

The Nuclear Fuel Market- Post Fukushima

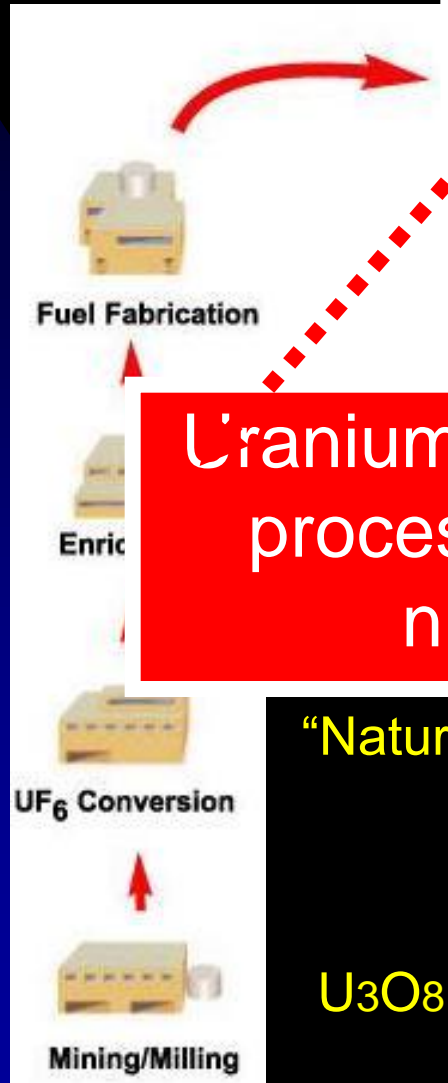
Nomura Asia Equity Forum 2011
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June 14, 2011

R. Gene Clark, Chief Executive



Uranium

The enrichment stage has variable economic efficiency, creating a substitution factor of electricity for uranium.

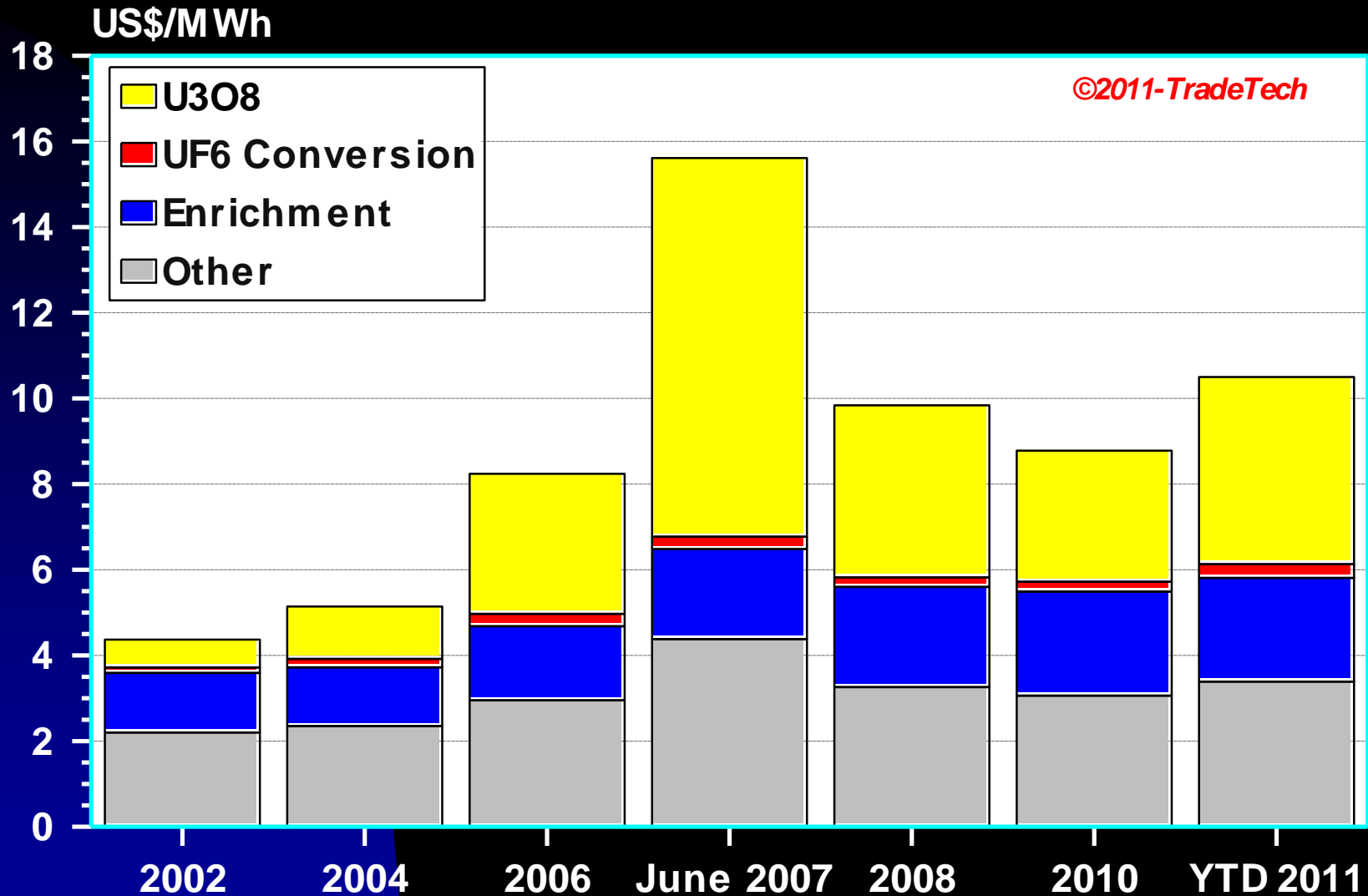


Uranium has to be further processed to become nuclear fuel.

“Natural” UF₆ (uranium hexafluoride)

U₃O₈ or Yellow Cake

Nuclear Fuel Costs At Spot Prices

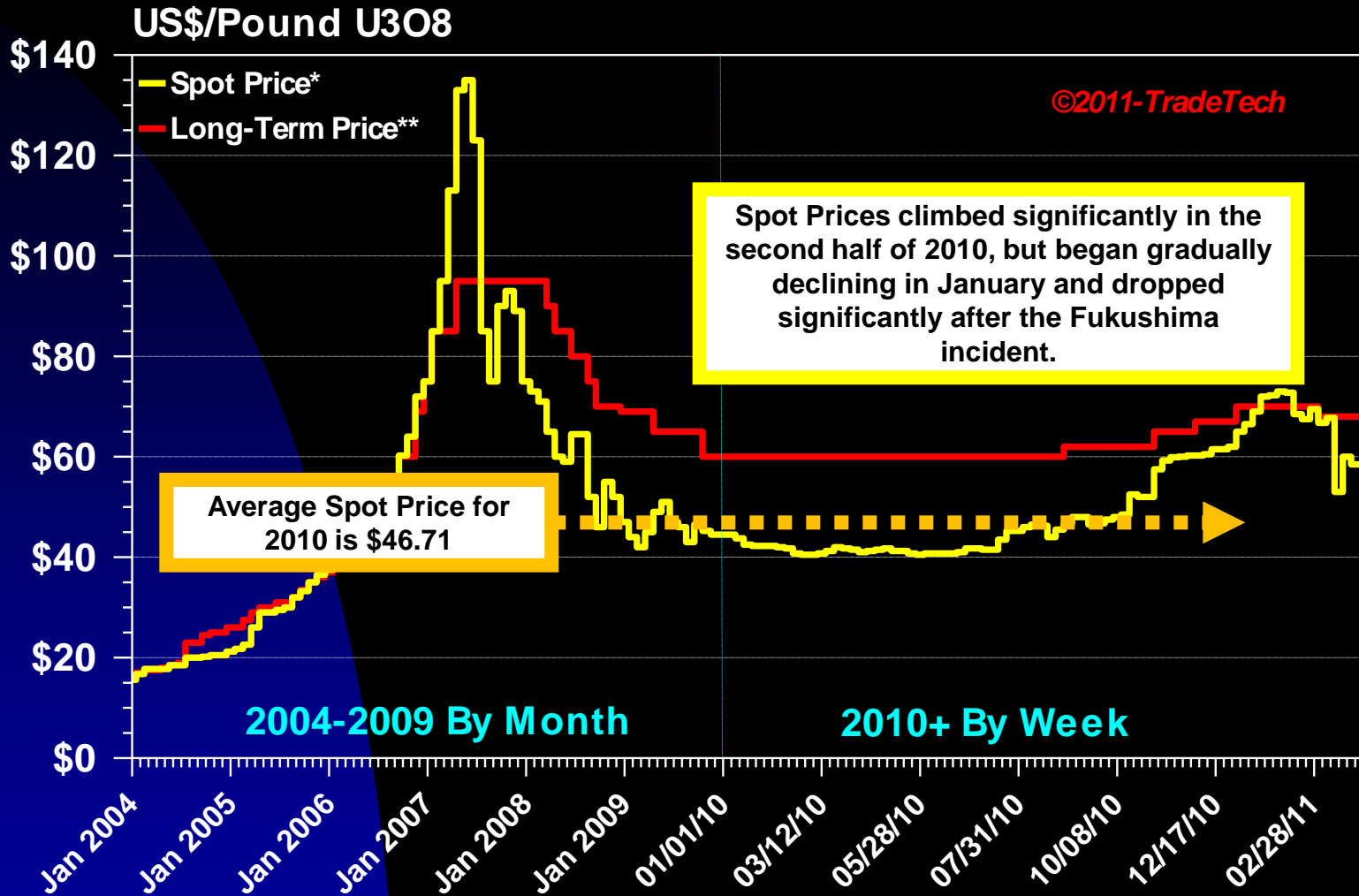


This fuel cost still represents only a small part of total electricity cost and are rolled into the generating cost over the course of several years

Topics

- Uranium Market
- Enrichment Market
- Overall Market Conclusions

Uranium Prices in 2010+



* TradeTech's NUEXCO Exchange Value through 2009; TradeTech's weekly Spot Price Indicator for 2010-2011YTD

** TradeTech's Long-Term Price Indicator for U3O8

Uranium Market

- Recent Developments Impacting Price
- Uranium Demand Outlook
- Uranium Supply Outlook
- Price Outlook

Recent Developments...

