



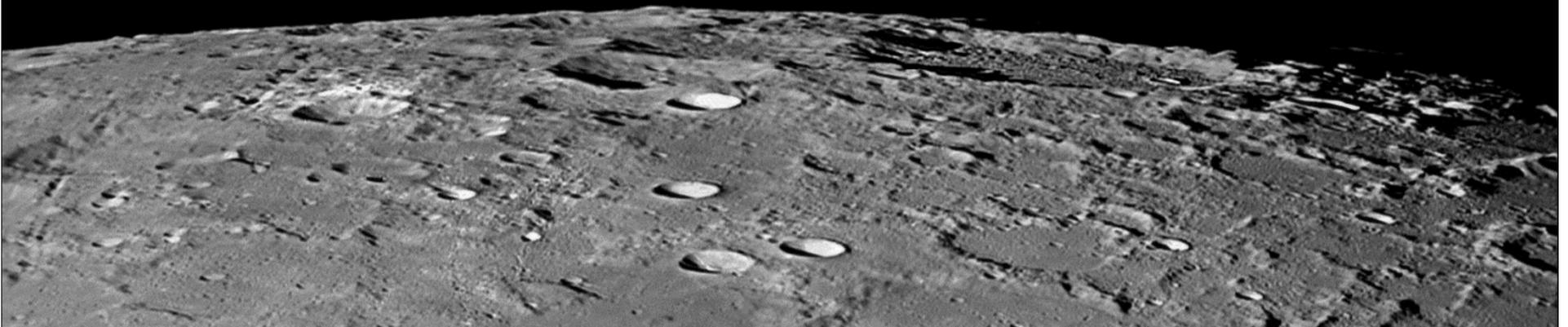
Economic Incentives and Tax Credits for Space Mining: Analogies and Ideas

Eva-Jane Lark
PTMSS Conference 2011

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Incentives for Space Mining

- Economic Incentives
- Why incentivize Space and space mining?
- Scenarios
- Potential Model/Analogue
- Challenges and Strengths



Importance of Economic Incentives

- Nurture and support nascent industries
 - Develop leadership in innovative areas
 - Motivate decisions or actions by others
 - Goal/outcome oriented
- 
- A carrot with green leafy tops is suspended by a thin white string from the top center of the slide. The carrot is positioned horizontally, with its orange root on the left and its green foliage on the right. The background is a solid blue color.

Types of Economic Incentives



Government

- **Grants**
- Subsidies
- Low interest loans
- Loan guarantees
- Carbon credits/ offsets
- Other incentives
- **Tax holidays**
- **Reduced tax rates**
- Performance-Based Tax Credits
- **Transferrable tax credits**
- **Prizes**
- Pre-Purchase Agreements
- Preferential procurement policies
- Guaranteed annual revenues, etc
- **Depletion allowances vs Depreciation**

Non-government

- **Prizes**
- **Patronage**
- **Pre-Purchase Agreements**

Property Rights and Licenses

- **Enabling legislation**
- **Property rights**

KEY ISSUES – Why Space? Are there reasons for Incentives?

**Science? Or Development and
Settlement?**

Key Long-term Motivators

- **Survival of the Species**
- **Resource Scarcity**
 - **Energy**
 - **Minerals**



What are the Foundations for a Space-Faring Humanity?

**Inexpensive, reliable ACCESS to
Space**

**Survival in Space- Resource
availability and conversion for**

- Energy, Oxygen, Water
- Radiation Protection
- Materials
- Propellant

Enabling Legal Regime



The Space Industry and Incentives

- NASA Changing IPP
 - SBIRS
 - Centennial Challenges
 - COTS
- Oklahoma and Rocketplane
- Many proposals DOA



Space Mining - Two Scenarios

- In-Situ Resource Utilization

Or

- Earth/Terrestrial Markets



ISRU

The “Vegas Model” – What’s mined in Space, stays in Space.

