

EXPLORATION AND EXPLOITATION OF MINERAL RESOURCES IN PORTUGAL

•GEOLOGICAL AND MINING CHARACTERISTICS

PRECIOUS METALS

BASE METALS

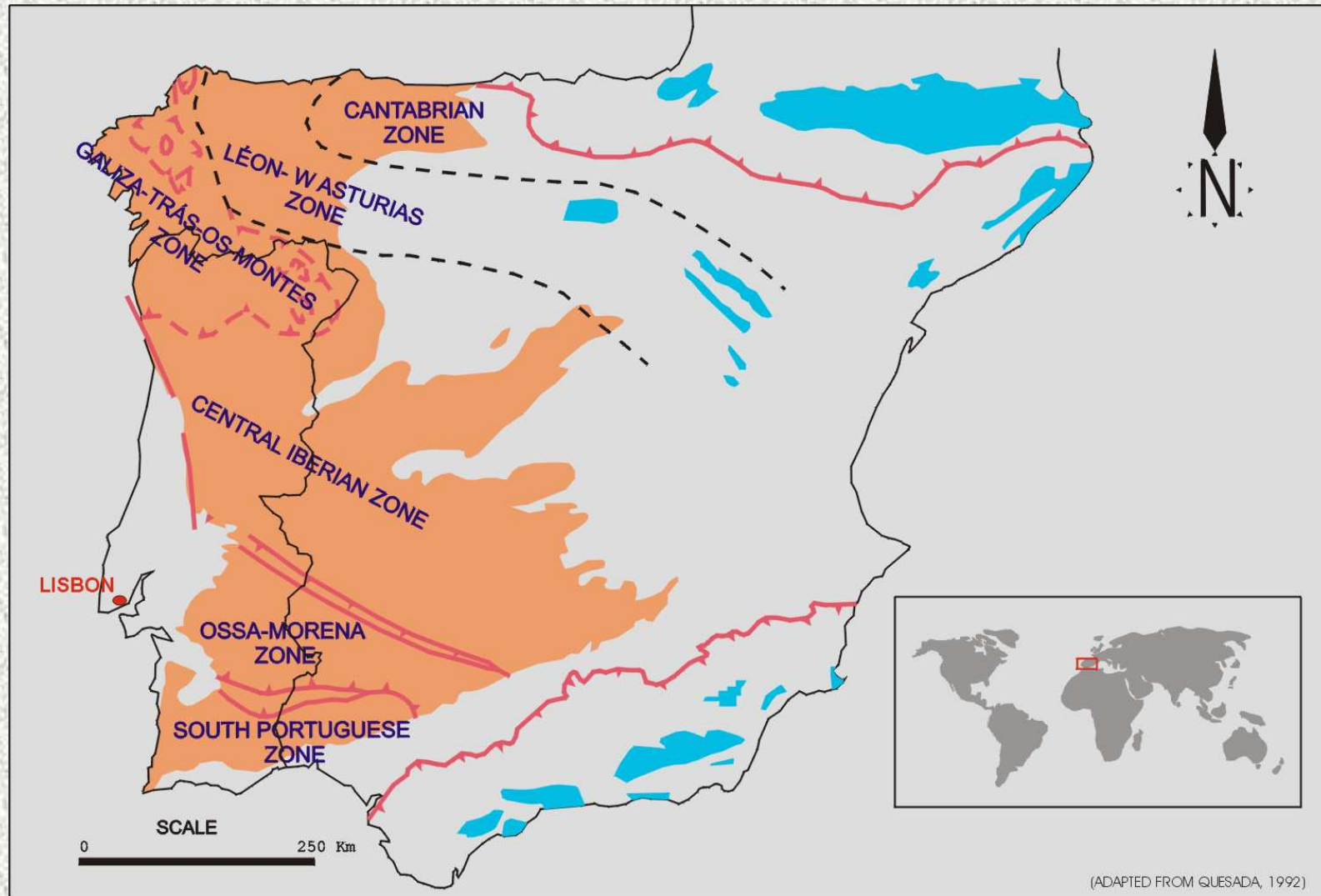
OTHER METALS

NON METALLIC MINERALS

•PRODUCTION AND INVESTMENT DATA

LUÍS MARTINS

GEOTECTONIC SETTING OF THE IBERIAN PENINSULA



GEOLOGY OF PORTUGAL

GEOLOGICAL MAP OF PORTUGAL

MESO-CENOZOIC SEDIMENTARY BASINS

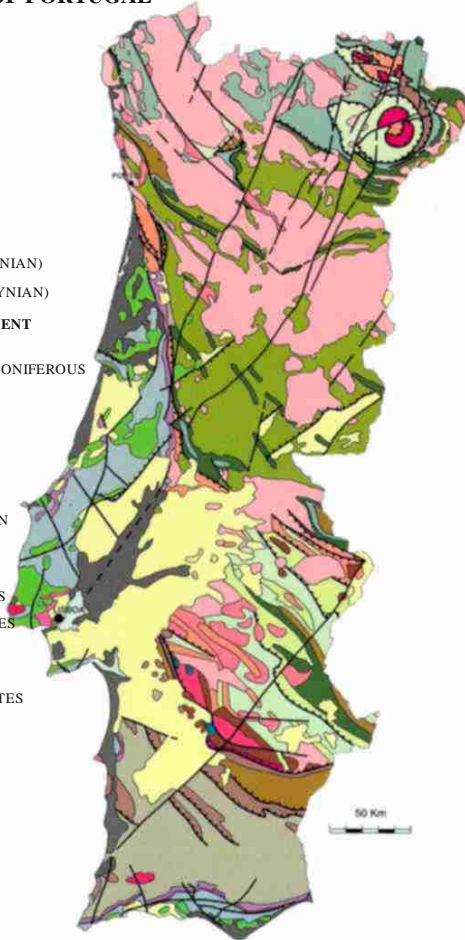
- QUATERNARY
- TERTIARY
- CRETACEOUS
- JURASSIC
- TRIASSIC
- ACID MAG. ROCKS (POST-HERCYNIAN)
- BASIC MAG. ROCKS (POST-HERCYNIAN)

