

# **THE IMPENDING WORLD ENERGY MESS**

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**Roger H. Bezdek, President  
Management Information Services, Inc.  
Washington, D.C.  
[rbezdek@misi-net.com](mailto:rbezdek@misi-net.com)**



## Messages

- In next 5 years, world oil production will begin to decline; shortages will worsen until mitigation takes hold.
- Oil production correlates with GDP, so deepening shortages worldwide mean deepening economic distress.
- There will be no quick fixes. Even crash program mitigation will take more than a decade to impact.
- “Oil is energy but all energy is not oil.”
- Societal priorities will change dramatically. Compromises will be required. Years of energy hopes & fantasy will yield to energy pragmatism.

### THE IMPENDING WORLD ENERGY MESS

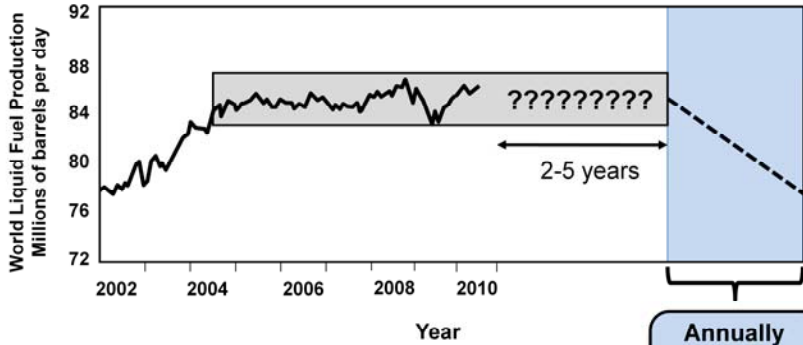
What It Is And What  
It Means To YOU!



ROBERT L. HIRSCH  
ROGER H. BEZDEK  
ROBERT W. WENDLING

# The Production Plateau

World oil production will stay on its current plateau & enter long-term decline in ~ 5 years.

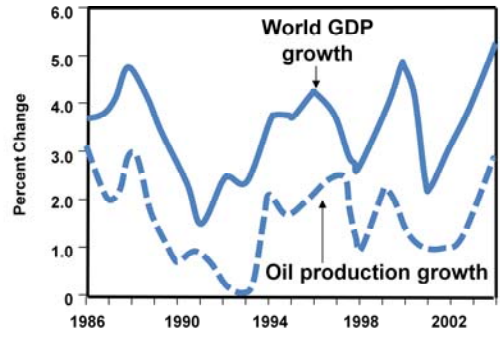


World Oil Production hit a plateau in mid 2004 & stayed in a narrow fluctuation range in spite of "The Great Recession."

Annually declining production

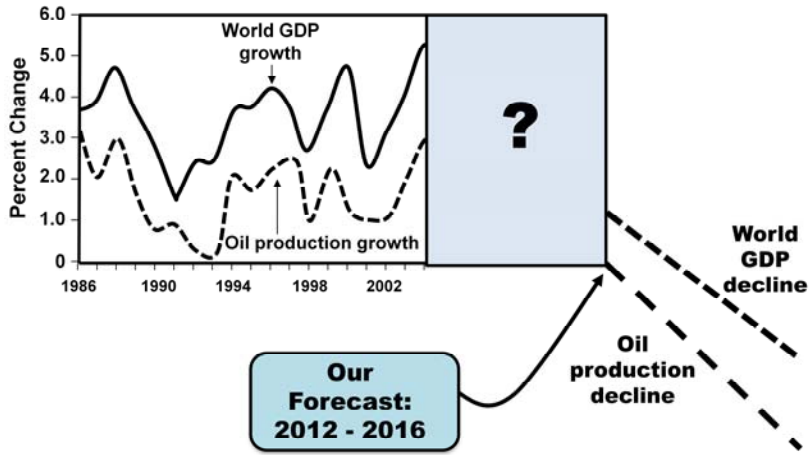
# World Oil Production and World GDP Growth Rates

Growth Rates have been tightly coupled for decades.



# Impacts of World Oil Production Decline

World oil production will begin to decline  
Within ~ 5 years & world GDP will follow.

