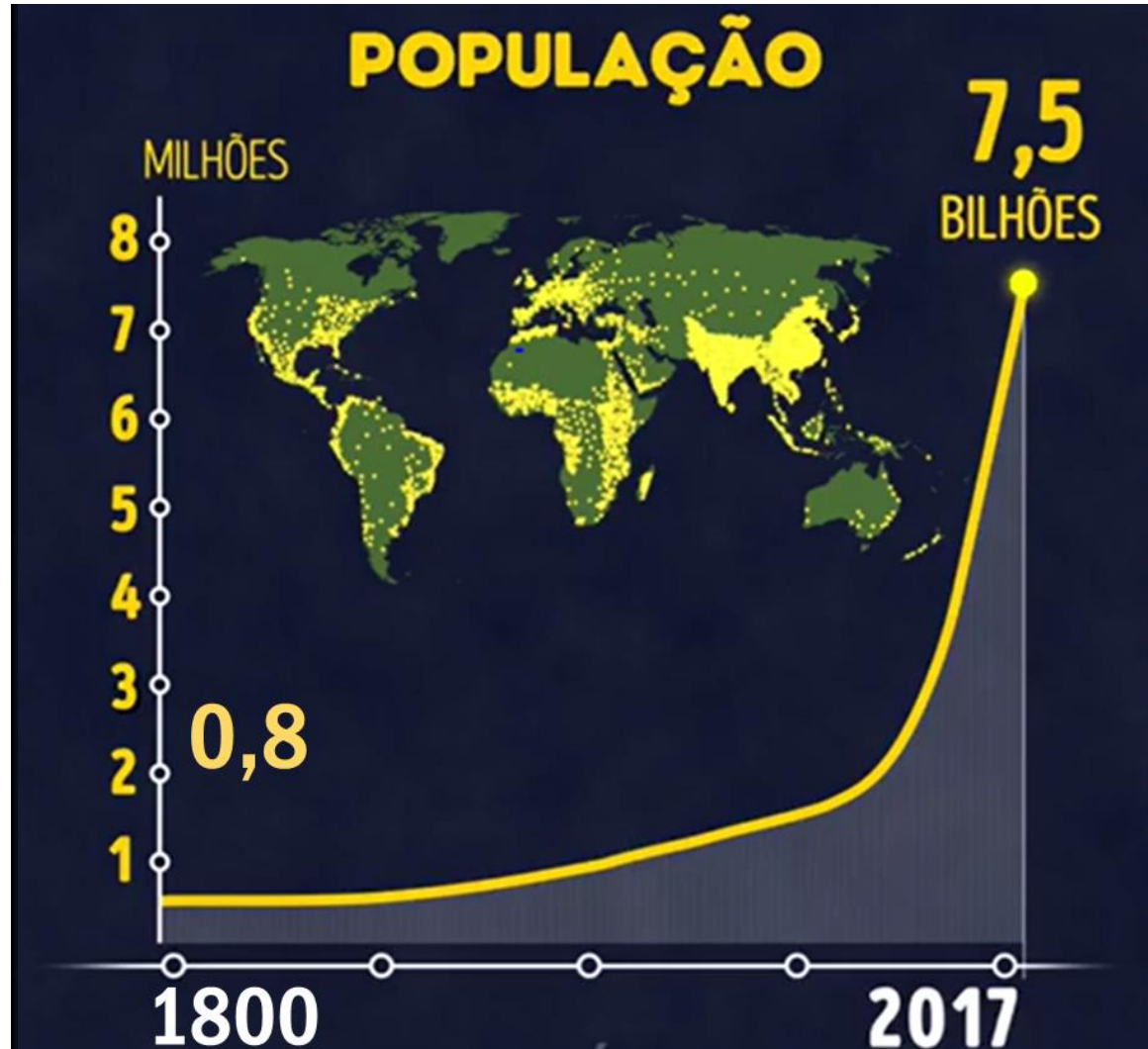




Laboratório Nacional do BioEtanol

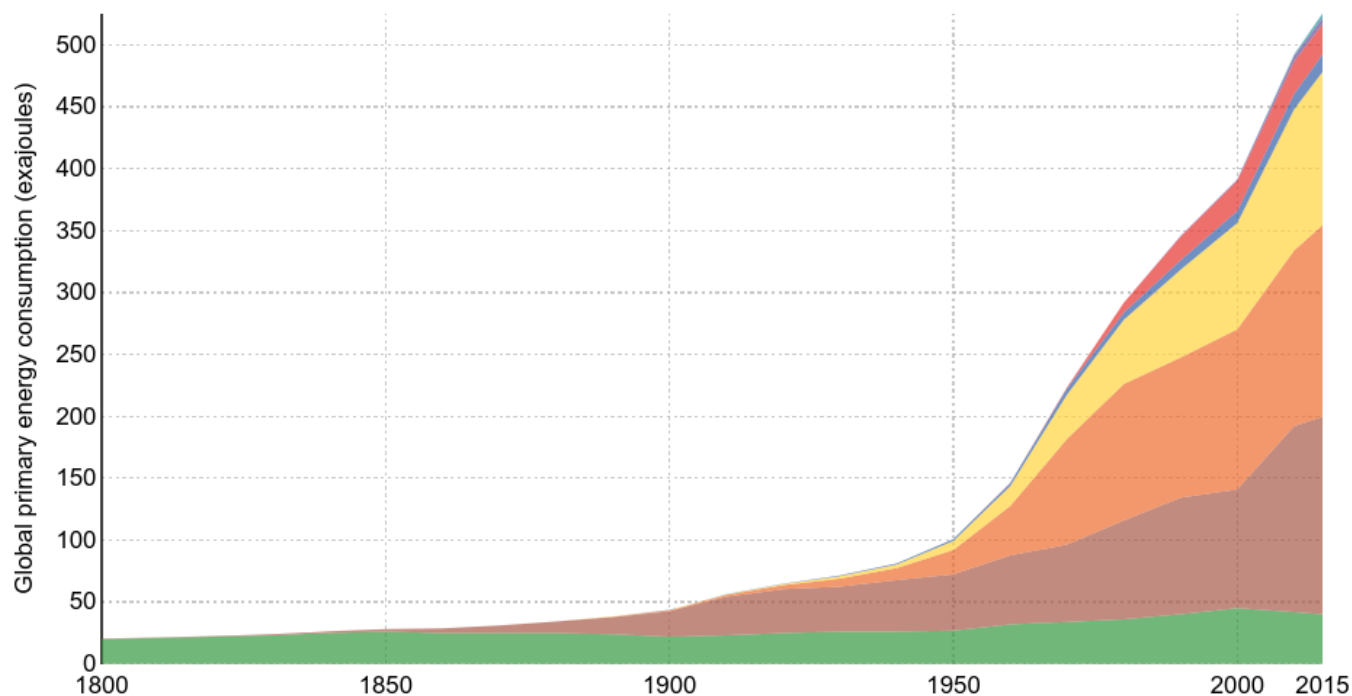




Global primary energy consumption, 1800-2015

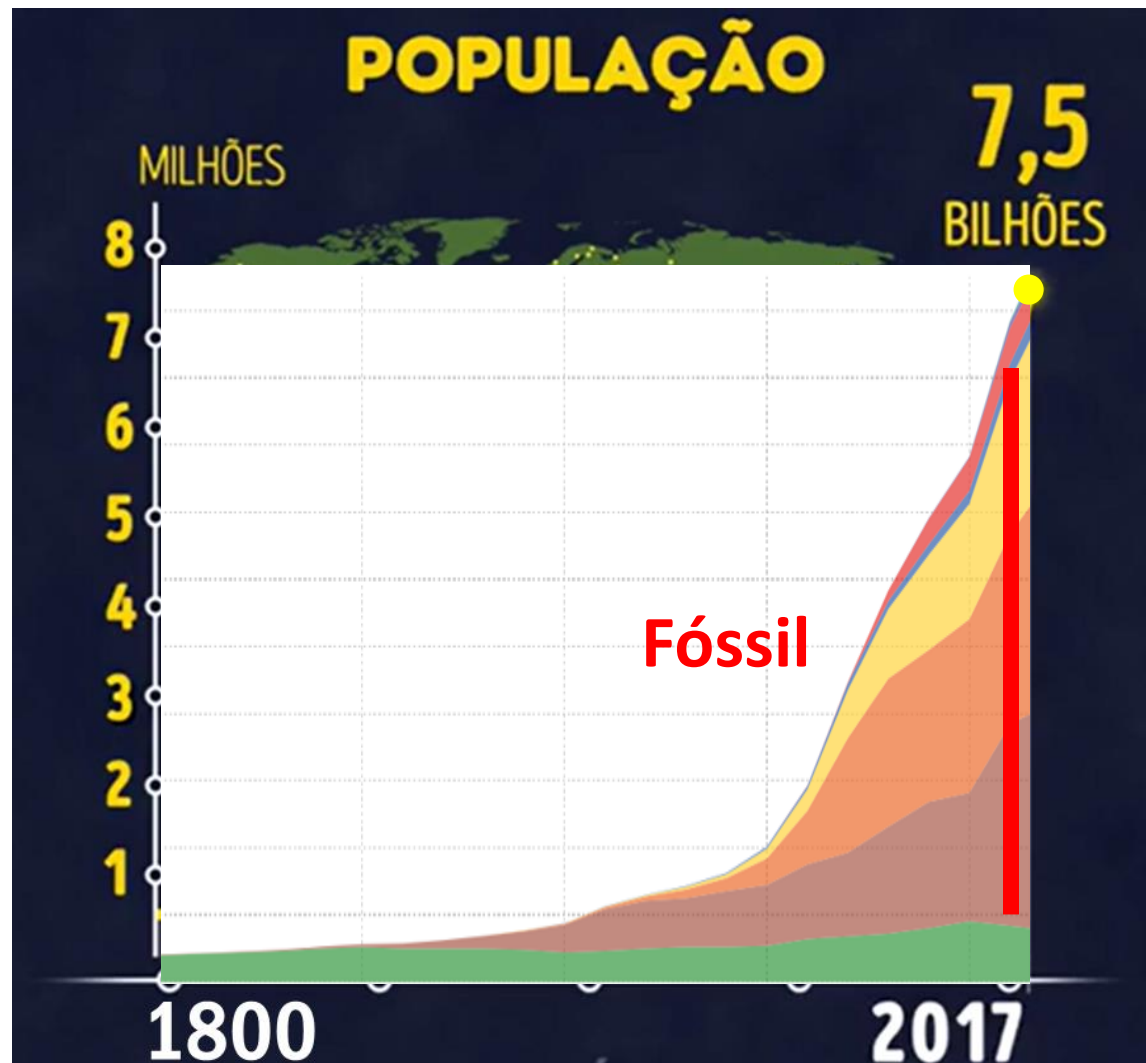
Global primary energy consumption by source, measured in exajoules (EJ). Values are reported to the nearest 0.01EJ

Our World
in Data



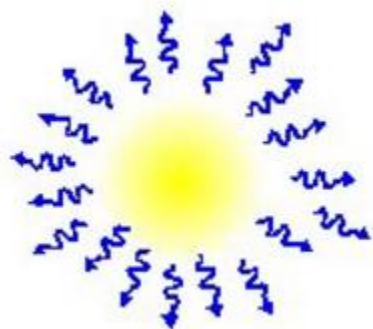
Fóssil

Source: Vaclav Smil (2017), Energy Transitions: Global and National Perspectives OurWorldInData.org/energy-production-and-changing-energy-sources/ • CC BY-SA



