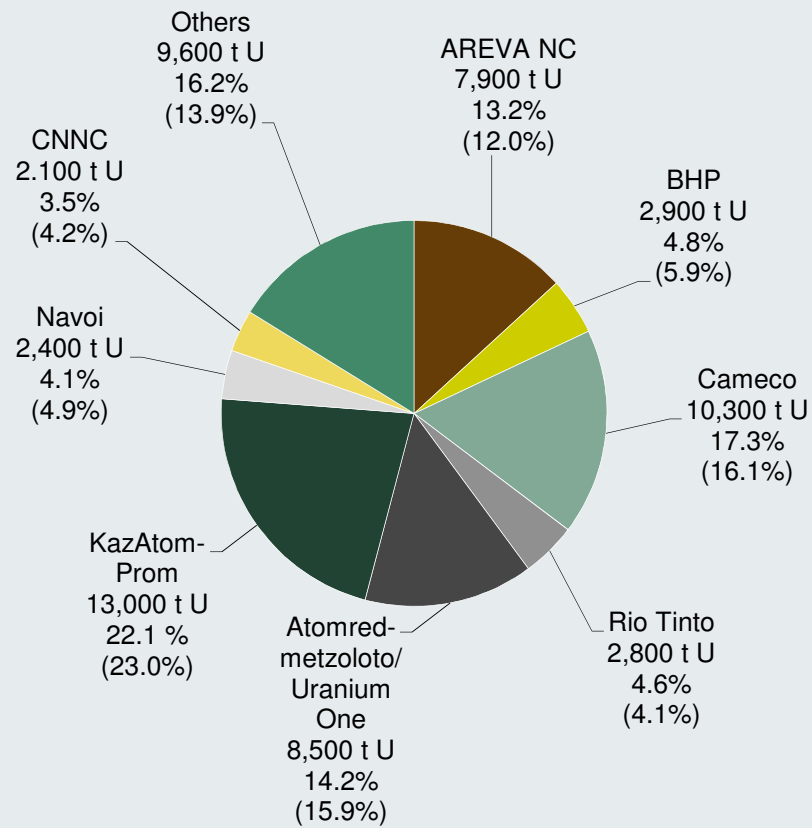


**Total:**  
59,500 t U (56,000 t U)

- „Eastern“ production\*): ~ 30,000 t U
- „Big 3“ (Aus, Can, USA): 20,000 t U
- Production Africa: 8,000 t U

\*) Including Ukraine  
2014 data in ()

## World Uranium Production in 2015 Shareholder



**Total:**  
59,500 t U (56,000 t U)

\*2014 data in ()

# Uranium Supply & Demand

## Market Fundamentals at a Glance (1)

### Major demand/supply characteristics

#### Demand

- 442 operating<sup>\*)</sup> nuclear reactors worldwide in 2016 (~ 380 GWe)
- 64 reactors currently under construction (~ 70 Gwe)
- Start-up of 113 reactors by 2025, with major new-build in China, Russia and India
- 55 reactors to be shut down, particularly in Asia, Russia, Europe
- ~ 500 reactors expected to operate by 2025

#### Supply

- Secondary supplies continuing on lower level beyond 2014
- New (big) uranium production projects suspended/postponed

Source: Cameco 2016, WNA 2015

<sup>\*)</sup> Operating = connected to the grid;  
including 43 Japan reactors

## Market Fundamentals at a Glance (2)

### Major challenges

#### Fukushima Impact

- Japan situation
  - Two reactors operating yet
  - Further restarts in 2016 likely
  - Still lack of reactor re-start schedule
  - Slow restart pace of Japanese reactors expected
- Public still wary of nuclear (Germany, Switzerland, Japan)

#### Uncertainties in the uranium market

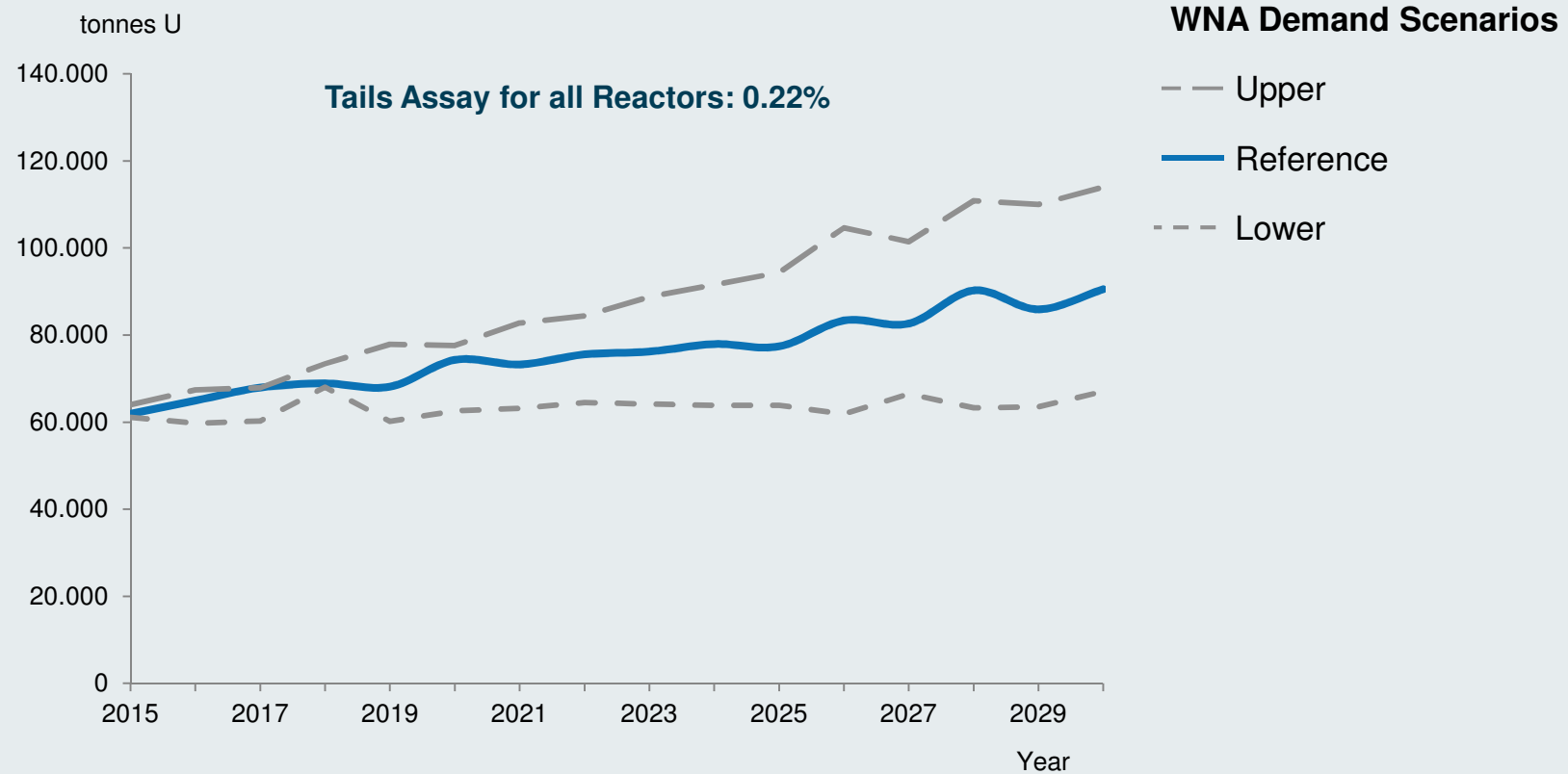
- Spot price developments
- Excess inventory
- Future production
- Excess enrichment capacity used for underfeeding & tails re-enrichment

