RAF3007, Workshop on Uranium Data Collection & Reporting

Red Book – Uranium: Resources, Production and Demand

July 2010, Ghana

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International Atomic Energy Agency

Introduction

- Historical developments
- Uranium supply (resources, production)
- Uranium demand
- Country reports

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Historical developments

- The first Red Book published in 1965
- Since that time 23 editions (the last 2009)
- A comprehensive assessment of uranium supply and demand
- Th and unconventional resources also included

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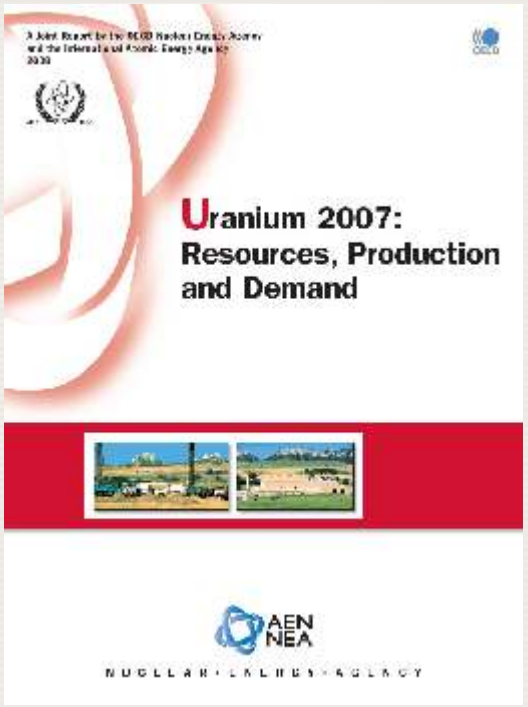
Historical developments

- Exploration
- Resources
- Production
- Environmental aspects of uranium production
- Demand
- Supply and demand relationships



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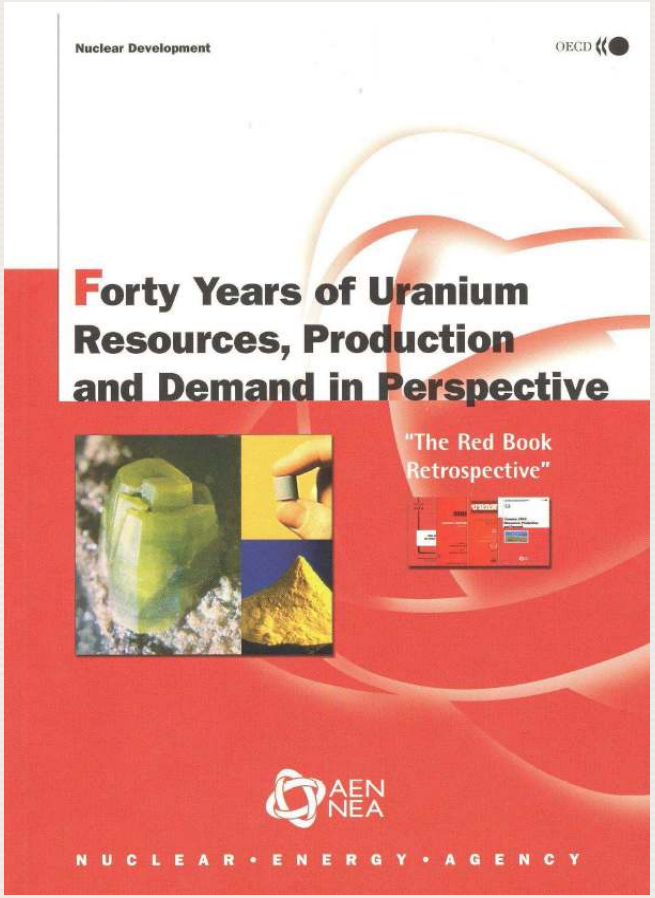
Historical developments

- Associated publications:
- The Red Book Retrospective
- Environmenal Issues in Uranium Production
- Remediation Activities in Uranium Production



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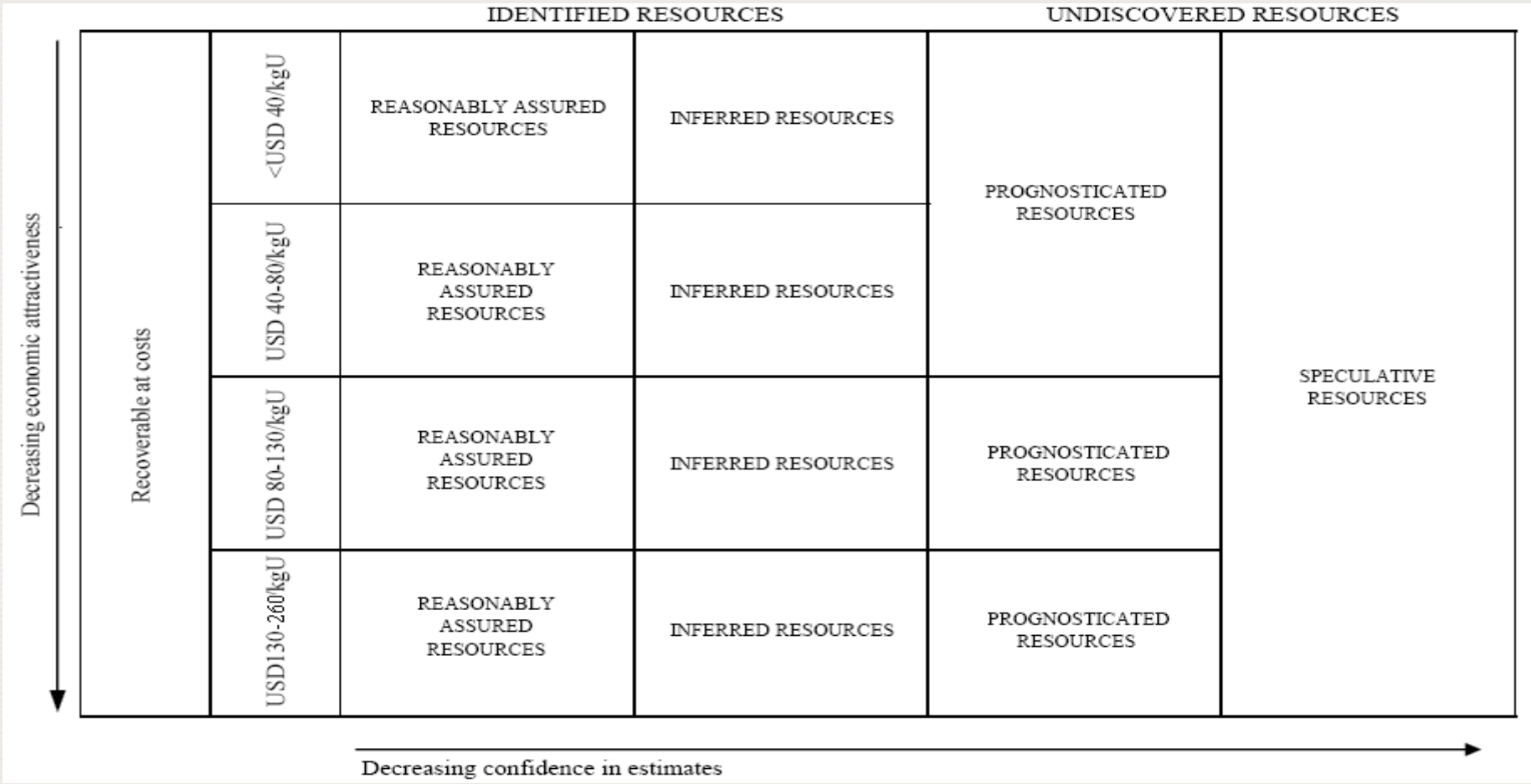
Uranium Resources Classification

