

Enerji Dönüşümleri

(Giriş)

Barış Sanlı

16 Mart 2019

www.barissanli.com

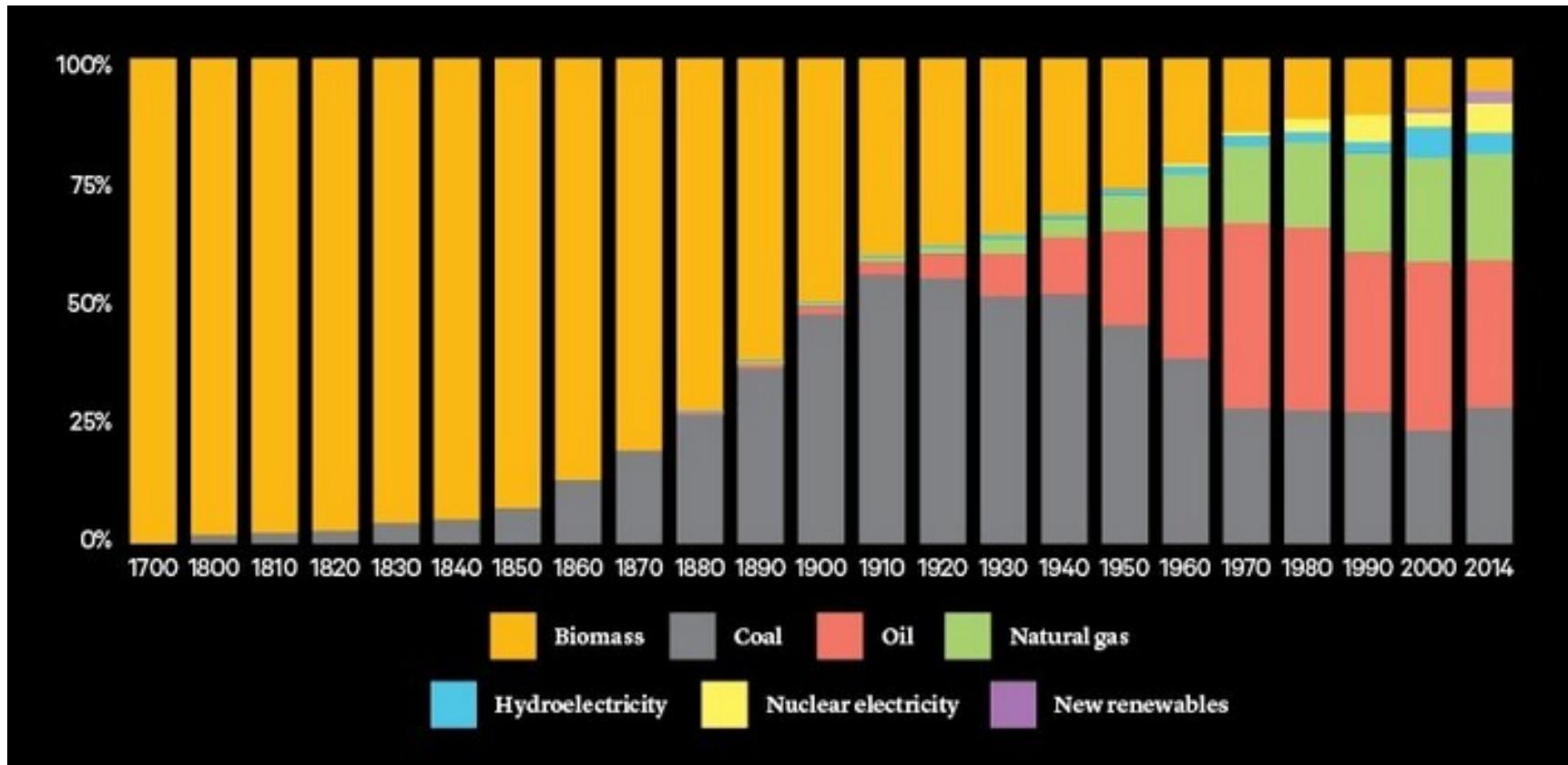
Ana kavramlar

- Enerji = petrol+gaz+kömür+elektrik
- Elektrik
- Yenilenebilir enerji > güneş ısıtma, odun yakma
- Yenilenebilir elektrik < güneş ısıtma, odun yakma
- Atıktan metan, bütan ~ yenilenebilir gaz, LPG

Enerji dönüşümü

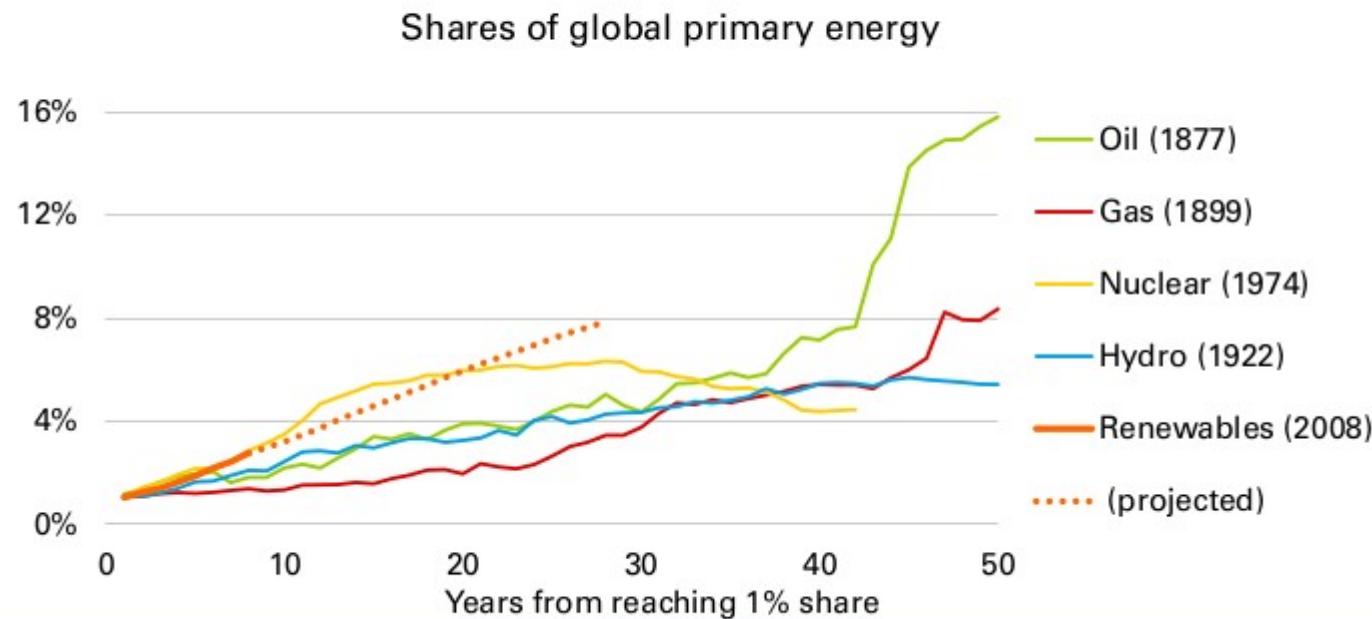
- Enerji sistemindeki uzun dönemli değişimler
- Günümüzde politik bir kavram
- Maliyet-etki analizine göre olmaması gereklidir
 - Bu sebeple itici güç gereklidir
 - Uzun dönemli kazanımların etkisi çok büyük olmalıdır
 - Teknolojiler hazır veya yakın olmalıdır
- Olur-olmaz değil hız tartışması