HERCYNIAN & PROTEROZOIC BASEMENT

- UPPER CARBONIFEROUS
- UPPER DEVONIAN-LOWER CARBONIFEROUS
- LOWER DEVONIAN
- SILURIAN
- ORDOVICIAN-SILURIAN
- ORDOVICIAN
- LOWER TO MIDDLE CAMBRIAN
- UPPER PROTEROZOIC-CAMBRIAN
- UPPER PROTEROZOIC




PALEOZOIC MAGMATISM

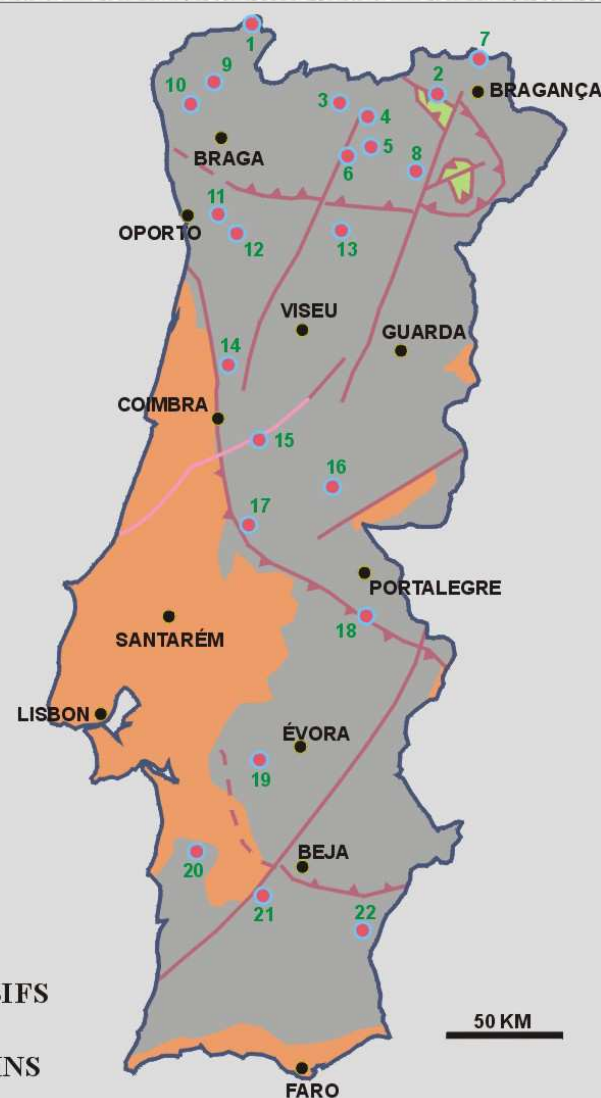
- GRANITES AND ORTHOGNEISSES
- GRANODIORITES AND TONALITES
- GABBROS AND PERIDOTITES
- OFIOLITES
- ACID PORPHYRIES AND RHYOLITES
- BASALTS AND ANDESITES



MAIN GOLD OCCURRENCES AND DEPOSITS

- 1- MELGAÇO
- 2- JARIÇA/EDROSA
- 3- POÇO DAS FREITAS
- 4- CARVELA
- 5- TRÊS MINAS
- 6- JALES
- 7- FRANÇA
- 8- LATADAS
- 9- VILA VERDE/PONTE DA BARCA
- 10- SERRA DE ARGA
- 11- VALONGO/CASTELO DE PAIVA
- 12- CASTROMIL
- 13- PENEDONO
- 14- CARAMULO
- 15- ESCÁDIA GRANDE
- 16- SARZEDAS
- 17- TOMAR/VILA DE REI
- 18- PORTALEGRE
- 19- MONTEMOR-O-NOVO
- 20- CAVEIRA
- 21- ALJUSTREL
- 22- SÃO DOMINGOS

-  HERCYNIAN MASSIF
-  MORAIS & BRAGANÇA POLYMETAMORPHIC MASSIFS
-  SEDIMENTARY BASINS & MESO-CENOZOIC MARGINS



THE MONTEMOR GOLD DEPOSIT

**PEA & NI 43-101
Compliant
Mineral
Resource**

- **PEA completed in May 2013 - 4 processing options - each of which delivered positive NPV5% and IRR results using conservative capital and operating cost estimates.**
- **Colt's NI 43-101 compliant resource estimate for six deposits within the Boa Fé and Montemor area has reported Indicated Resources of 340,310 oz and Inferred Resources of 84,200 oz.**