#### Other

- New nuclear generation less competitive due to new gas fracking
- Nuclear production costs boosted by new safety regulations

## World Uranium Demand & Supply (1)

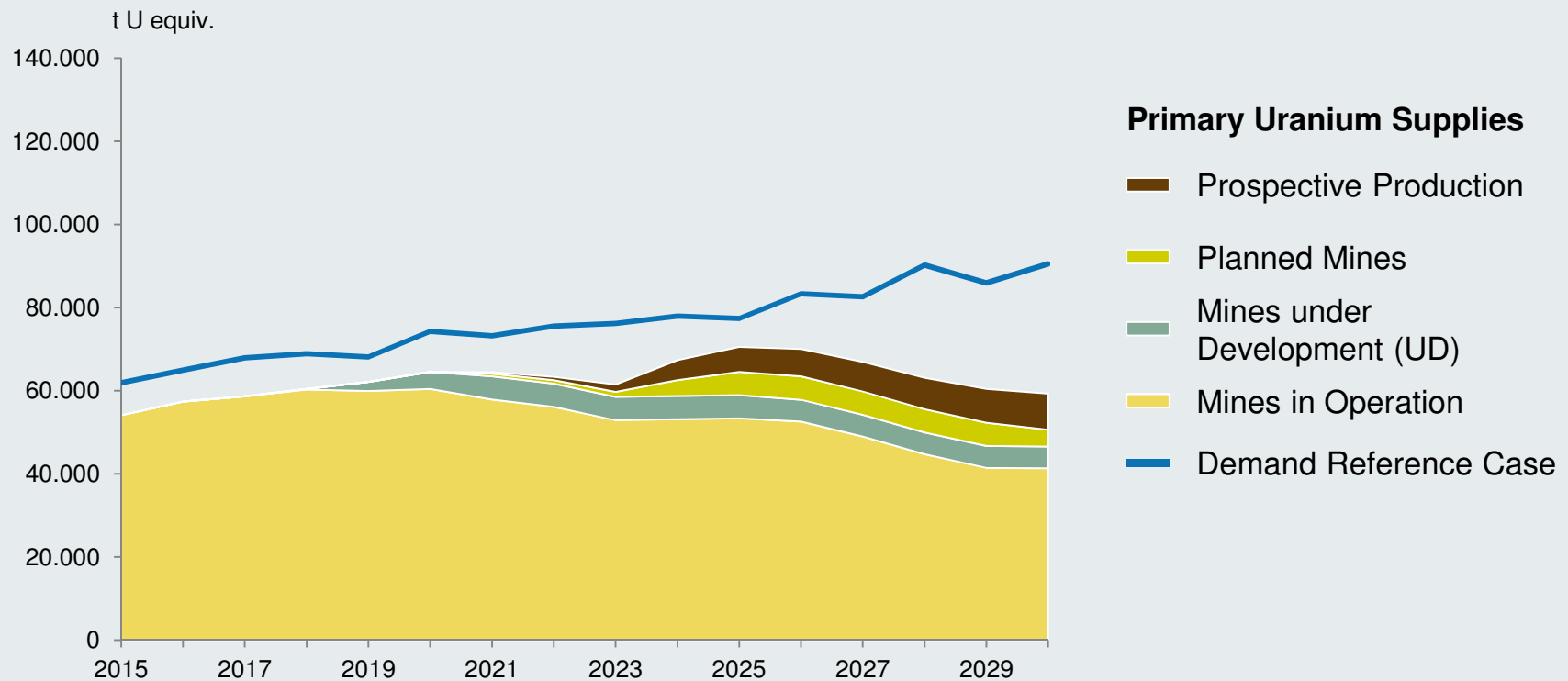
### WNA Demand – Three Scenarios



Source: WNA Fuel Report Sep 2015

## World Uranium Supply & Demand (2)

### Primary Uranium Supply in line with WNA Reference Scenario



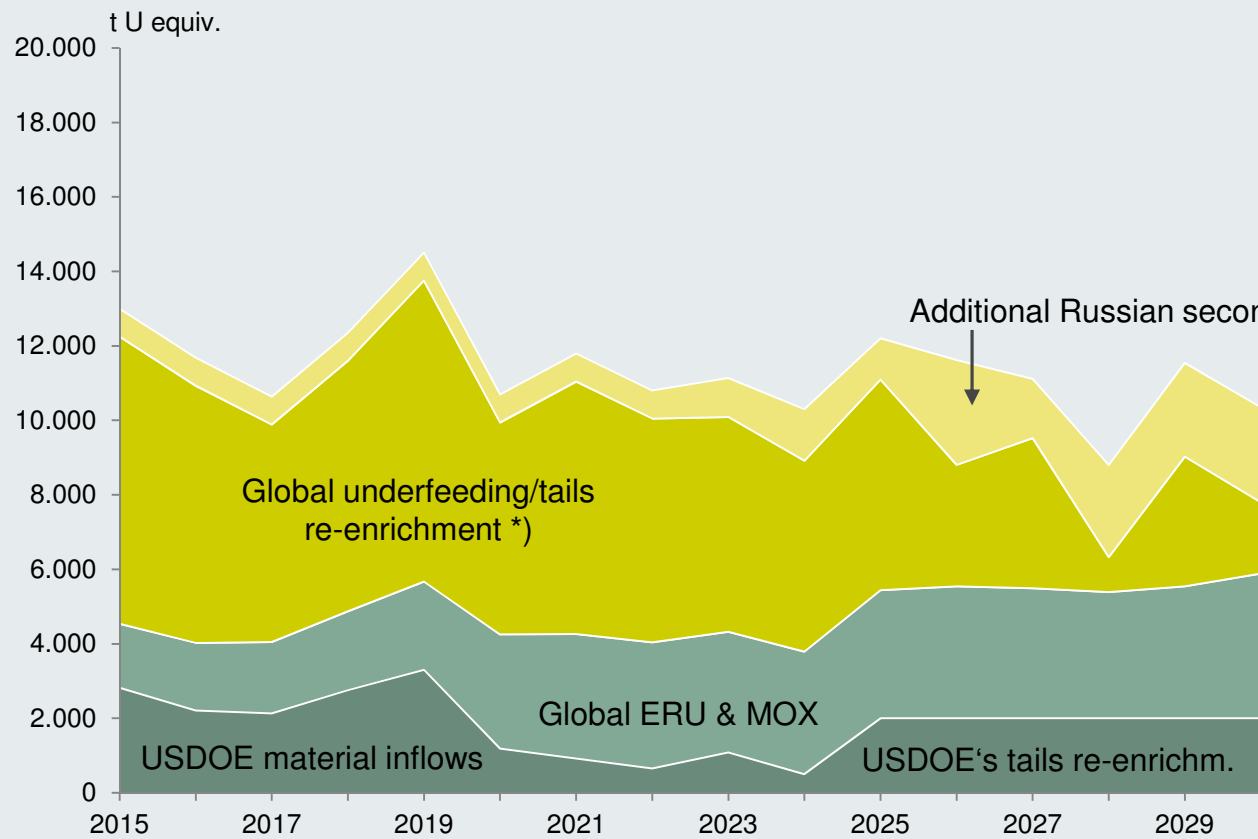
Major assumptions: Trekkopje/Areva; Bakouma/Areva; Yeelirrie, Kintyre/Cameco; Imouraren suspended or postponed