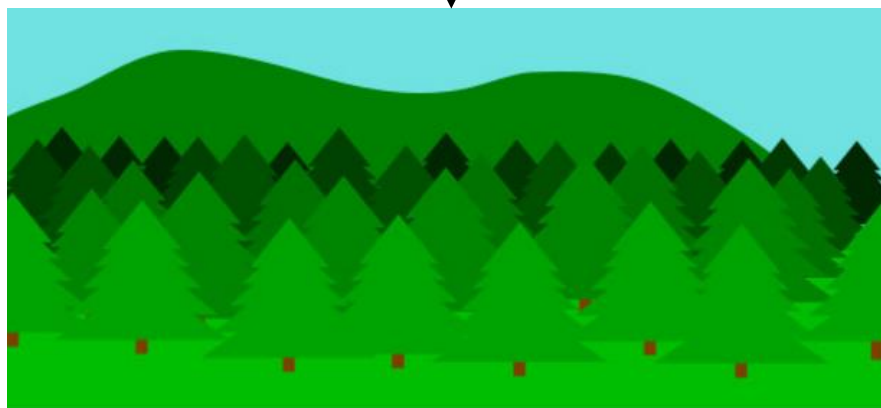
O Petróleo é Extraordinário



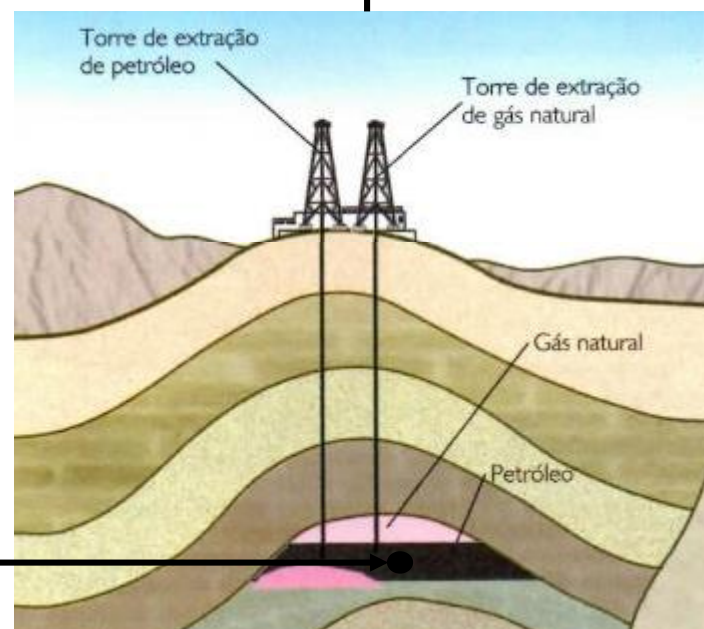


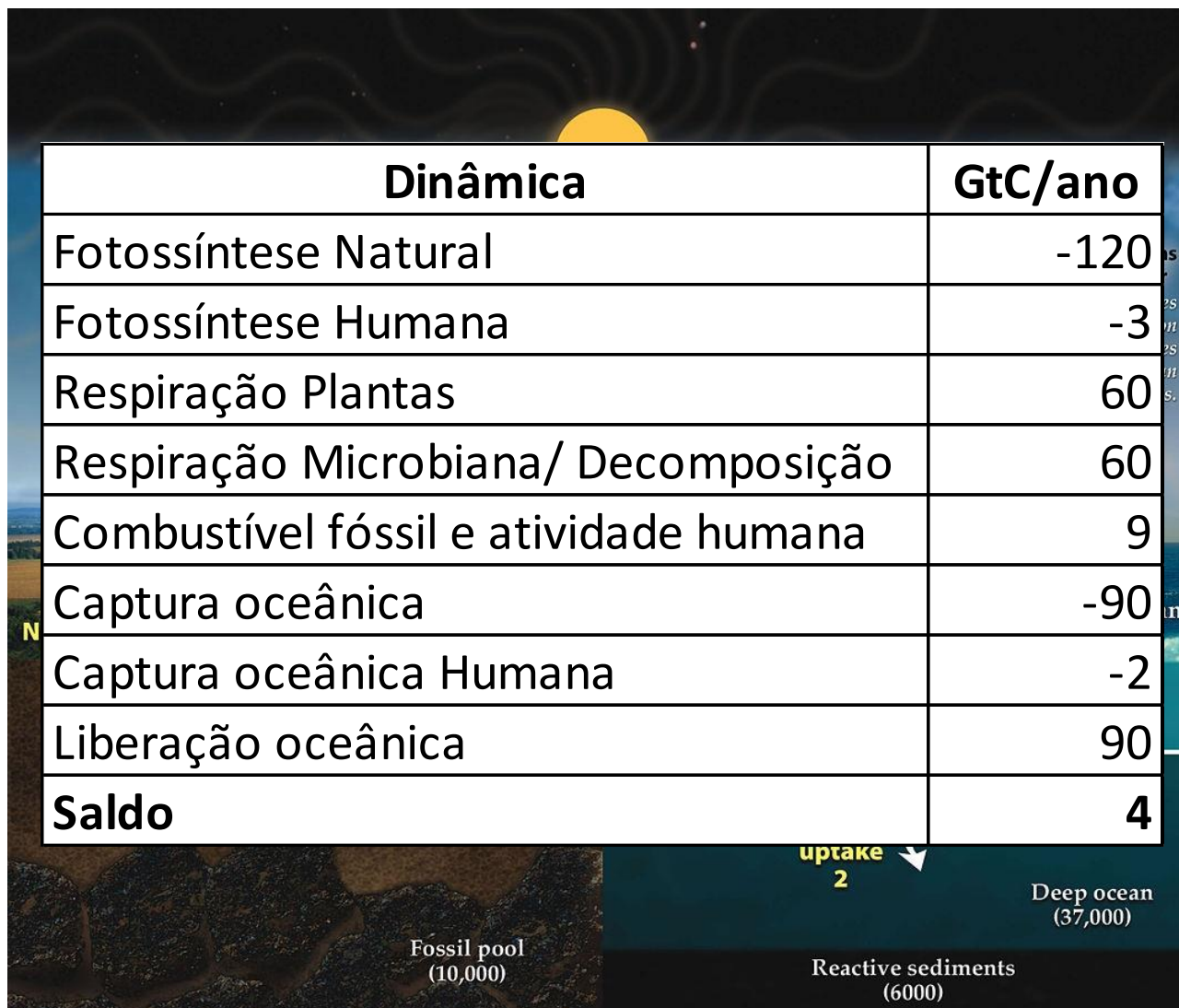
CO₂

4.500.000.000 t/y