**Readily
Recoverable
Gold**

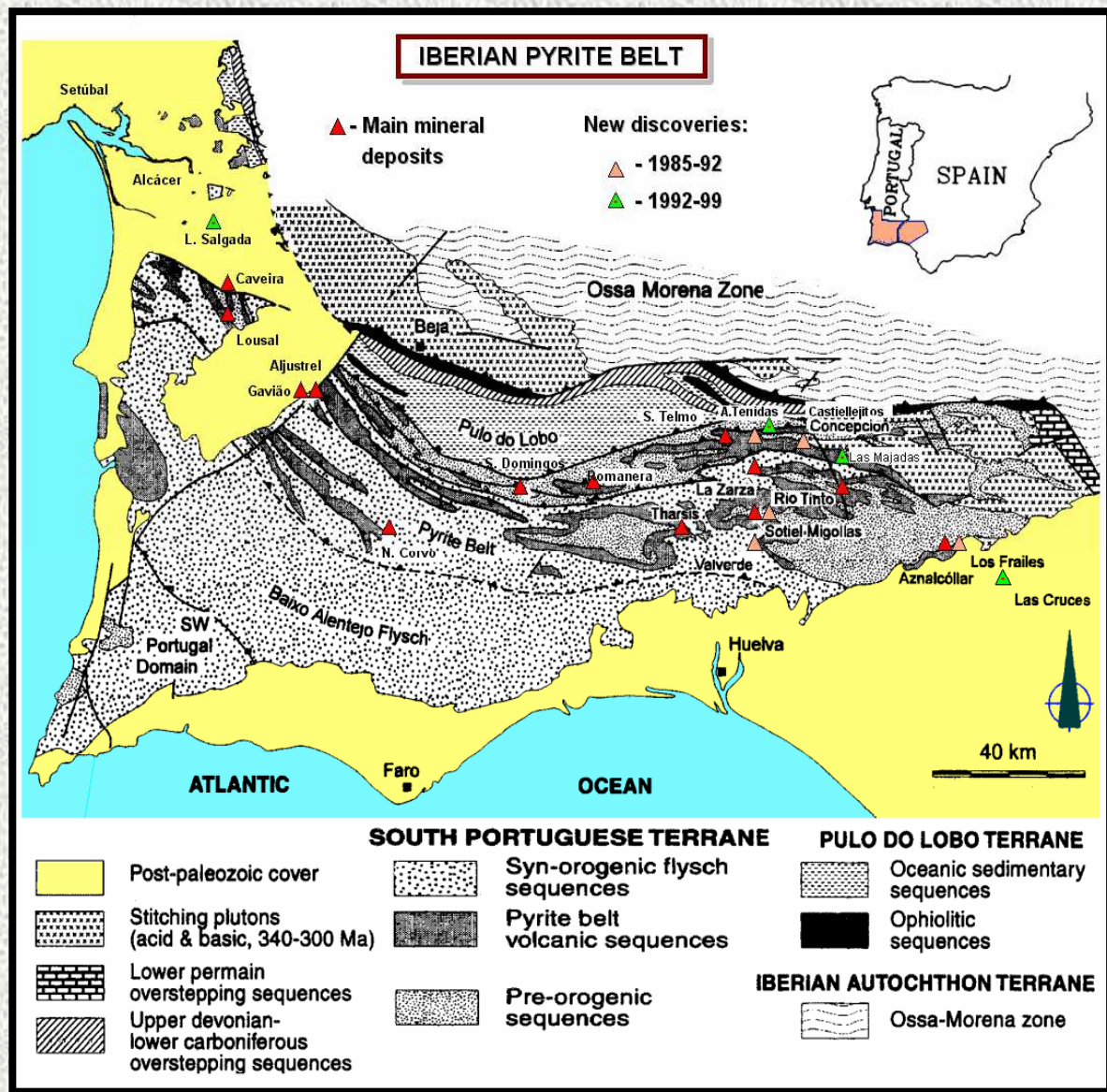
- **Initial metallurgical test work has demonstrated that gold is readily recoverable using a combination of conventional methods (gravity, flotation and cyanide technologies)**

**Significant
Resource
Expansion
Potential**

- **Focussed on delivering initial gold revenue by 2015 from a sub section of a potentially world class gold mining district.**

- **Historical mainly shallow drilling and trenching mostly focused on 10Km strike length (Boa Fé belt) out of an estimated total extent of over 30km containing several parallel gold mineralized zones.**
- **Montemor Shear Zone hosts several shear corridors favorable for gold mineralization.**

THE IBERIAN PYRITE BELT: A FANTASTIC SOURCE OF BASE METALS



(ad.
Barriga *et al.* 1997,
Carvalho *et al.* &
Leistel *et al.* 1998,
Matos *et al.* 2000)

TABLE I

period	Portugal		Spain	
	Nº deposits	M. tons	Nº deposits	M. tons
1950/60	2	60	1	>50
1960/70	4	150	3	>60
1970/80	4	>300	6	150
1980/90	0	0	7	300
1990/98	1	10 (?)	1	>40 (?)
total	11	>520	19	>600

VMS DISCOVERIES
IN THE IPB (1950 - 1998)

TABLE II

1950 - 1998	
VMS	M. tons
30	>1120

AVERAGE: 1.2 VMS/2 YEARS

EXPLORATION PERFORMANCE IN THE IPB

IN: CARVALHO, D. (1998). EXPLORATION STRATEGIES
IN THE IBERIAN PYRITE BELT: A YOUNG, MATURE,
OR SENILE MINERAL EXPLORATION PROVINCE?
WORLD MINING CONGRESS, LISBON MEETING (IOC).

NEVES CORVO: A WORLD CLASS DEPOSIT

To date, copper proven and probable mineral reserves at Neves-Corvo, are approximately 27 million tonnes at 2.9% Cu.

Zinc proven and probable mineral reserves at Neves-Corvo are 23.3 million tonnes at 7.4% Zn.

