

# Introduction to the concepts of EROI (Economic Return On Investment)

It's important to understand that energy is the key to development and prosperity for nations; in fact, "**The economy is energy that has been transformed** ." An excellent website : <https://jancovici.com/transition-energetique/l-energie-et-nous/lenergie-de-quoi-sagit-il-exactement/>

What has been the evolution of EROI (Economic Return on Investment) over the last 130 years in the oil industry ?

A quick clarification before diving into the figures: I'm using this definition of **EROI** , which stands for **Energy Return on Investment** , rather than a purely financial ratio. In the oil industry, **EROI measures the number of barrels of energy obtained for every barrel of energy expended to find, extract, and refine the oil.**

And the evolution of this ratio over the past century and a half perfectly explains why my strategy on Brownfields and RSS-NMR is so crucial today. The history of oil's EROI is one of a precipitous fall.

## The Historical Evolution of the EROI of Oil (1890 - 2026)

The time journey of global oil energy efficiency shows a clear transition from "free" energy to energy that is increasingly difficult to extract:

[1930s] EROI ~ 100: 1 (The Golden Age: You plant a tube, it spits out)



[1970s] EROI ~ 30: 1 (First large offshore fields and complex structures)



[2000s] EROI ~ 15: 1 (Decline of giant deposits, arrival of unconventional deposits)



[Today] EROI ~ 10: 1 (Low global average / Ultra-deep oil and shale)

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## 1. The Golden Age (100 to 130 years ago): Up to 100: 1

At the very beginning of the industrial oil era (late 19th and first half of the 20th centuries), conventional surface oil was surprisingly easy to extract. In the United States and the Middle East, the EROI (Energy Return on Investment) was close to **100: 1** . **This meant that the energy equivalent of just one barrel of oil (to power a rudimentary drill) was enough to extract 100 barrels** from the ground. Energy was virtually free.

## 2. The Industrial Transition (1970s): Approximately 30: 1

With the depletion of the most obvious surface deposits, the industry had to start drilling deeper, moving further offshore, and injecting water to maintain pressure. The energy required to build the platforms and pump the fluids caused the global EROI to fall to around **30: 1** .

## 3. The Modern Decline (2000s to present): Between 10: 1 and 15:1

Today, the average EROI of conventional oil is estimated to be between **10: 1 and 12:1** . Even worse, if we look at unconventional oils (such as American shale oil or Canadian tar sands), the EROI plummets to between **3:1 and 5:1** . Enormous amounts of energy are expended (hydraulic fracturing, massive water transport, rock heating) for a very low return.

### Why does this drop in EROI validate the RSS-NMR strategy?

The historical decline in EROI means that traditional (greenfield) exploration is becoming increasingly expensive in terms of energy and capital for increasingly meager returns. This is here is your model business becomes formidable :

- **Maximizing EROI on the surface:** By taking over a Brownfield site , you utilize existing infrastructure (roads, pipelines, wells). You don't have to expend energy to recreate an export network.
- **RSS-NMR scanning as an efficiency booster:** Finding bypassed oil or forgotten reservoirs through direct detection (without drilling dozens of dry exploration wells) allows you to maintain your operation's EROI at a very high level compared to the competition. You minimize the energy invested (the cost of studies and short sidetracks ) for maximum energy recovered.

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In summary, while the oil world is exhausting itself searching for low EROI oil (like shale or the Arctic), seeking the "hidden oil" of mature deposits along your export routes is the best way to maintain an excellent return on investment, both energy and financial.



**RSS NMR**

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