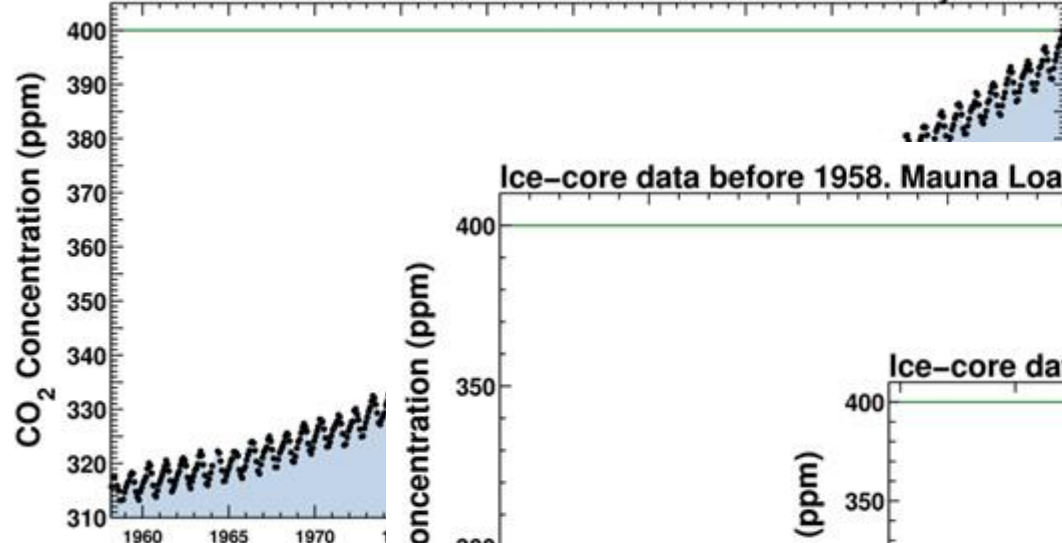
1500 t/y



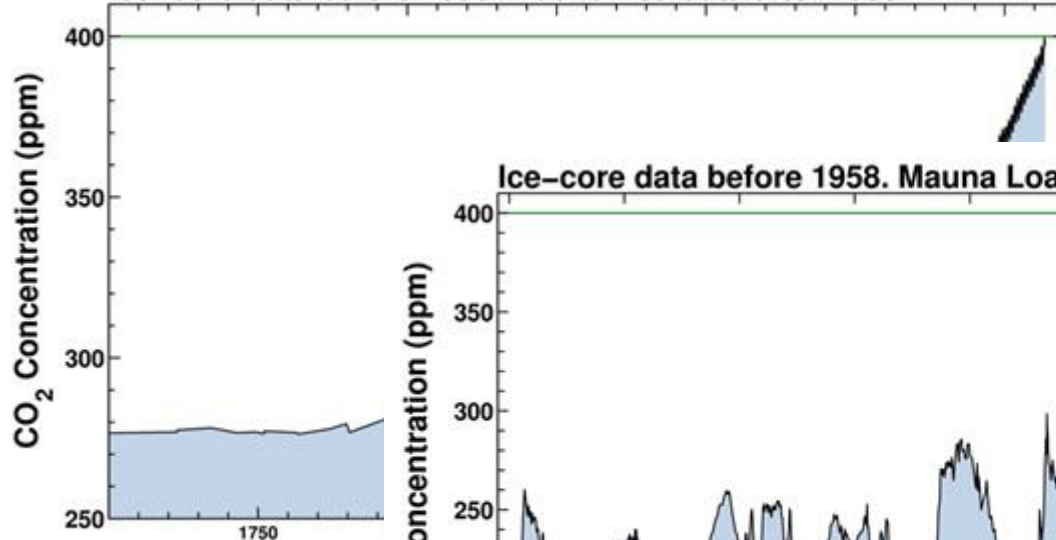


4

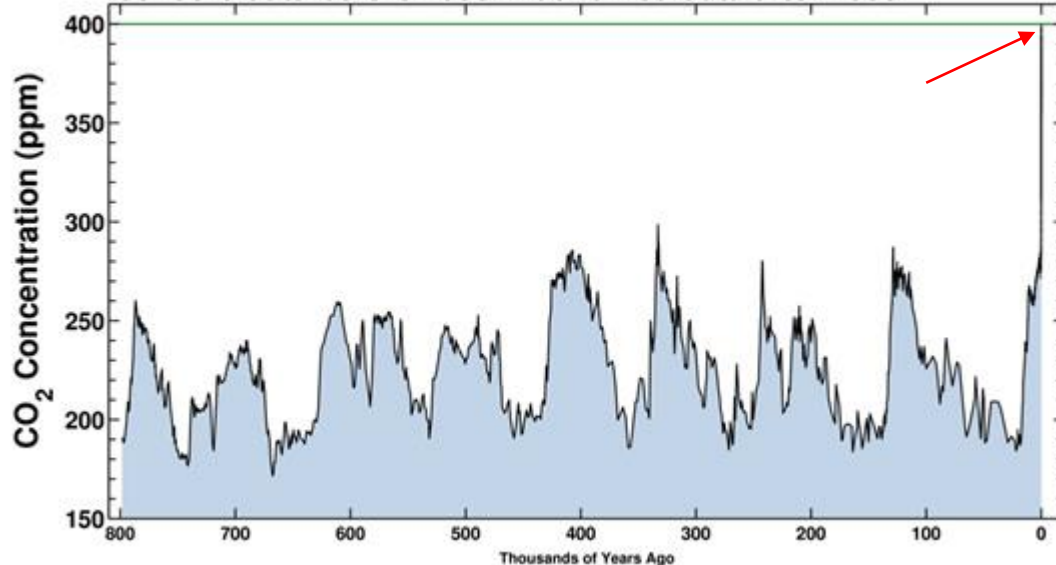
Carbon dioxide concentration at Mauna Loa Observatory



