

Energy Limits & Responses

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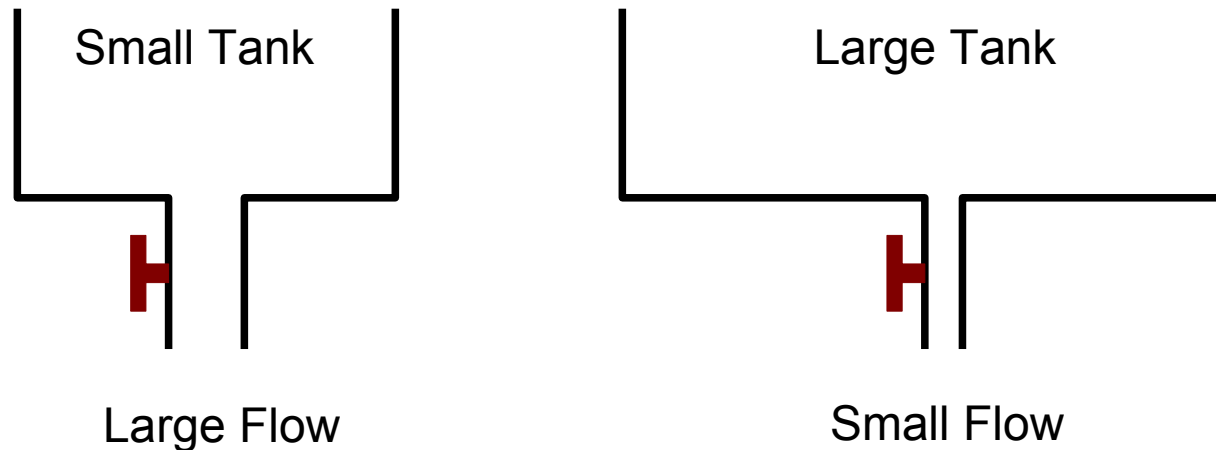
Energy Limits

Three fundamental things to understand:

1. Energy Reserves vs. Flows
2. Energy Return on Energy Invested
3. Energy Quantity vs. Density

Energy Limits

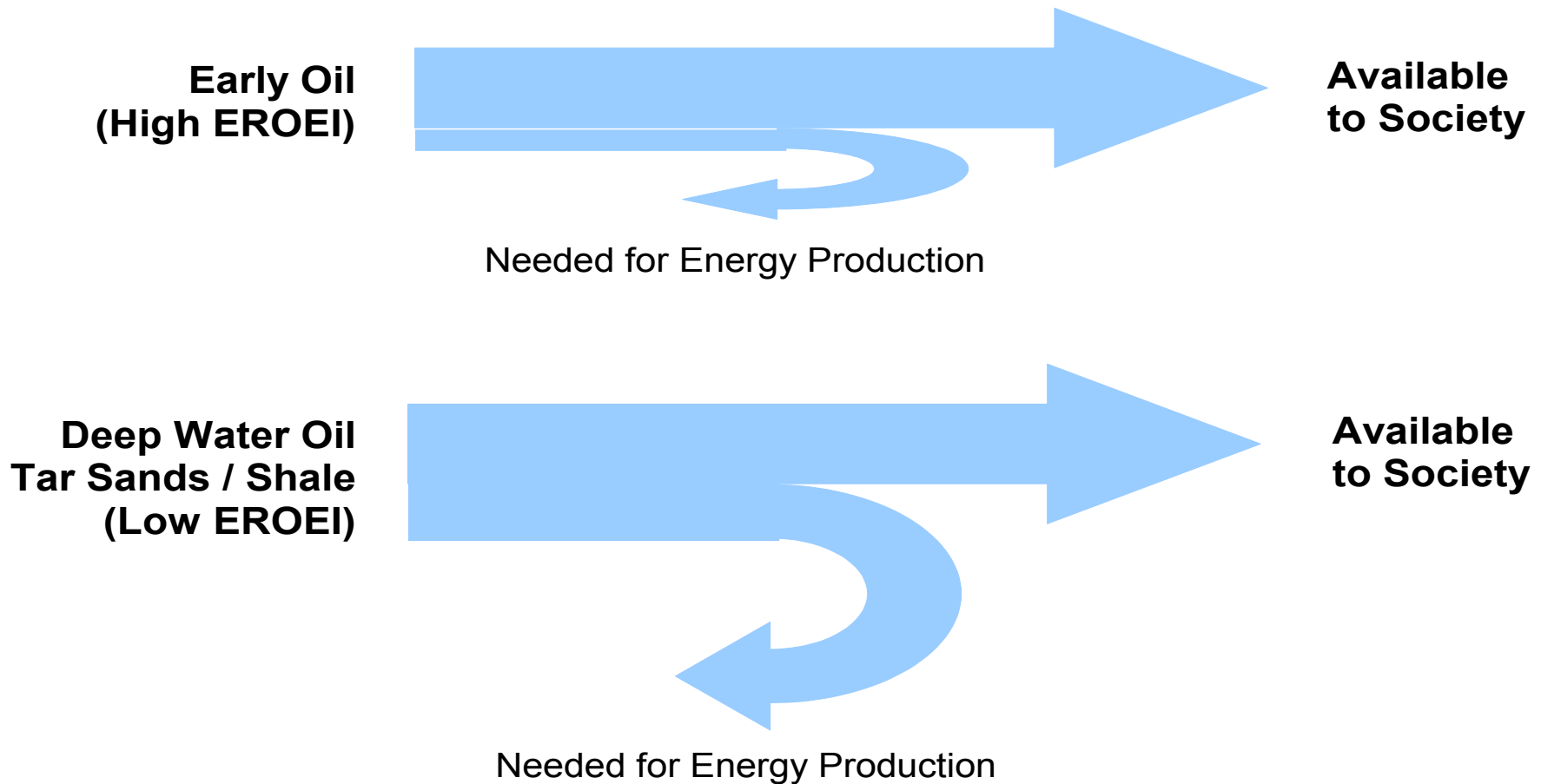
1. Energy Reserves vs. Flows



The size of the tank doesn't really matter if the flow rate is less than you require ...

Energy Limits

2. Energy Return on Energy Invested



Similar issues apply to coal, gas, hydro ...

Energy Limits

2. Energy Return on Energy Invested

Society went after the easiest energy first
Oil gushers, gas domes

That leaves us and the future with more
difficult energy

Tar sands, Oil shales, Heavy Oil
Deep-water oil, Polar oil/gas, Ethanol

Energy Limits

3. Energy Quantity vs. Density

Every 20 minutes enough solar energy falls on the planet to provide all of the world's energy needs for a year!

Energy Limits

3. Energy Quantity vs. Density

Every 20 minutes enough solar energy falls on the planet to provide all of the world's energy needs for a year!

Sounds very impressive ...

But this energy is thinly distributed over the whole planet. Very hard to collect it all.

Energy Limits

3. Energy Quantity vs. Density

Oil, Coal, Gas, Uranium:

High Density

Energy is concentrated in a small area
Can focus efforts on large-energy flows

Solar, Wind, Ethanol, Wave:

Low Density

Energy is distributed and needs collecting
Need to build infrastructure to concentrate,
collect, move little bits of energy around.

Energy Limits

Clearly Flows / EROEI / Density Interrelate:

For a fixed investment:

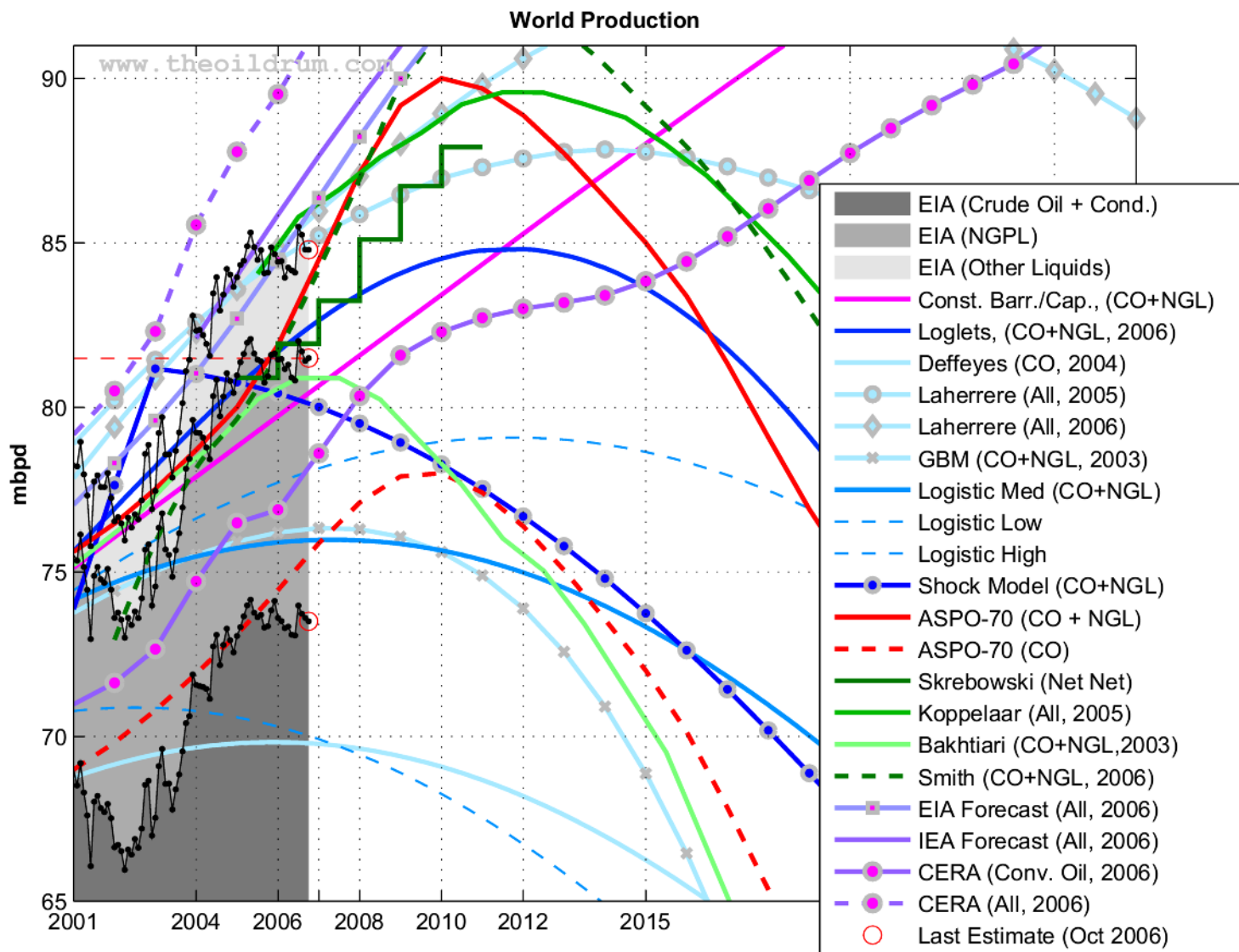
Low EROEI sources produce lower flow

For a fixed amount of infrastructure:

Lower-density sources produce lower flow

Energy Limits

Where does that leave us ...?



Energy Usage

<i>Country</i>	<i>Oil / Day</i>	<i>Population</i>	<i>Oil Per Capita</i>
Canada	2.3	33	25.0
United States	20.0	303	24.0
Germany	2.7	82	11.9
France	2.1	64	11.7
China	6.4	1322	1.8
India	2.3	1169	0.7
World	76.0	6671	4.2

Energy, Climate, Limits -- Response

1. We're using **SIX** times as much energy as the world average. What exactly are we waiting for?

Energy, Climate, Limits -- Response

1. Our energy usage is **SIX** times world average
2. Many organizations seem to be planning for increased energy costs, but not reduced supply. If everyone plans for continued energy use, and supply contracts, who loses?

Energy, Climate, Limits -- Response

1. Our energy usage is **SIX** times world average
2. Planning for costs, but not supply reductions
3. It is much easier to reduce consumption voluntarily than to be forced to by threat of bankruptcy or financial difficulties.

Energy, Climate, Limits -- Response

1. Our energy usage is **SIX** times world average
2. Planning for costs, but not supply reductions
3. Voluntary vs. forced change
4. It is far more effective to have time to plan and resources to make changes, than to delay and be forced into poor, abrupt change.
 - Need to lead, be ahead of the curve

