Overview on Uranium Activities in Africa / Global Uranium Activities

New Developments

in cooperation with

urania-network.org

wise

World Information Service on Energy

Uranium Project
Uranium and the Nuclear Fuel Chain

- **Prospection and Exploration**
- **Mining**
- **Uranium "mill"**
- **Conversion**
- **Enrichment**
- **Production of fuel rods**
- **NPP**

Diagram showing the process from mining to nuclear power plant with stages including:
- **Mining**
- **Prospection**
- **Conversion**
- **Enrichment**
- **Production of fuel rods**
- **Nuclear Power Plant**

Graphics: WISE Uranium Project
New Developments
since 2007 / 2008
Uranium – Development of Price 1987 - 2013

high levels for longer than it takes for new producers to enter the market and anxiety about supply to subside.

Graph courtesy of UxC

Note that the Euratom long-term price is the average price of uranium delivered into the EU that year under long term contracts. It is not the price at which long-term contracts are being written in that year.
2007 / 2008 – Sudden rise of the price of uranium
Reasons not clear, probably based on excessive expectations re: new-builds of reactors

Consequences
- approx. 200 new exploration companies start „chasing“ uranium globally
- Africa becomes one target area … Why?

“The Australians and the Canadians have become over-sophisticated in their environmental and social concerns over uranium mining. The future is in Africa.”
John Borshoff, (former) CEO of Paladin, Australia

- Exploration companies are „milking“ the capital market
- Focus on Africa in Presentation
Exploration activities and 'announced' mining projects

Europe
- Finland
- Portugal

Africa
- Namibia
- Malawi
- Namibia
- South Afrika
- Cameroon

North America
- USA
- Kanada

Australia

What became of these PROJECTS?

What became of the COMPANIES?

What to expect for the FUTURE?

... some examples ...
Niger - Imouraren

Announced as „... the largest mining project ever undertaken in Niger, the largest open pit uranium mine in Africa, and the largest anywhere to use heap leaching ...“ (WNA)

2008 / 2009: Licensing, construction begins

Announced Investment: 1,2 billion €
Expected Production: 5,000 t Uranium / year

2013: AREVA announces postponement to 2015 – 2020, pays 35 Mio. € for postponement to Gvt. of Niger (!)

2014: Imouraren Uranium Mine Project postponed indefinitely

AREVA changes deposit rating from „proven“ to „probable“
Deposit is considered „unmineable“ by other sources

2015 / 16: AREVA writes off 348 million € of Imouraren Project (WNA)
2008 / 2009: Niger’s then President Tandja (1999 – 2010) tries to break French monopoly on resource extraction, attracts Chinese companies to Niger

2007: SOMINA, operator of Azelik mine, majority owned by CNNC – Chinese National Nuclear Corporation gets license to mine uranium

2010: President Tandja is overthrown in a (unbloody) coup

2010: Considerable shortcomings re: protection of environment, Touareg women loose water sources, the possibility to produce salt – and thus their livelihood

2010, Dezember: First delivery of uranium to China

2014, August: SOMINA fails to secure a cheap loan
Investment higher than expected
Price of uranium LOW (after Fukushima)

2015, 17. Februar: CNNC mothballs Azelik – unprofitable
Mali – Falea

Uranium-Silver-deposit, known since the 1980ies

2010: Rockgate Capital announces Environmental Impact Assessment
2012: Feasibility-Study

from 2011 onward: Strong resistance from local people, international support, ARACF – Association des Ressortissants et des Amis de Falea, www.falea21.org

2012, March: International Uranium Conference in Bamako
2013 / Jan 2014: Denison Mines (Canada) buys Rockgate Capital (US $ 26 Mio)
2016: GoviEx buys project from Denison Mines, Denison gets shares of GoviEx

Uranium mining plans currently not continued.
Tanzania

Region Bahi / Central part of Tanzania

2009: Gvt of Tanzania has given 70+ exploration licenses to foreign companies

Companies exploring for Uranium (mainly) from Australia:
   Mantra Resources, URANEX, and others

since 2009: Local people stage considerable resistance, informed by NGOs CESOPE, LHRC – Legal and Human Rights Center etc. and supported internationally
   Tanzania Atomic Energy Commission (TAEC) admits later: „No social license“ for Uranium exploitation