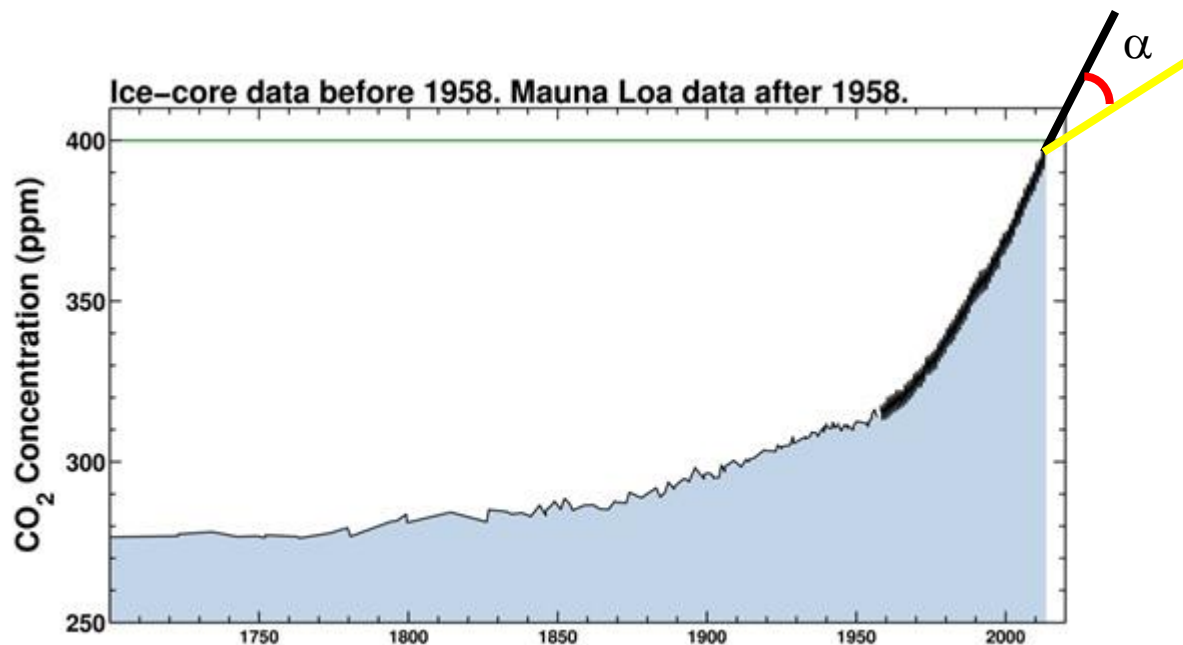
Ice-core data before 1958. Mauna Loa data after 1958.



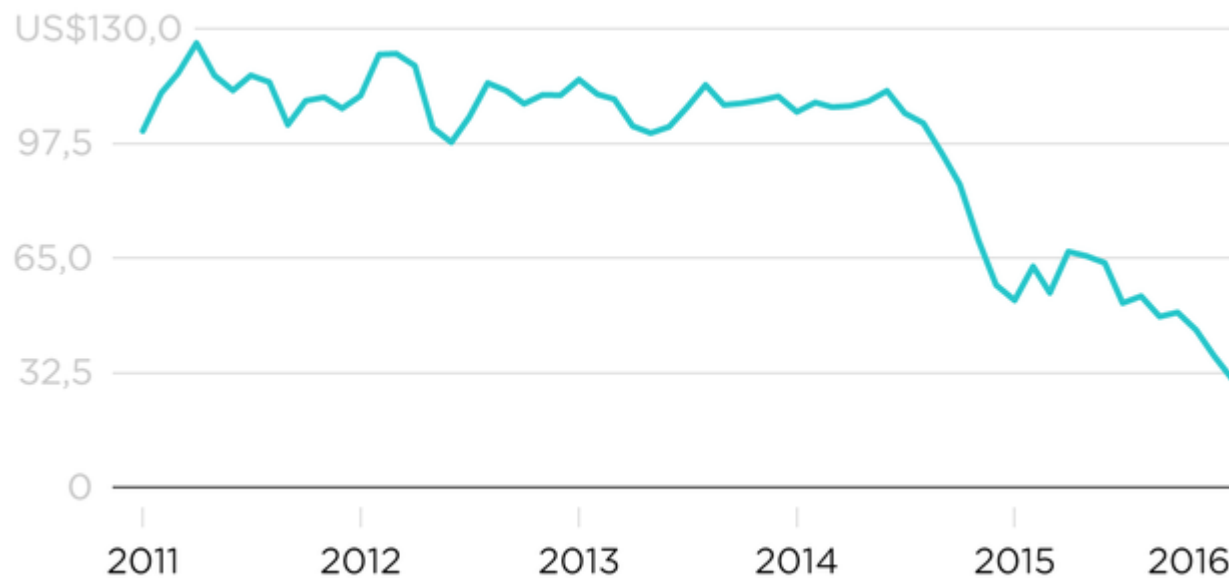
Ice-core data before 1958. Mauna Loa data after 1958.



2,13 GTc = 1 ppm



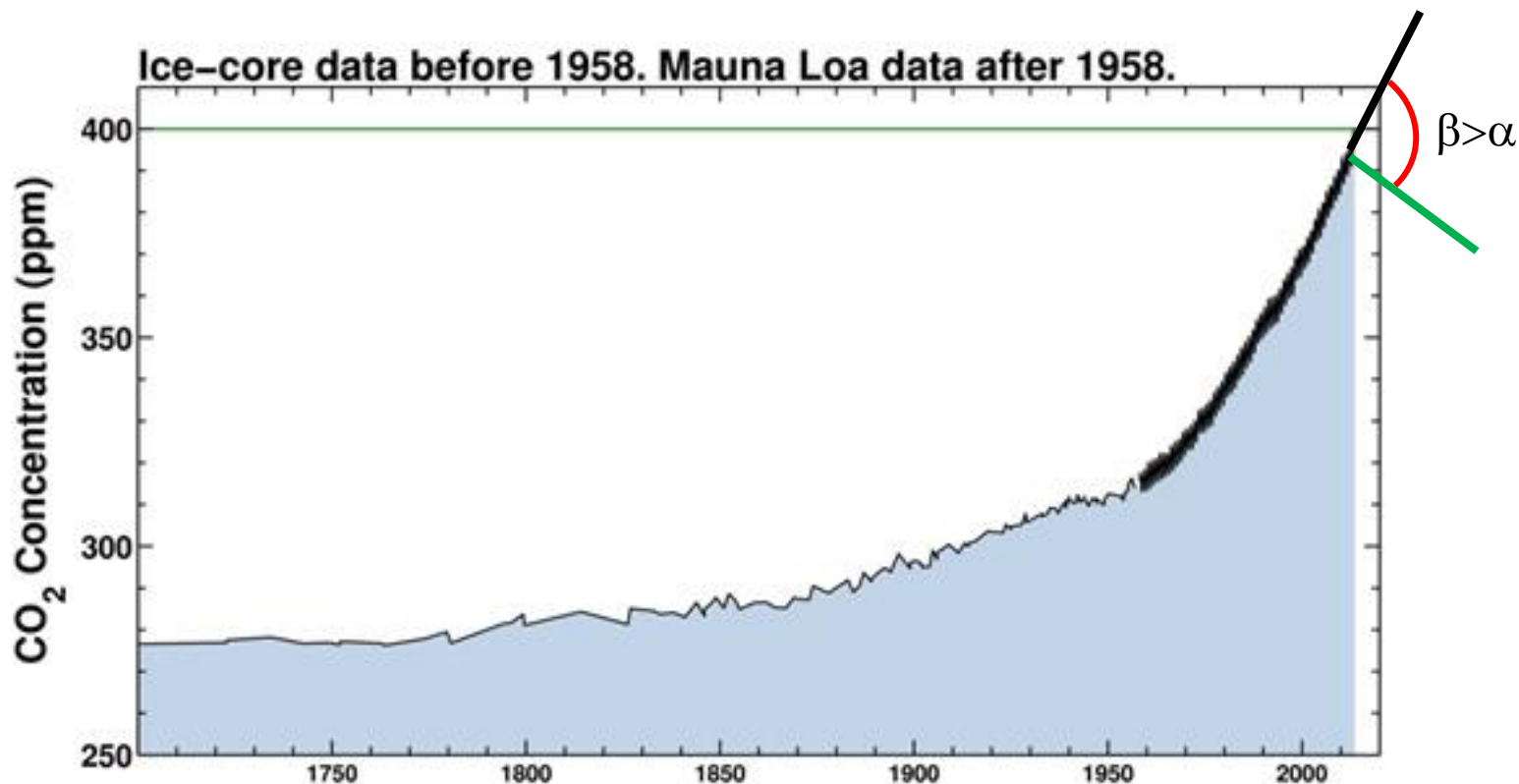
Preço do barril no mercado internacional