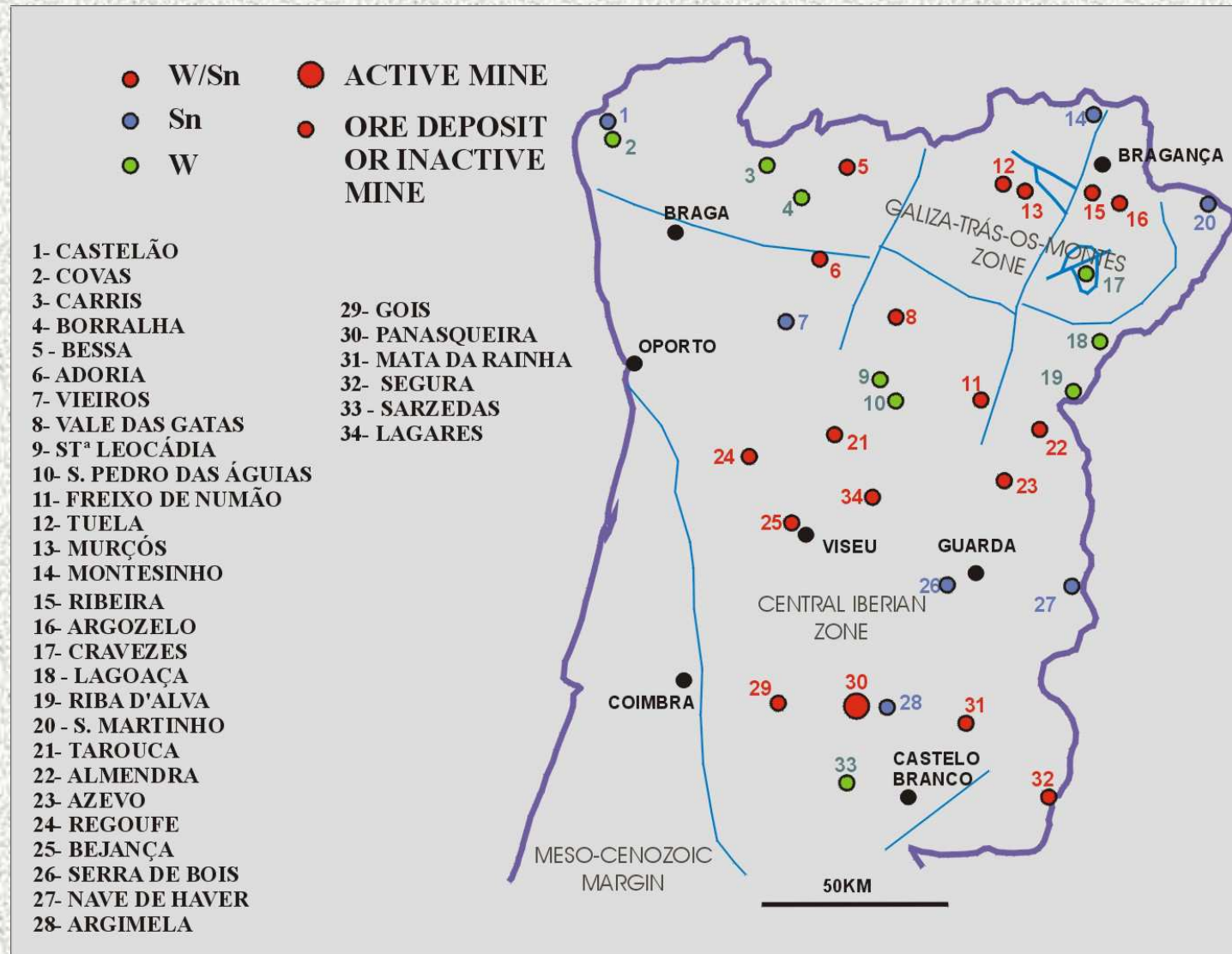
Neves-Corvo has economic evaluation extending at least to 2030.

NEVES CORVO: A WORLD CLASS DEPOSIT

Lundin Mining announced in October 2010 the discovery of a new copper-rich massive sulphide deposit, the Semblana deposit, 1.5 km to the east of the Neves Corvo mining concession.

To date, copper inferred resources at Semblana are approximately 7.8 million tonnes at 2.9% Cu.

GEOTECTONIC UNITS AND MAIN W/Sn DEPOSITS AND MINES



Panasqueira mine remains in operation. Here, in the beginning of 2009 a total of 9,355,750 tonnes of reserves, with 2,159,526 MTU WO₃ and a cut off of 14 kg/m² were defined.

The mineralised zone consists of series of sub-horizontal quartz veins, which overlap and fill the joints of fractures occurring in schist rock. These veins vary in thickness from 1 to 150 centimetres, the average thickness of the veins currently being mined around the 30-40 cm mark.

THE TABUAÇO TUNGSTEN DEPOSIT

Classification	Tonnage Kt	Grade WO ₃ %	Contained Metal t WO ₃	Contained Metal lb	Contained Metal MTU
Indicated Mineral Resources	1,495	0.55	8,150	18,000,000	815,000
Inferred Mineral Resources	1,230	0.59	7,200	16,000,000	720,000

■ **Tabuaço NI-43-101 prepared by SRK (UK) and SRK(Exploration Services) with inputs from SRK (US)¹;**

■ **Classification of the Mineral Resource is based on quality control data, geological continuity and borehole spacing. The estimate is considered to have reasonable prospects for eventual economic extraction, as it is constrained by a cut-off grade derived from reasonable underground mining and processing costs;**

■ **A cut off grade of 0.3% WO₃ has been used to constrain the Mineral Resource estimate;**

■ **This cut-off grade is based on a WO₃ price of US\$300/mtu², an underground mining cost of US\$30/t and a processing cost of US\$22/t, as supplied by SRK Denver, and agreed by Colt Resources;**

■ **The deposit remains open in all directions.**

1: Released: October 3, 2012, Filed
on SEDAR, November 15, 2012.