- 2010 had the largest spot volume in history of market; third year in a row of high volume
- Uranium prices were low in 2009 and mid-2010, but recovered later in 2010 through the beginning of the year 2011
- Excess US Government uranium stocks still overhang the market, with announcements of continued sales

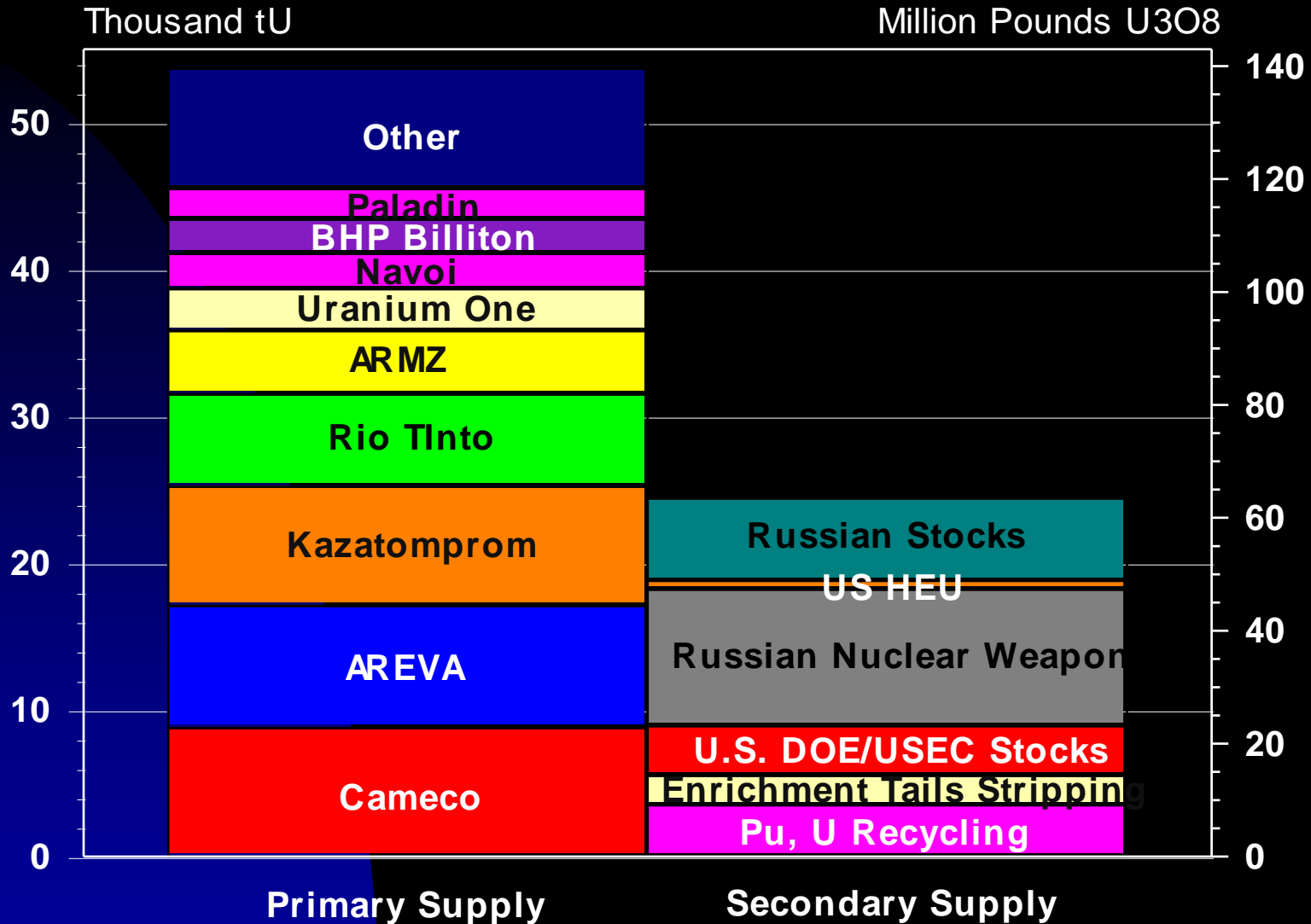
...Recent Developments (post-Fukushima)

- Incident at Fukushima Daiichi plant following earthquake/tsunami on March 11th
- Germany announces immediate shut down of 7 older nuclear units and reevaluation of future plans to extend the lives of operating nuclear plants
- China announces reassessment of safety standards for all future licensing of plants

How Does The Uranium Market Work?

- Has been described as a very immature “horse-trading” market, and is definitely a *boutique* market
- Market reporters like TradeTech publish price *indicators*
- No open exchange like LME

Primary and Secondary Supplie(r)s

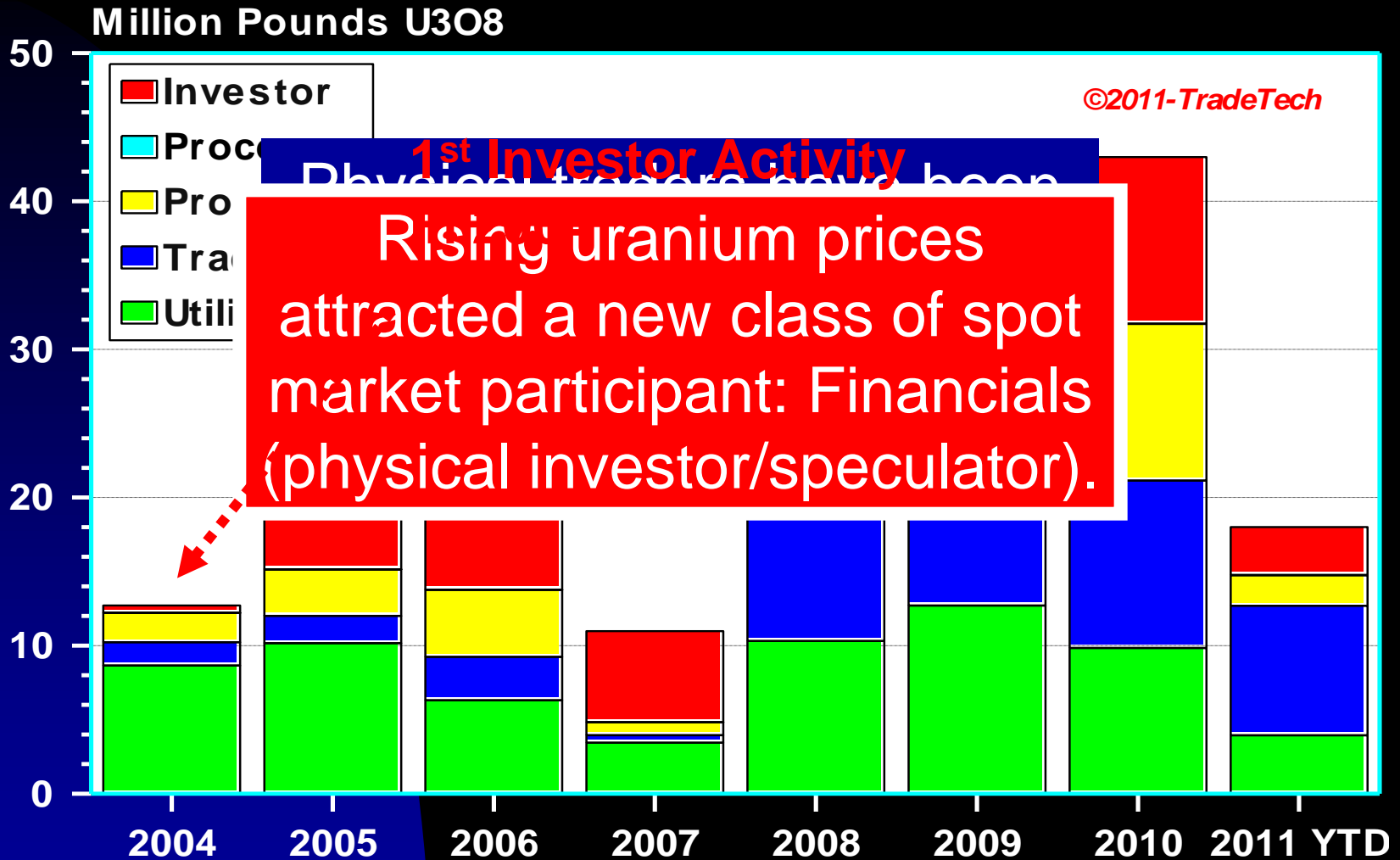


- *Secondary supply is very large (40%)*
- *A few producers control primary supply*