Potential Incentives

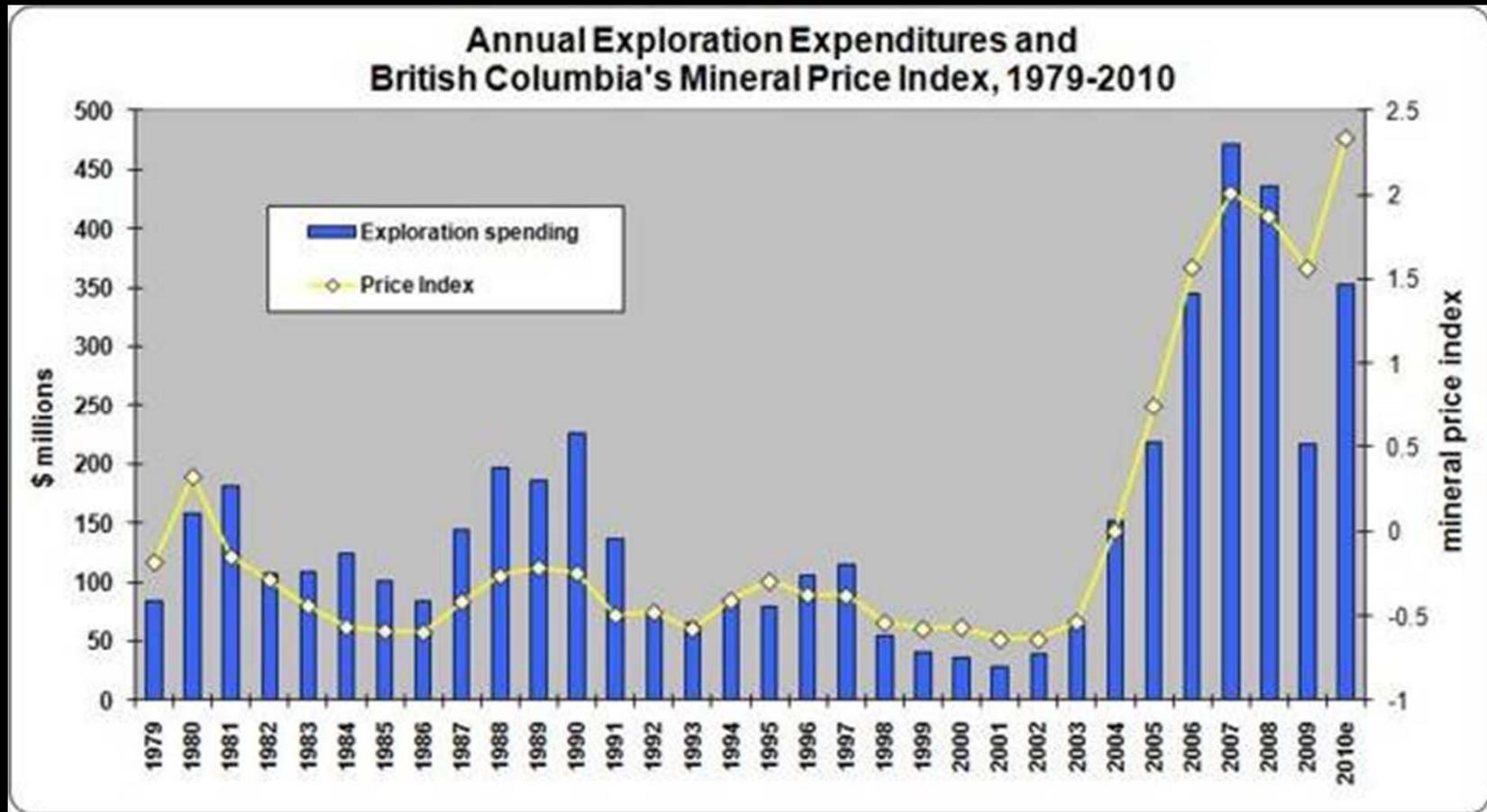
- **Zero G, zero tax**
- **Taxation only upon re-entry**
- **Tax holidays**
- **Accelerated depletion allowances**
- **Transferrable Tax Credits**