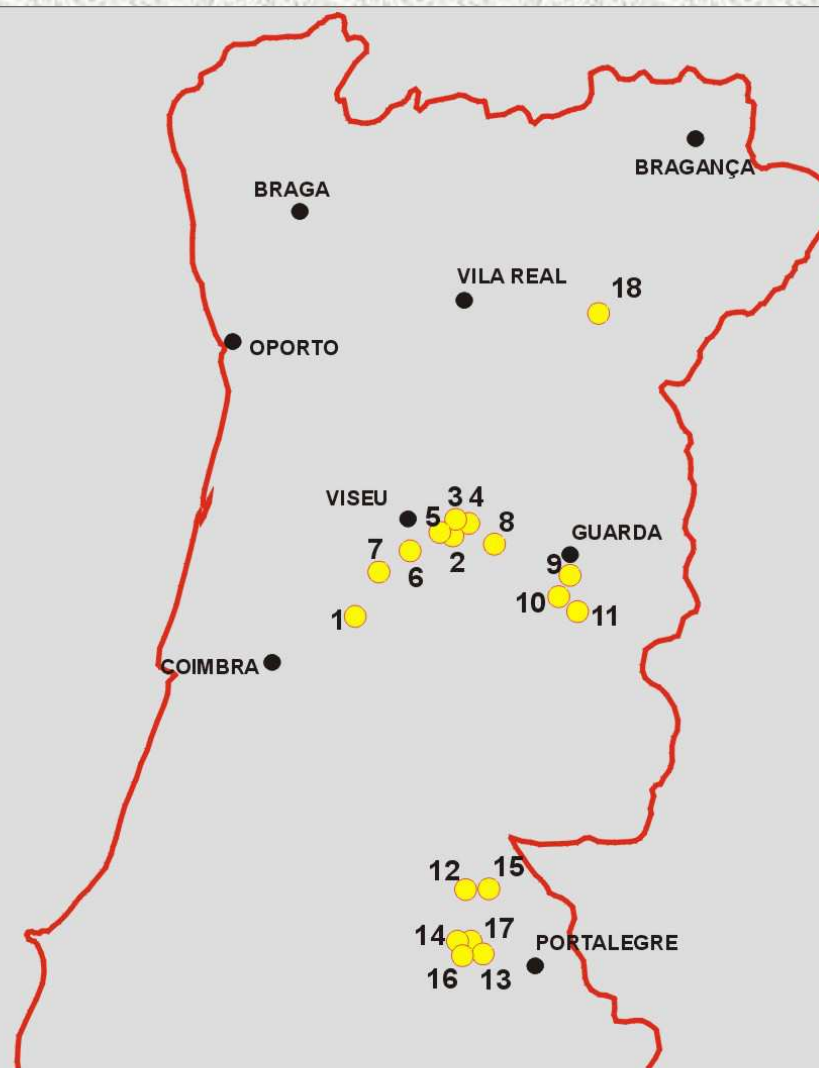
2: Concentrate

Tuela is the most important tin deposit, with vast stockwork zones with a high density of mineralised veins and remobilisation along strike-slip faults running subparallel to the regional structural alignment. For this deposit, 464,057 tones of measured and indicated resources were recently calculated for “Open Pit W”, with 974.86 tonnes of tin, with a grade of 2.10 kg/ton.

LOCATION OF THE MAIN URANIUM DEPOSITS

MAIN DEPOSITS

- 1- ÁZERE
- 2- CUNHA BAIXA
- 3- FREIXIOSA
- 4- PINHAL DO SOUTO
- 5- QUINTA DO BISPO
- 6- URGEIRIÇA
- 7- CABANAS
- 8- CASTELEJO
- 9- JOÃO ANTÃO
- 10- BORREGA
- 11- BICA
- 12- NISA
- 13- MAIA
- 14- PALHEIROS TOLOSA
- 15- TARABAU
- 16- TOLOSA
- 17- ALTO DO CORGO
- 18- HORTA DA VILARIÇA



Today no mines are working, but recently several international companies showed interest in the Portuguese potential, specially in the Nisa deposit, where 2.5 Mt with 0.11% U₃O₈ (cut off of 0.05%) of geological resources are estimated.

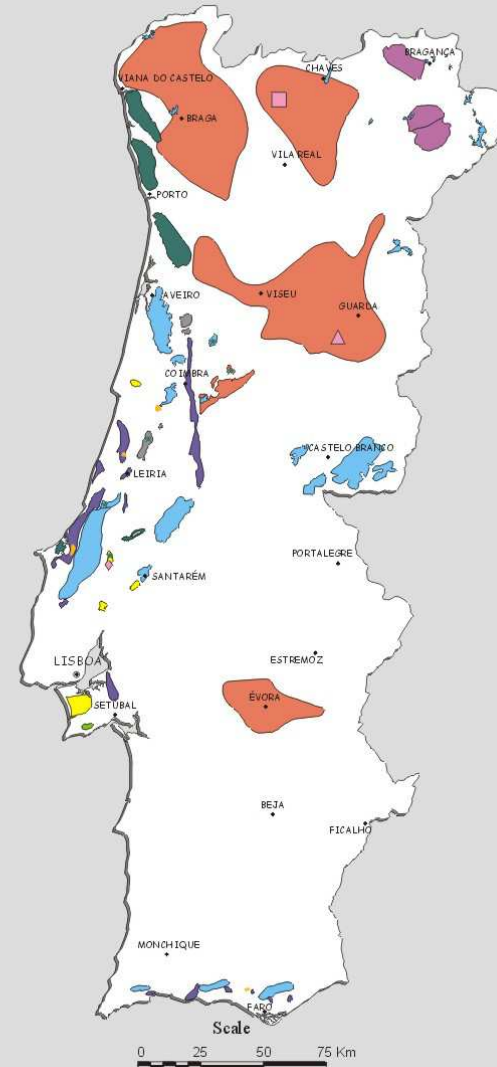
THE MONCORVO IRON DEPOSIT

The Moncorvo deposit, composed of 5 ore bodies, is the most important iron deposit. Laboratorial tests showed that it's possible to obtain concentrates with grades between 64% and 68% in Fe and 0.15% and 0.25% of P. Through metallurgical methods we can reach to iron concentrates with less of 0.10 % P. The proven and probable reserves of the Moncorvo deposit, with a total of 550 Mt of ore, are enough for produce 250 Mt of fine sinterized agglomerates with 60% to 65% Fe.