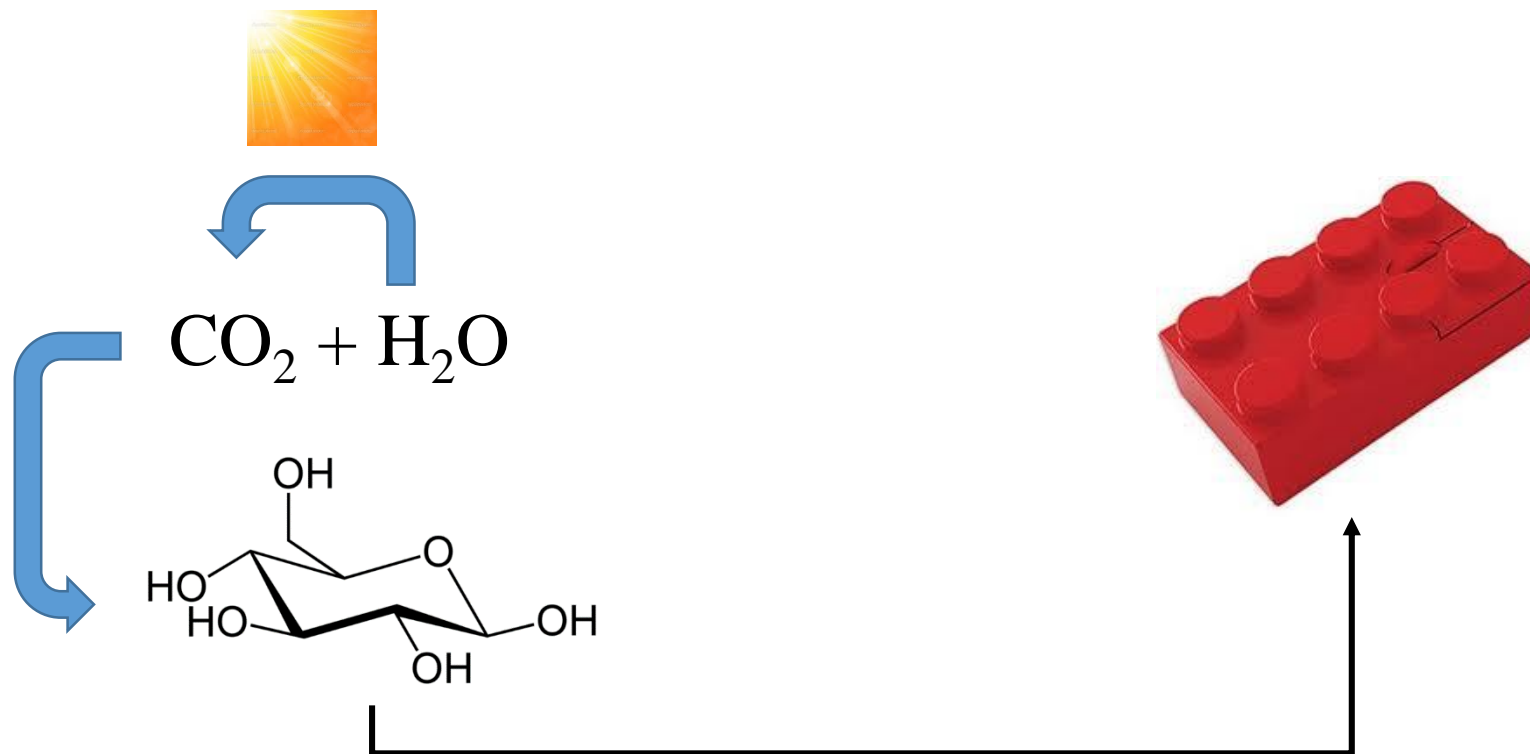
Fonte: Investing.com

NEXO



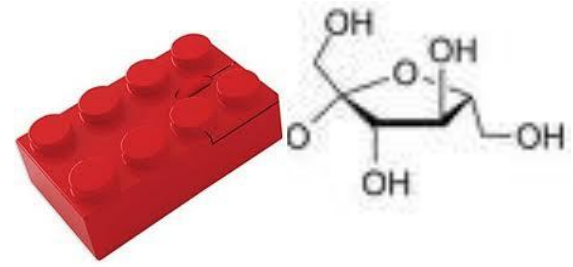


Engenharia Climática



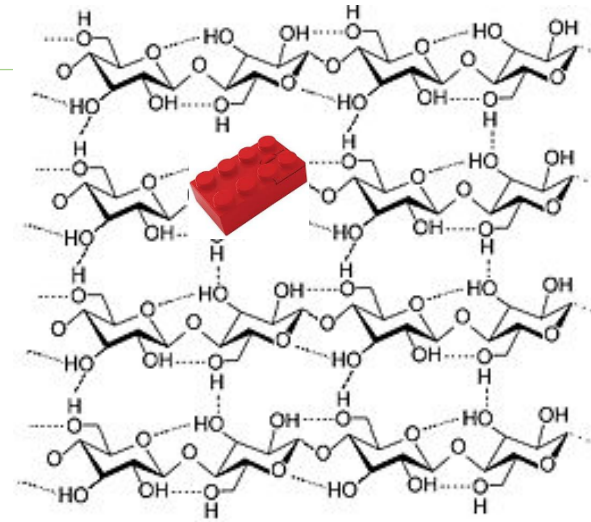


Glicose + Frutose



Sacarose

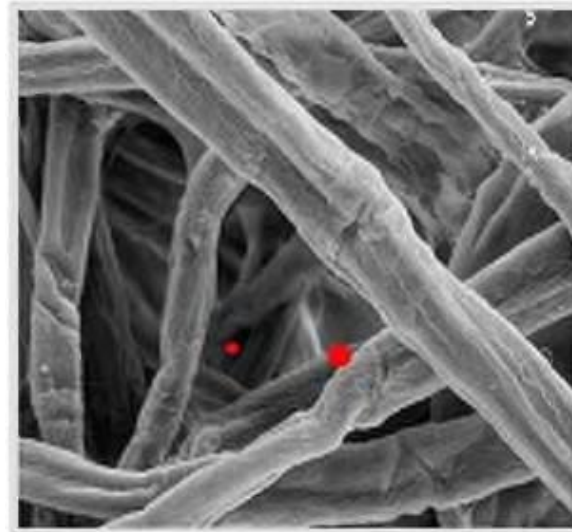




Glicose + Glicose + Glicose +



Celulose



Variabilidade

Eficiência Fotossintética

| Plant | Efficiency |
|------------------|--|
| Typical Plants | 0.1% ^[2] 0.2–2% ^[3] |
| Typical Cultures | 1–2% ^[2] |
| Cane | 7-8% peak ^{[2][4]} |