Current Uranium Supply Sources and Markets

	Primary Supply = 69%	Secondary Supply = 31%
Year 2010		
Spot Market = 13%	6%	7%
Longer-Term Market = 87%	63%	24%

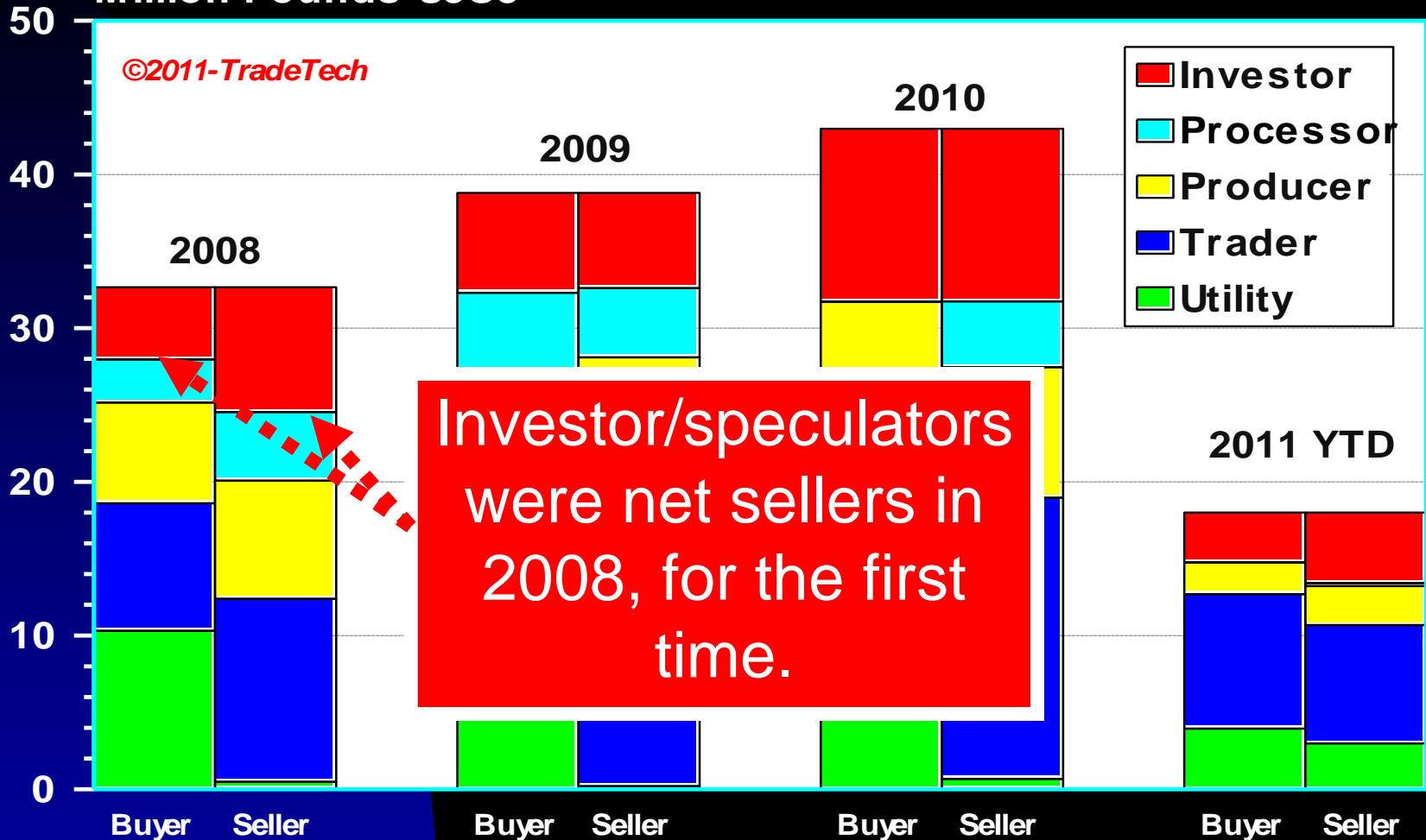
Uranium Spot Volume By Buyer Type



➤ *Investors now have a major presence and influence in the spot uranium market!*

Spot Volume By Buyer/Seller Type

Million Pounds U3O8



➤ *Investors still have a major presence, but the financial crisis has lessened their buying interest/ability.*

Uranium Market

- Developments in 2009 Impacting Price
- **Uranium Demand Outlook**
- Uranium Supply Outlook
- Price Range Forecast

Nuclear Power Worldwide

Nuclear Power Units*

420 Operating

Nuclear energy is a growth industry

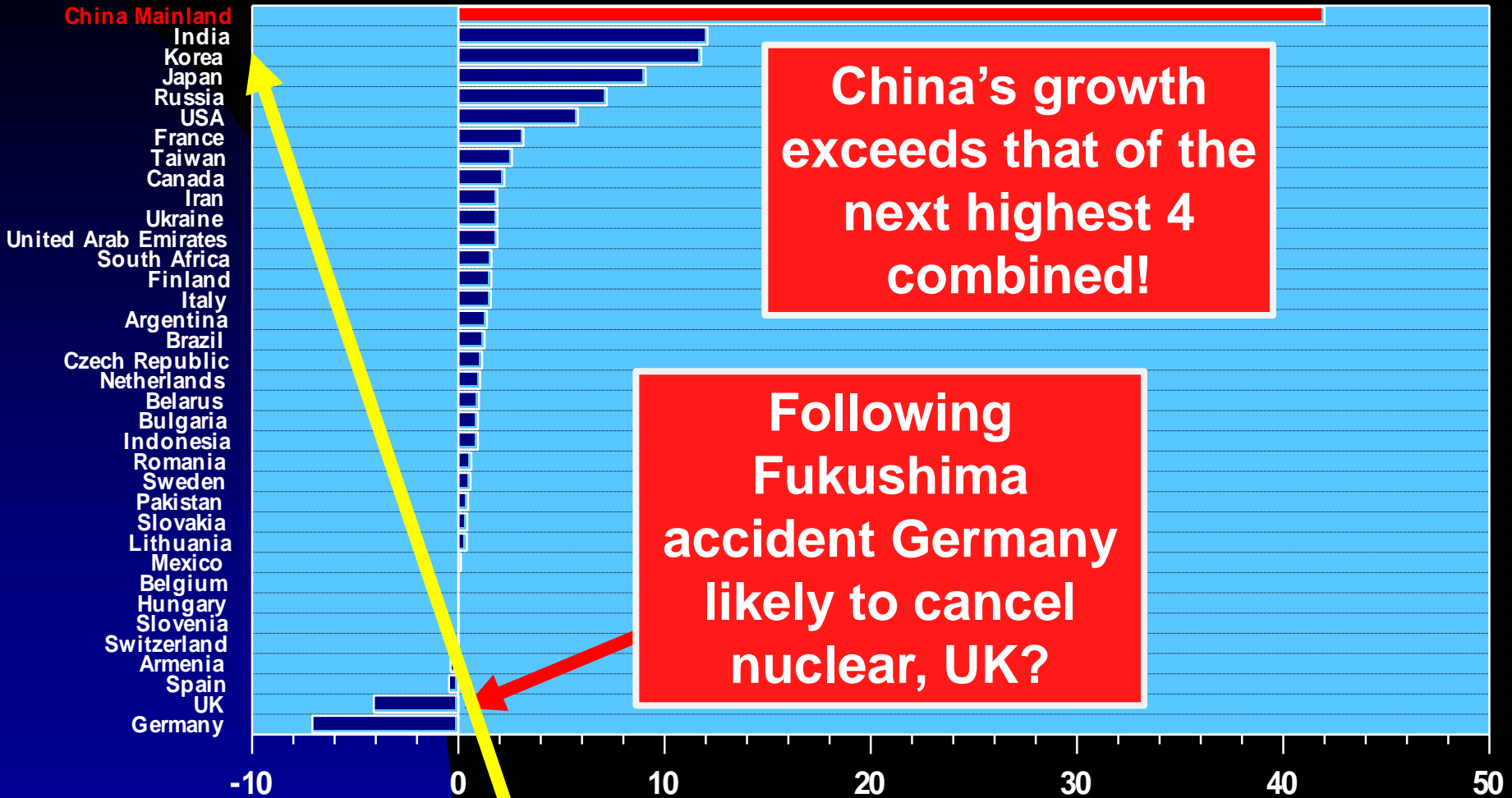
- ~150 Planned
- ~320 Proposed

➤ *Large existing base + growth from nuclear renaissance*

*WNA April 2011 data

Nuclear Capacity Growth

World Nuclear Association Reference Case



China's growth exceeds that of the next highest 4 combined!

Following Fukushima accident Germany likely to cancel nuclear, UK?