2013: International Uranium Conference in Bahi/Dodoma and Dar es Salaam

2014: URANEX abandons plans to mine uranium in Bahi area
   Mantra disappears from Bahi area

Uranium mining plans in Bahi area / Tanzania currently not continued.
URANEX / now Magnis Resources share value

Magnis Resources Ltd
ASX: MNS - 27 Mar, 16:10 GMT+11

0.56 AUD ↓ 0.00 (0.89 %)

1 day | 5 day | 1 month | 3 months | 1 year | 5 years | max

2014

URANEX – now MAGNIS – share value – 2004 – 2017
2011: UraniumOne, with a bad track record from its South African DRUM-Project, becomes operator of Mkuju River Uranium Project (MRP). MRP majority owned by Russian ROSATOM.

2012: UNESCO World Heritage Committee ‘excises‘ in an “exceptional and unique manner“ mine area from WH site to enable mining, breaking its principle „Mining incompatible with status as WHS“

2014: UNESCO WHC lists Selous Game Reserve as „in DANGER“ due to excessive poaching and „industrial developments“

2016, March: UraniumOne: NO start of mining at MRP until price of uranium rises by 70% to US$ 55 / lb (price US $ 30/ lb).

Tanzanian Minister deplores „loss of millions investment“
Tanzania / 3

Region Namtumbo / Songea / Southwest of Tanzania

2009: Mantra discovered uranium deposit „Mkuju River“
Deposit is located in World Heritage Site Selous Game Reserve

2010, Dec.: ROSATOM / ARMZ buys Mantra, pays off shareholders

delisted following the merger by scheme of arrangement between the company and JSC Atomredmetzoloto effective 15/06/2011

Scheme of arrangement by which JSC Atomredmetzoloto acquired all of the issued shares in Mantra was implemented with Mantra shareholders receiving the following amounts for each Mantra share they held:
A$6.87 in cash and an unfranked dividend of A$0.15

Mantra Resources Ltd - share price - 2008 – 15 / 06 / 2011

Russian state corporation suspends $1.2 billion uranium project in Tanzania

Russian state nuclear corporation Rosatom suspends Mkuju River uranium project in Tanzania for at least three years due to depressed uranium market. Rosatom, which previously hoped to start construction and mining uranium at Mkuju River project in 2013, 2016 and in 2018 respectively, decided to suspend the development of this project until the demand for uranium is restored, which is expected not earlier than 2020.

2017, July 7: ROSATOM announces 3 – 5 year suspension of Mkuju River Uranium Project

ROSATOM continues to be owner of project
DR Congo

Radium Mine between 1st and 2nd World War: Shinkolobwe Mine, Province of Katanga

Shinkolobwe closed after independence of DR Congo
Mining inofficially / illegally restarted
UN-Report re: Illegal trafficking of radioactive materials

2009: AREVA’s then CEO Anne Lauvergeon and then Pres. Sarkozy make secret contract with Gvt of DRC – Joseph Kabila – granting AREVA a monopoly right to exploit uranium in DRC

2009: Human Rights-NGO ASADHO Katanga (Pres. Golden Misabiko) publishes Report on illegal mining of uranium and a secret contract; Misabiko is incarcerated, later liberated

2011: Due to insecurity in DR Congo (regime of Kabila), NO mining activities by AREVA.

AREVA retains monopoly for uranium exploitation (➔ „staking claims“)
Centralafric. Republic (RCA / CAR)

2007: UraMin starts Feasibility Study for Bakouma-Project
AREVA purchases UraMin

2008: RCA Gvt. upset since Mining License had been granted to
Canadian UraMin – not to French AREVA

August: End of dispute between AREVA and RCA Gvt.:
AREVA allowed to mine Bakouma Project

2011: AREVA suspends Bakouma Project, due to Fukushima
and difficulties with mining

2012, June: „Guerilla“ Attack on Bakouma Project (possibly staged)

since 2012: Bakouma Project abandoned
NO further activities, existing installations deteriorate …

2015: Investigation against AREVA in France re: corrupting foreign
officials, private individuals etc. related to purchase of UraMin

2012: Bakouma Project abandoned.
AREVA retains right to mine → „staking claims“
Malawi

Uranium mine „Kayelekera“ / PALADIN

2000: Paladin (Australia) purchases Kayelekera Uranium Project
  Founder and CEO: John Borshoff

2005 ff: Paladin starts licensing procedures
  HumanRights groups oppose, protest against 15 year tax break

2006 / 2007: EIS, Mine Development Agreement with Gvt
  Mineral Policy Institute (Australia):
    Mine would not have been licensed in Australia
    CSOs, church groups protest, take to court
  Repeated confrontations with workers/ strikes for better payment etc.