Dünya Tarihinde



Enerji dönüşüm hızı

Speed of transition



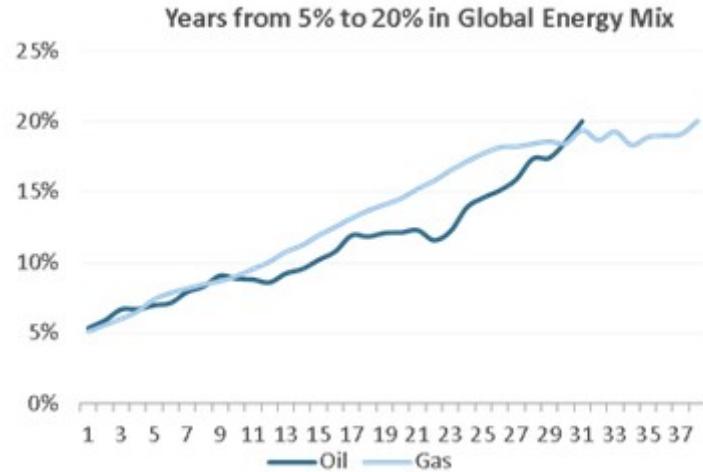
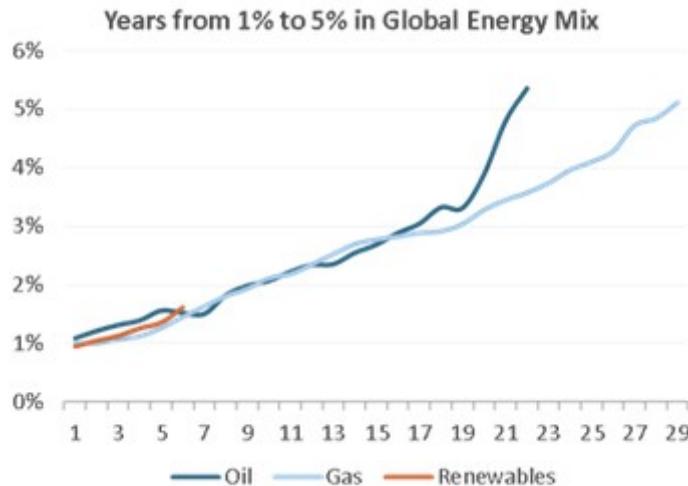
Note: - For sources of data pre-1965 see "Economic development and the demand for energy" by Ruehl et al, Energy Policy, 2012

BP Statistical Review of World Energy

© BP p.l.c. 2016

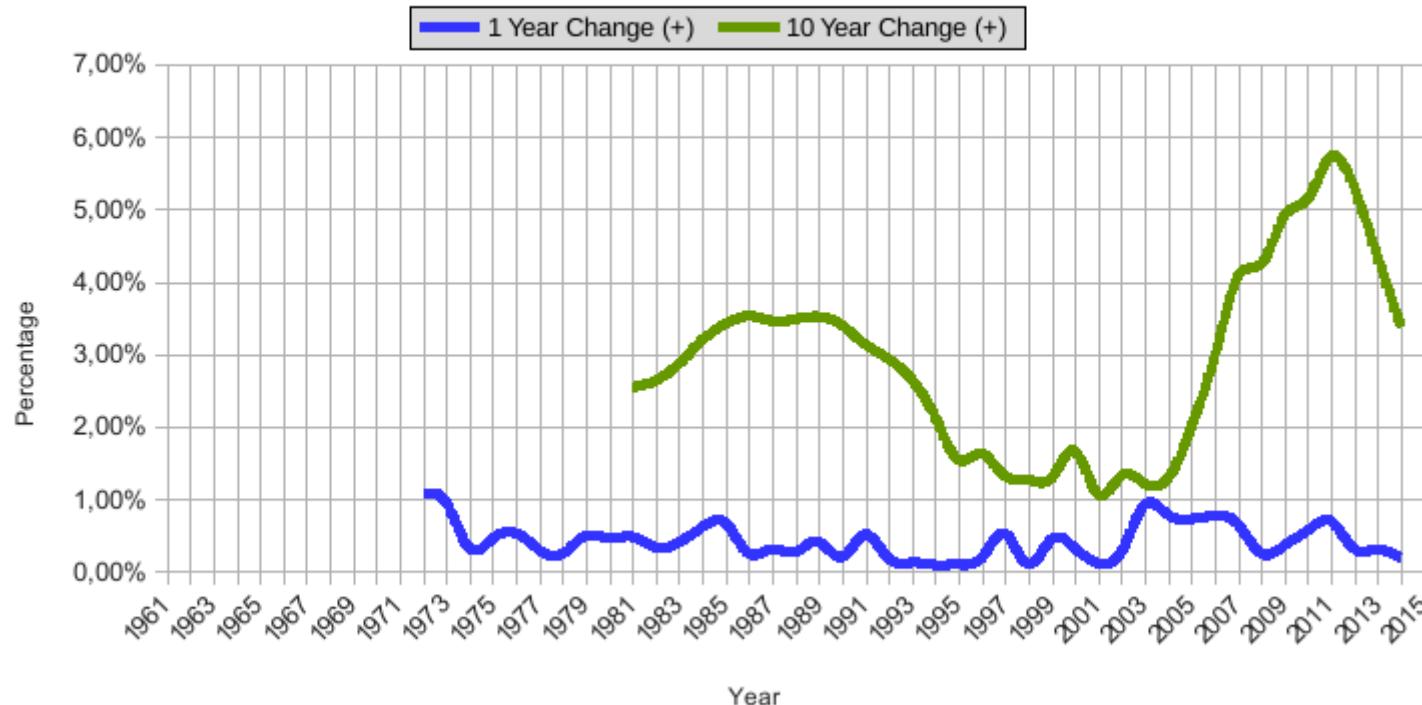
What is the speed of energy transition? Barış Sanlı, <http://dergipark.gov.tr/download/issue-file/6560>