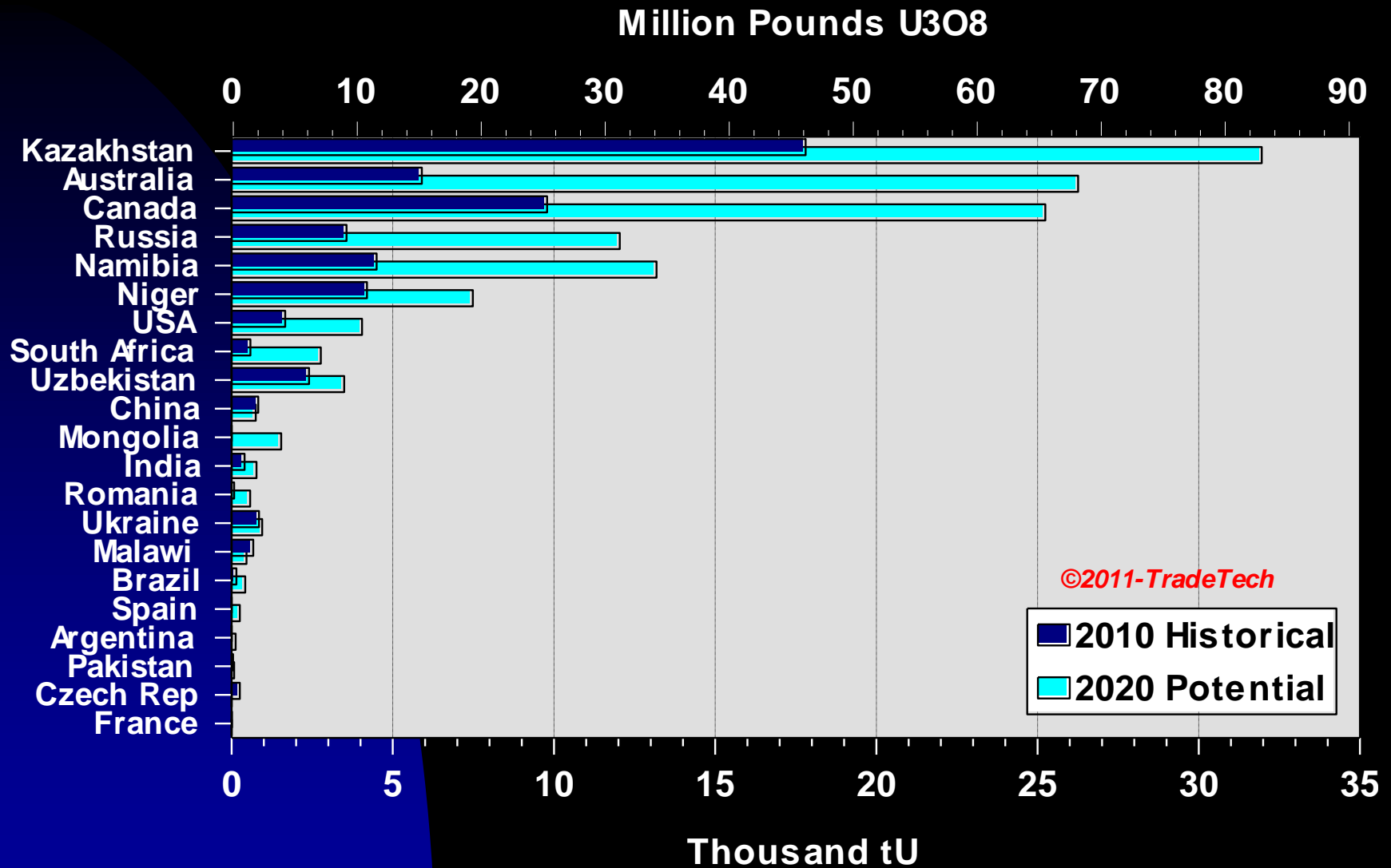
*GW e To Be Added From 2008-2020

Largest regional growth area: Asia

Uranium Market

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- **Uranium Supply Outlook**
- Price Range Forecast

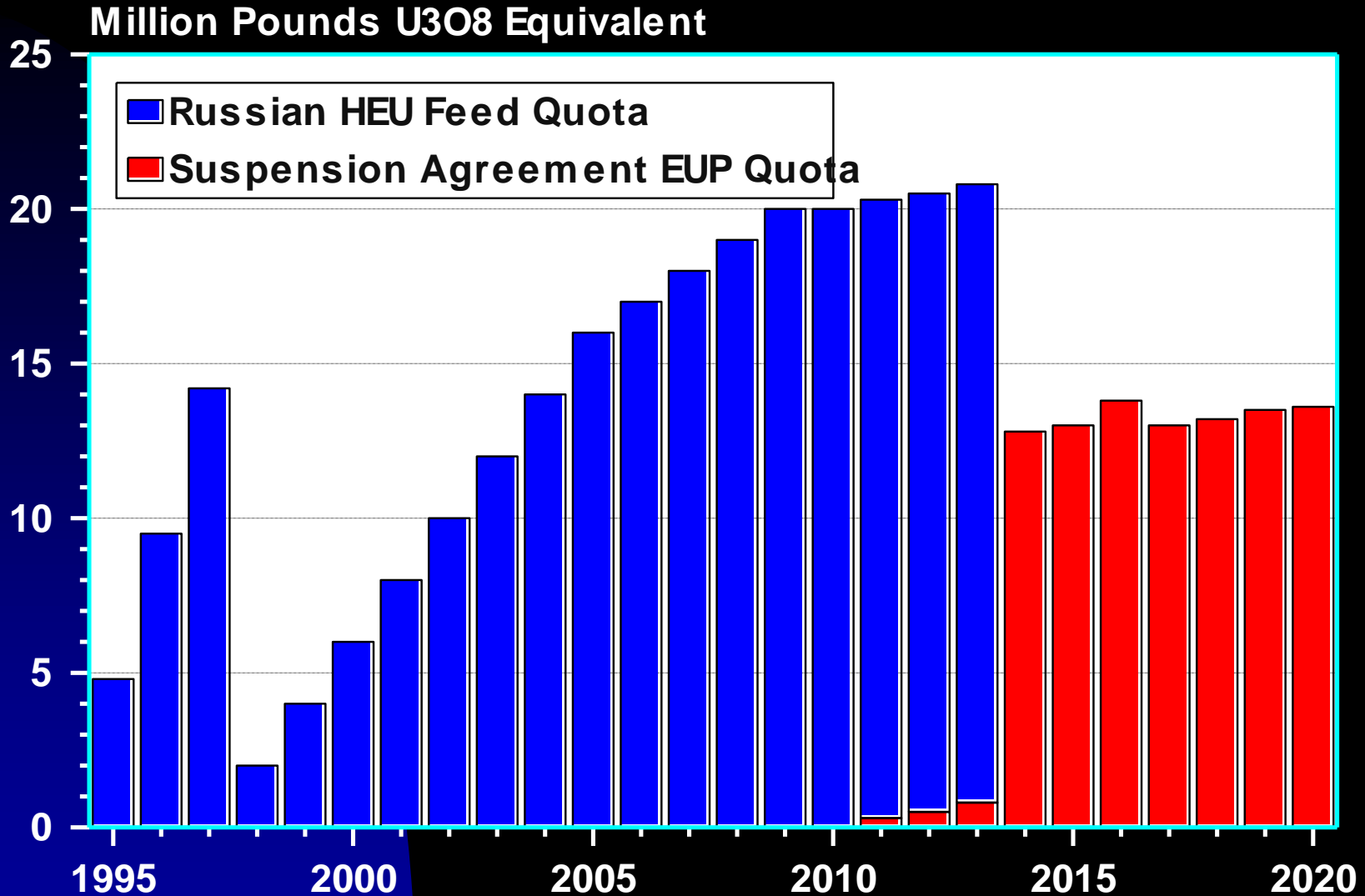
Current and Projected Uranium by Country



2010+ Uranium Supply Developments

- Kazakhstan continues growth as new #1 producer
- Paladin Energy initiates production in Malawi
- BHP Billiton accident at Olympic Dam
- ERA announces extension of shut-down at Ranger operations in northern Australia
- McClean Lake Mill shut down in June 2010, due to lack of ore to process
- Cameco continues remediation at Cigar Lake
- Pace of exploration slows significantly