- NEA/IAEA Classification Scheme for Uranium Resources



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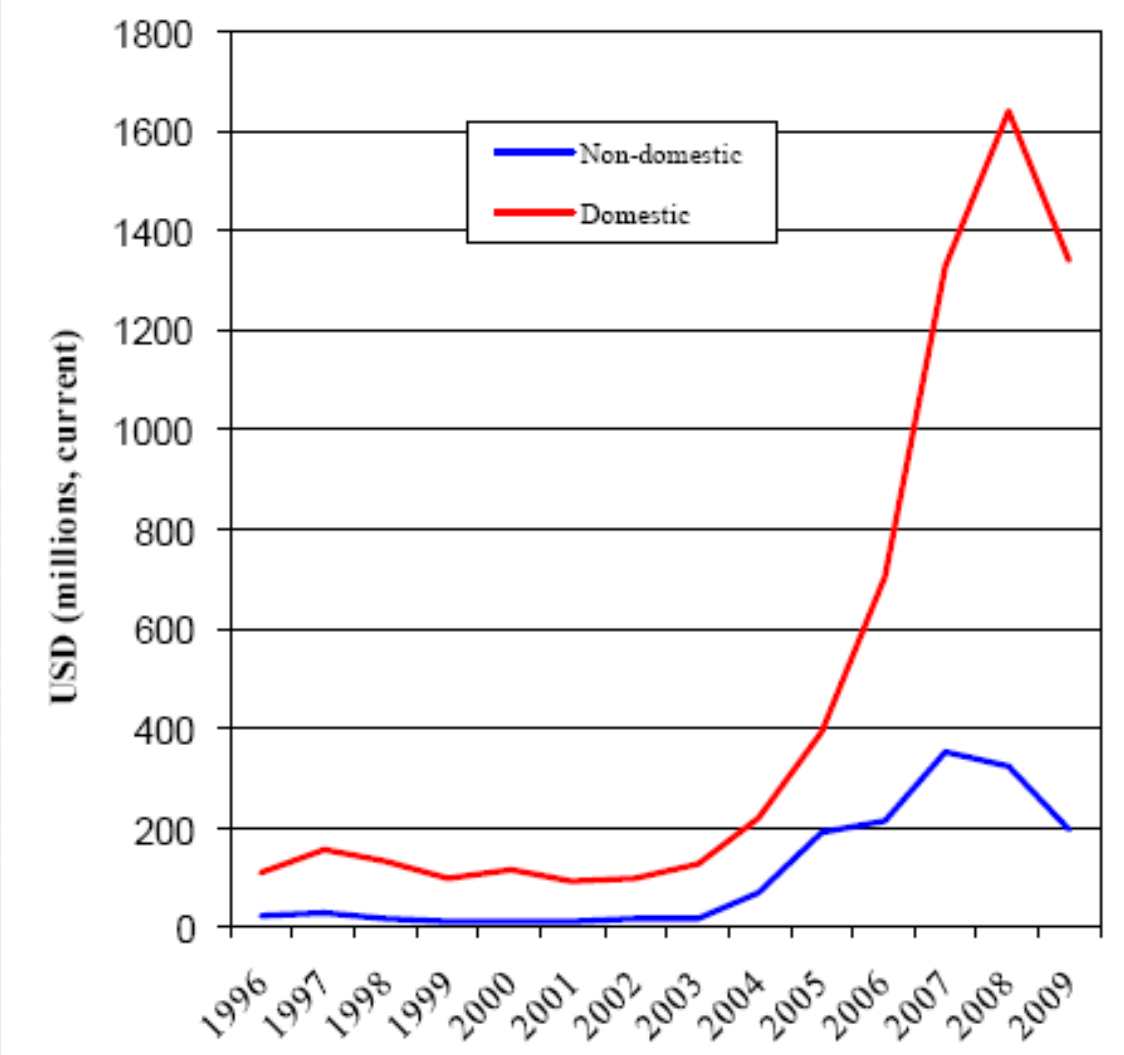
Uranium exploration and development



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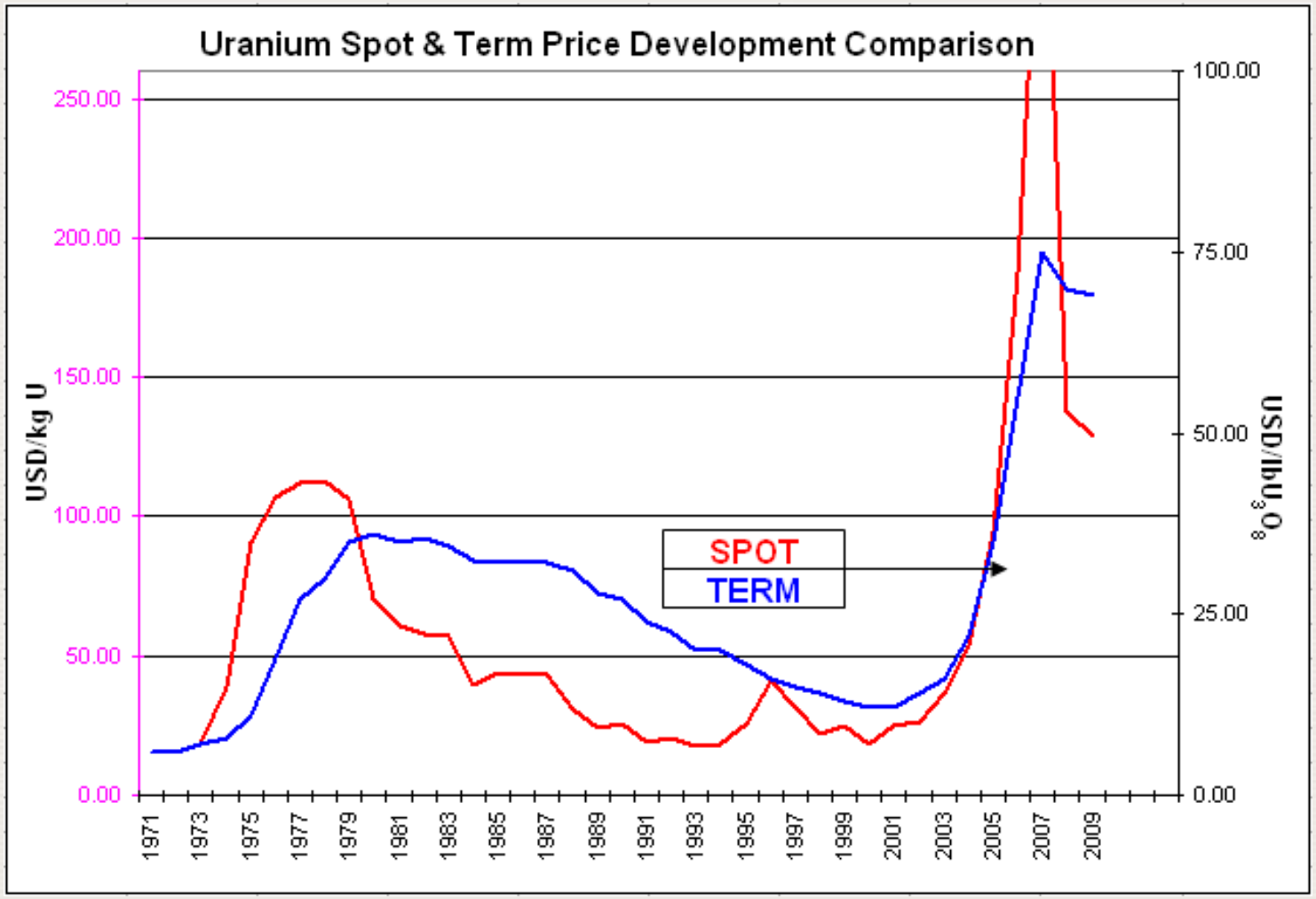
Uranium Prices