%5'ten %20'lere zor bir yol

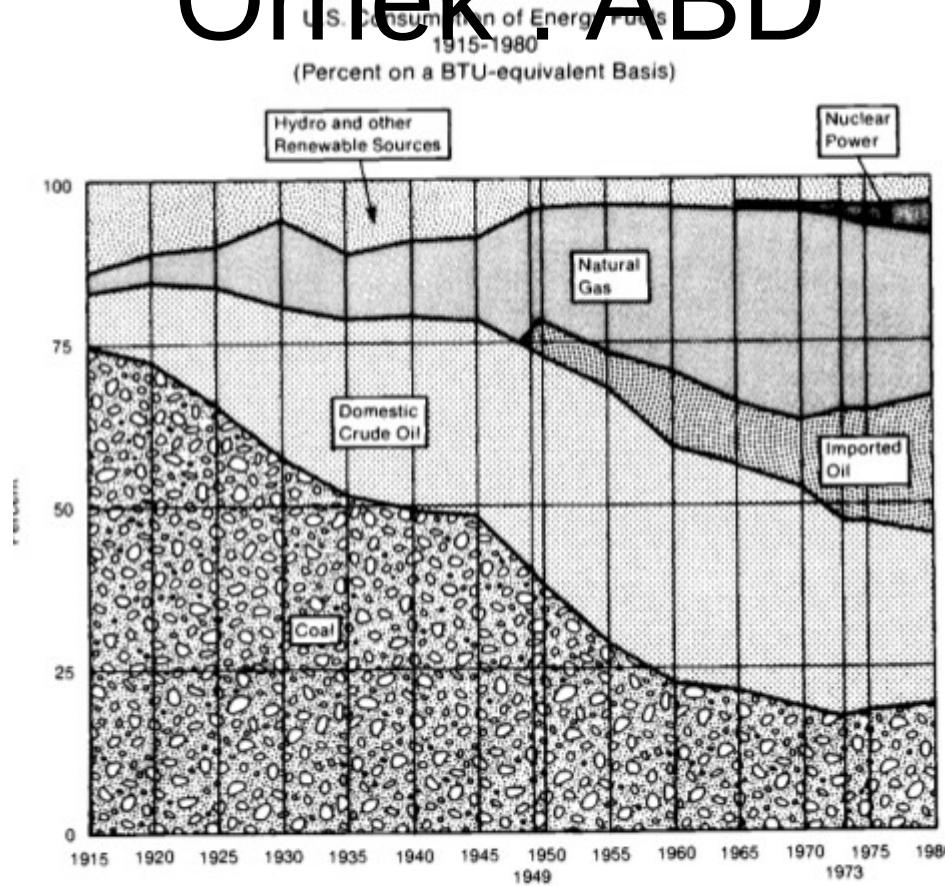


Dünya'da yıldan yıla değişim

World - 1 Year and 10 Year Increase in the share of the fastest growing energy fuel in total TPES