2013: Depreciation of mine (US $ 99 Mio.) due to low price of uranium

2014, May 27: Production is stopped due to low price of Uranium

2014 ff: Environmental problems continue

NGOs: Malawi lost 12 Mio US $ in taxes due to tax break for Paladin
Namibia / 1

Trekkopje Uranium Mine

2006: Preliminary Feasibility study

2007: Heap-leaching planned, construction of a desalination plant

35% of production to be sold to China

2007, May: AREVA purchases UraMin at 2,5 billion (!) €

2009: First production of uranium from heap leaching

2011, Dec: AREVA scales down uranium reserves of by 42% ...

2011: Depreciation (write-off) of 1,46 billion (!) € (58% of purchase price)

Uranium reserves not existing or not mineable ...

2012: AREVA abandons Trekkopje Uranium Mine, mothballs mine

In addition: Suspicions of corruption / betrayal etc.
AREVA investigated in France by police
Anne Lauvergeon, CEO of the time, steps down ...
Uranium project Trekkopje / UraMin → AREVA

arte - Documentation

Ermittlungsverfahren wegen „Betrugs, Veruntreuung und Bestechung ausländischer Amtsträger“.

Das zweite Verfahren wegen der „Verbreitung falscher Informationen, Verwendung oder Vorlage falscher Bilanzen, Machtmisbrauch und der Fälschung von Dokumenten und der Verwendung von gefälschten Dokumenten“

www.arte.tv/sites/de/story/reportage/zeitbombe-der-franzoesischen-atomindustrie/?lang=de

Die Machenschaften um den Kauf von UraMin zu überhöhtem Preis werden zur Staatsaffäre in Frankreich, die überhöhten Zahlungen tragen erheblich zur Pleite von AREVA bei

Buch von Vincent Crouzet:
„Eine atomare Affaire - UraMin / AREVA – der haarsträubende Saga eines Staats-Skandals“
Langer Heinrich Uranium Mine / PALADIN (Australia)

2002: Paladin purchases „Langer Heinrich“ Uranium project

2004 / 2005: Paladin is granted Mining License for 25 years
   EARTHLIFE Namibia and HumanRights-NGOs protest
   German ÖKO-Institut: massive underestimation of radiation impact

2007: First production of uranium, delivery of uranium to China planned

2016 – 2017: Due to low price of uranium, mining is stopped
   to save expenses only uranium ore already mined is processed

2016 / 2017: Paladin cannot pay back US$ 277 loan from EdF (!)

2017: Paladin faces bankruptcy, calls in „administrator“
   July: Paladin shares suspended from trade at stock exchange
   August: Paladin manages to stop take-over by Chinese CNNC
   Future of company remains unclear
Zonghe Uranium Project

... one of the most secretive uranium projects in Namibia ...

2010: ‘first sighting’ of project (hundreds of garbage bags left ...)  
Deposit 100% owned by Chinese companies
58% - China Uranium Corporation (“CUC”)  
42% - Namibia-China Mineral Resources Investment and Development

2012: CUC – China Uranium Corporation – is granted Mining License  
Public participation does not happen ...

2013: 2 years after writing and 1 year after granting of Mining License  
Environmental Impact Statement is published ...

Nothing known about construction, start of production etc.
HUSAB Uranium Mine

2009: Rössing plans to exploit „Rössing South“ deposit
owner: Extract Resources

2010: KEPCO, Korea, ROSATOM consider partnership

2011: Mining License granted in record period of 2 months

2012: HUSAB becomes majority owned by Chinese companies (90%)

Note:
Chinese companies pushed Rössing / RioTinto and others out of
Rössing South, ROSATOM also not successful

HUSAB becomes one of the biggest uranium mines, 100,000 t Uran
Production 5,000 t Uranium / year, area 19 qkm

Zone 1 pit: 2.5 km long, 1.0 km wide and 400 m deep.
Zone 2 pit: 1.9 km long, 1.4 km wide and 390 m deep
Centrales chinoises, uranium namibien

Avec l’ouverture, fin 2016, de la mine géante de Husab, en Namibie, la Chine est parvenue à sécuriser ses approvisionnements. Désormais, elle lorgne le Niger.