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Uranium Resources (as of 2007)

Identified (Reasonably Assured + Inferred) Resources (in 1000 tonnes)

	< US $ 40 / kgU	< US $ 80 kgU	< US $ 130 / kgU
World	~ 3 000	~ 4 500	~ 5 500
Australia	1 196	1 216	1 243
Kazakhstan	517	752	817
Russia	84	495	546
South Africa	235	343	423
Canada	352	423	435
USA	NA	99	>> 339
Brazil	140	231	278
Namibia	116	230	275
Niger	34	75	274
Uzbekistan	86	86	111

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Uranium resources changes

Resource category	2007	2009	Changes[a]
Identified (Total)			
<USD 260/kgU	NA	>6 306	+ 837[b]
<USD 130/kgU	5 469	5 404	- 65
<USD 80/kgU	>4 456	>3 741	- 715
<USD 40/kgU[c]	2 970	>796	- 2 174
RAR			
<USD 260/kgU	NA	>4 004	+ 666[b]
<USD 130/kgU	>3 338	3 525	+ 187
<USD 80/kgU	2 598	>2 516	- 82
<USD 40/kgU[c]	>1 766	570	- 1 196
Inferred Resources			
<USD 260/kgU	NA	>2 301	+ 171 [b]
<USD 130/kgU	>2 130	> 1 879	- 251
<USD 80/kgU	>1 858	> 1 225	- 633
<USD 40/kgU[c]	1 204	>226	- 978

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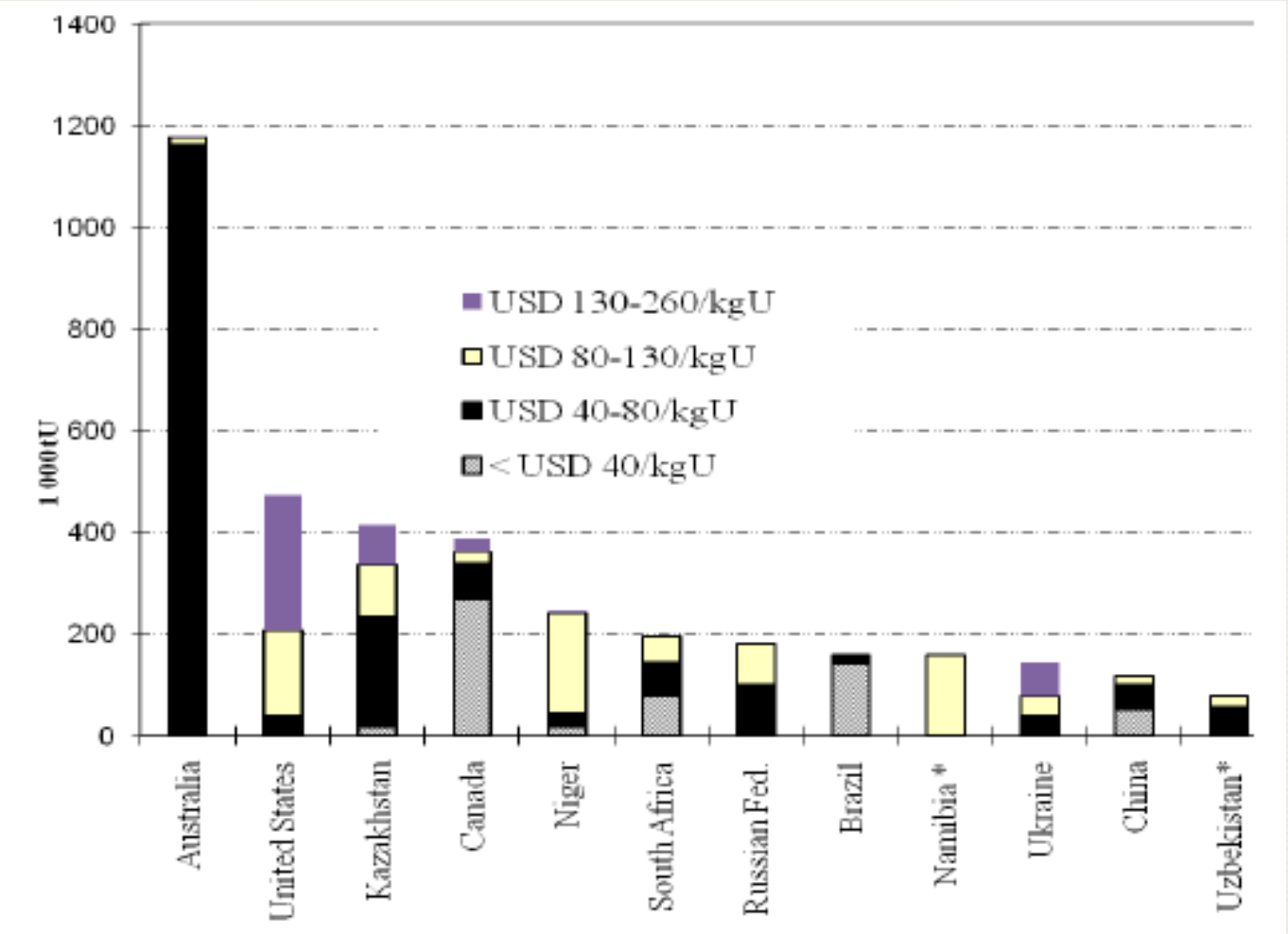
Uranium RAR distribution



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Uranium RAR by deposit type

	<USD 40/kgU	<USD 80/kgU	<USD 130/kgU	<USD 260/kgU
Unconformity-related	267 078	536 815	559 416	564 301
Sandstone	32 875	424 208	888 529	1 118 830
Hematite breccia complex	0	900 300	908 000	908 000
Quartz-pebble conglomerate	61 085	82 147	108 822	108 822
Vein	0	7 432	64 611	129 048
Intrusive	1 013	4 997	97 091	100 093
Volcanic and caldera-related	0	132 410	166 813	193 480
Metasomatite	88 788	147 576	246 738	314 311
Other *	53 600	138 600	263 025	278 208
Unspecified	65 422	141 699	221 822	289 383
Total	**569 861**	**2 516 154**	**3 524 867**	**4 004 476**