Örnek : ABD

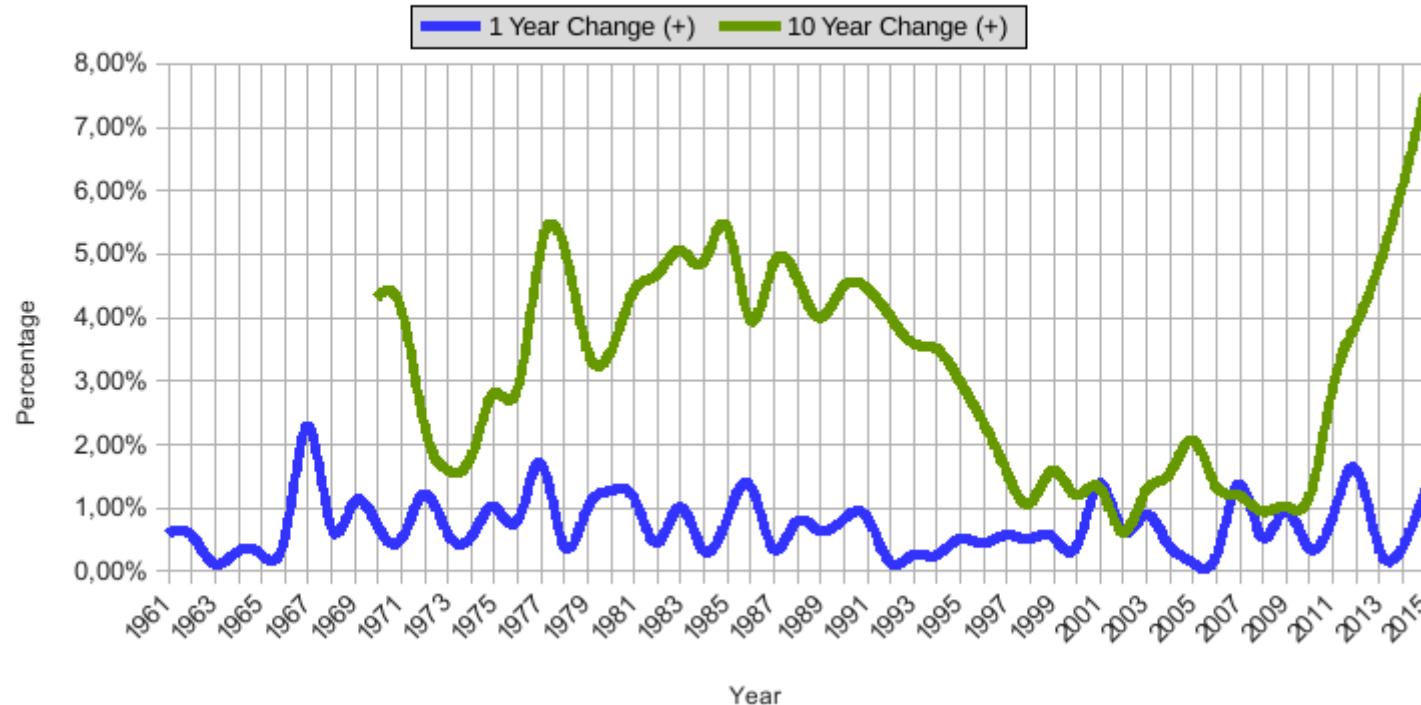


Sources: Sam Shurr et al., *Energy in the American Economy, 1850-1975* (Baltimore: Johns Hopkins University Press, 1960); American Petroleum Institute, *Basic Petroleum Data Book*, November 1976; Exxon Background Series, *World Energy Outlook* (New York: Exxon Corporation, 1981).

What is the speed of energy transition? Barış Sanlı, <http://dergipark.gov.tr/download/issue-file/6560>

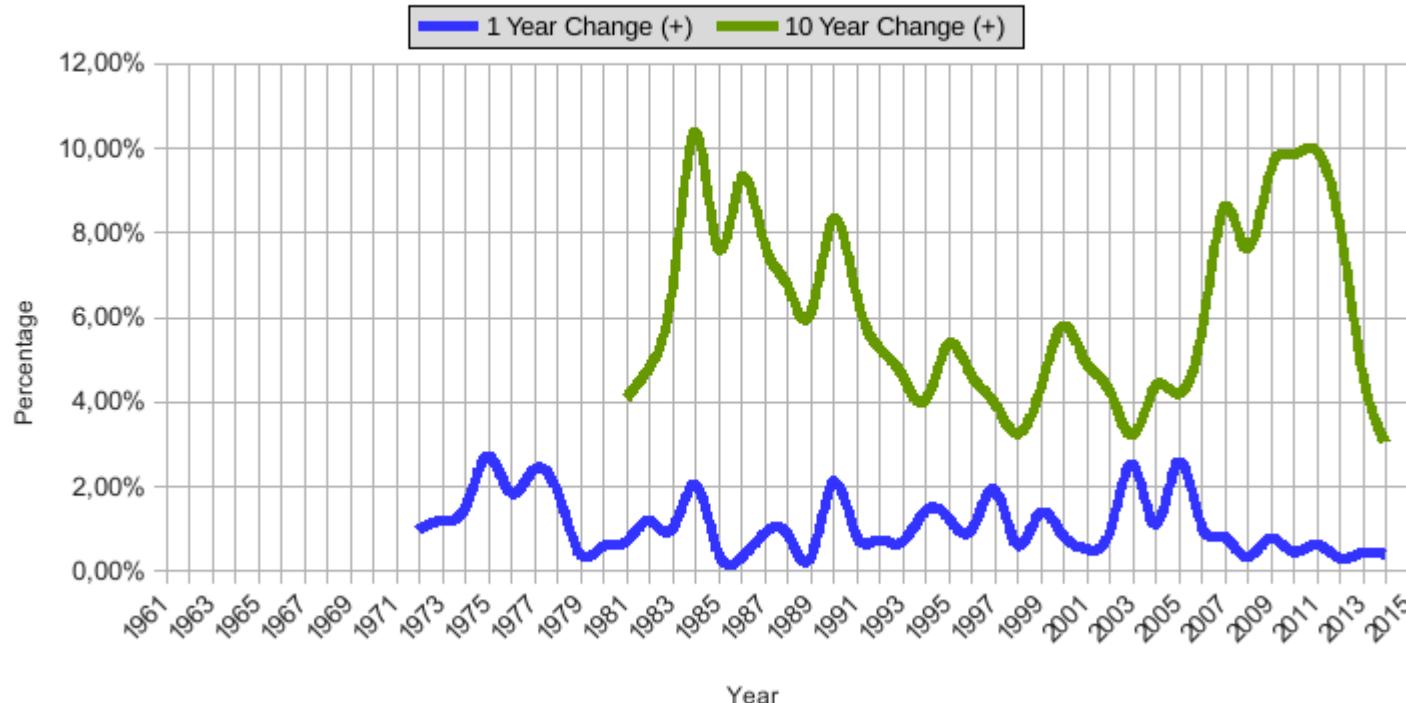
ABD – 1 ve 10 yılda değişim hızı

USA - 1 Year and 10 Year Increase in the share of the fastest growing energy fuel in total TPES



