

# Ukrainian Titanium Sector

## Investment Opportunities

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# Exim-Consulting – your partner for Ukraine

- Independent and privately owned by management. Key people have worked previously at leading global banks and advisory companies.
- We have country's leading expertise in project finance and M&A.
- Often we assist large international investment banks for joint projects in Ukraine.
- Sector coverage: agriculture, infrastructure, oil & gas, power (incl. renewable energy), metals & mining, transportation.
- Currently we work on attracting investors in the following projects:
  - titanium feedstock mining,
  - coal mining,
  - municipal water supply,
  - biogas,
  - iron ore mining,
  - oil & gas extraction,
  - frozen food logistics,
  - wood processing.

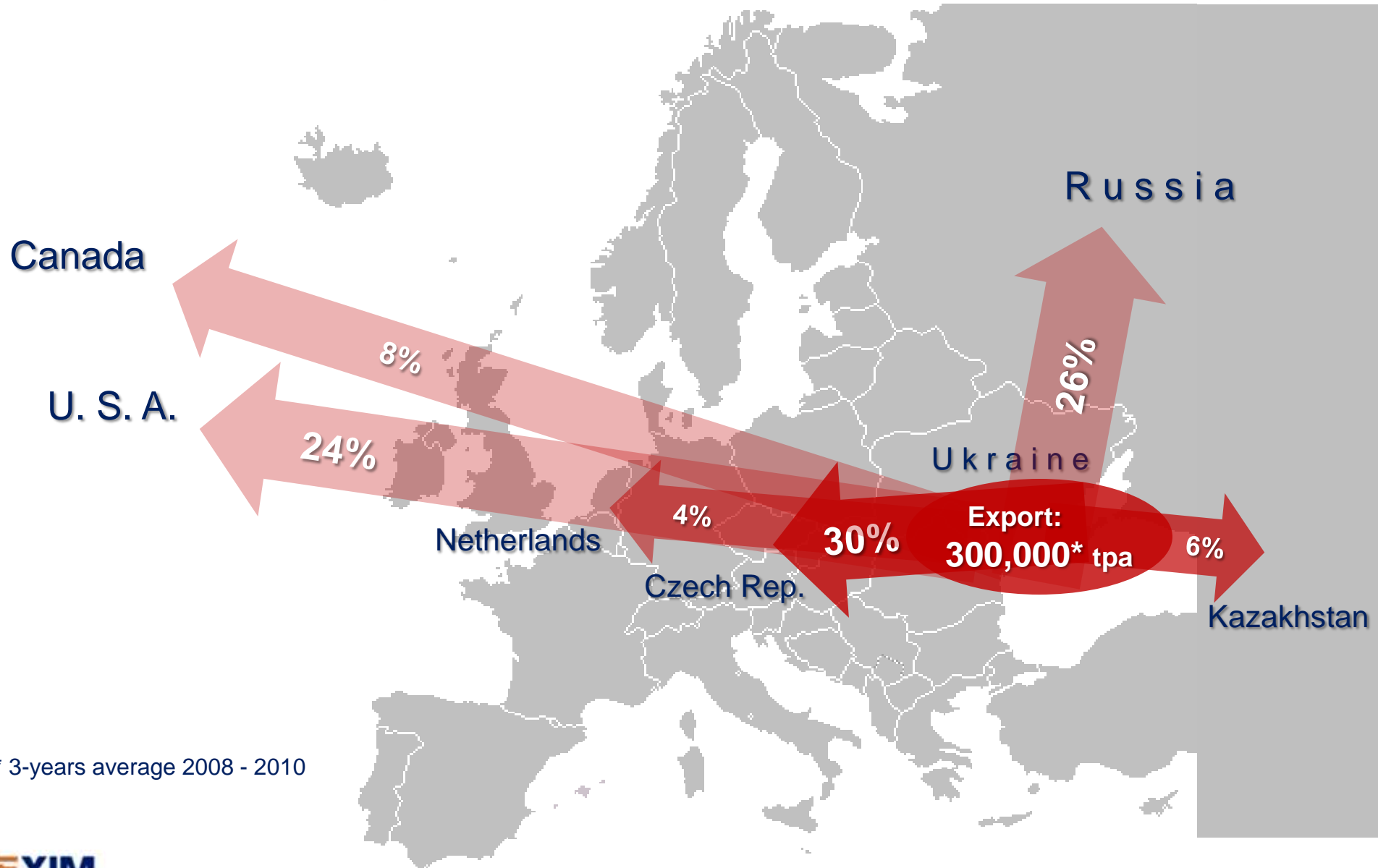
# Key facts about Ukrainian titanium sector