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World Uranium Resources

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Uranium Resources

Reasonably Assured Resources <130

2005: 3 300 th. tU 2007: 3 350 th. tU 2009: 3 525/4 005 th. tU

Inferred Resources <130

2005: 1 450 th. tU 2007: 2 150 th. tU 2009: 1 880/2 300 th. tU

IDENTIFIED RESOURCES (TOTAL)

2005: 4 750 th. tU 2007: 5 450 th. tU 2009: 5 400/6 300 th. tU

It would last for 100 years at recent demand

Those are officially reported RESOURCES ONLY

The potential is much higher, some countries do not report

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World Uranium Production

- 2009 ~ 50 000 tonnes U
- 2008 43 750 tonnes U
- 2007 42 463 tonnes U
- 2006 39 603 tonnes U
- 2005 41 943 tonnes U
- 2004 40 188 tonnes U

	2009 (rounded)	% share
Kazakhstan	14 000	28
Canada	10 000	20
Australia	8 000	16
Namibia	4 600	9
Russia	3 600	7
Niger	3 200	6
Uzbekistan	2 500	5

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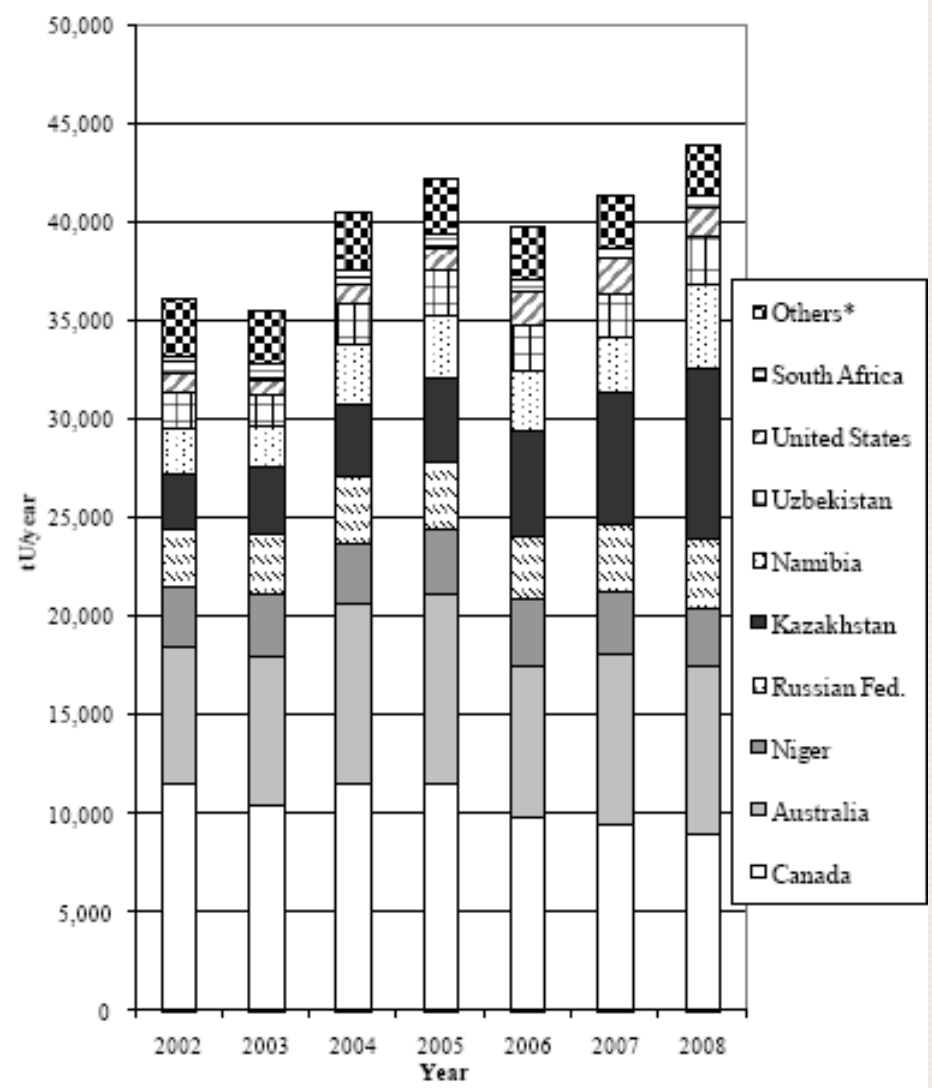
World Uranium Production



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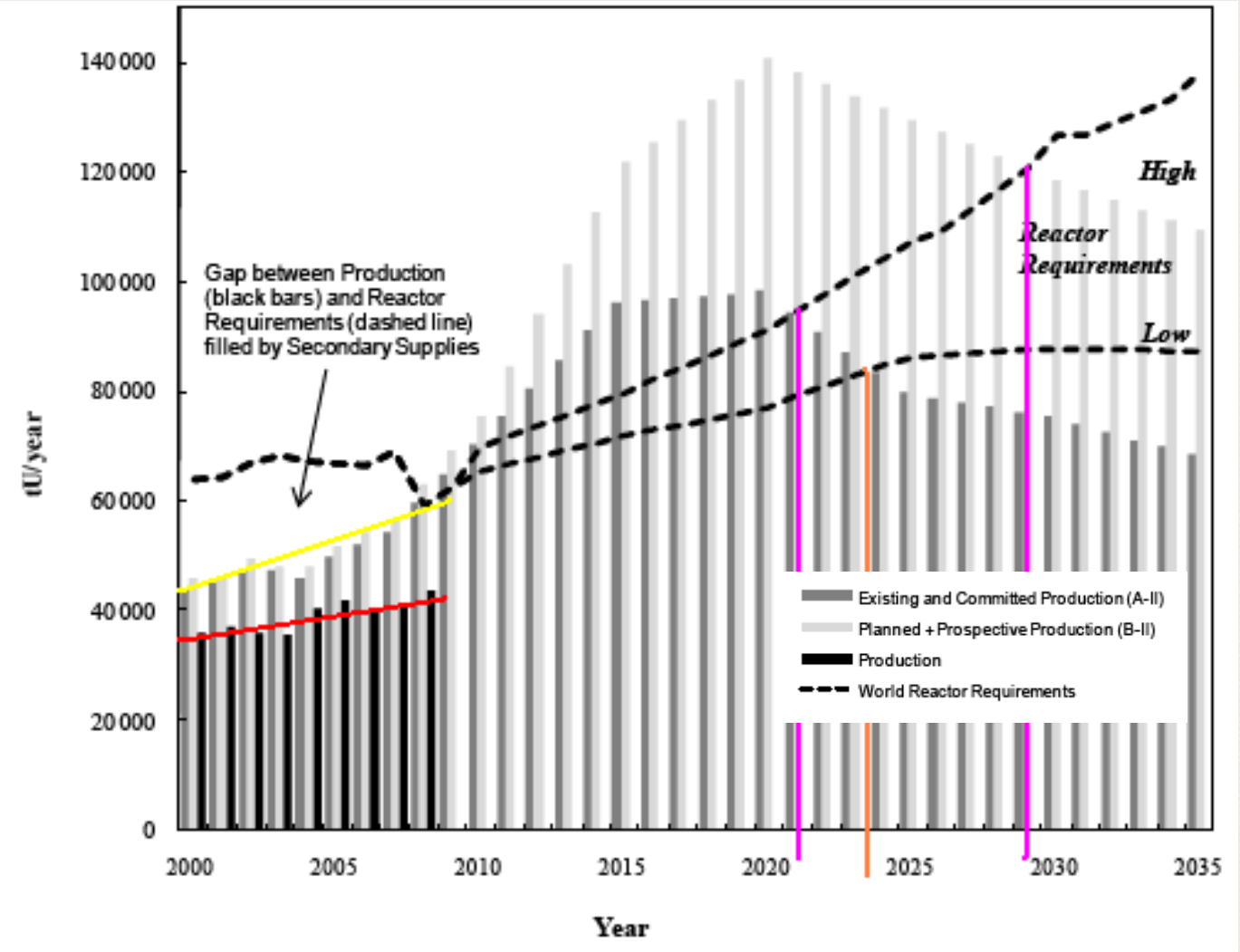
Expected World Uranium Production