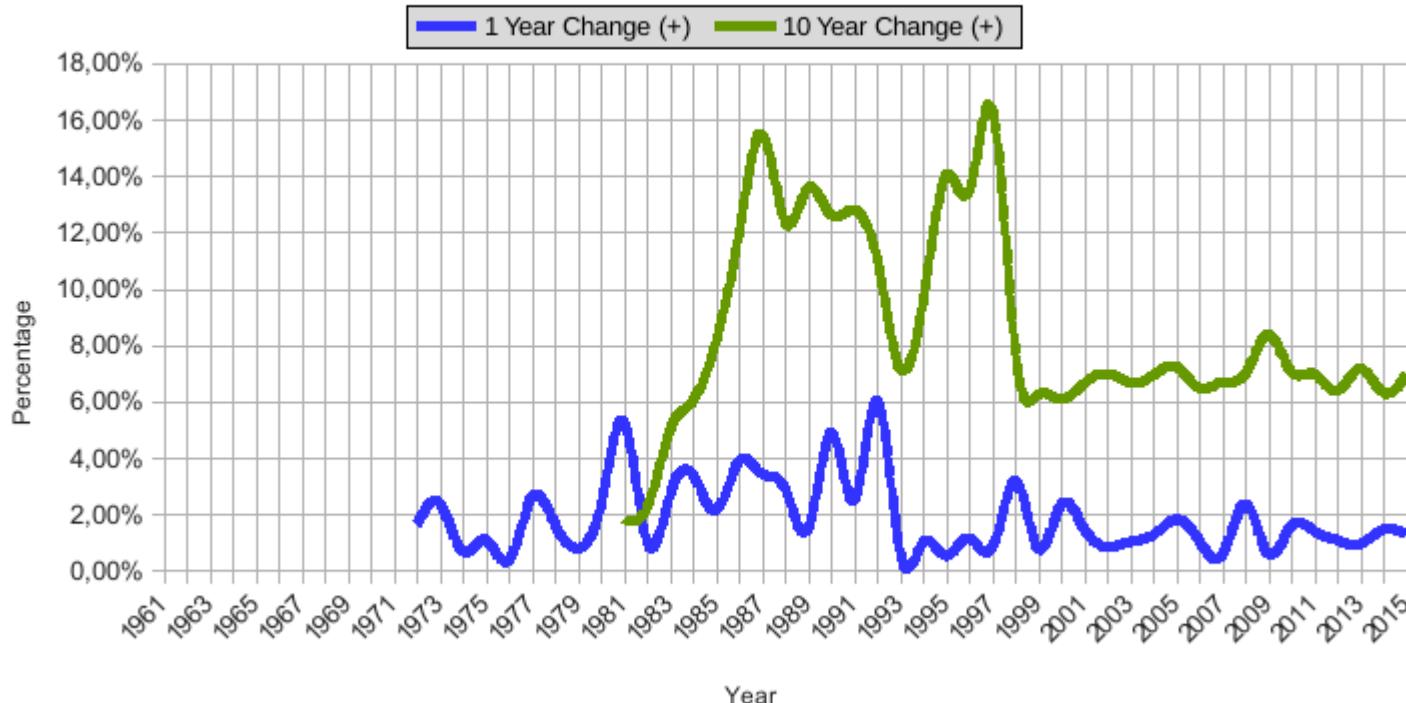
Çin

China - 1 Year and 10 Year Increase in the share of the fastest growing energy fuel in total TPES



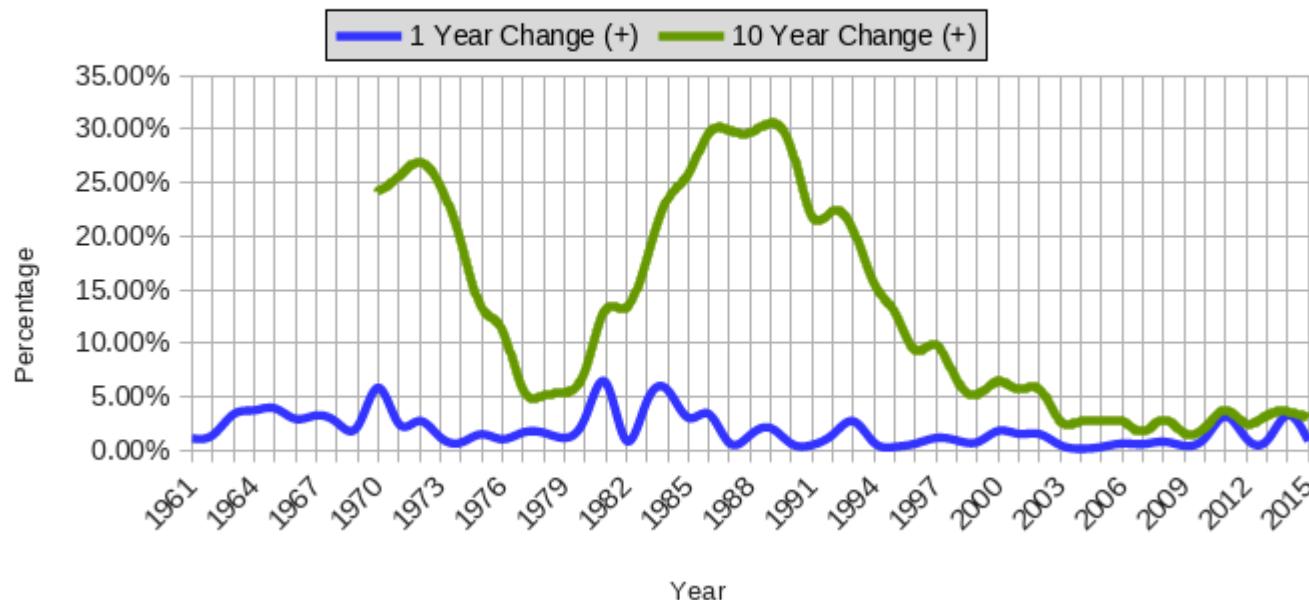
Güney Kore

S.Korea - 1 Year and 10 Year Increase in the share of the fastest growing energy fuel in total TPES