Russian Access to the US Market



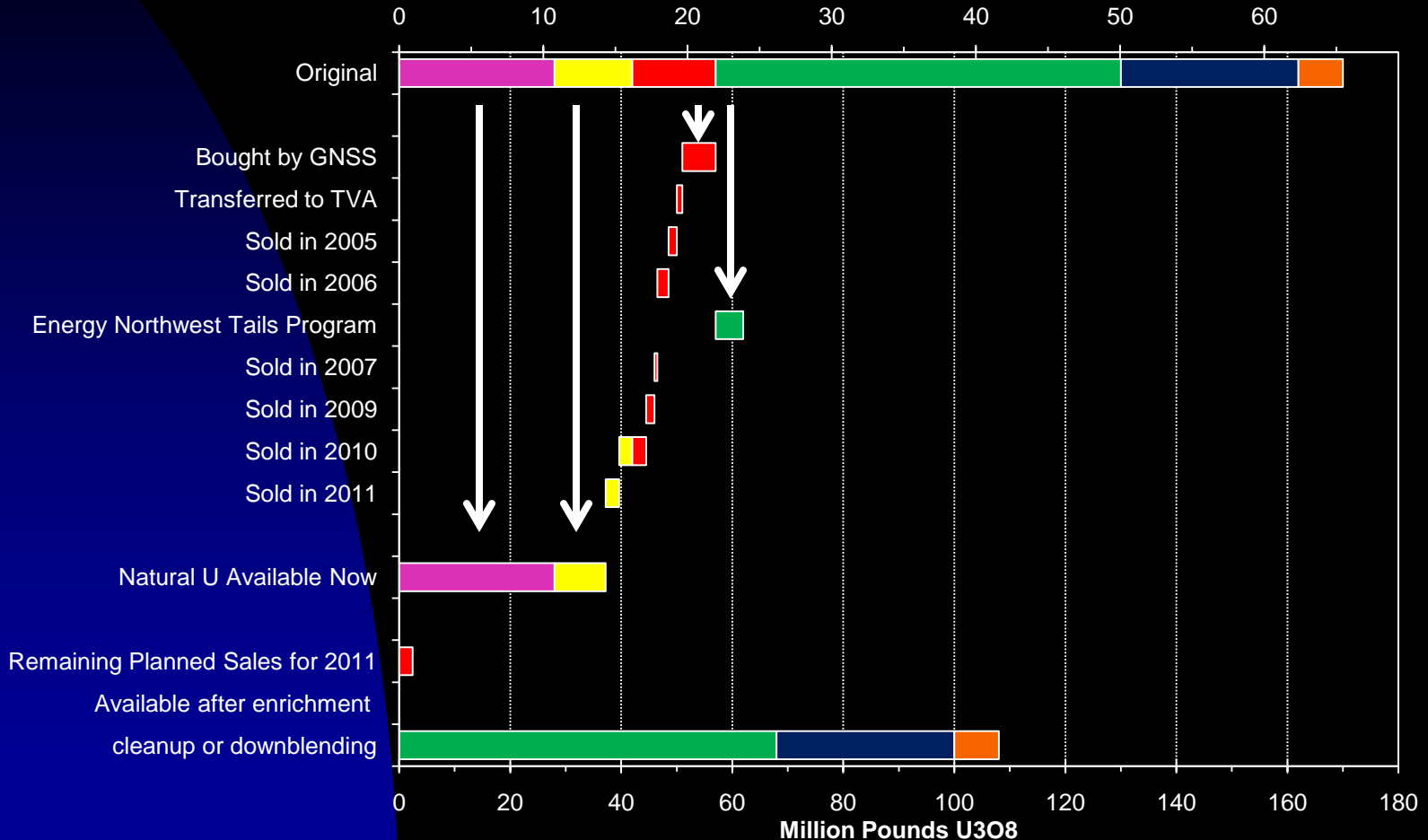
➤ *Russia will get reduced but continued access.*

U.S. DOE Excess Inventory Program

- 1997-1998 Russian HEU Feed*
- 1995-1996 Russian HEU Feed
- U.S. HEU

*In sales moratorium until March, 24 2009.

- U.S. DOE "Commercial" Inventory*
 - Depleted
 - Off-spec Non-UF6
- Thousand tU

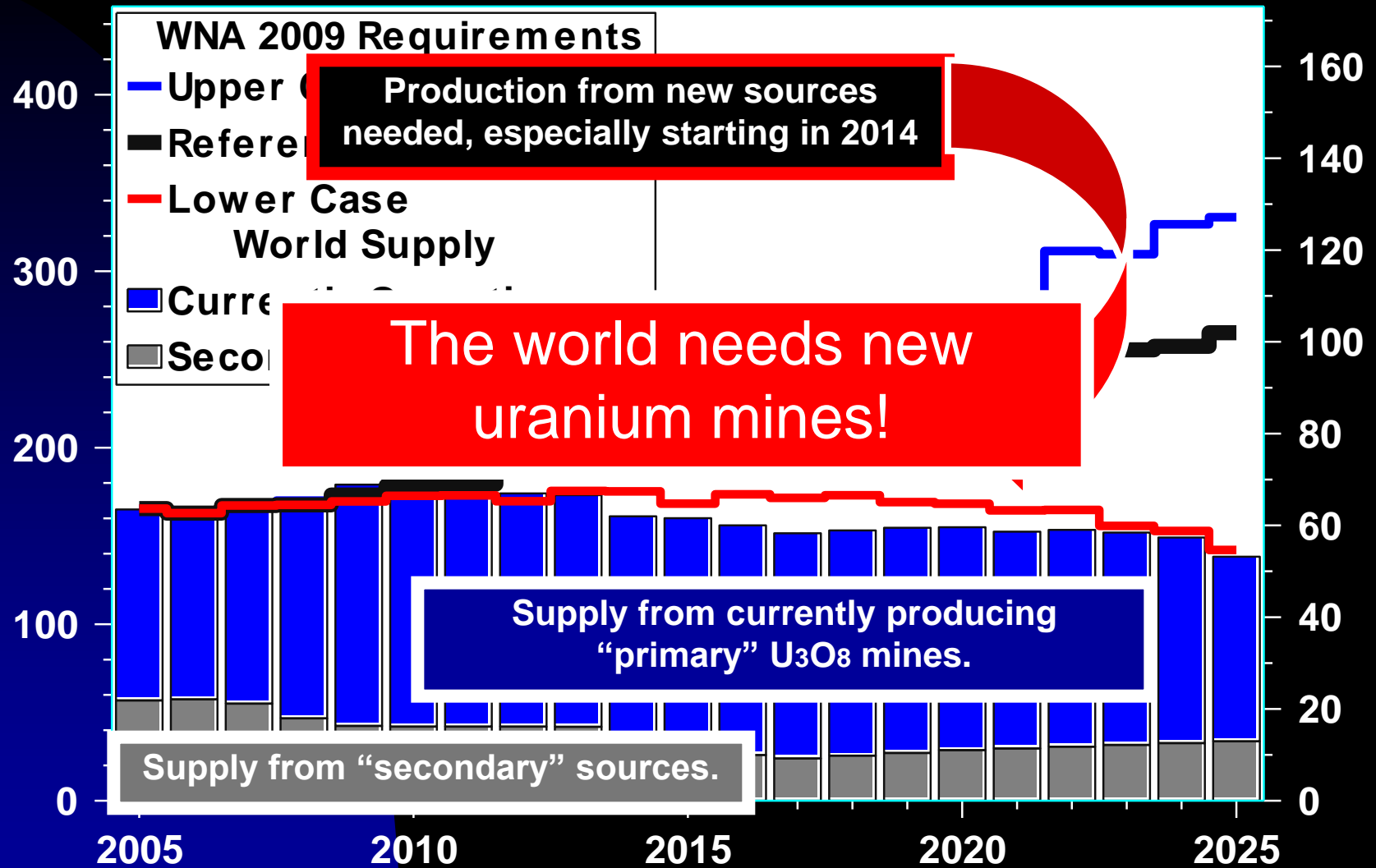


➤ *Maximum sales planned: 10% of US market (~6 million lbs U₃O₈)*

Demand vs. Existing Supply Sources

Million Pounds U3O8

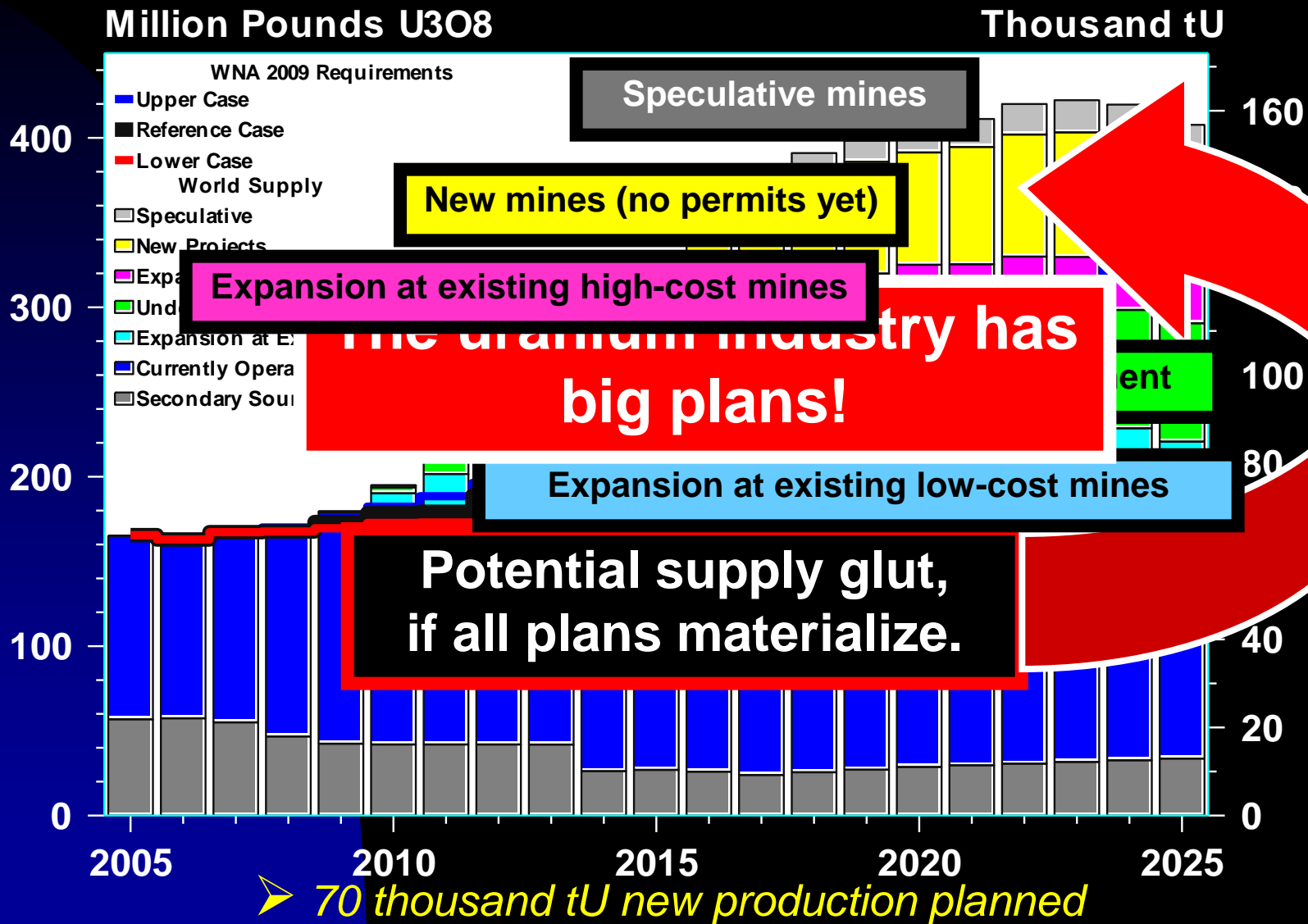
Thousand tU



➤ 40-80 million pounds U₃O₈ new production needed (Reference Demand Case)