- About 10% of world titanium mineral reserves (over 100 million tons)\*.
- 26 explored deposits. Mainly ilmenite, but also rutile, leucoxene.
- An integrated titanium sector (feedstock+metal+TiO<sub>2</sub>) exists since over 40 years.
- Titanium concentrates production: 600 thsd. tpa\*\*, thereof export - 50%.
- TiO<sub>2</sub> production: 140 thsd. tpa\*\*, thereof export - 80%.

\* Estimation from open publications. Official information on reserves is a state secret.

\*\* 5-years average 2005 - 2010

# Feedstock export destinations in % of total export



\* 3-years average 2008 - 2010

# Existing facilities: mining

## Irshansky GOK

Ilmenite: 400,000 tpa\*  
“sulphate” type



## Volnogorsky GOK

Ilmenite: 200,000 tpa\*  
“chloride” type  
Rutile: 65,000\* tpa  
Zircon: 35,000\* tpa



## Ukrainian Minerals (tails of Volnogorsky GOK)

Ilmenite: 20,000 tpa\*  
“chloride” type

\* 5-years average 2005 - 2010

# Existing facilities: chemistry & metallurgy

## Zaporozhye titanium & magnesium plant

Titanium sponge 10,000\* tpa



## Sumykhimprom

TiO<sub>2</sub> "sulphate": 40,000\* tpa



## Krimskiy Titan

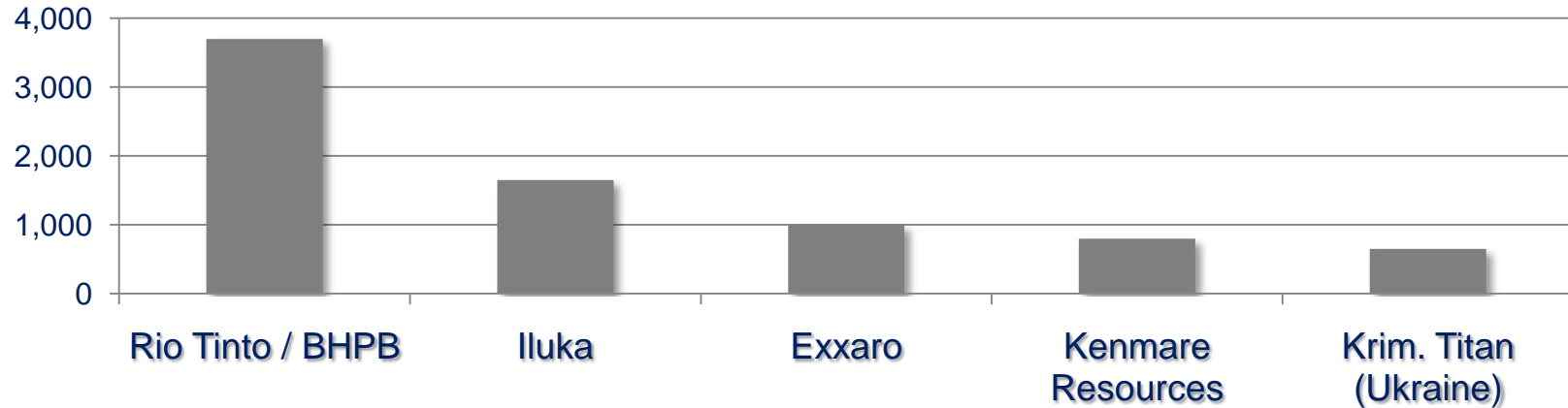
TiO<sub>2</sub> "sulphate": 100,000\* tpa