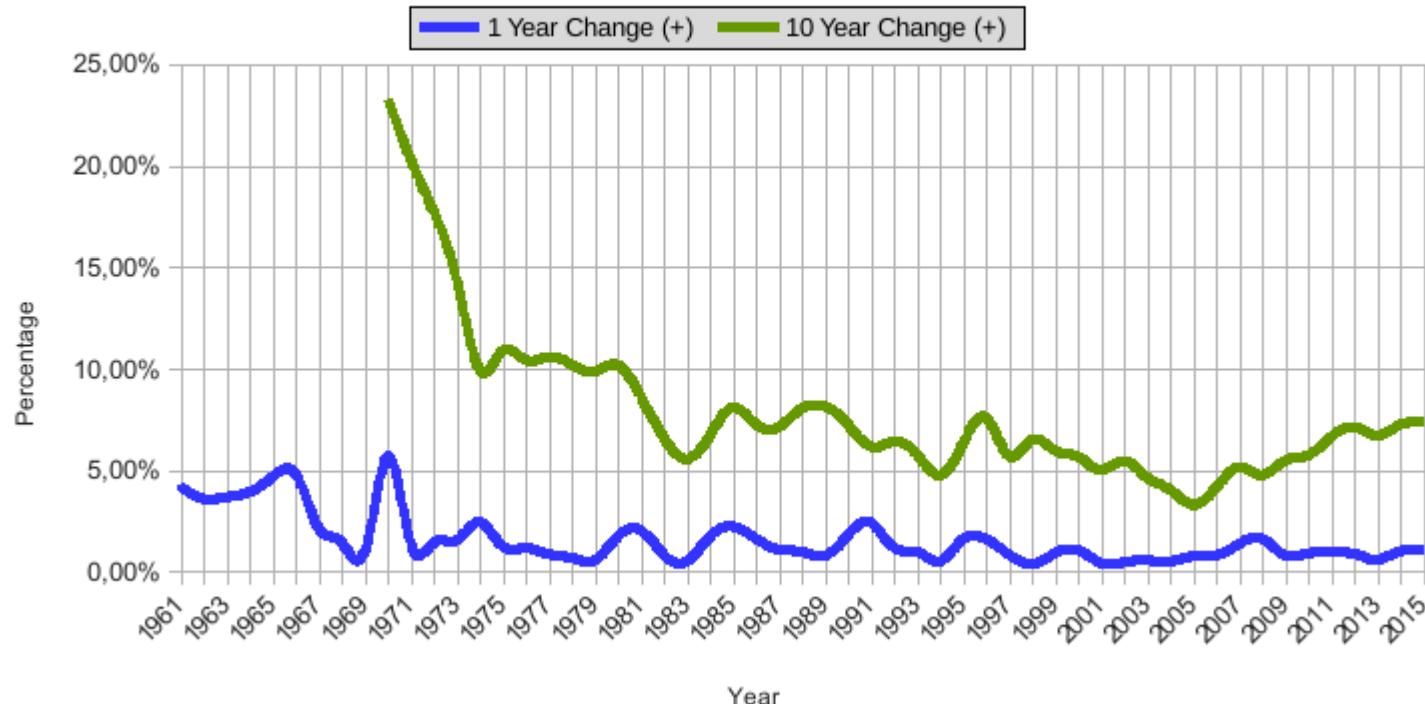
Fransa

France - 1 Year and 10 Year Increase in the share of the fastest growing energy fuel in total TPES



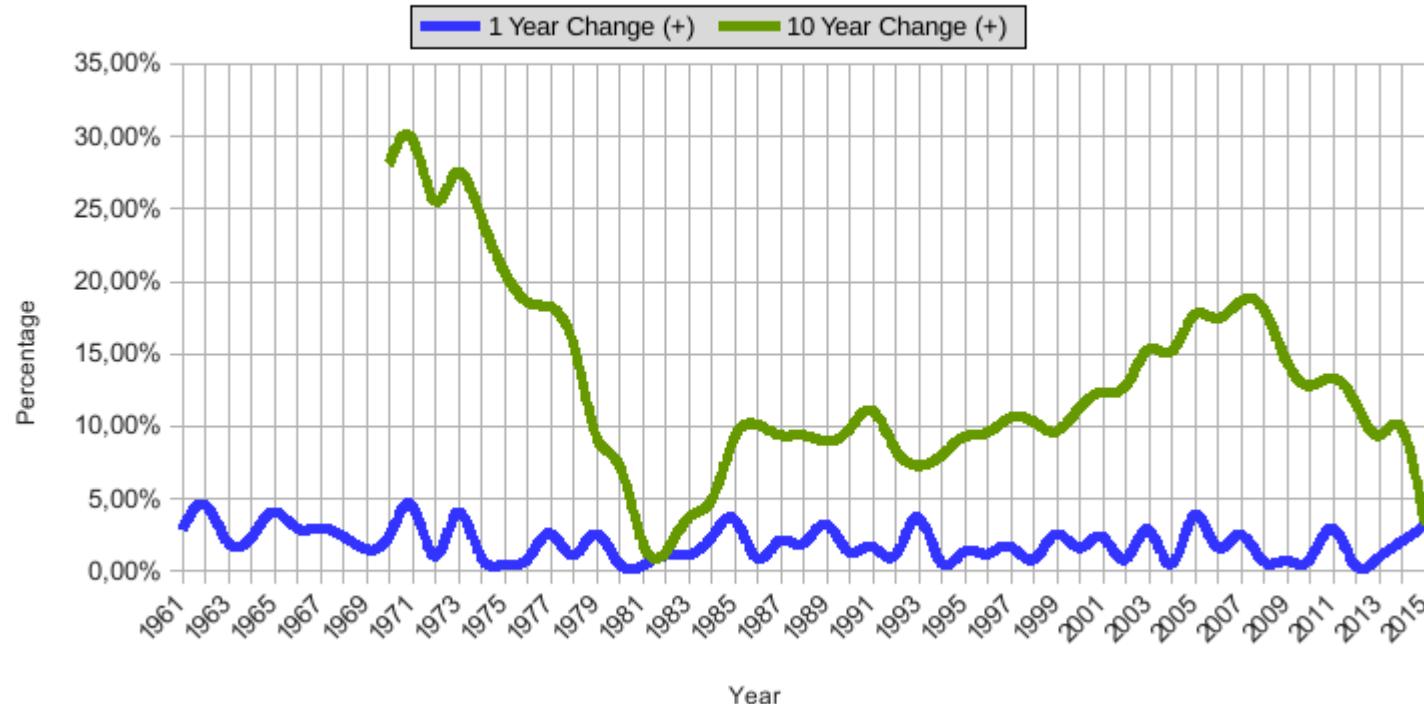
Almanya

Germany - 1 Year and 10 Year Increase in the share of the fastest growing energy fuel in total TPES