Demand vs. Planned Supply Sources

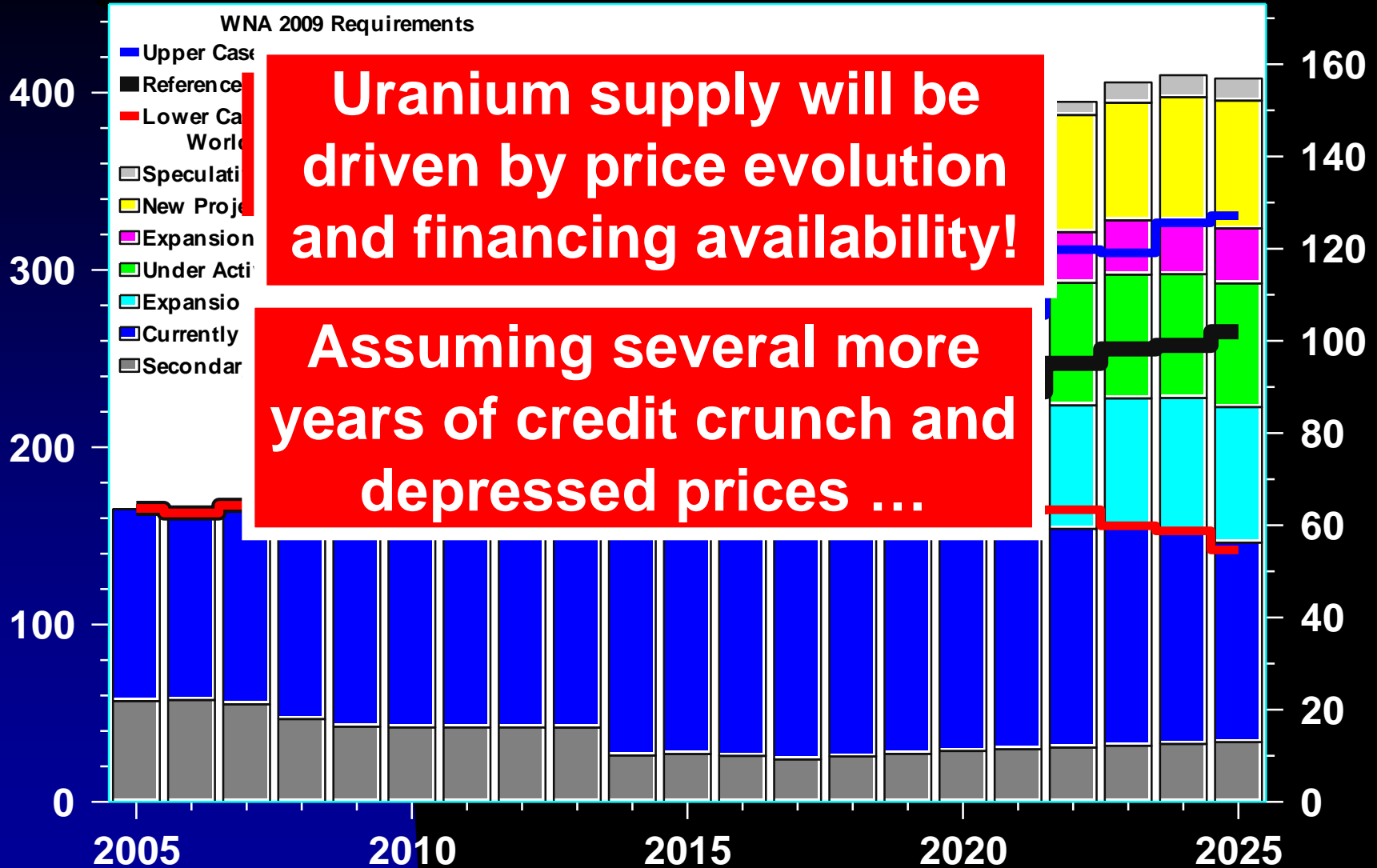
Production Based on Producer Plans



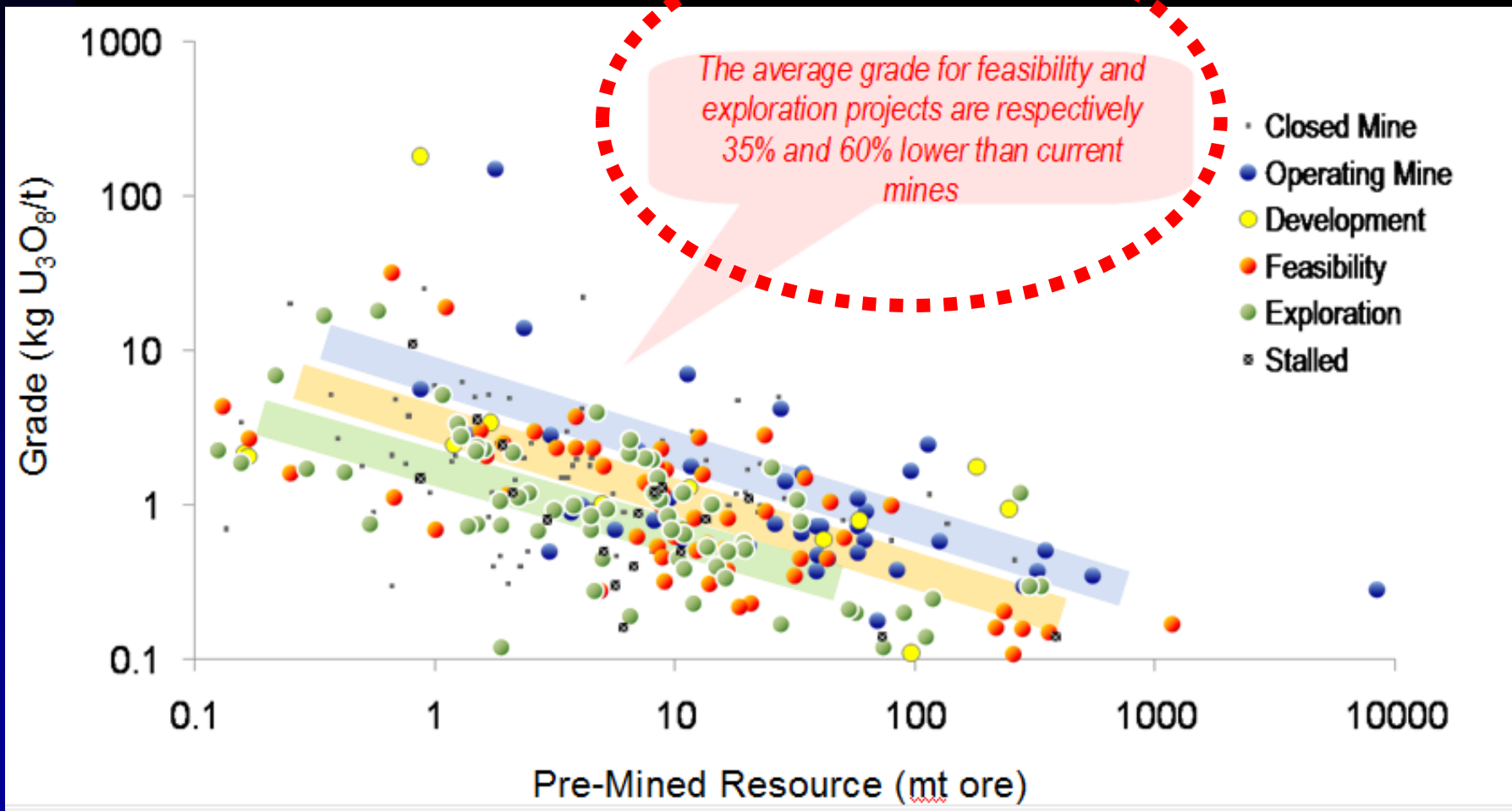
Demand vs. Deferred Supply Sources

Million Pounds U3O8

Thousand tU



World Uranium Ore Quality



Source: CRU Strategies

New uranium sources will be increasingly costly to produce.