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Expansion of Uranium Production

Planned mine re-openings or expansion of existing facilities

2008	Australia (Ranger: Construction of a laterite treatment plant to produce an additional 400 tU/year).
2009	Niger (Expansion of Somair and Cominak production capability by 700 tU/year to a total of 4 500 tU/year).
	Kazakhstan (Southern Zarechnoye, 1 000 tU/year).
2010	Canada (McArthur River and Key Lake expansion to produce 8 800 tU/year).
	Brazil (Caetité expansion to 670 tU/year).
	Namibia (Langer Heinrich expansions to 2 000 tU/year).
2012	Namibia (Rössing expansion to 4 500 tU/year).
2016	Australia (Proposed Olympic Dam expansion, to produce as much as 16 100 tU/year).

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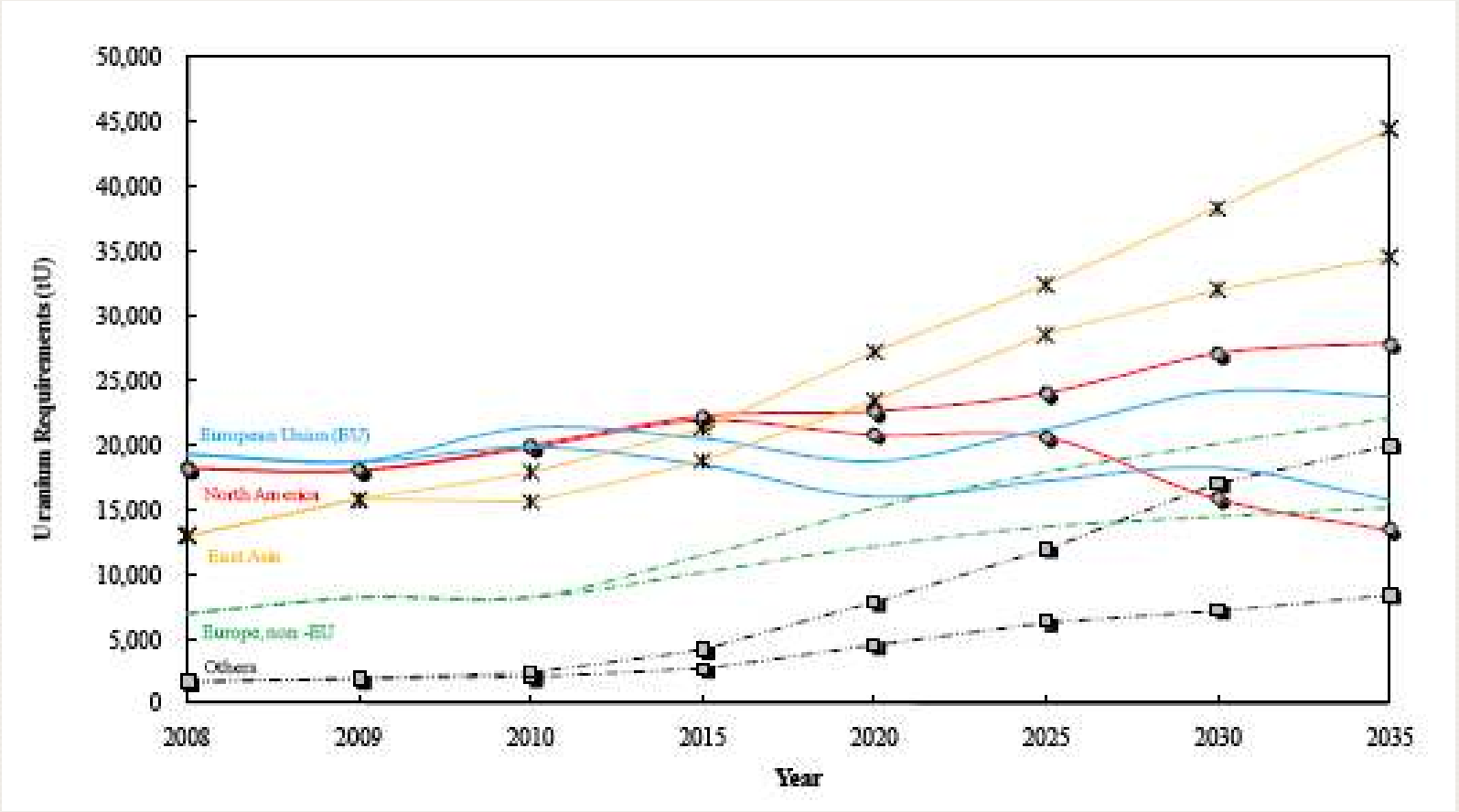
Uranium requirements to 2035



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Uranium Production & Demand

2007 production – 42 500 tonnes (62% of demand) **2007 demand - 69 100 tonnes U**

the gap (> 25 000 tU)
is supplied from the so called "secondary supplies"

Country	2007	% share
Canada	9 500	22.3
Australia	8 600	20.2
Kazakhstan	6 600	15.5
Russia	3 400	8.0
Niger	3 200	7.4
Namibia	2 900	6.8
Uzbekistan	2 300	5.2
USA	1 700	4.0
Ukraine	1 000	2.4

Country	2007	% share
USA	22 825	33.0
France	9 000	13.0
Japan	8 790	12.7
Russia	4 100	5.9
Germany	3 490	5.1
South Korea	3 200	4.6
Ukraine	2 480	3.6
Canada	1 900	2.7
UK	1 900	2.7