Par Sébastien Le Belzic (chroniqueur Le Monde Afrique, Pékin)
LE MONDE Le 11.04.2017 à 15h28 • Mis à jour le 11.04.2017 à 15h30

Areva en rêvait, les Chinois l’ont fait. Le géant public du nucléaire, China General Nuclear Power Corporation (CGNPC), a ouvert, le 30 décembre 2016, sa mine géante de Husab, en Namibie, pour un investissement de 2 milliards de dollars (environ 1,9 milliard d’euros). L’ancien président chinois Hu Jintao était venu en personne négocier avec le gouvernement la signature du contrat qui, en 2012, a accordé 90 % des parts au groupe chinois et 10 % à l’Etat namibien.
Most of the new uranium mining projects announced in Africa did not succeed

AREVA overpaid dearly for UraMin, this contributed heavily to AREVA's near bankruptcy and now split-up

However, AREVA sucessfully 'staked claims' in Niger, DR Congo and Centralafric. Republic for exploitation later on.

AREVA is involved in a major scandal

Newcomer Paladin, Australia, is in serious trouble, with one of ist two U mines mothballed

ROSATOM / UraniumOne announced 'suspension' of ther Mkuju River Project, supposedly also overpaid

Chinese CNNC successfully launches Husab U mine, Namibia
The Nuclear Companies
(some ...
AREVA
Uranium mining, building of NPPs,
all parts of the nuclear fuel chain

AREVA – share value 2004 – 2017 (from € 33 to € 4.44)
The Nuclear Companies …

AREVA in its known form has ceased to exist

2009 / 2010: AREVA over-pays for UraMin´s uranium mines, approx. € 3 billion

Monies probably used to convince S.A. then president Mbeki to contract AREVA to built new NPPs in S.A. … does not work.

Inside deals, corruption, etc. researched by French financial police, published on „arte“and other media channels …

2015 ff: Depreciation of u mines (mainly Trekkopje / Namibia and Bakouma / RCA) → high losses, AREVA factually bankrupt

2016 / 2017: AREVA group split up into

- AREVA NP (reactors and fuel operations) and
- New AREVA group (fuel cycle operations)
The Nuclear Companies ... 

The „restructuring“ of France's Areva group (…)

- implementation of a € 2.0 billion ($2.3 billion) capital injection from the French state.
- NewCo – Areva's separated nuclear fuel cycle activities – is also to receive a € 2.5 billion capital increase from the state by the end of this month (July 2017).


„Old“ company has only TWO tasks:
- Pay-off of (old) debts
- Finishing building of Olkiluoto NPP, Finland

2017, 17./ 20. August: Shares of AREVA suspended from trading at Stock Exchange, final departure days later

AREVA becomes „ltd.“, 99% owned and controlled by French Gvt.

French nuclear industry rescued by French state at the cost of € 4,5 billion at taxpayers expense.
The Nuclear Companies ...

ROSATOM, state-owned by Russia

Russia – creating a global nuclear power empire (?)

from: ROSATOM website
“About us …”, 2016
July 3, 2017: ROSATOM loses hope in int’l nuclear builds …

Amid decreasing world demand for nuclear energy, Russia’s state nuclear corporation last week warned it would likely be receiving fewer requests to build nuclear power plants abroad.

The announcement marks a sharp departure for the corporation, which until recently has posed its contracts with other countries as the bread and butter of its bottom line – as well as a potent tool for broadening Moscow’s sphere of political influence.

Speaking at last month’s Tekhnoprom-2017 conference, a technical conference in the Siberian city of Novosibirsk, Rosatom’s deputy director Vyacheslav Pershukov called the market for nuclear power stations abroad “exhausted.”