The Major Current Suppliers

- **Kazatomprom: Kazakh government company**
- **Cameco: Canadian company traded as CCO.TO**
- **AREVA: French conglomerate 4% publicly traded on NYSE Euronext**
- **Rio Tinto (Energy Resources of Australian-ASX: ERA)**
- **ARMZ: Russian government company**
- **Uranium One: Traded as UUU.TO on TSX**
- **Navoi: Uzbek government company**
- **BHP Billiton: Major mining company**
- **Paladin: Traded as PDN on ASX**

Uranium Market

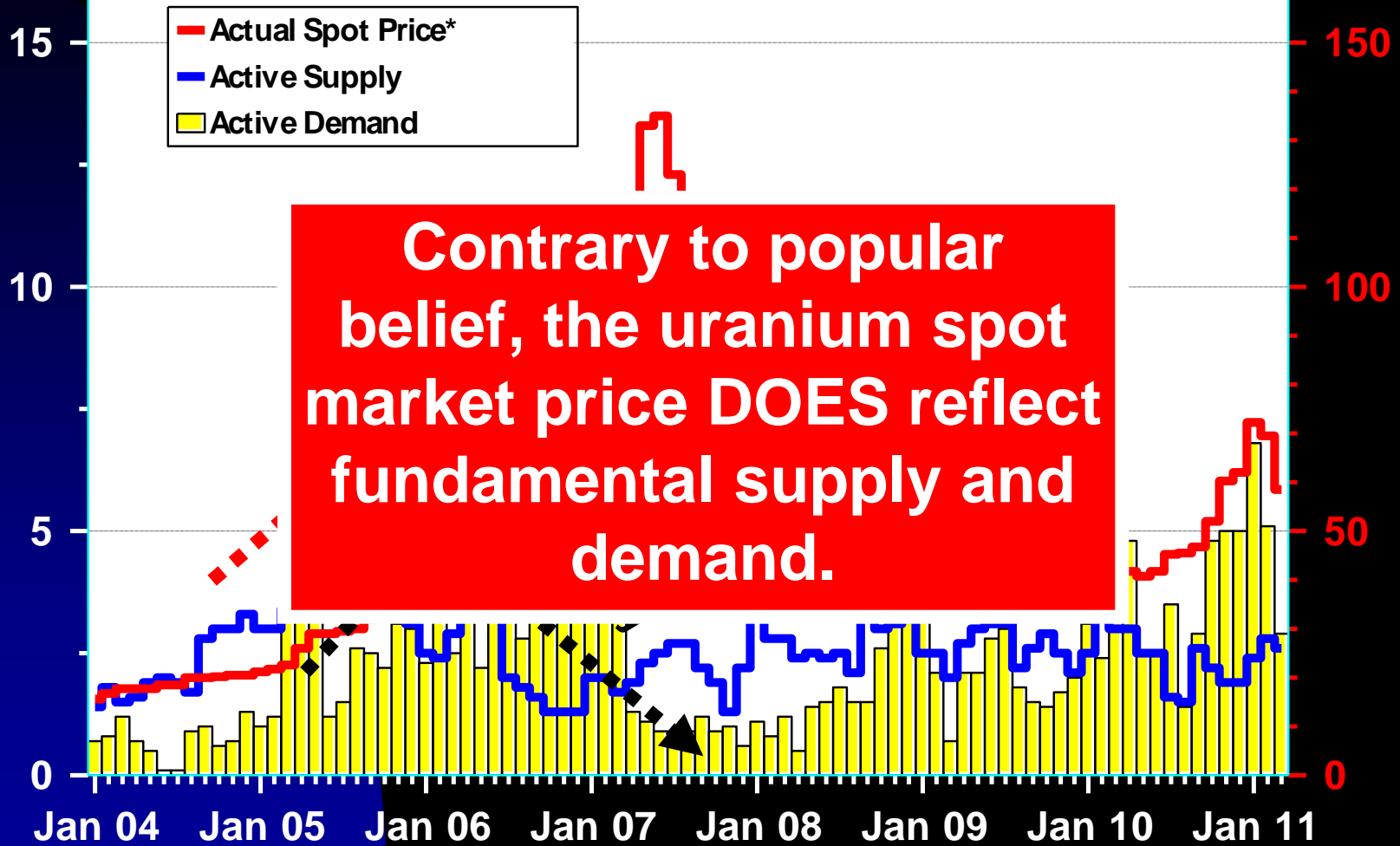
- Developments in 2010 Impacting Price
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Spot Price vs. Demand & Supply

Million Pounds U3 O8

U.S. Dollars per Pound U3O8

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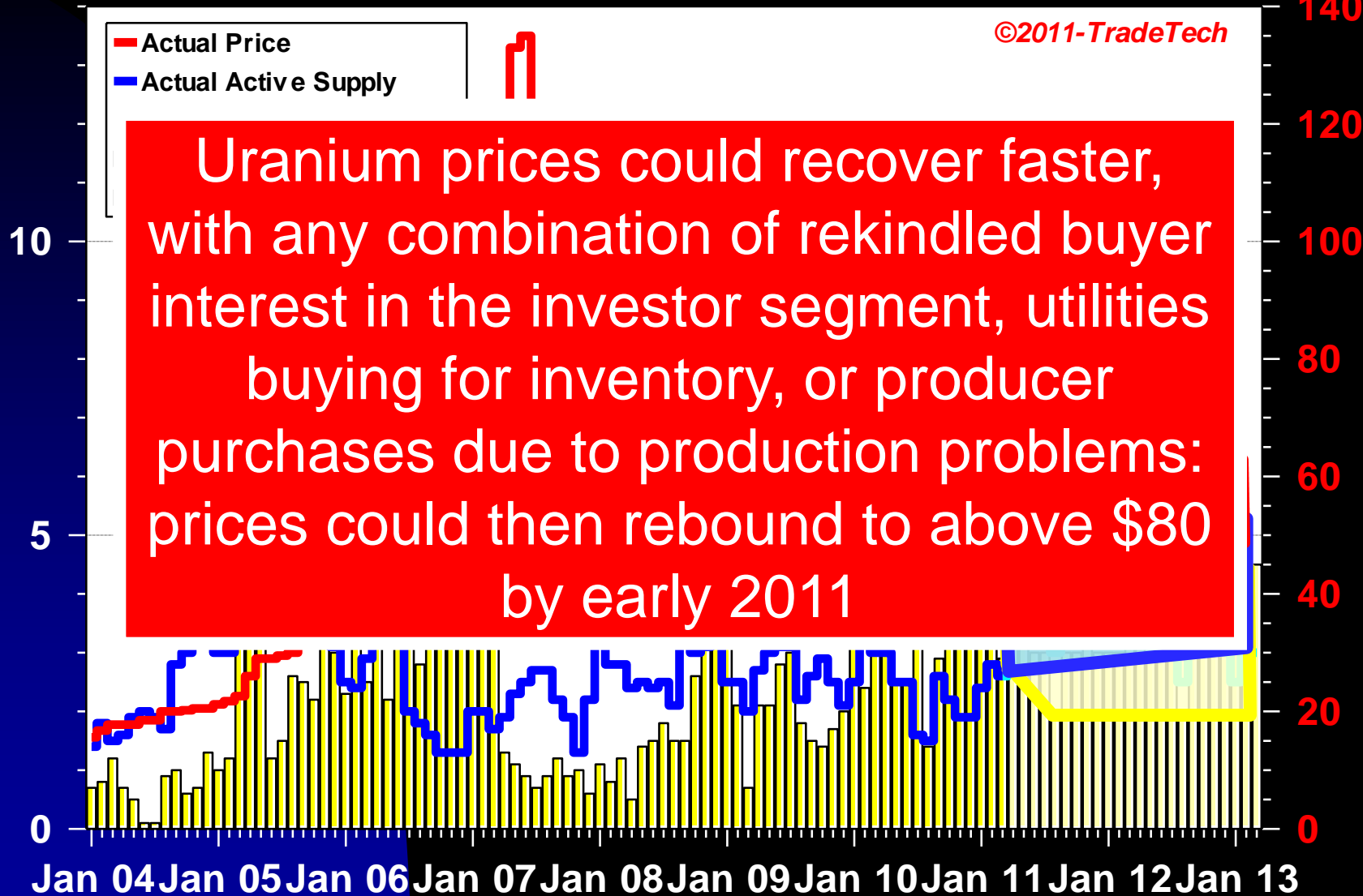


* TradeTech's NUEXCO Exchange Value

Projected Spot Market

Million Pounds U3O8

U.S. Dollars per Pound U3O8



Conclusions

- 2009 -- the halt of the fall in spot prices, but downward pressure continued on the long-term price.
- Uranium still not traded on an open exchange, in spite of efforts in the past few years
- Next 2 years -- prices to stay in the \$40-60 range (spot) and maybe \$55-70 (long-term), unless a major supply event occurs
- Growth in world nuclear power usage projected (especially Asia), with two major non-production supplies ending
- Expansion of uranium enrichment capacity will tend to dampen demand growth for uranium, as enrichment substitutes for uranium on the margin.