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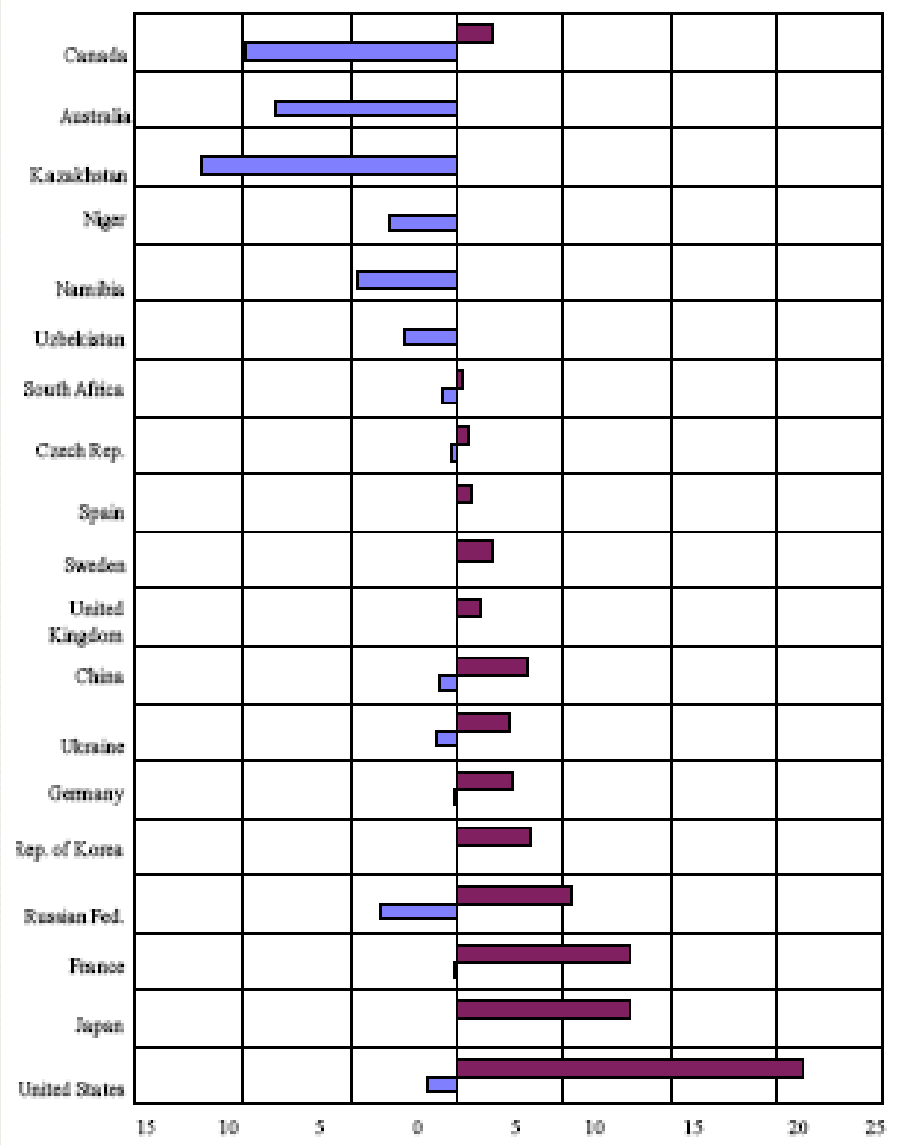
U prodution and requirements in 2009



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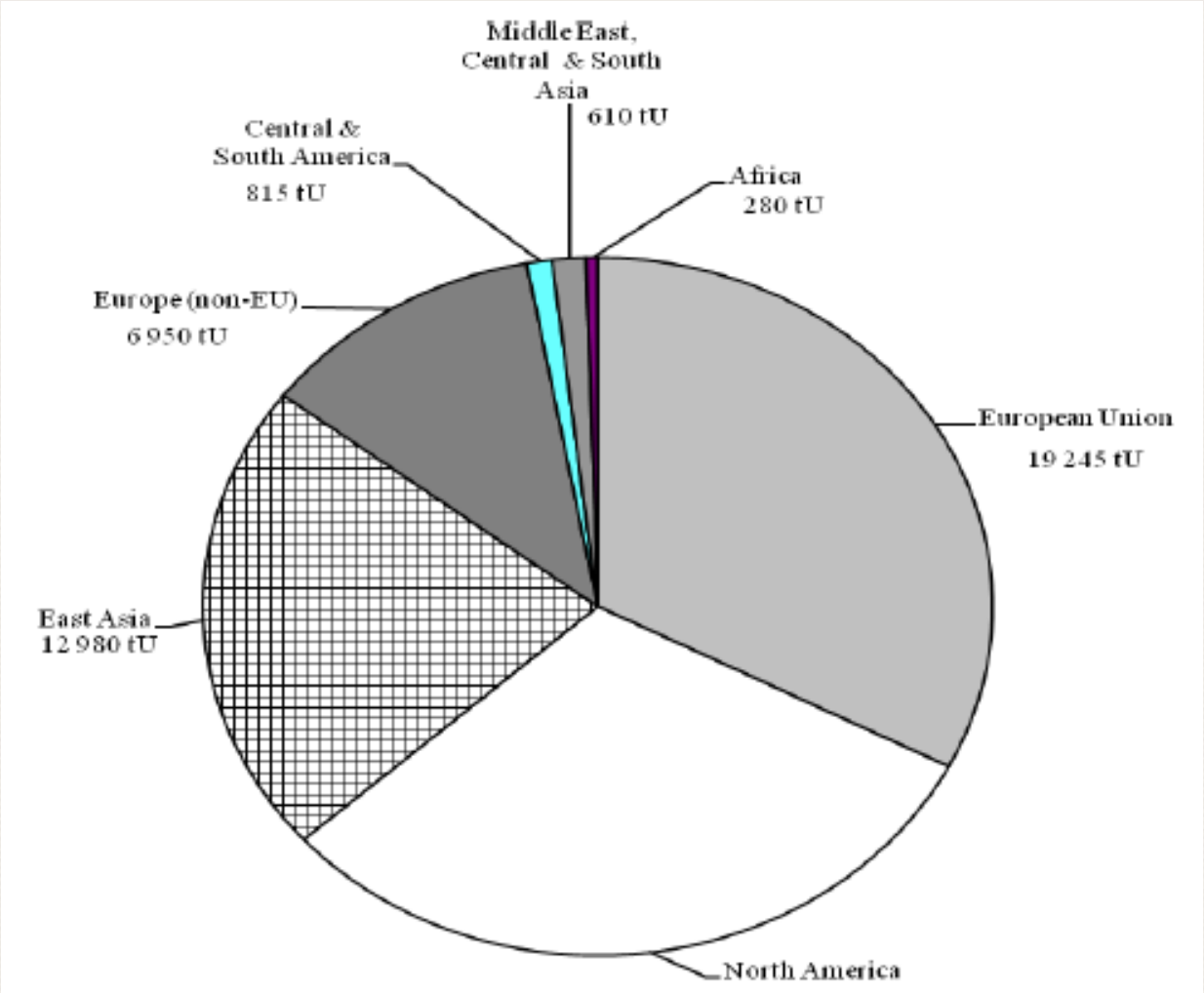
Uranium requirements in 2008 (60th. tU)