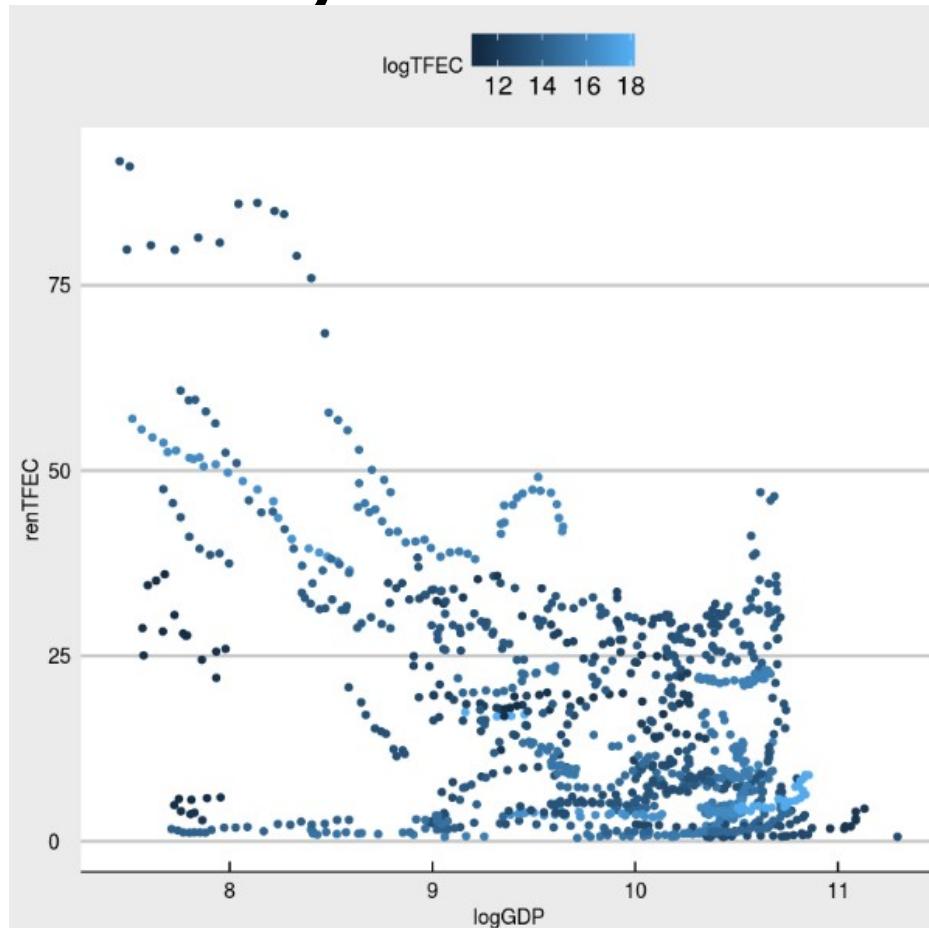


Türkiye

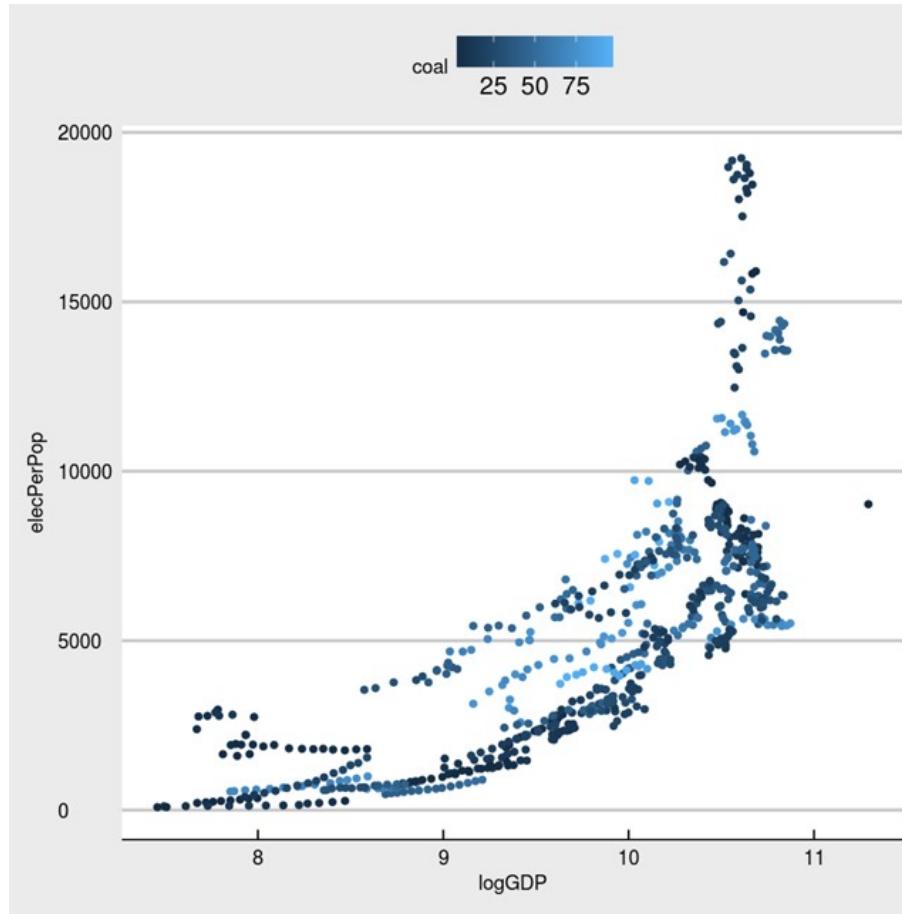
Turkey - 1 Year and 10 Year Increase in the share of the fastest growing energy fuel in total TPES