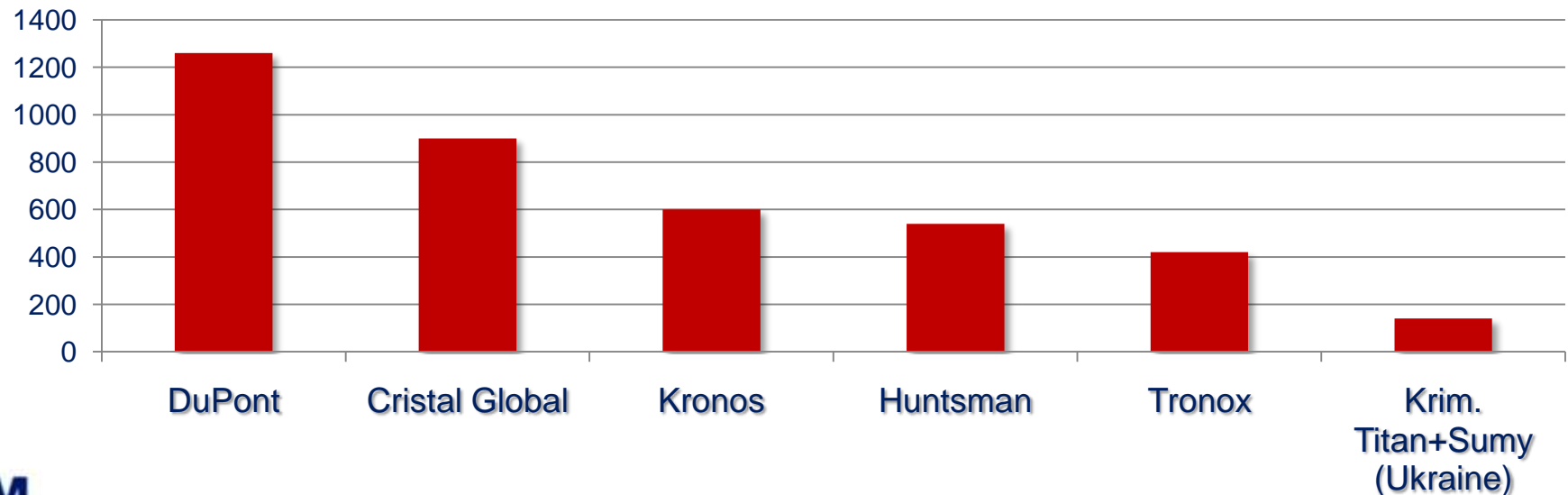
\* 5-years average 2005 - 2010

# Ukraine's feedstock and TiO<sub>2</sub> production share

Titanium feedstock supply majors. Production forecast for 2010, in thsd. t



TiO<sub>2</sub> supply majors. Production forecast for 2010, in thsd. t



# Titanium minerals deposits

## Irshansk group

1. Fedorivske
2. Krasnorichenske
3. Kropyvenske
4. Lemnenske
5. Livoberezhne
6. Mezhyrechske
7. Paromivske
8. Stavyschanske
9. Torchynske
10. Trostyanytske
11. Valky-Gazkovske
12. Verchnjoirshinske
13. Zlobychske
14. Stremigorodske
15. Tarasivske

## Birzulivske-Nosachivske group

16. Andriivske
17. Birzulivske
18. Likareveske
19. Nosachivske

## Volnogorsk group

20. Krutaya Balka (technogenic)
21. Malyshevske
22. Samotkanske
23. Volchanskoe
24. Voskresenovske



- - operating
- - non-operating

# Junior independent mines: location



# Junior independent mines: key facts

## Licensee: PVP «Sirius»

Placer deposit, area: 400 hectares.  
Overburden thickness: 10-18 m.

Reserves: 60 mln. t titano-magnetite,  
15 mln. t ilmenite, 21 mln. t apatite, 0.4  
mln. t vanadium.

Estimated production: 1,600,000 tpa  
titanomagnetite, 300,000 tpa ilmenite,  
370,000 tpa titanium slag, 600,000 tpa  
apatite.

Exploration end: 2011.

Required investment: \$500 m.