Source:  
WNA Fuel Report Sep 2015



# World Uranium Supply & Demand (5)

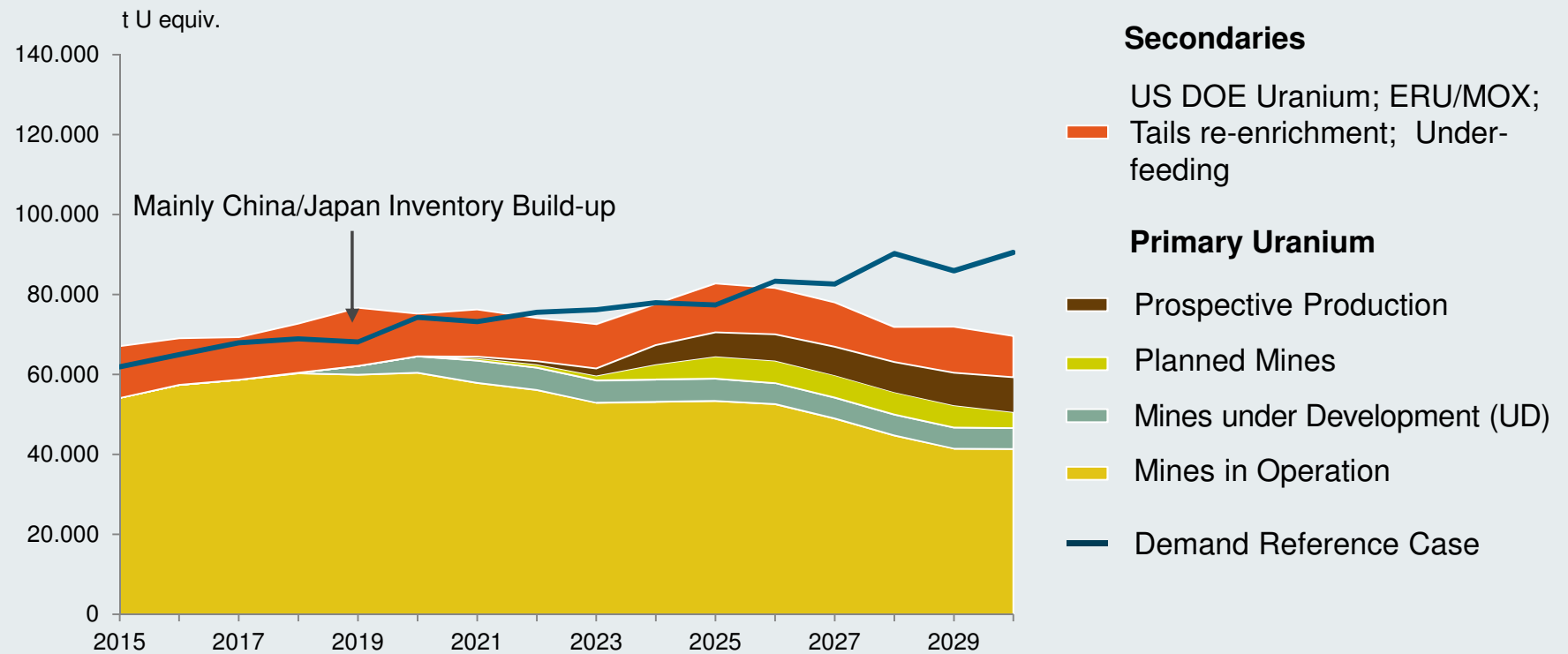
## Secondary Supply Sources (U<sub>3</sub>O<sub>8</sub>) – Breakdown of Reference Scenario



\*) Level can vary by +/- 1,000 tU/year due to market conditions and operational flexibility of centrifuges