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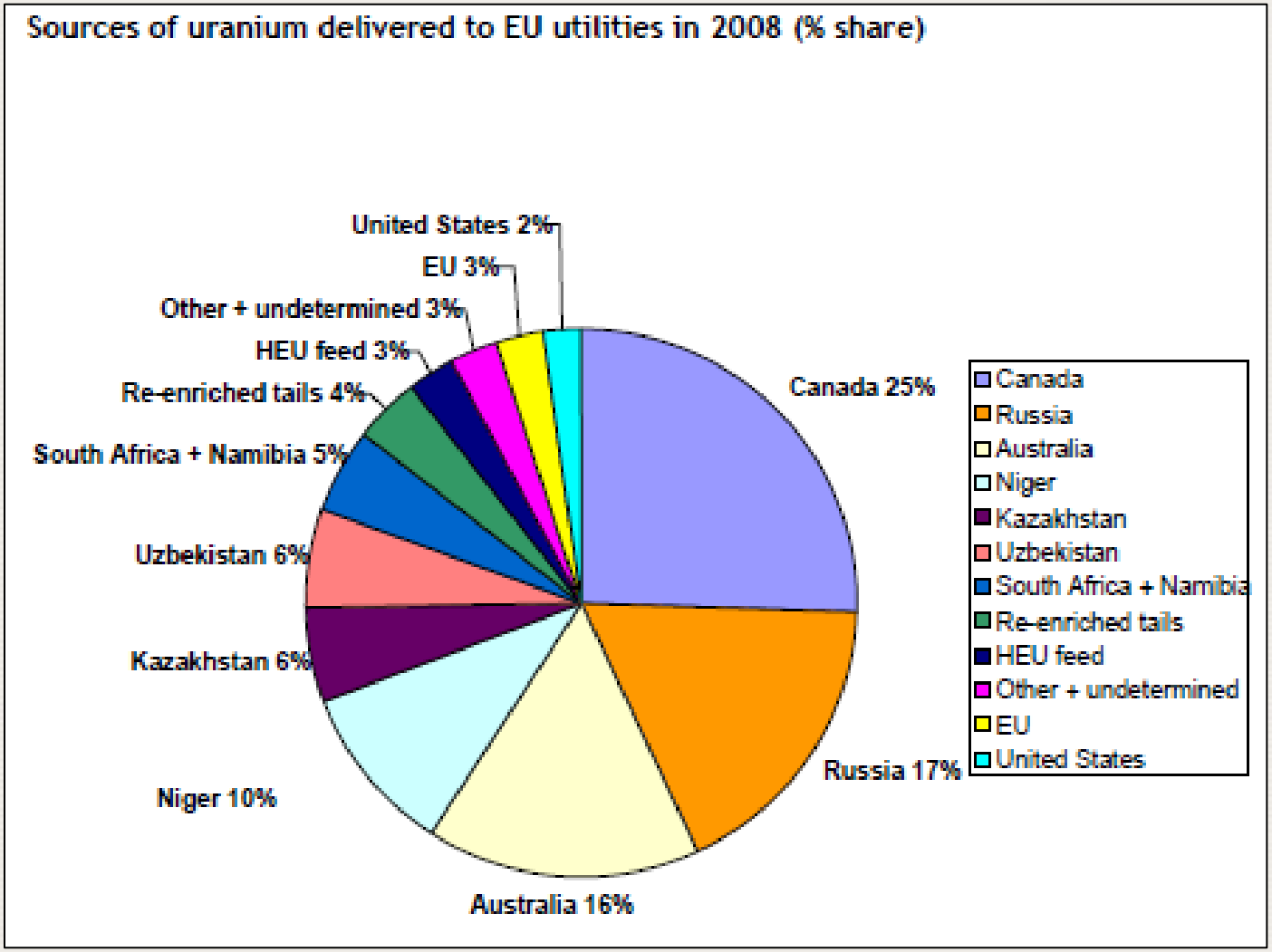
Uranium Sources to EU



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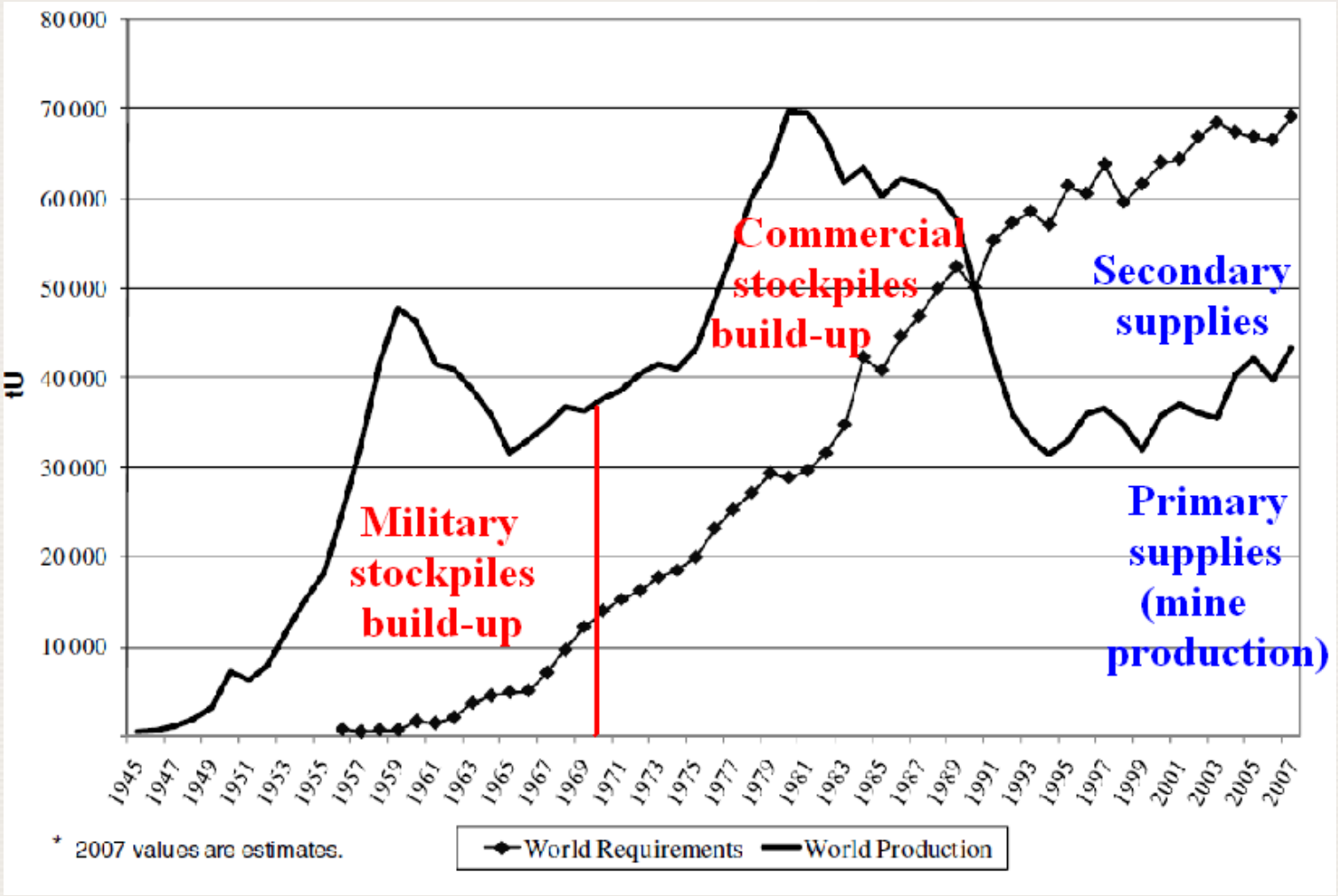
Secondary supplies for fuel