PRODUCING AREAS OF INDUSTRIAL MINERALS

LEGEND

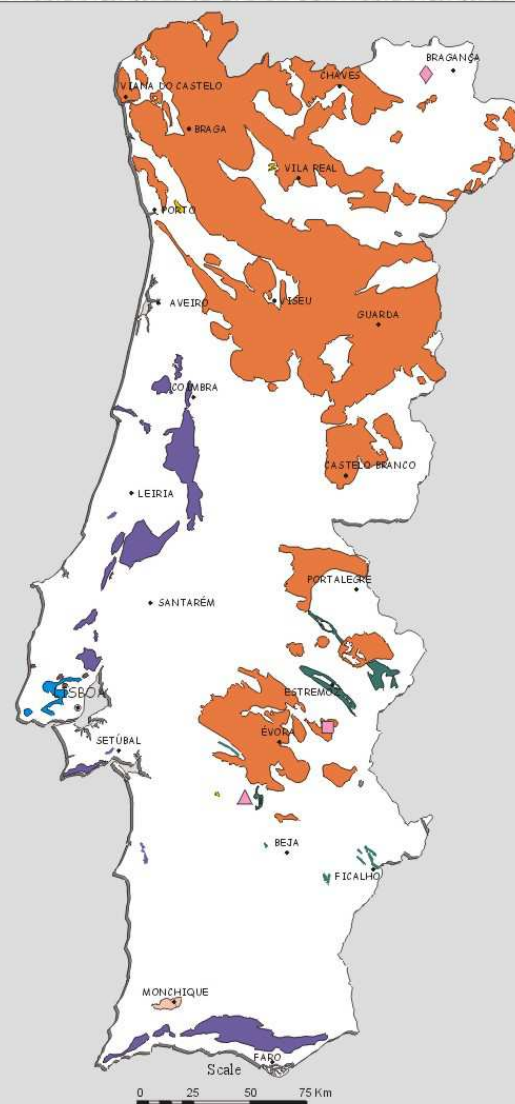
-  Common Clays
-  Dolomite
-  Gypsum
-  Kaolin
-  Quartz and feldspars
-  Rock-Salt
-  Special Clays
-  Special Sands
-  Talc
-  Lepidolite
-  Spodumene
-  Diatomite



PRODUCING AREAS OF ORNAMENTAL & INDUSTRIAL STONE

LEGEND

- Acid Porphyry**
- Basalt**
- Granite**
- Limestone**
- Nephelinic Syenite**
- Marble**
- Microcrystalline Limestone**
- Schist**
- Slate**
- Diorite**
- Gabbro**
- Serpentinite**



A NEW GOVERNMENTAL STRATEGY FOR MINERAL RESOURCES

Vision for the Portuguese Mining Sector

**Increasing
geological
knowledge and
valorising
mineral
potential**

**Divulcation and
promotion of
the mineral
potential**

**Economical,
Social and
Environmental
Sustainability**

Restructuration of the sector bases

A NEW PARTNERSHIP FOR MINERAL RESOURCES, INVOLVING ALL THE STAKEHOLDERS

-6 UNIVERSITIES

-4 PUBLIC RESEARCH INSTITUTES

-1 TECHNOLOGICAL CENTER

-1 GOVERNMENTAL DIRECTORATE GENERAL

-1 PUBLIC COMPANY

-2 MINING ASSOCIATIONS

-1 CLUSTER

g
 Direcção Geral
 de Energia e Geologia
 Divisão de Apoio Transversal

PROSPECÇÃO E PESQUISA DE DEPÓSITOS MINERAIS (27-09-2013)