## World Uranium Supply & Demand (7)

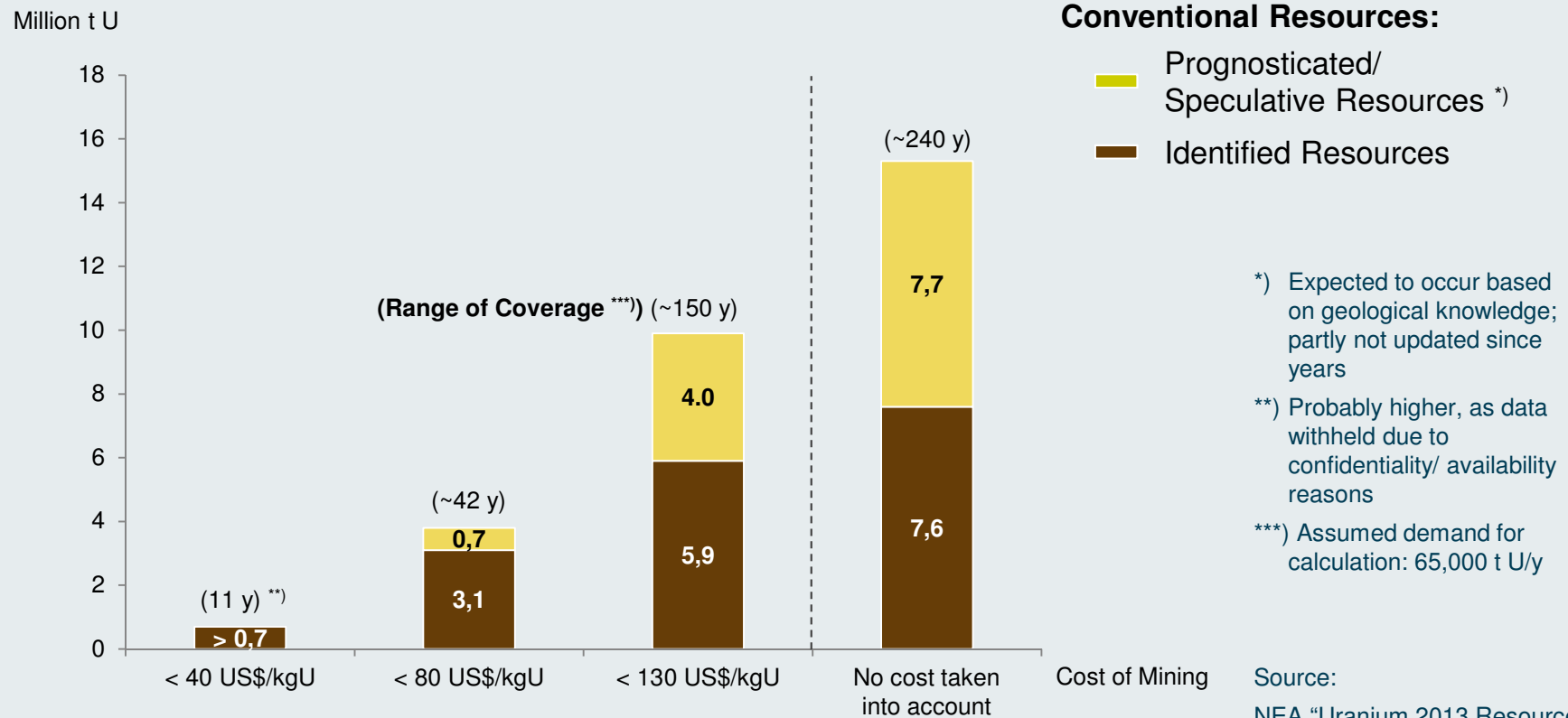
### Global Supply/Demand – WNA Reference Scenario



Source: WNA Fuel Report, Sep 2015

# Uranium Resources Worldwide by Production Cost

## Range of Coverage



### Conventional Resources:


- Prognosticated/Speculative Resources \*)
- Identified Resources

\*) Expected to occur based on geological knowledge; partly not updated since years

\*\*\*) Probably higher, as data withheld due to confidentiality/ availability reasons

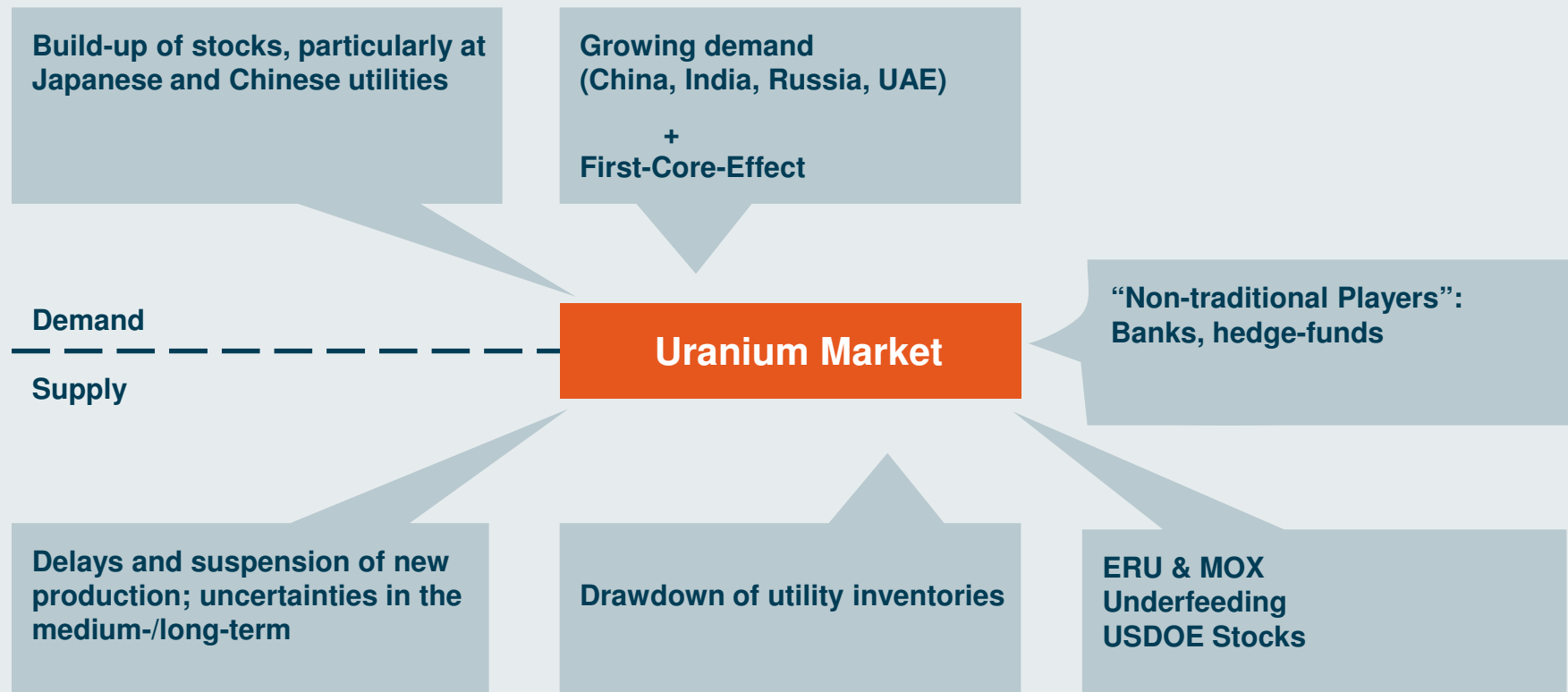
\*\*\*) Assumed demand for calculation: 65,000 t U/y

Source:  
NEA "Uranium 2013 Resources, Production and Demand" (Red Book 2013)

A dark blue horizontal band at the top of the slide contains three white, overlapping arches that curve upwards from the bottom edge of the band.