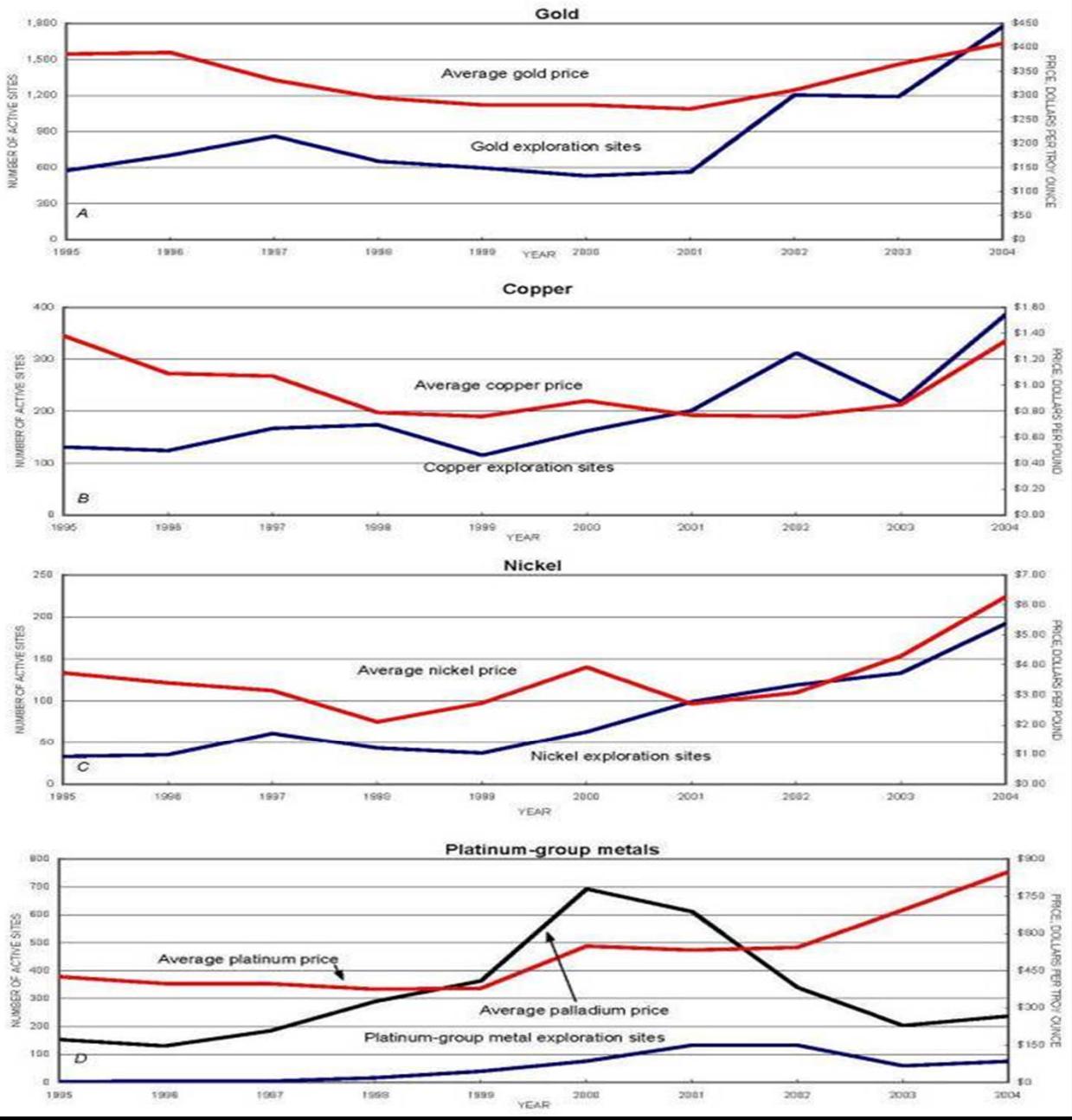
Earth Use/Terrestrial Markets

A balance scale is centered in the image, with a globe of the Earth serving as the weight on the right pan. The scale is set against a background of a colorful nebula with green and orange hues. The text is overlaid on the left side of the image.