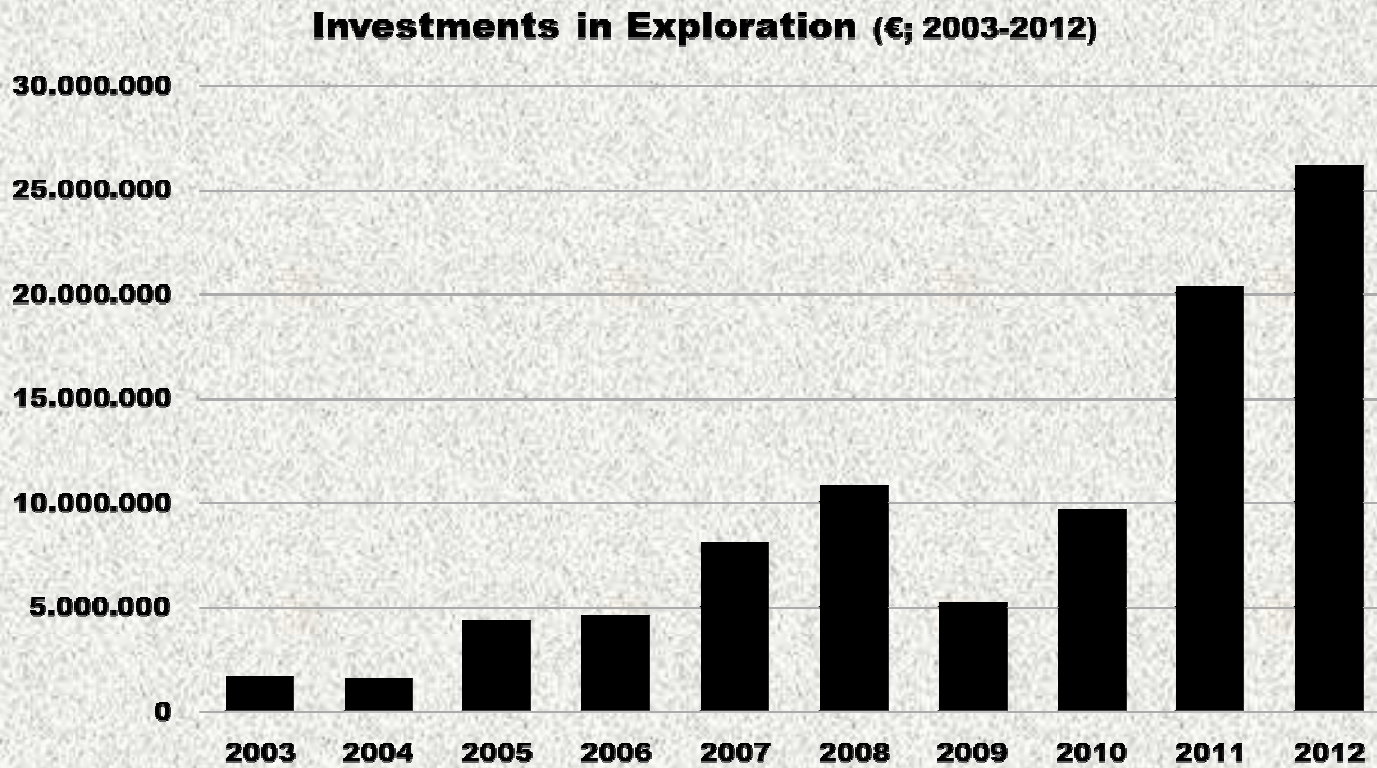
Legenda

- Contrato de prospecção e pesquisa
- Pedido de prospecção e pesquisa

0 50 000 Metros

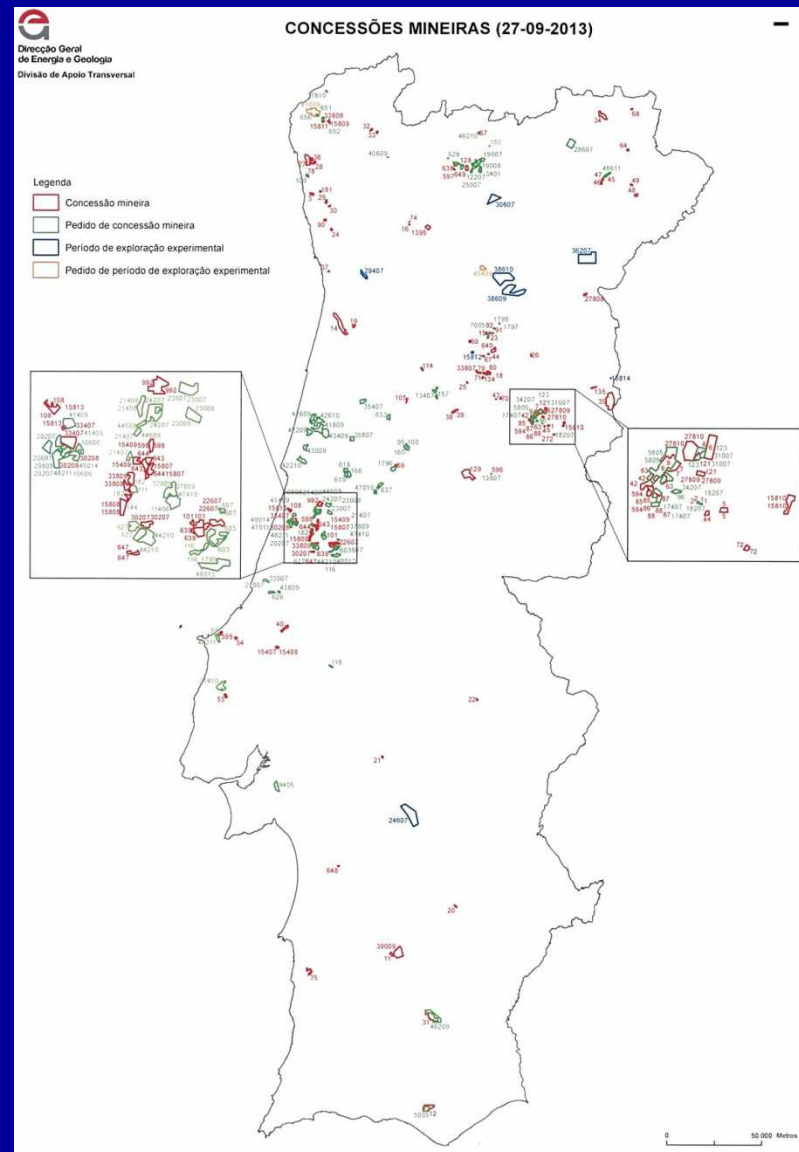
Source: DGEG

INVESTMENTS ON EXPLORATION



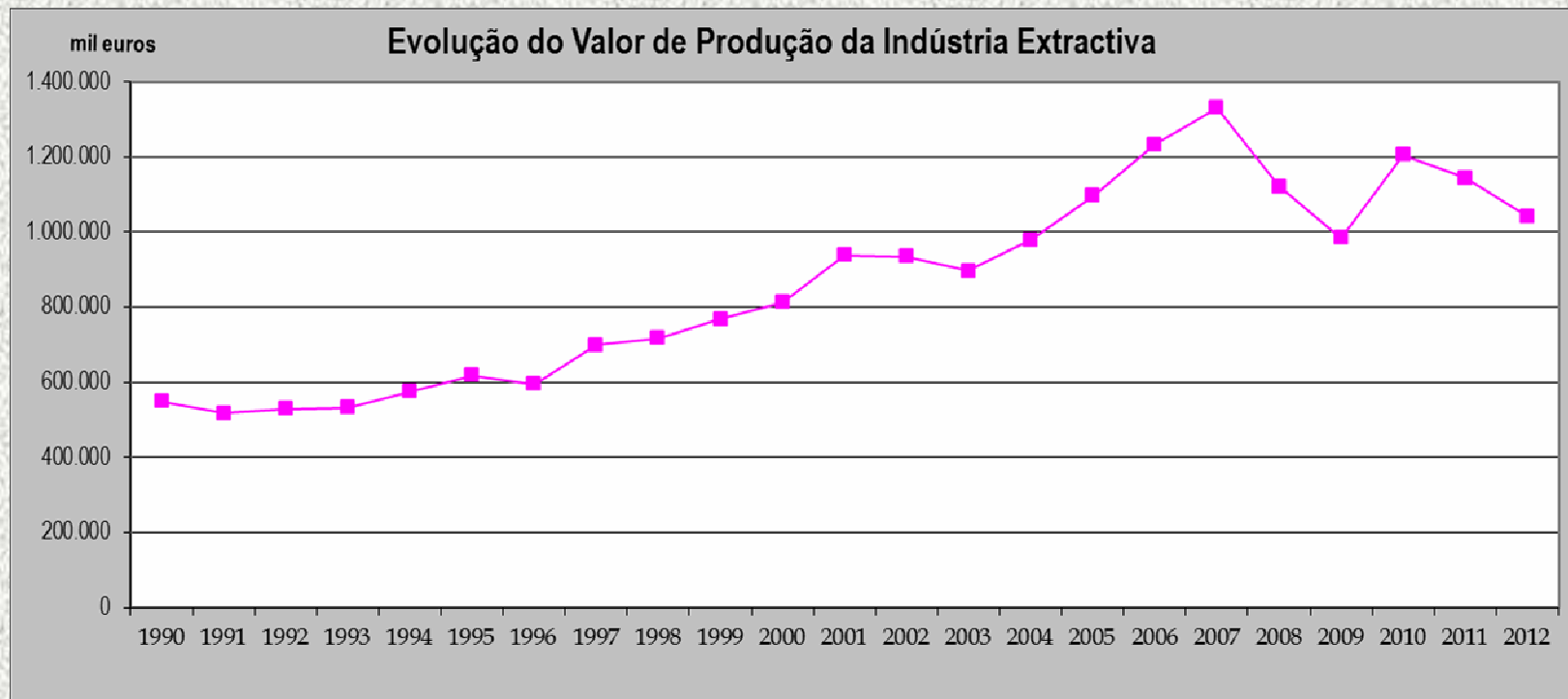