# Uranium Spot and Long-term Market

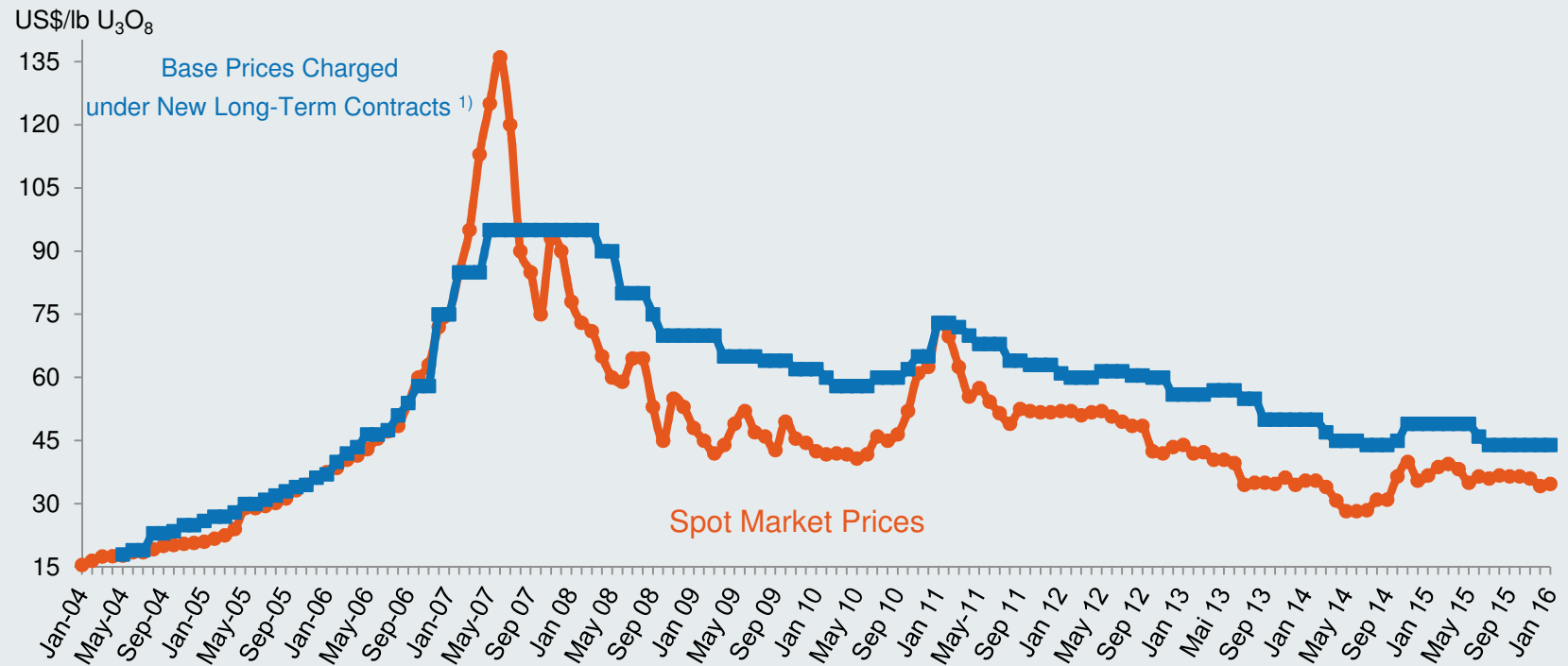
# Uranium Market Today and in Future: Main Influences



# Uranium Spot Market Prices



## Uranium Base Prices for New Long-Term Contracts



Source: UxC Weekly Reports

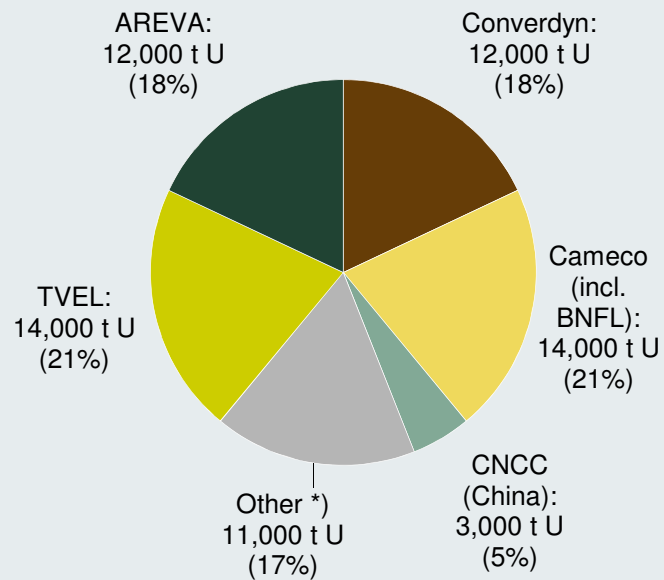
<sup>1)</sup> Base prices are given for the month of contract conclusion