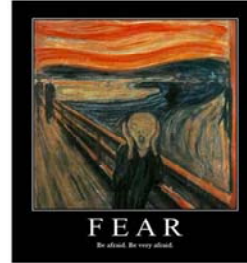


**Our Forecast:  
2012 - 2016**

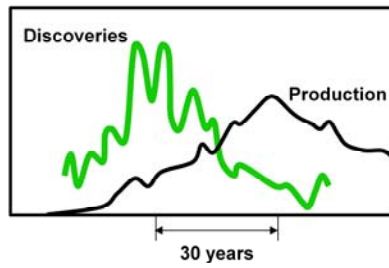
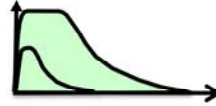
## Shock of World Oil Production Decline

1973 & 1979 tell us what will likely happen when shock of world oil production decline becomes widely realized

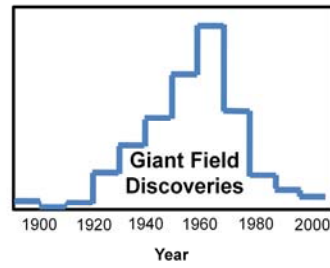
- Sudden panic, disorientation, & insecurity
- Immediate liquid fuel shortages.
- Large increases in fuel prices.
- Difficult commuting.
- Increasing inflation.
- Growing unemployment.
- Declining real estate prices in areas far from work or public/mass transportation. Vacation & entertainment areas hard hit.
- Deepening recession until effective mitigation takes hold.
- "It will be the similar this time," but it will last much, much longer.



## Some Fundamentals from the Book



Discovered Reserves  
in Giant Fields



# Mitigation Approaches

## Administrative

- Price Controls, Rationing, etc.

## Physical

- Fuel Efficient Transportation
- Heavy Oil/Oil Sands
- Coal-to-Liquids (CTL)
- Enhanced Oil Recovery (EOR)
- Gas-to-Liquids



*gasoline rationing coupon*



*CTL plant*

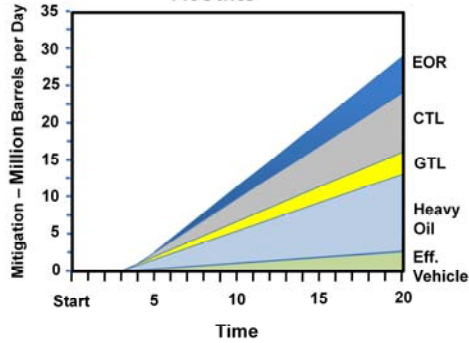


# Crash Mitigation Program

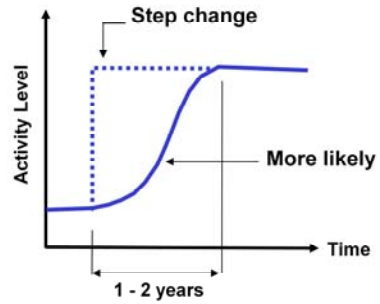
Purpose of considering a worldwide crash mitigation program was to scope the best physically possible.

*However, our assumed step change start is unrealistic.*

**Crash Program Physical Mitigation Results**



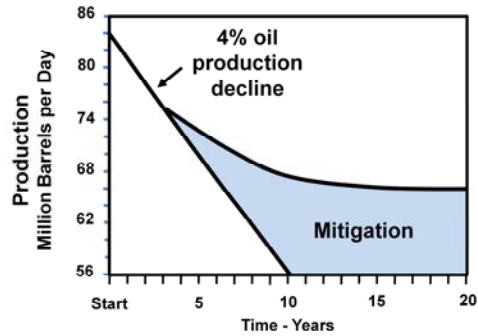
**Assumed Crash Program vs. the More Likely Pathway**



## Crash Mitigation Program, cont.

Our best mitigation scenario does not overtake expected world oil production decline for over a decade.

*Decline has a big head start!*



## Crash Mitigation Program & GDP

In the U.S. in 1973 & 1979, the oil shortage percentages were about equal to the decline in U.S. GDP. If the 1:1 ratio holds after world oil production decline, world GDP decline might look like this in the best crash program mitigation case.

*Keep in mind...*

**THE WORLD HAS NEVER FACED A PROBLEM LIKE THE DECLINE IN WORLD OIL PRODUCTION.**