X



=



S. officinarum

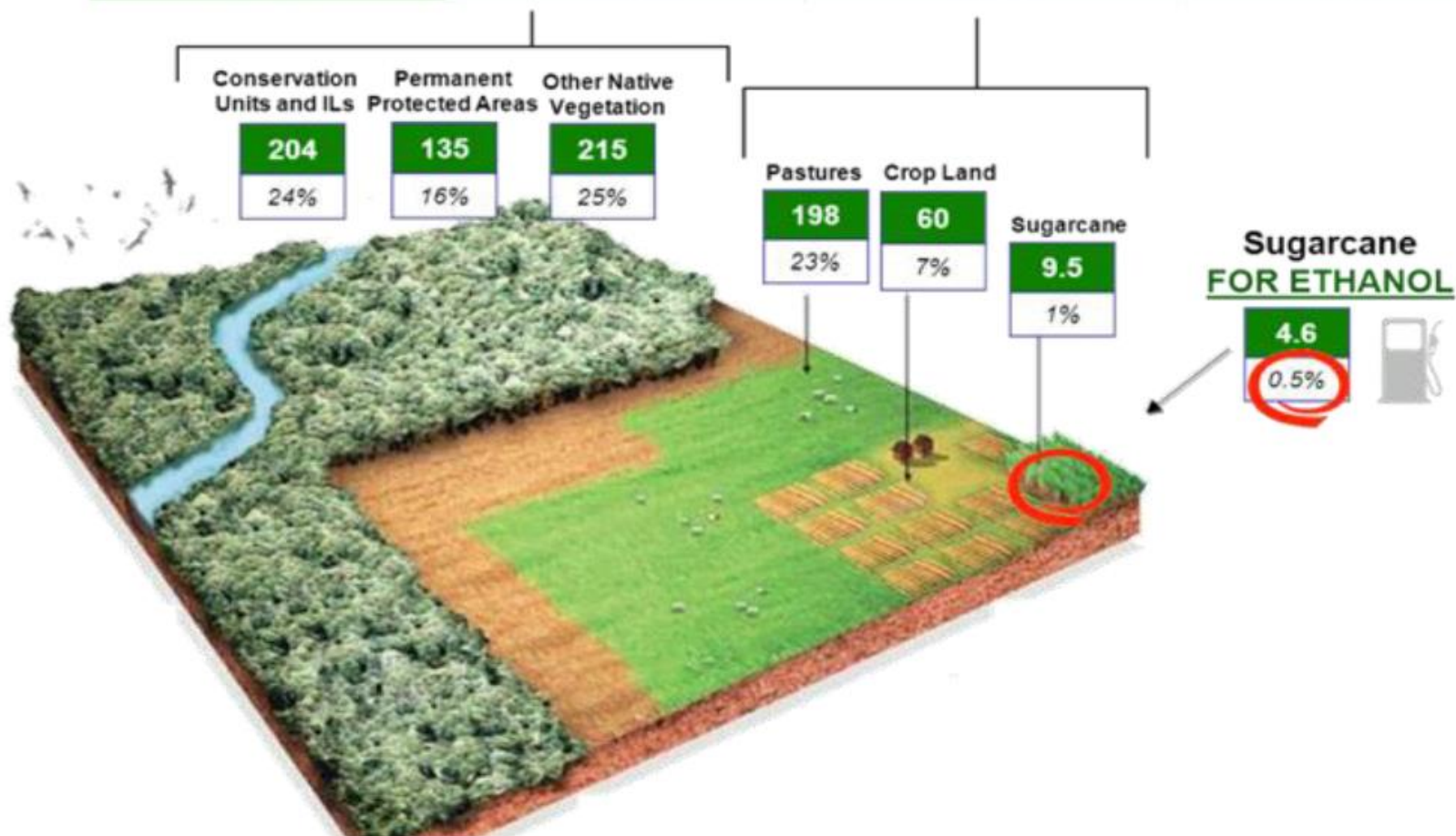
S. spontaneum

Com ***Ciência, Tecnologia e Políticas Públicas*** somos capazes de fazer a Gestão Adequada do ***Solo, Água e Recursos Biológicos*** para gerar uma alternativa eficiente às fontes fósseis de carbono e fazer disso um ***Excelente Negócio***



Million Hectares

| Total Area | Native Vegetation | Land in Actual Use | Other Uses |
|------------|-------------------|--------------------|------------|
| 851 | 554 | 258 | 38 |
| 100% | 65% | 30% | 5% |

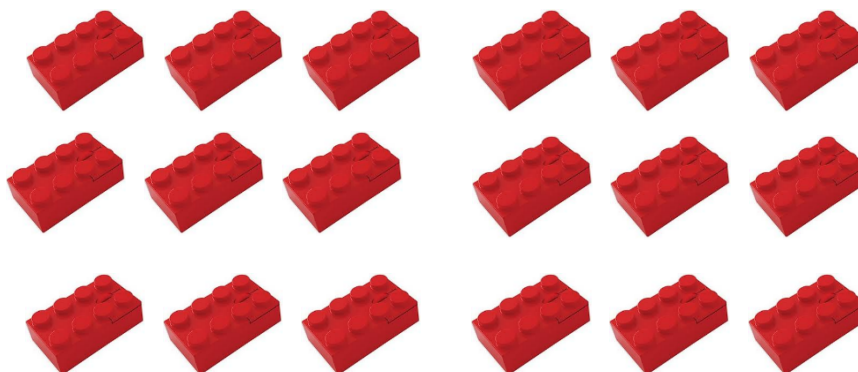
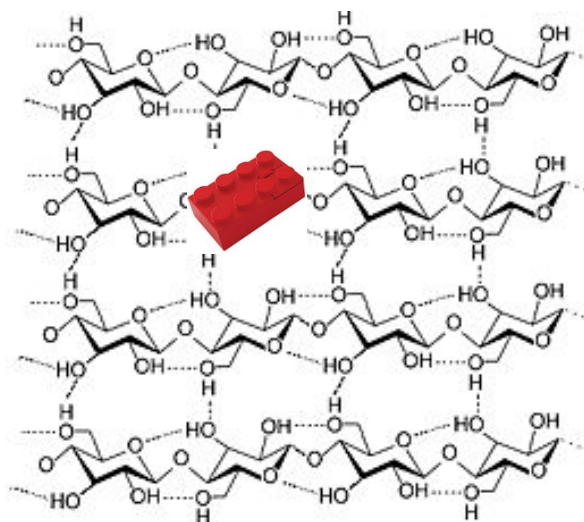


Cana Energia

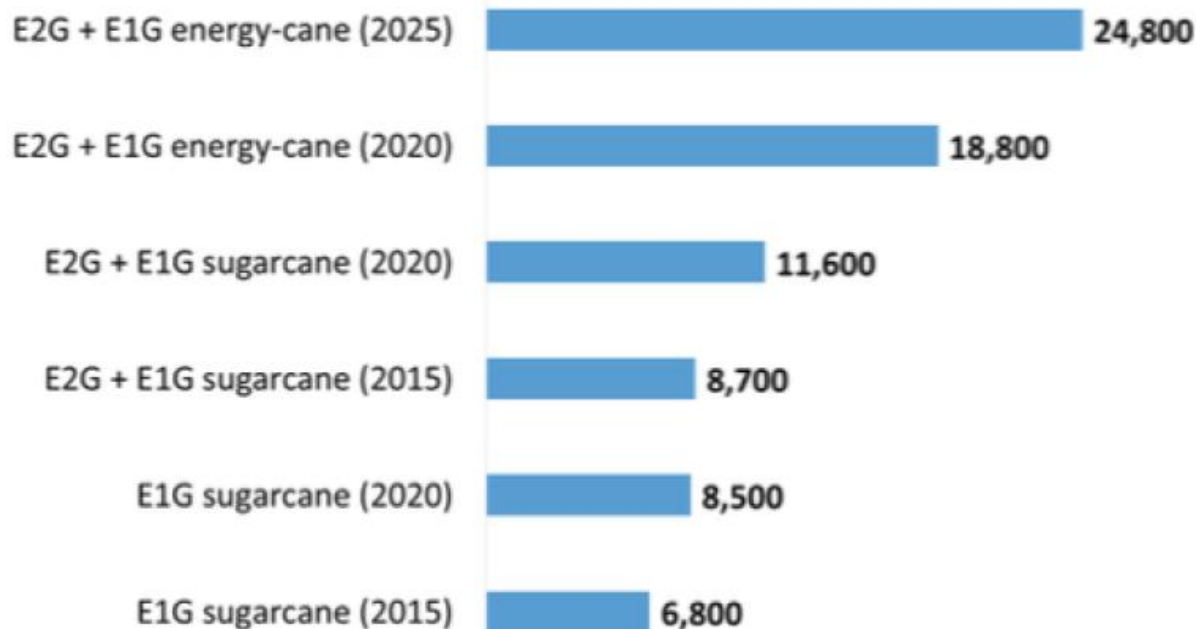
85t/ ha
R\$ 96,00/t
10 k ha = 680.000 t



180 t/ha
R\$ 45,00/t
10 k ha = 1.620.000 t



Ethanol productivity (liters/ha)



| Area Requirement Analysis | |
|--|----------------------|
| Global Gasoline Consumption | 1,3tri liters/year |
| EtOH Equivalent | 1,86 tri liters/year |
| Required Area E2G + E1G Energy Cane (2025) | 75MM hectares |
| Required Area E2G + E1G Energy Cane (2020) | 100MM hectares |