# Conversion



# Conversion Market in 2014

## Sources of Conversion – Best Estimate

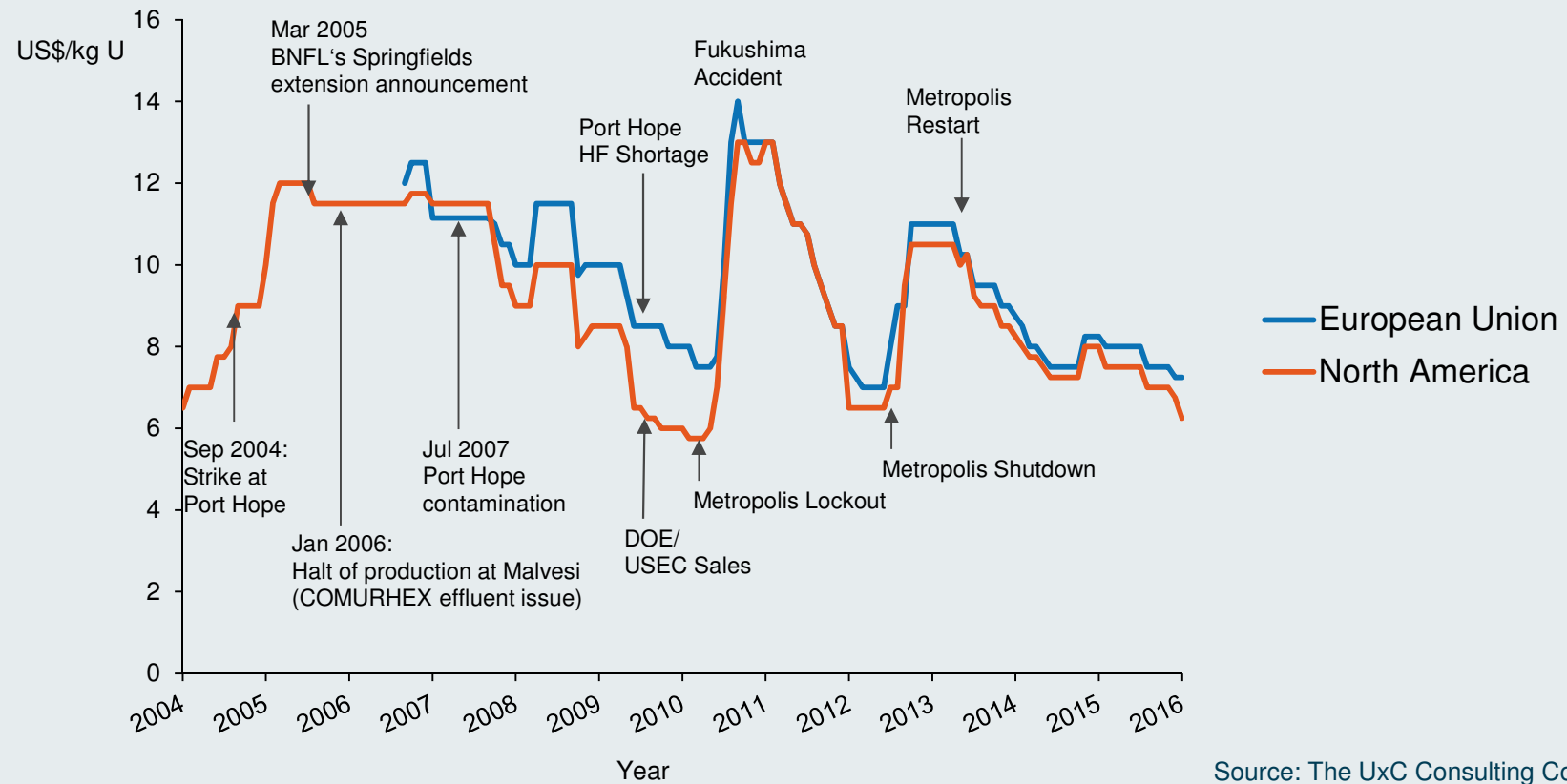


Demand:  
~ 60,000 t U/UF<sub>6</sub>

Installed Capacity:  
~ 65,000 t U/UF<sub>6</sub>

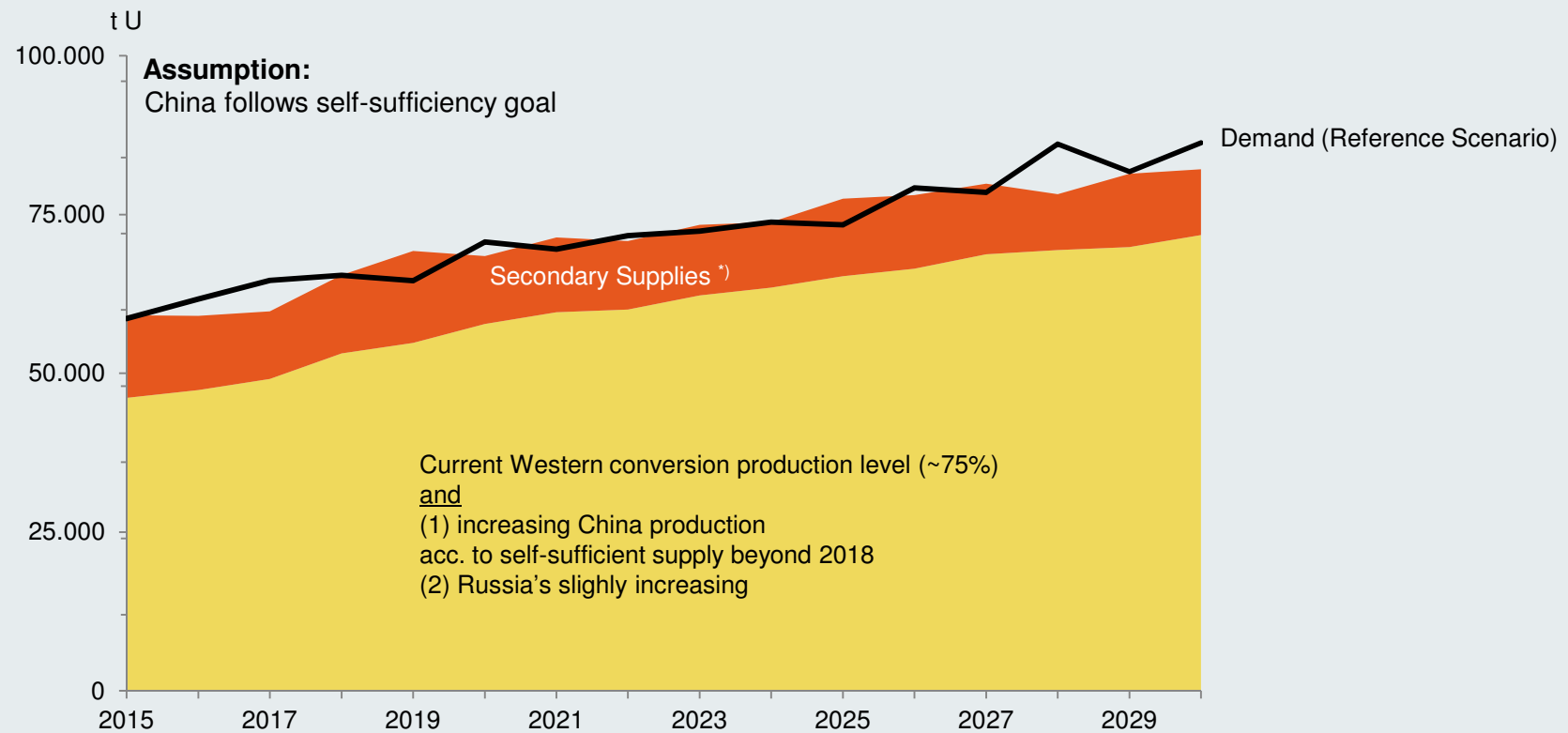
\*) LEU/HEU; ERU/MOX; USDOE stocks!