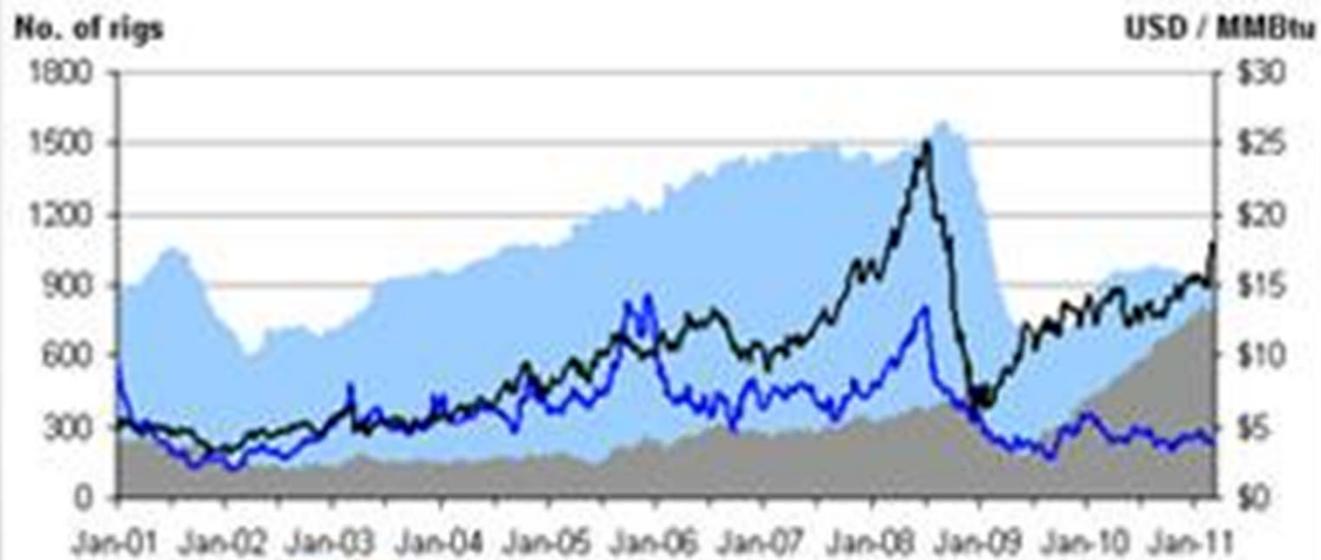
- Relationship between Commodity Prices and Exploration Activity
- Effect of New Supply on Mineral Prices
 - Market Distortions
 - Immediate and Pronounced
- Incentives - Producer Nations and Consumer Nations

Relationship Between Exploration Activity and Prices





Drilling Activity in USA Relative to Energy Prices



Sources: Baker-Hughes, NYMEX

- No. of Rigs Drilling for Natural Gas
- No. of Rigs Drilling for Crude Oil
- Near-Month Price of Natural Gas
- Near-Month Price of Crude Oil (Energy Equivalent)



Best analogy for space mining = Canadian Mineral and Oil & Gas Exploration

- Flow-through shares
- CEE = Canadian Exploration Expense
- ITCE = Investment Tax Credit for Exploration
- Packaged for smaller investors
- Achieve multiple policy goals
- Mineral property right structure

Property Rights/Legal Regime

- **OST vague at best and based on sovereignty issues**
 - UN viewpoint anti-capitalist at best
 - Need enabling unrestrictive regime
- **Terrestrial Mineral Rights (in many nations) provide possible analogies**
 - Fee Simple vs Mineral Rights vs Surface Rights
 - Long-term leases and Royalties

Challenges and Strengths

Challenges

- Incentives are driven by politics and policy makers
- Strong lobby often needed (and does it exist?)
- Producer nations may be threatened
- UN view of Space as a “sanctuary”

Strengths

- Early in the process
- Lobby and awareness can be created
- LT - Projected scarcity will favour space mineral exploration
- LT - Predicted “green” legislation may force mining and mineral processing off-Earth



THANK YOU!

Questions?

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