Source: DGEG

MINING CONCESSIONS



Source: DGE

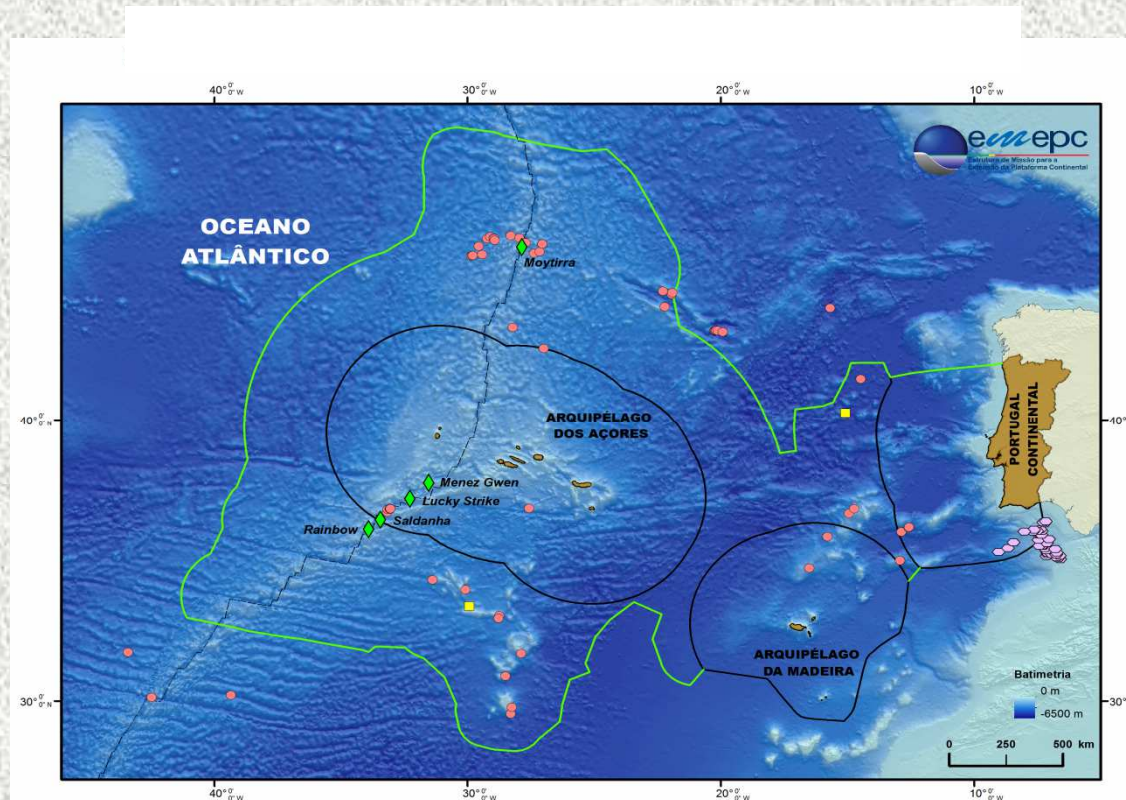
PRODUCTION DATA



Source: DGEG

PORTUGAL,

***Where the land ends and the sea begins...
(Luís Vaz de Camões)***



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Thanks for coming!