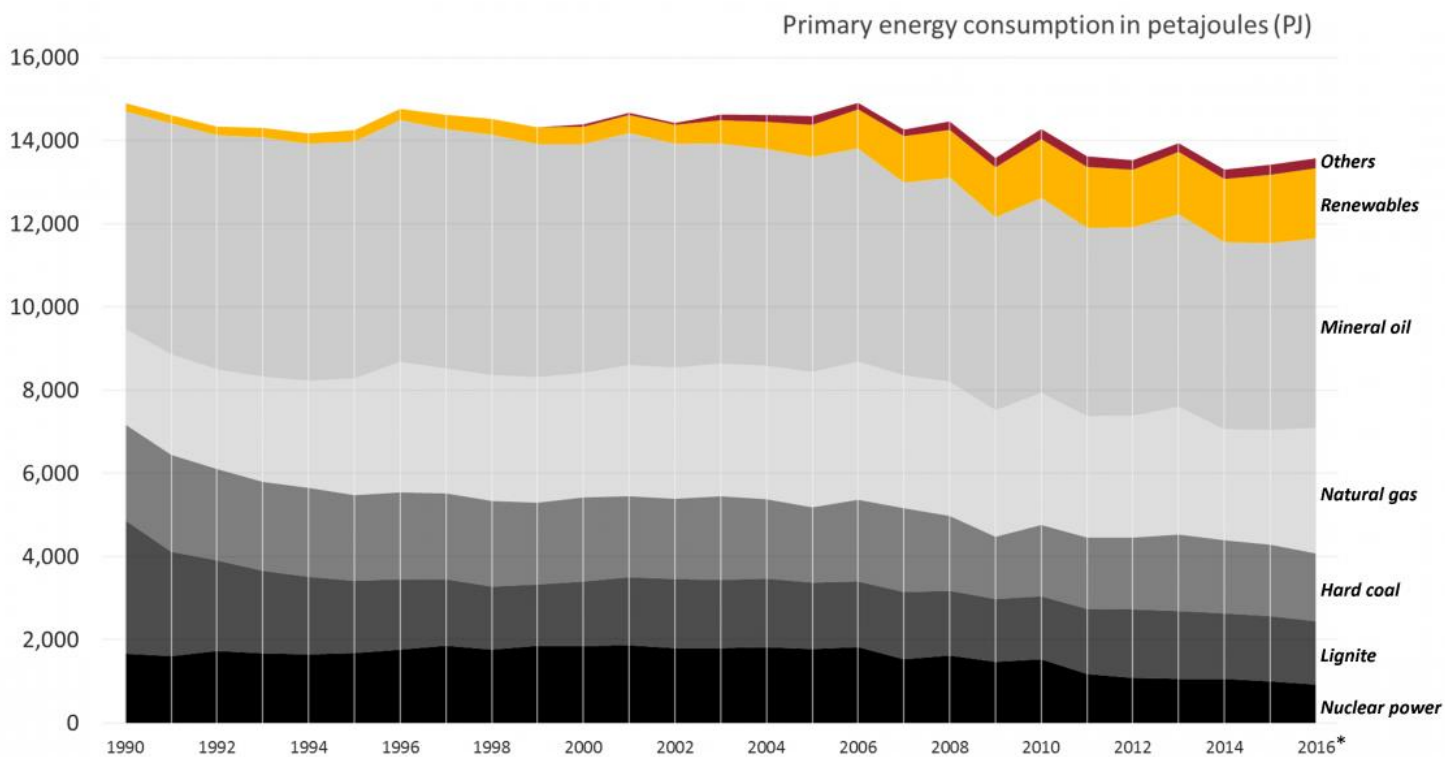
50% do Pasto = 200 MM ha, que podem produzir

Consumo Global de Gasolina



German energy sources' share in primary energy consumption 1990 - 2016.

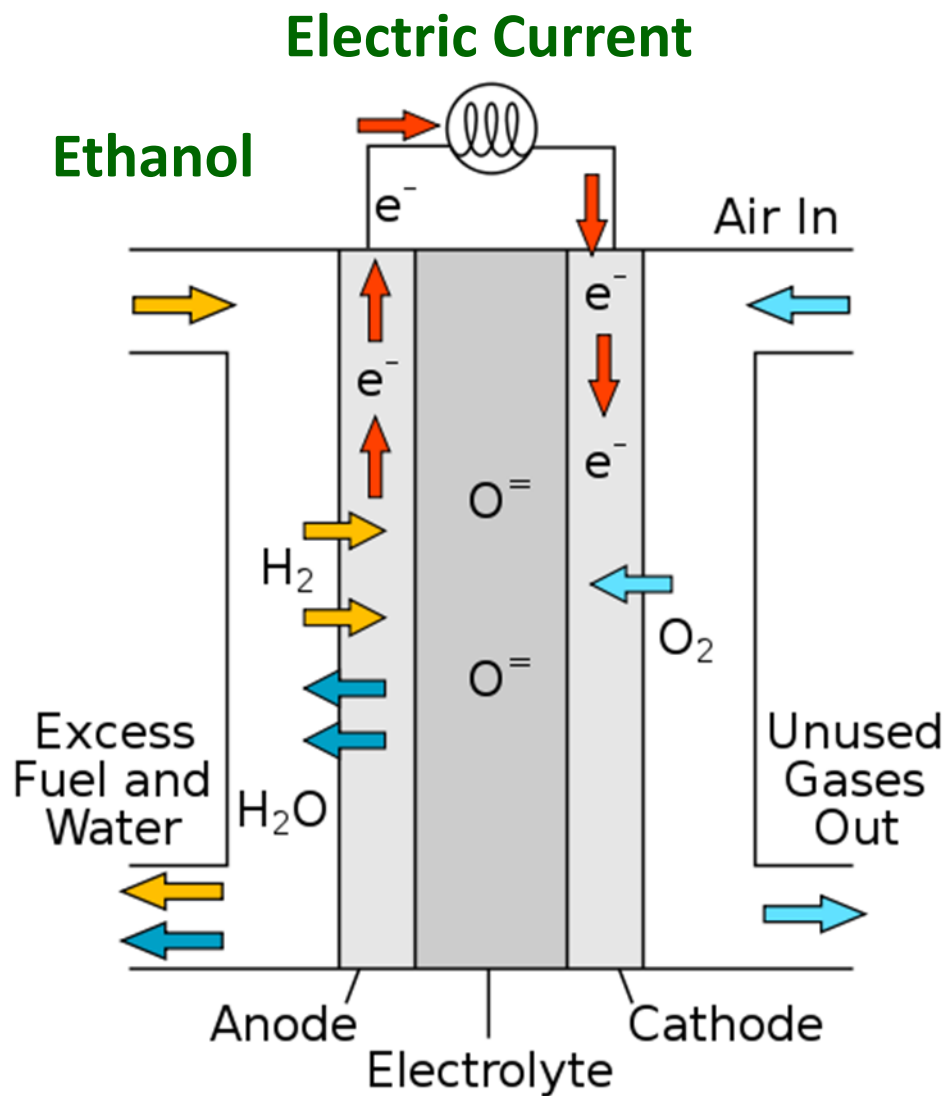
Data: AG Energiebilanzen 2017.



**Não
Renovável**

*2016: preliminary data

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Nissan unveils world's first Solid-Oxide Fuel Cell vehicle

YOKOHAMA, Japan (August 4, 2016) – In Brazil today, Nissan Motor Co., Ltd. today revealed the world's first Solid Oxide Fuel-Cell (SOFC)-powered prototype vehicle that runs on bio-ethanol electric power. The breakthrough model is an all-new light-commercial vehicle that can rely on multiple fuels – including ethanol and natural gas – to produce high-efficiency electricity as a power source.

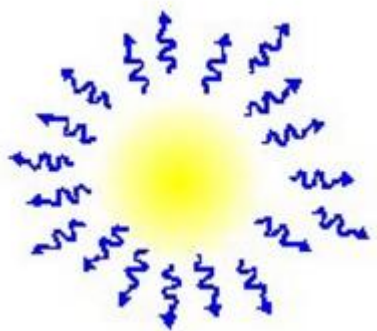
  1920 x 1080

  1200 x 1200

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Aumentar a competitividade da BioEconomia através do
Aprofundamento Científico, Desenvolvimento Tecnológico e Apoio a Inovação



SB
PC

Ranking mundial de trabalhos indexados (2013)



| Rank | Country | Papers | % of total papers in the world |
|-----------|---------------|---------------|--------------------------------|
| 1 | USA | 378.625 | 27,0 |
| 2 | CHINA | 219.281 | 15,6 |
| 3 | GERMANY | 102.271 | 7,3 |
| 4 | ENGLAND | 94.660 | 6,8 |
| 5 | JAPAN | 78.447 | 5,6 |
| 6 | FRANCE | 70.732 | 5,0 |
| 7 | CANADA | 62.804 | 4,5 |
| 8 | ITALY | 61.963 | 4,4 |
| 9 | SPAIN | 55.096 | 3,9 |
| 10 | AUSTRALIA | 53.296 | 3,8 |
| 11 | INDIA | 51.660 | 3,7 |
| 12 | SOUTH KOREA | 51.051 | 3,6 |
| 13 | BRAZIL | 38.523 | 2,7 |
| 14 | NETHERLANDS | 37.570 | 2,7 |
| 15 | RUSSIA | 29.077 | 2,1 |
| 16 | TAIWAN | 27.699 | 2,0 |
| 17 | SWITZERLAND | 27.325 | 1,9 |
| 18 | TURKEY | 25.510 | 1,8 |
| 19 | IRAN | 25.415 | 1,8 |
| 20 | SWEDEN | 24.416 | 1,7 |