Enrichment Market

Messages

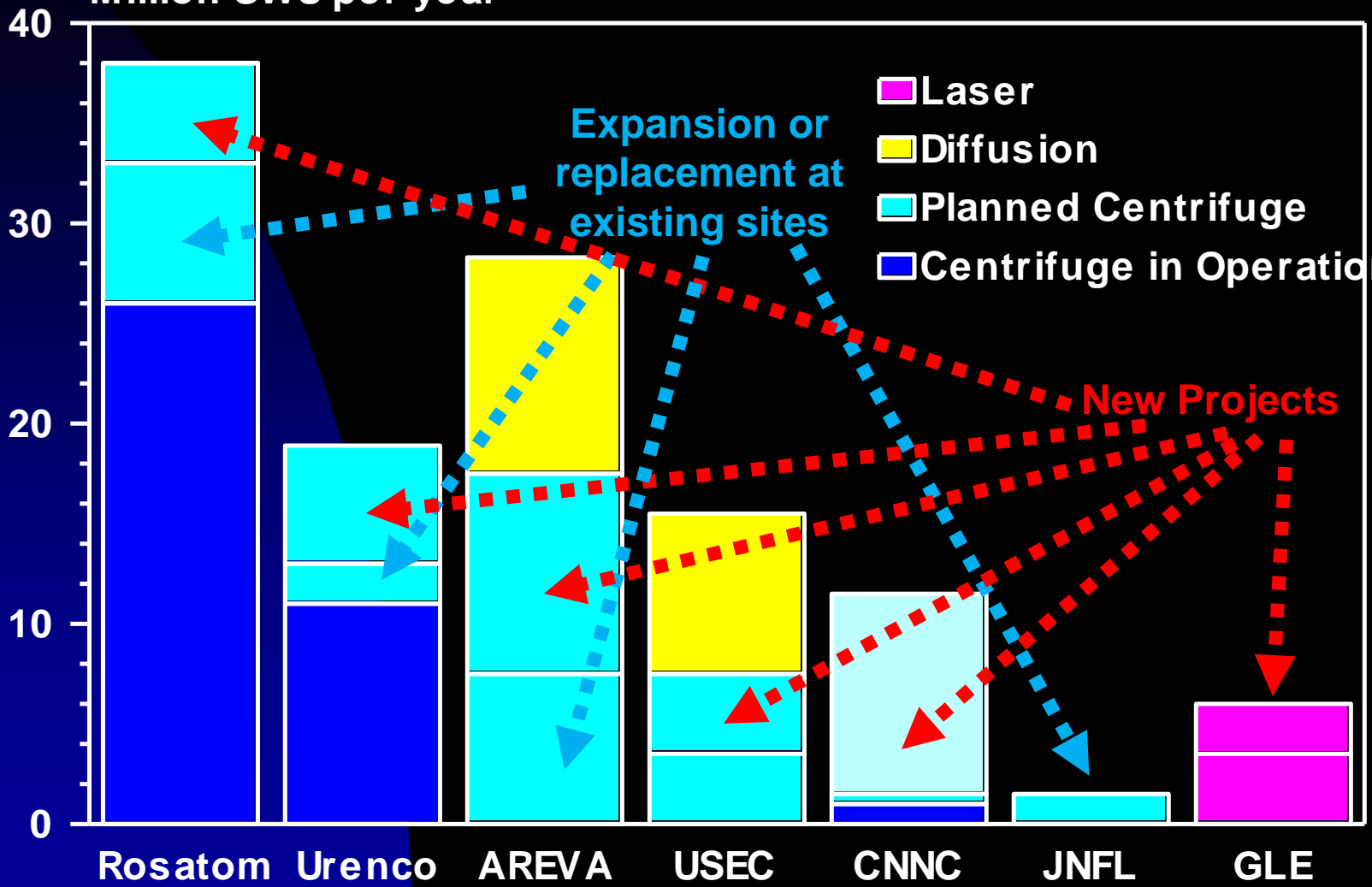
- **The supply industry is in a technology transition**
- **The USA is the enrichment battleground**
- **Russia is the “500-pound gorilla”**
- **Trade restrictions continue to distort the market**
- **Centrifuge technology will dictate uranium consumption**
- **There may be “life after death” for old diffusion**

The Major Suppliers

- **Rosatom: The Russian nuclear conglomerate; output marketed by Techsnabexport**
- **AREVA: The French nuclear conglomerate; 4% publicly traded on NYSE Euronext**
- **Urenco: German/Netherlands/UK joint venture**
- **USEC Inc: U.S. company publicly traded as NYSE:USU**
- **CNNC: Chinese nuclear company; some output marketed by CNEIC**

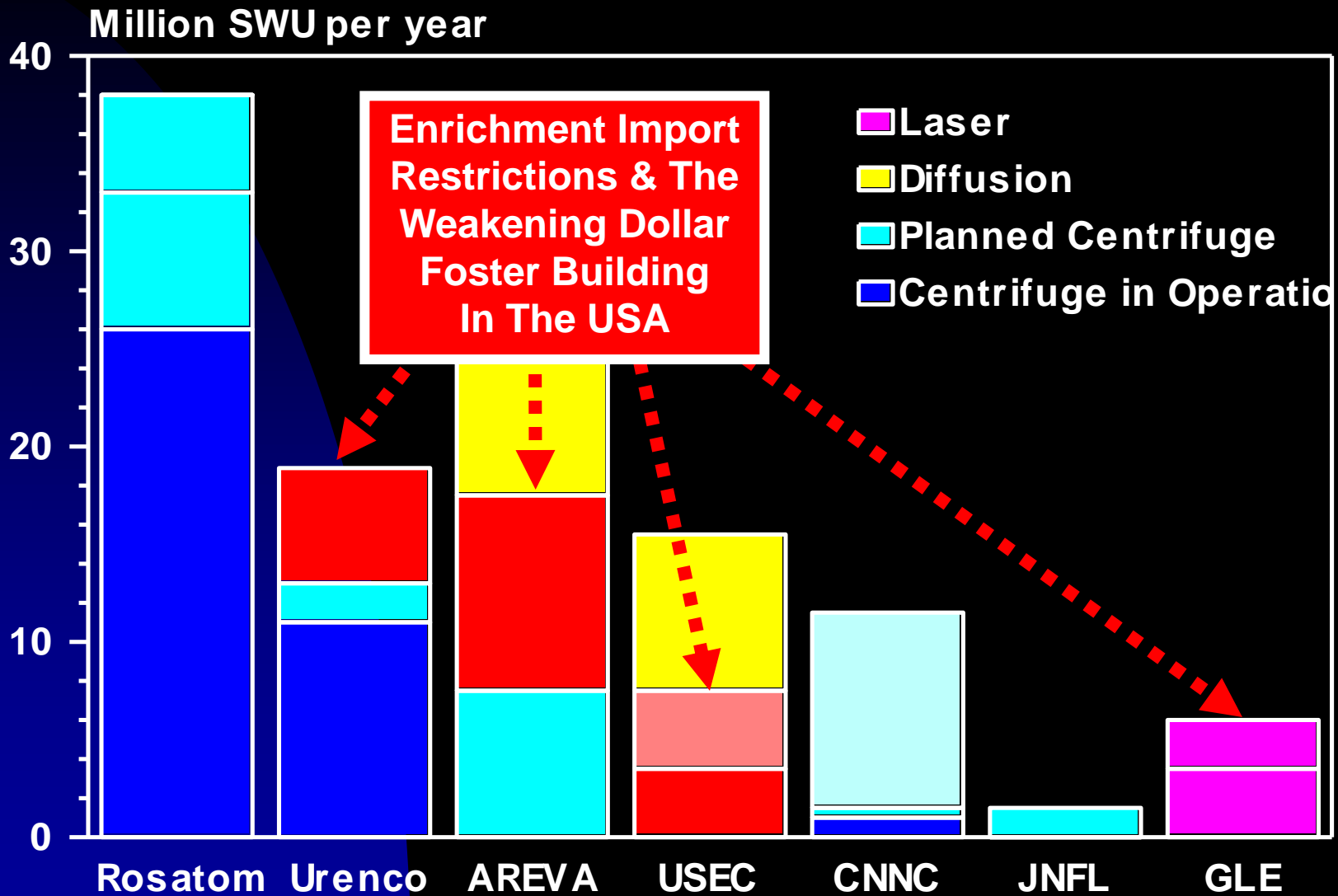
Future Enrichment Capacity*

Million SWU per year



* Current plus planned.

USA: The Battle Ground



* Current plus planned.

Enrichment Implications

- All the major suppliers will be on the centrifuge technology by the middle of the next decade, but the old gas diffusion plants might still have some useful life.
- Once centrifuge manufacture becomes routine and the cost matures, there is “no stopping” the continual installation of centrifuge capacity; the installation rate is merely a function of the size of the centrifuge manufacturing capacity
- Production costs (and thus possibly prices) could then stabilize or drop, given the centrifuge technology’s low operating costs.
- But, maybe enrichment and uranium pricing will become locked in a competitive environment, if the relationship between the two becomes more transparent to the markets. Enrichment may serve as a long-term cap on uranium prices.
- Trade restrictions against Russia will continue to result in a sub-optimal, economically-inefficient nuclear fuel market for the foreseeable future.

Overall Markets: Potential Surprises

- Cigar Lake uranium deposit may be delayed well into the decade.
- Olympic Dam expansion may not occur within a 10-year time.
- GE's SILEX enrichment system may rush to the forefront.
- The USA may decide to process enrichment tails material, for sale into the market.
- The USA may decide to release much more military stockpile into the market.
- A lingering Fukushima crisis could slow the expansion of nuclear power in many regions
- Russia could become integrated into the world fuel markets without restrictions.

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