… probably not.
Slowing demand for electricity and tumbling prices for natural gas have eroded the economic rationale for nuclear power, which is extremely costly and technically challenging to develop. Alternative-energy sources like wind and solar power are rapidly maturing and coming down in price. The 2011 earthquake in Japan that led to the nuclear disaster at the Fukushima Daiichi plant renewed worries about safety.

General Electric, a pioneer in the field, has scaled back its nuclear operations, expressing doubt about their economic viability. Areva, the French builder, is mired in losses and undergoing a large-scale restructuring.

Among the winners could be China, which has ambitions to turn its growing nuclear technical abilities into a major export. That has raised security concerns in some countries.
Nuclear power plants are ‘bleeding cash’

Business columnist: "Let it be written that environmentalists didn’t kill the nuclear power industry, economics did" 

JOE ROMM AUG 22, 2017, 4:50 PM

The nuclear industry is so uncompetitive now that over half of all existing U.S. nuclear power plants are “bleeding cash” according to a Bloomberg New Energy Finance (BNEF) report released earlier this summer. BNEF found that $2.9 billion is lost every year by just 55 percent of all the nuclear plants in the United States.

Nuclear power as we know it is finished

By Chris Tomlinson | August 3, 2017 | Updated: August 4, 2017 10:44am
Uranium company PALADIN /Australia/Africa

Founded by John BORSHOFF

- Former employee of Uranerz Australien, subsidiary of German Uranerzbergbau GmbH; he secures their database …
- Paladin purchases several projects with positive feasibility studies during time of low price of uranium

2005: Price of uranium starts to rise, Paladin starts mines

John Borshoff is highly acclaimed as CEO, Paladin becomes „the market´s darling“ …

from 2011 on: Value of Paladin´s shares starts to go down

2014: Kayelekera Uranium Mine, Malawi, mothballed

2014: Langer Heinrich Uranium Mine / Namibia, Paladin´s second mine) in serious financial problems …

Share value dropped from $ 10 to $ 0,10
Uranium company PALADIN

2017: Paladin faces bankruptcy, calls in „administrator“

July: Paladin shares suspended from trade at stock exchange
August: Paladin manages to stop take-over by Chinese CNNC
Future of company remains unclear
Cameco faces CRA in court over $2.2B tax bill


Cameco Corp. Faces a Nuclear Implosion Due to Tax Avoidance

Chris MacDonald | December 19, 2016 | More on: CCJ CCO
CAMECO – Share value – 2004 – 2017
Summary …

1. Regional Shifts …

... re: Uranium Mining

- away from US, Canada, also partially from Australia
- towards Kazakhstan (currently world’s biggest uranium producer) (low environmental standards, politically no problems …)
- and targeting Africa (due to low environmental standards, lack of enforcement of laws, and cheap labour)

... re: Nuclear Power Plants (NPP)

- Central Europe, USA, Canada: very few new built of NPPs (economically not feasible, much resistance, renewables cheaper)
- New built / new connections to grid 80% in Asia (China, India …)
Summary ...

2. Shifts re: Companies

... re: Uranium Mining
- ‘Traditional’ uranium miners (AREVA, CAMECO) in difficulties
- AREVA successfully ‘staked claims’ (DR Congo, RCA, Canada)
  Newcomers (such as Paladin) → serious problems by now
- KAZATOMPROM – leading position in the world market
- CNNC – Chinese National Nuclear Corporation – in Namibia
  → quietly launched big U mine (Husab, 5,000 t U / year)

... re: Nuclear Power Plants
- AREVA bankrupt, restructured, future re. NPP new builts unclear
  Westinghouse filed for bankruptcy (March 2017)
  ROSATOM ‘looses hope’ in int’l new builts of NPPs (July 2017)
- New builts of NPPs mainly Asia (China, India …)
What to expect in the Future?
The report makes clear, in telling detail, that the debate is over. Nuclear power has been eclipsed by the sun and the wind. These renewable, free-fuel sources are no longer a dream or a projection-they are a reality that are replacing nuclear as the preferred choice for new power plants worldwide.

It no longer matters whether your greatest concern is nuclear power or climate change the answer is the same. The modern-day “Edisons” have learned to harness economically the everlasting sources of energy delivered to earth by Mother Nature free of charge.

The value of this report is that this conclusion no longer relies on hope or opinion but is what is actually happening. In country after country the facts are the same. Nuclear power is far from dead but it is in decline and renewable energy is growing by leaps and bounds.