InCites™, Thomson Reuters (2012).
Report Created: Jul 4, 2015 Data
Processed March 18, 2015 Data
Source: Web of Science

Prof. Helena Nader

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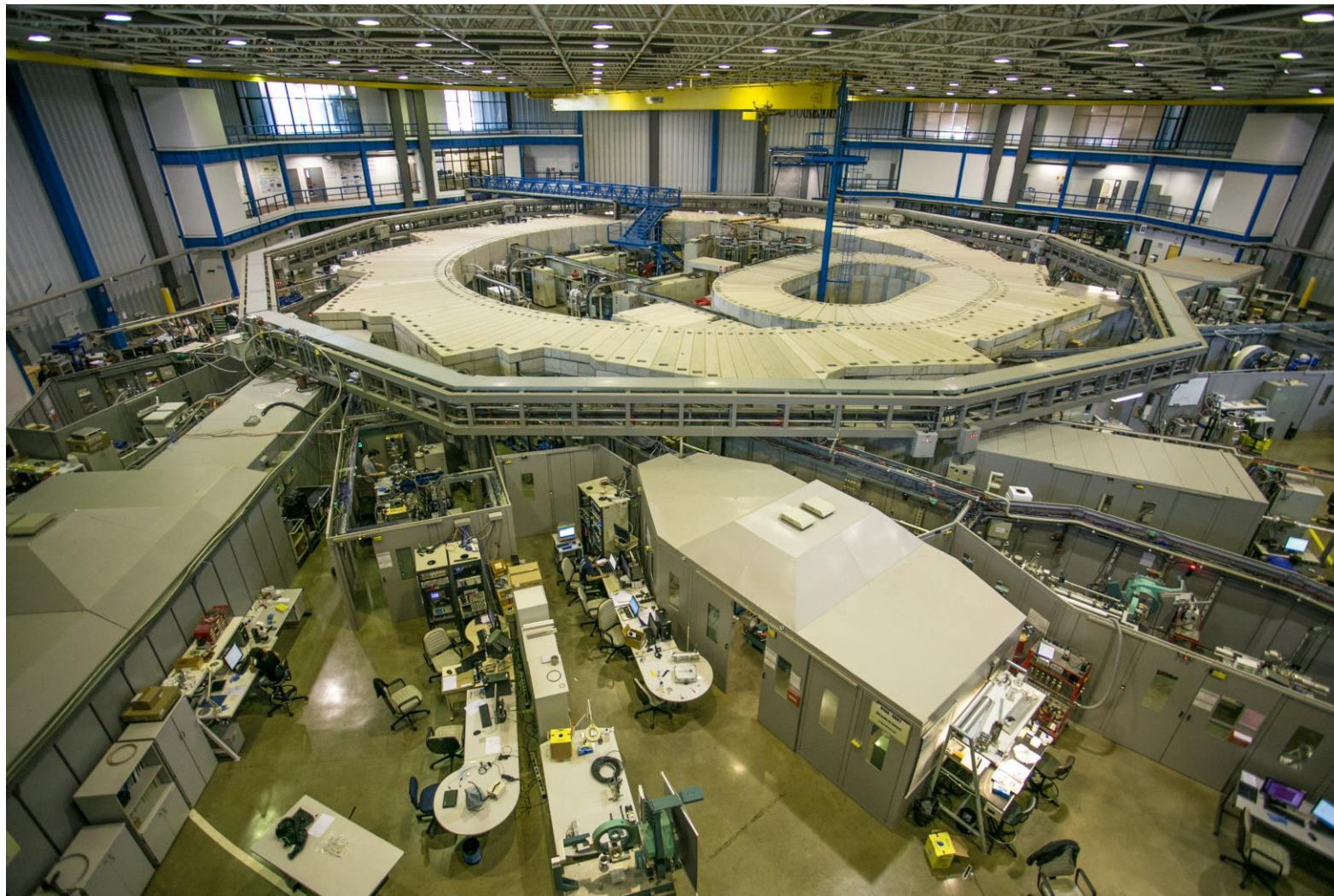
Global Innovation Index - 2015

| POSITION | COUNTRY | % RANK |
|-----------|--------------------------|-------------|
| 1 | Switzerland | 1.00 |
| 2 | United Kingdom | 0.99 |
| 3 | Sweden | 0.99 |
| 4 | Netherlands | 0.98 |
| 5 | United States of America | 0.97 |
| 6 | Finland | 0.96 |
| 7 | Singapore | 0.96 |
| 8 | Ireland | 0.95 |
| 9 | Luxembourg | 0.94 |
| 10 | Denmark | 0.94 |
| 11 | Hong Kong (China) | 0.93 |
| 12 | Germany | 0.92 |
| 13 | Iceland | 0.91 |
| 14 | Korea, Republic of | 0.91 |
| 15 | New Zealand | 0.90 |
| 16 | Canada | 0.89 |
| 17 | Australia | 0.89 |
| 18 | Austria | 0.88 |
| 19 | Japan | 0.87 |
| 20 | Norway | 0.86 |
| 21 | France | 0.86 |
| 22 | Israel | 0.85 |
| 29 | China | 0.8 |
| 30 | Portugal | 0.79 |
| 31 | Italy | 0.79 |
| 42 | Chile | 0.71 |
| 51 | Costa Rica | 0.64 |
| 52 | Viet Nam | 0.64 |
| 60 | South Africa | 0.58 |
| 67 | Colombia | 0.53 |
| 68 | Uruguay | 0.52 |
| 69 | Oman | 0.51 |
| 70 | Brazil | 0.51 |
| 71 | Peru | 0.50 |
| 72 | Argentina | 0.49 |

Cornell University, INSEAD, and
WIPO (2015): *The Global
Innovation Index 2015: The
Local Dynamics of Innovation*,
Geneva, Ithaca, and
Fontainebleau.



Prof. Helena Nader





Centro Nacional de Pesquisa em Energia e Materiais





R\$1,8 Bi

R\$1,5 Bi

**É surpreendente
o que
conseguimos
realizar
quando deixamos de
lado a questão da
autoria.**



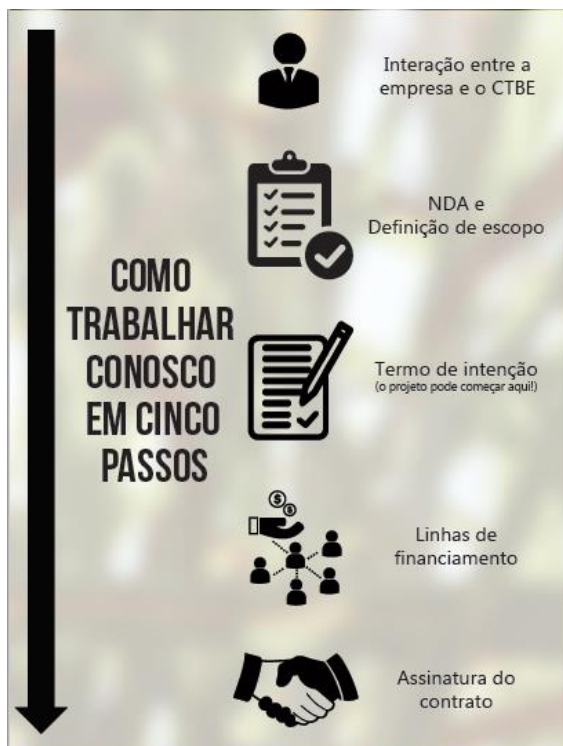


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Fazer a **Ponte entre o Conhecimento Científico e o Desenvolvimento Tecnológico** a partir de parcerias com empresas para que essas aumentem sua **Competitividade e a Geração de Riquezas**





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Detalhes Técnicos, Certificações e Calculadora

18 de agosto | 8h30 às 18h | CTBE