## Licensee: TOV «TioFab, Ltd.»

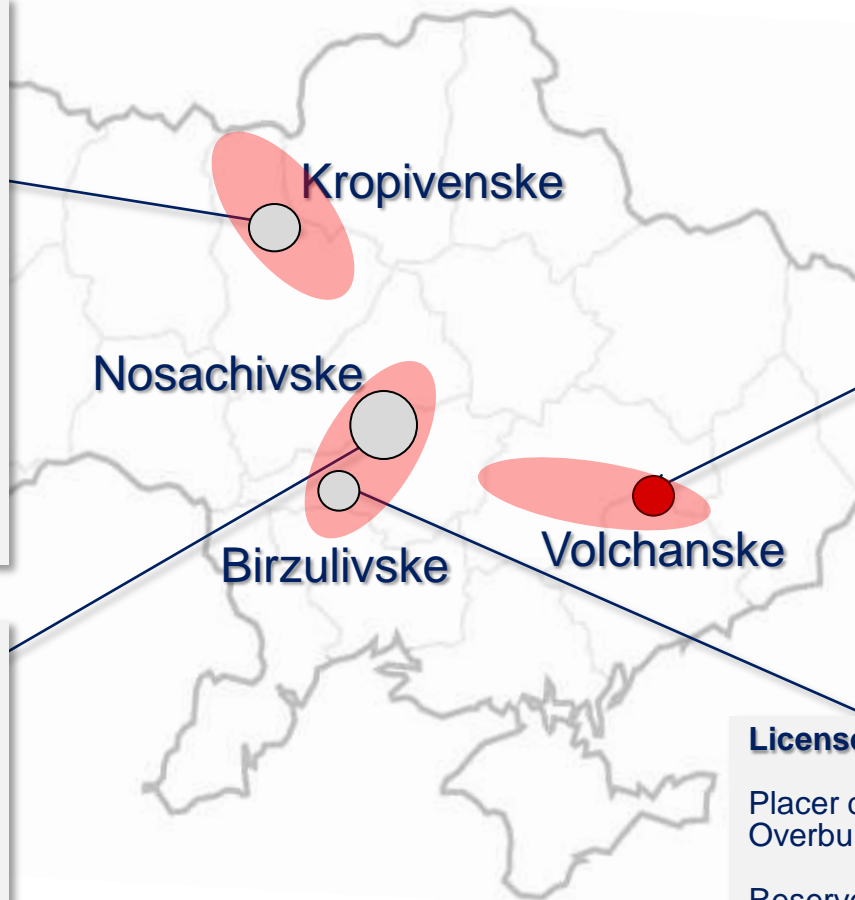
Hard rock deposit, area: 105 hectares.  
Depth: up to 200 m.

Reserves: 50 mln. t ilmenite, 180 mln. t  
feldspar, 5 mln. t apatite. TiO<sub>2</sub> content:  
49-50% in ilmenite.

Estimated production: 500,000 tpa  
ilmenite, 1,900,000 tpa feldspar,  
65,000 tpa apatite.

Construction works start: 2H2011

Required investment: \$600 m.



## Licensee: TOV «Demurinskiy GOK»

Placer deposit, area: 2,500  
hectares. Overburden thickness:  
10-40 m.

Reserves: 5 mln. t ilmenite  
(„chloride“ type), 0.7 mln. t rutile,  
0.2 mln. t zircon. TiO<sub>2</sub> content:  
64% in ilmenite, 96% in rutile.

Estimated production: 74,000 tpa.  
ilmenite, 24,000 tpa rutile, 5,000  
tpa zircon.

Pit construction is 50% completed.  
Processing plant is 80% completed.

Additional investment need: \$15 m.

## Licensee: TOV VKF «Velta»

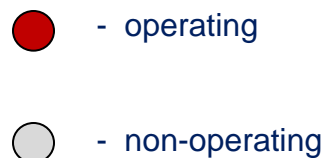
Placer deposit, area: 1,200 hectares.  
Overburden thickness: 10-40 m.

Reserves: 5 mln. t ilmenite („sulphate“ type).  
TiO<sub>2</sub> content: 54 - 57% .

Estimated production: 185,000 tpa.

Construction works start: 2H2010

Required investment: \$65 m.



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