# Ux Month-End Spot Conversion Price 2004 onwards



Source: The UxC Consulting Company

## World Conversion Demand & Supply (2) Existing Supplies vs. Demand



Sources:  
Demand, secondary supplies: WNA Fuel Report 2015

\*) USDOE UF6; ERU & MOX (incl. US weapons-grade Pu); underfeeding; tails re-enrichment

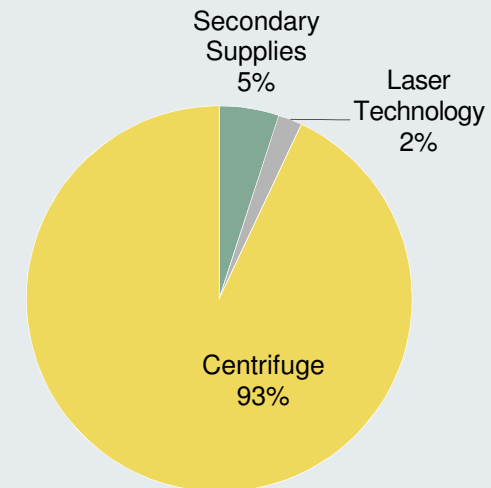
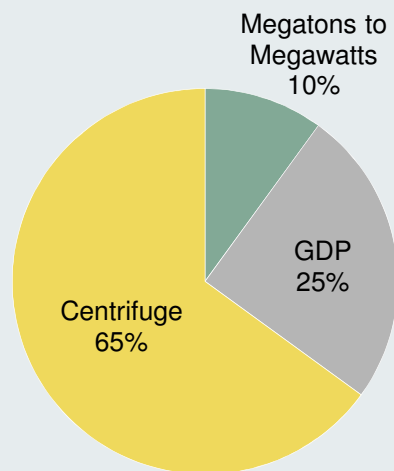
# Enrichment