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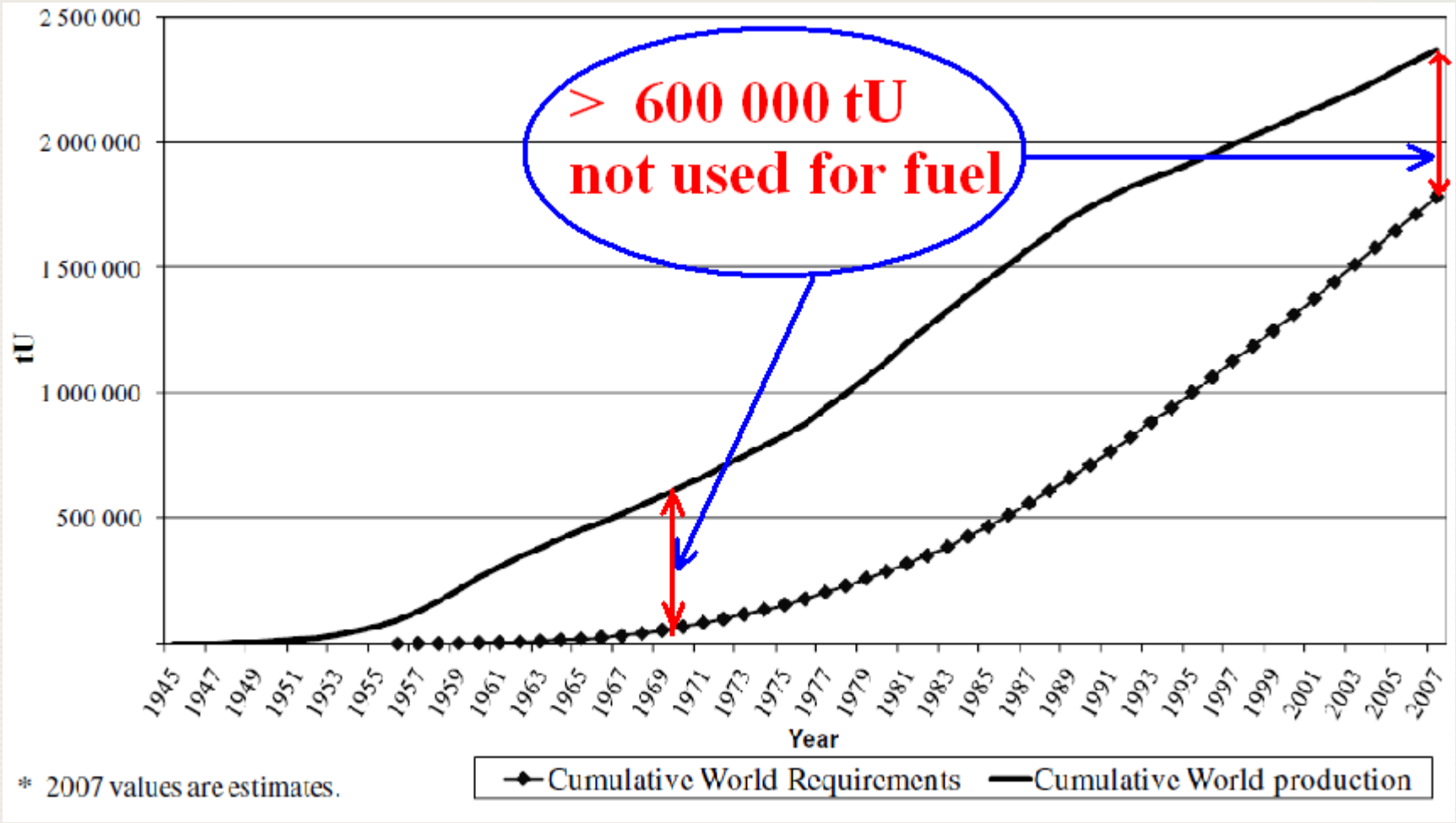
Secondary supplies for fuel



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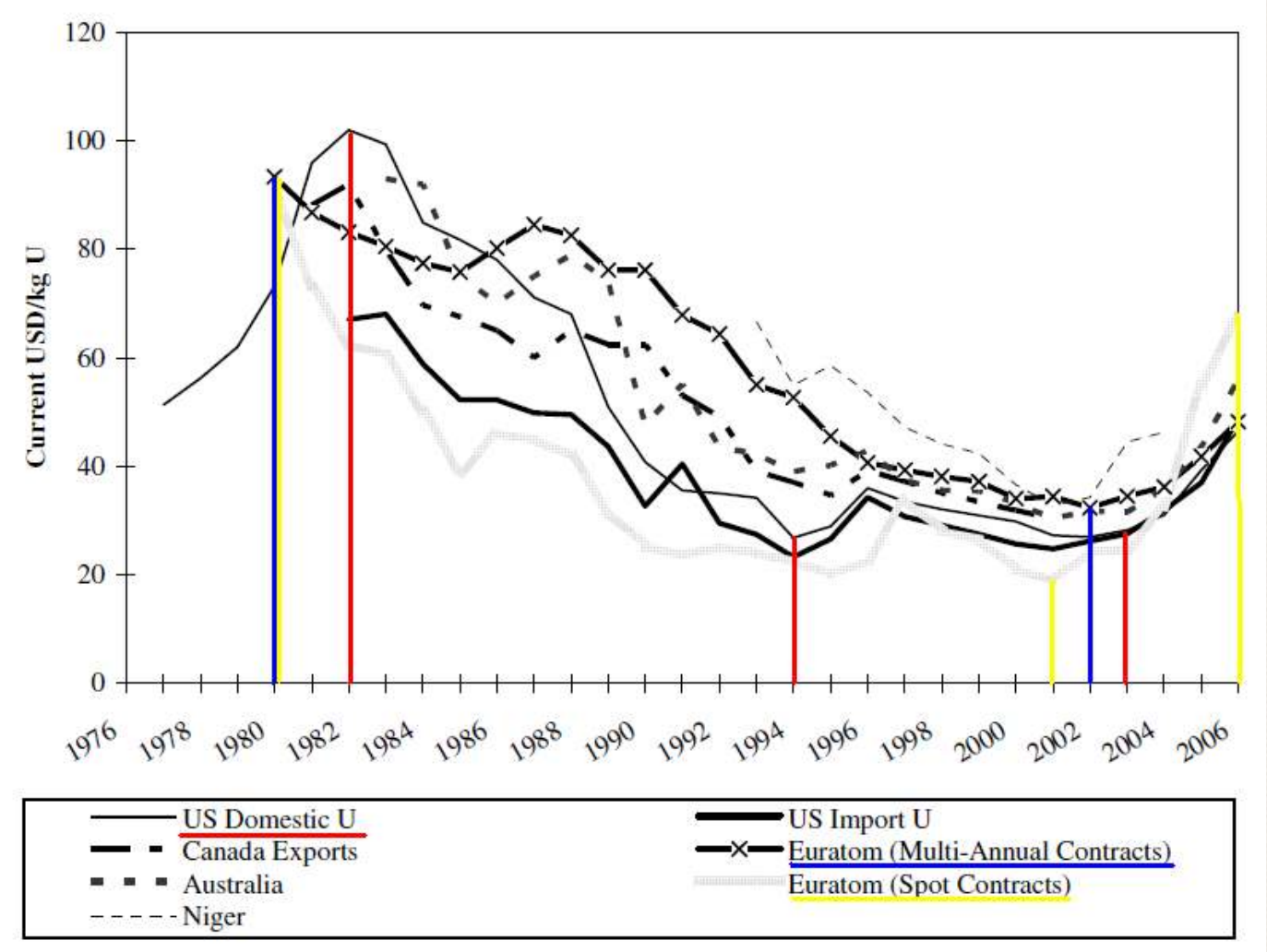

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THANK YOU FOR YOUR ATTENTION

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