Energy, Climate, Limits -- Response

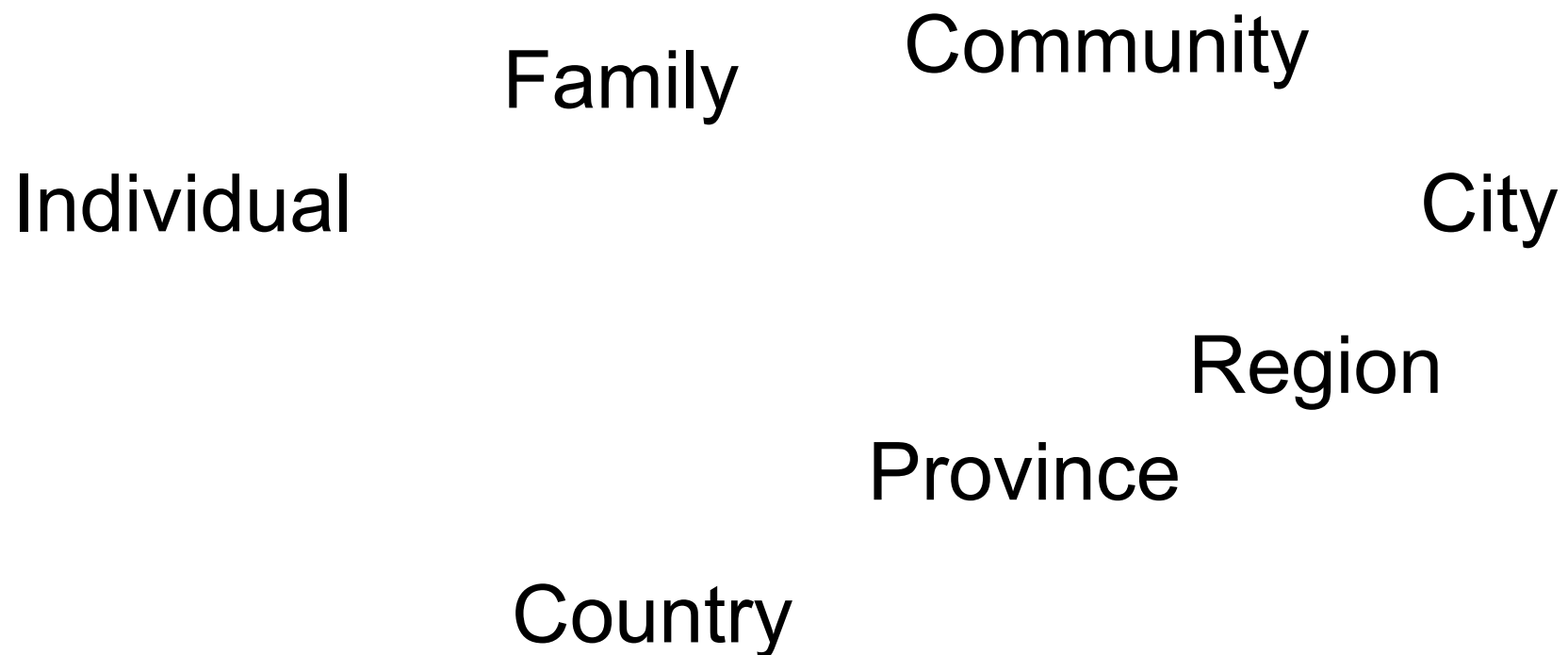
If we believe that major changes will be needed to lifestyle and status quo, how do we move in that direction:

1. Increased awareness
2. Incremental changes to status quo
3. Increased commitment
4. Fundamental lifestyle changes

Energy, Climate, Limits -- Response

Can't solve the problem on our own.

Also can't expect government to solve everything.



Energy / Climate / Conflict

To Think About: (1/6)

It can no longer be possible to limit the examination of our lifestyle to the local environment.

To discuss or contemplate peace-making, in the absence of taking a very hard look at our energy use and lifestyle, is either naive or hypocritical.

If you don't cut your energy use, which of the economic / developmental / environmental disasters are you wishing upon others?

Energy / Climate / Conflict

To Think About: (2/6)

- The Stewardship of Creation:
 - We are hitting the limits of the world we have been given
 - What are God's expectations for our stewardship?
- Go Amish or Go Noam Chomsky: The Western lifestyle has major impacts, worldwide.
 - Go Amish: live locally and see your impact
 - Go Noam Chomsky: live globally, but be aware (hard!)

Energy / Climate / Conflict

To Think About: (3/6)

– Upside-Down Kingdom:

- Poor subsistence farmer in warm, third-world climate, vs
- Rich, globalized, highly-dependent first-world worker

– The Meek Shall Inherit:

- Living at peace with the earth means doing & having less
- North America uses A LOT more than its fair share! Why are we happy to justify and perpetuate this system?

Energy / Climate / Conflict

To Think About: (4/6)

– Cheap Energy:

- It is hard to take action – energy is still dirt cheap
- Noah built his ark while the weather was still dry ...

– Out of Sight, Out of Mind:

- Many poor countries have already suffered a “peak oil”
- Why do we want to take action only now that it might actually affect us?

Energy / Climate / Conflict

To Think About: (5/6)

– The Genius of Western Development:

- The high GNP and apparent productivity of Western countries is due to the leverage of cheap energy.
- Every previous energy source built the next one:
 - Human → Animal → Wood → Coal → Oil / Gas / Uranium
 - We have mostly used Oil/Gas on consumption & hedonism
 - The next energy source is not yet ready, and takes time
- Our infrastructure is long-term, and cannot be substantially changed without a lot of energy:

! We're stuck !

Energy / Climate / Conflict

To Think About: (6/6)

- Who Blinks First ...
 - Wait for wealth or military might to allocate energy?
 - Wait for ecosystem to collapse before acting?
- Status Quo ...
 - Should be an anachronism
 - We need a fundamental shift in attitude / outlook

Energy / Climate / Conflict

What to do ... how do we live with integrity as peacemakers in a wasteful, affluent society?

- Increased awareness
- Reduction in energy consumption
- Reduced-material lifestyle, Challenge status-quo
- Support for local food production
- Support for alternative energy production
- Build strong, local communities
- Localized production, localized skills
- Celebrate creation, love life