## Enrichment Capacity by Technology

### Diffusion Phased out in 2013

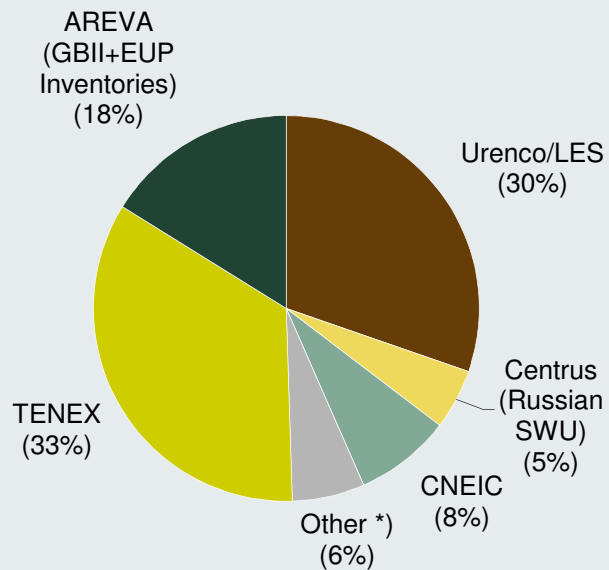
2011

2020



Source: The Ux Consulting Company

## SWU World Market in 2014 Market Shares by Enricher

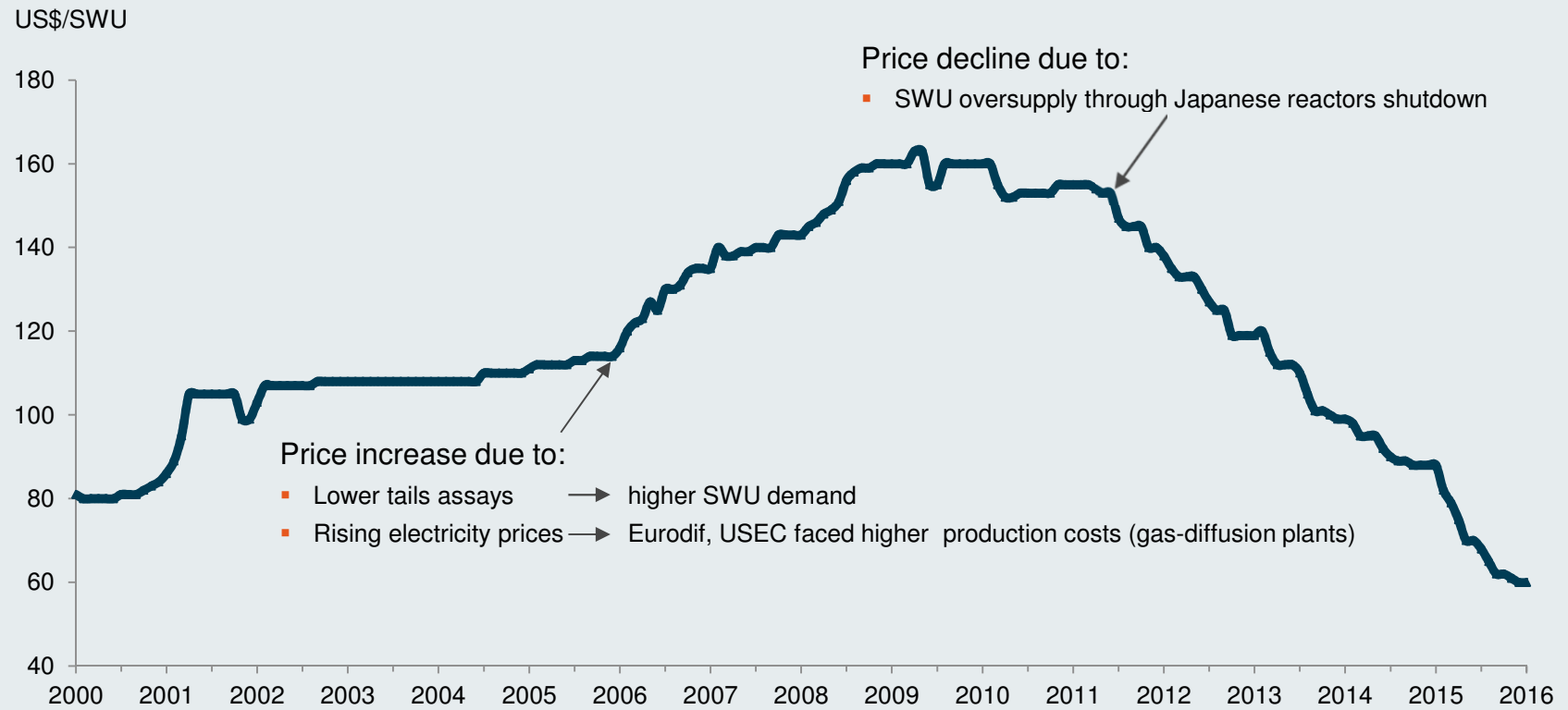


Demand:  
~ 50 mill SWU

Installed Capacity:  
~ 60 mill SWU

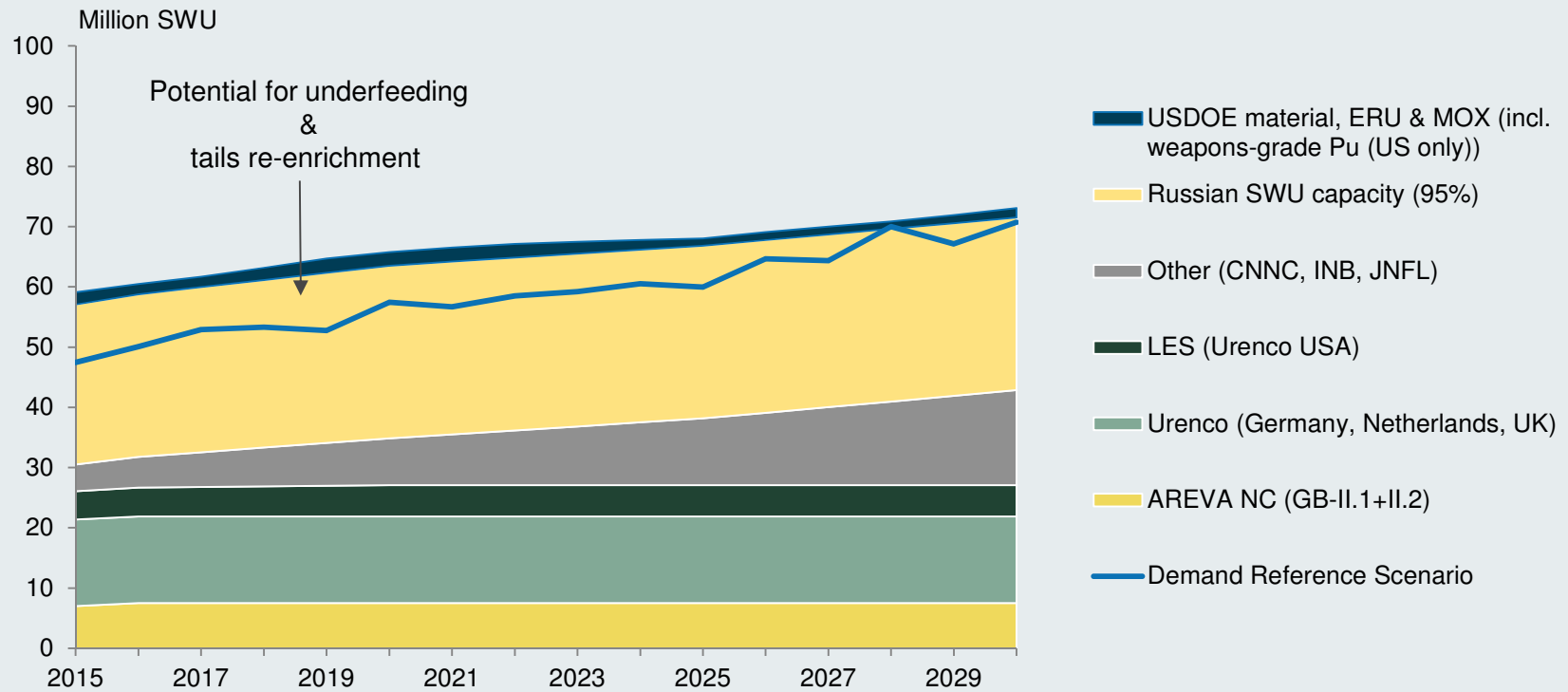
\*) Secondary supplies: USDOE stocks;  
MOX & ERU

## Ux Month-end SWU Spot Price



# World SWU Demand & Supply (1)

## Existing Supplies

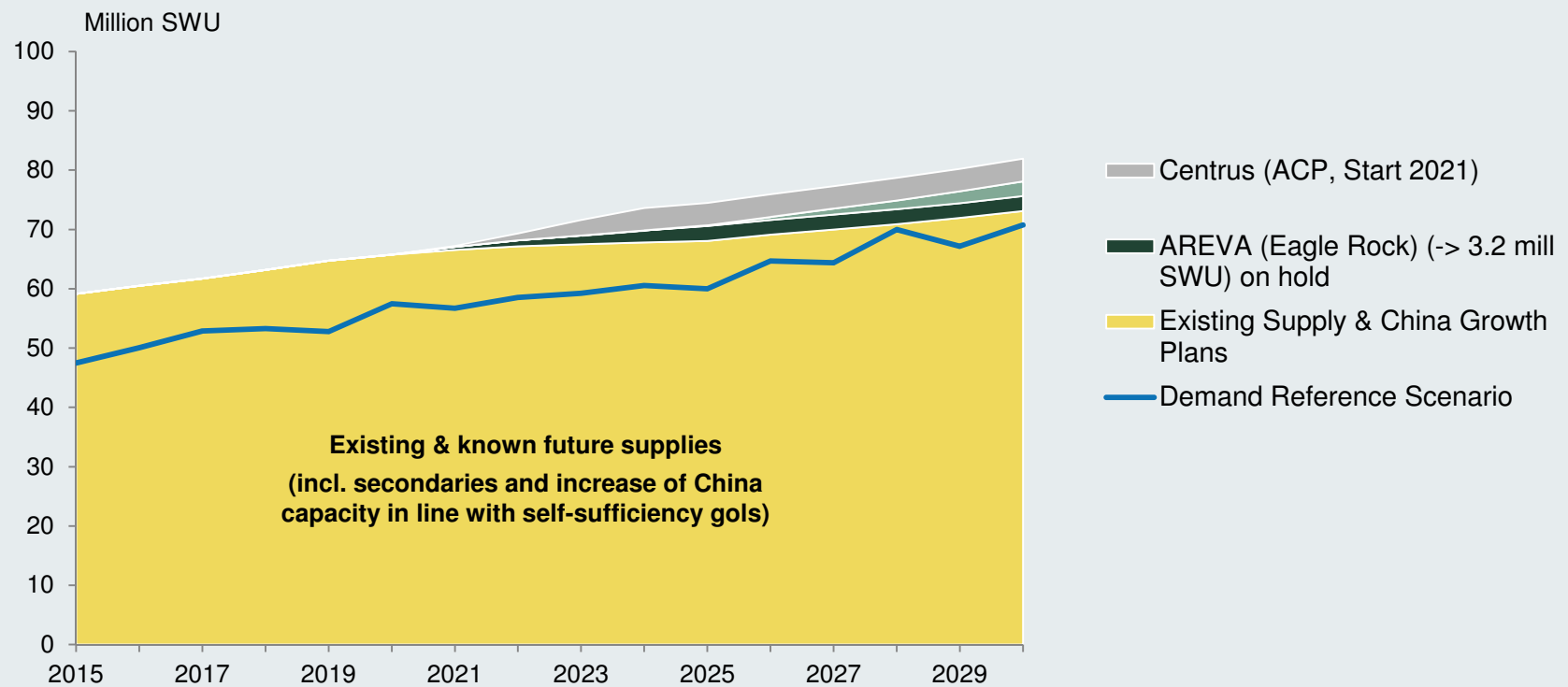


Sources:  
Demand - WNA Fuel Report 2015



## World SWU Demand & Supply (2)

### Prospective Supplies



Sources:  
Demand - WNA Fuel Report 2015