( … )
It is more than symbolic that the Japanese Government has formally accepted the death of its breeder reactor, which was the original holy-grail of nuclear power.

Most revealing is the fact that nowhere in the world, where there is a competitive market for electricity, has even one single nuclear power plant been initiated. Only where the government or the consumer takes the risks of cost overruns and delays is nuclear power even being considered.
Future …

Impacts on (future) demand for uranium

- Some 350 NPPs remain in operation, continue to need uranium

- New builts of NPPs
  - Central Europe, US, Canada ´dead´ or only minimum numbers of NPPs
  - Attempts to extend life-span of existing NPPs

- ? Re-start of NPPs in Japan ?
  (much slower than expected / advertised by nuclear industry)

- Other sources of uranium not relevant (i.e. programs like „Megatons to Megawatts“ not expected to be renewed under Trump and Putin)

- Some of the ´traditional´ uranium companies in trouble

- 80% of new connections to the grid in the past 3 - 4 years in Asia
  (mainly China, India)
Future … NPPs connected to the grid 2014 – 2017

<table>
<thead>
<tr>
<th>Year</th>
<th>Connections</th>
<th>Countries</th>
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<tr>
<td>2014</td>
<td>5</td>
<td>China 3, Russia 1, Argentina 1</td>
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<td>2015</td>
<td>10</td>
<td>China 8, Russia 1, South-Korea 1</td>
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<td>2016</td>
<td>10</td>
<td>China 5, Russia 1, South-Korea 1, India 1, Pakistan 1, USA 1</td>
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<td>2017</td>
<td>project</td>
<td>China 10, Russia 1, South-Korea 1, India 1, Pakistan 1, UAE Emirates 1, Slowakia 1</td>
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<tr>
<td></td>
<td>16 connections</td>
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</tbody>
</table>

Grid Connections 2014 – 2017 (total 41)
- China: 64%
- Asia (others): 17%
- Russia: 9,8%
- USA, Canada: 2,5%
- Central-Europa: 2,5%

81%
China: Increase in Nuclear - Increase in Renewables
Future ...

Projected Uranium Production Capacity vs. Reactor Requirements

Figure 2.11. Projected world uranium production capability to 2035 compared with reactor requirements*

Gap between production and demand filled by secondary supply

High

Low

Year


Existing and committed production (A-II)
Planned + prospective production (B-II)
World reactor requirements

Production

Source: Tables 1.26 and 2.4.

* Includes all existing, committed, planned and prospective production centres supported by reasonably assured resources and inferred resources recoverable at a cost of <USD 130/kgU. Does not include the secondary supply forecast.
Future ...

Historic Development

Projections

World Nuclear Industry Status Report 2017

OECD – IAEA `Red Book` 2016
Future ... Projections Uranium Demand by OECD / IAEA

Figure 2.4. Annual reactor uranium requirements to 2035
(low and high projections)

HIGH estimate

LOW estimate

IAEA-OECD „RedBook“ 2016 (p101)
Future ... *End of Nuclear Age?*

US, Canada, Central Europe

- very few new builds
- Life-time expansion of existing NPPs

China, India, some Asian countries

- numerous new builds of NPPs
  however: China also invests heavily in renewables

? Japan: future of NPPs unclear, no fast re-start, though

Africa

→ targeted for uranium mining

→ Nuclear companies push for and IAEA promotes nuclear power

Note:

- Nuclear industry pushes for small scale reactors
- EU European Union keeps investing heavily in nuclear research via EURATOM
Future ... re: Uranium Mining

„Traditional“ uranium miners (AREVA, CAMECO ...) in difficulties

Chinese Companies advancing
China‘s future uranium needs will raise to 16% of the world uranium market

Uranium / Exploration companies continue to „milk the capital market“ (for ex. Azincourt ... and others)

➔ In fact, few new starts of uranium mines due to low price of U

➔ Companies “stake claims“, wait for rise of the price of U

➔ African Gvt. WANT U mining - income for the state / Gvt.

➔ Pressure on the resources has ´relaxed´ a bit and thus also pressure on the (grassroots) people ...
...thanks for your attention!

... and LEAVE URANIUM in the GROUND!