GSYH ile yenilenebilir oranı



Kömürün oranı

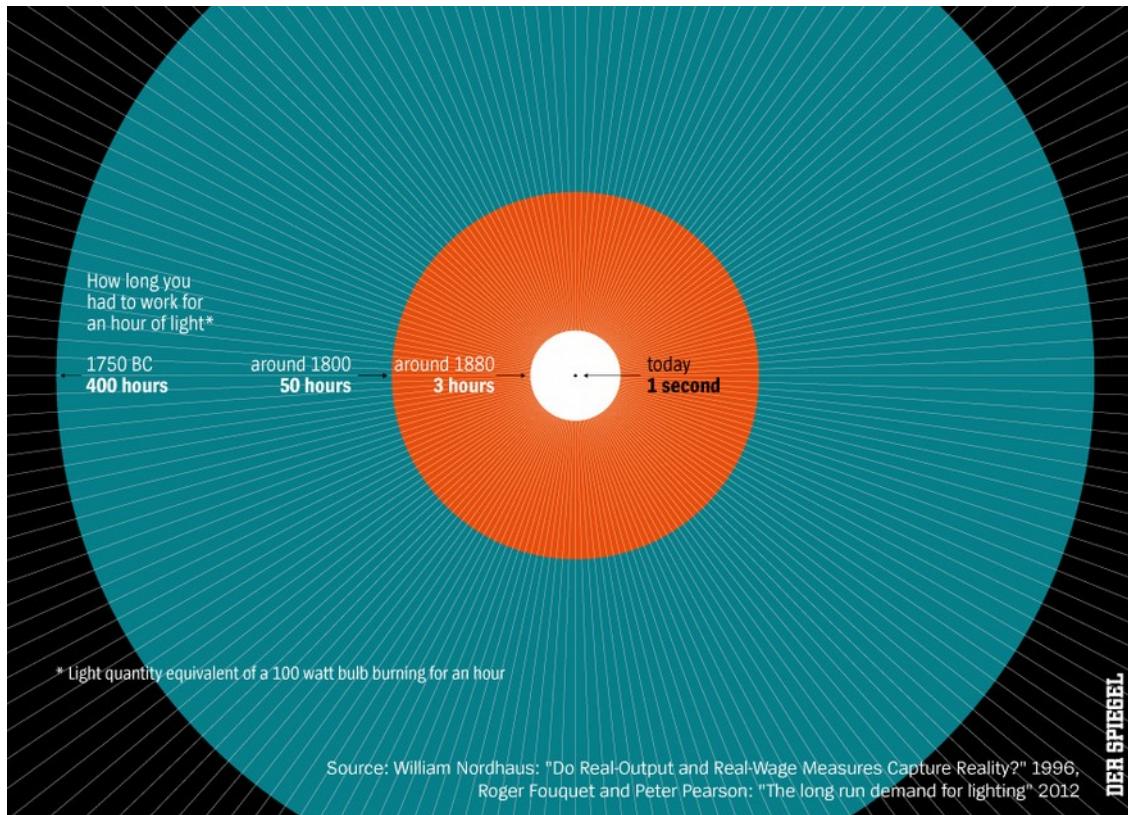


Kaynaklar ve ilişkiler

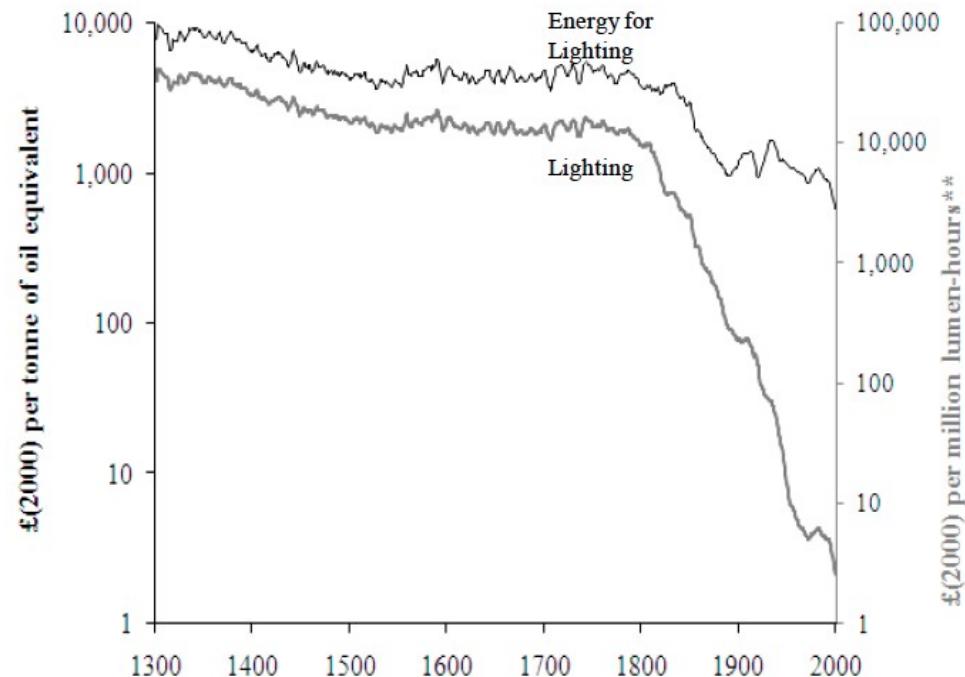
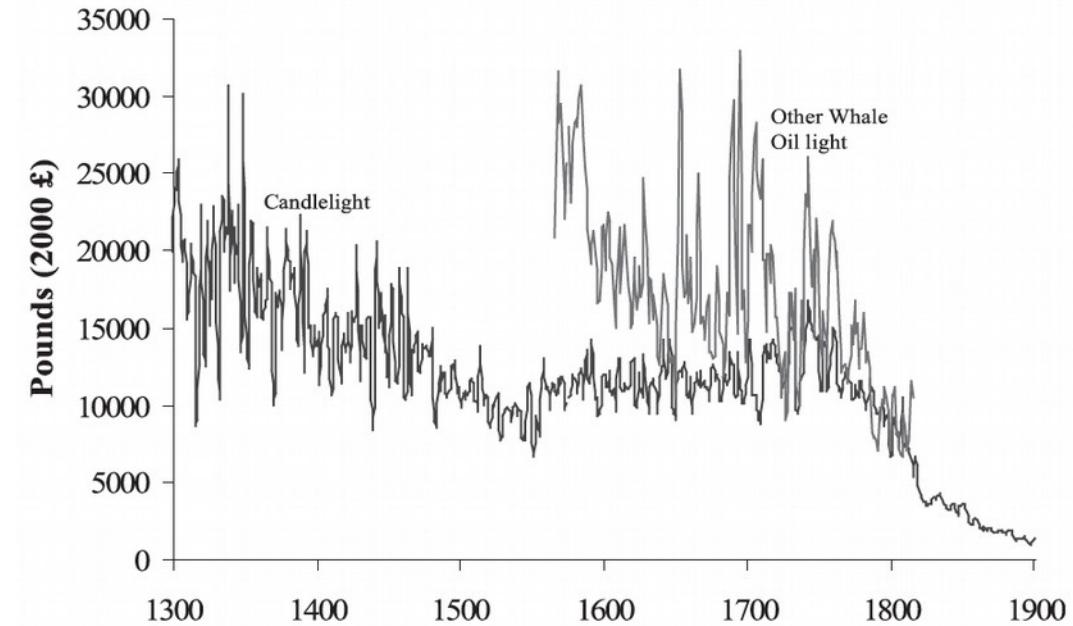
	coal	gas	gdp	raccess	uaccess
coal	1.00000000	-0.249834831	0.02328390	0.17787919	0.09448646
gas	-0.24983483	1.000000000	0.36006542	0.25551126	0.18332611
gdp	0.02328390	0.360065419	1.00000000	0.51061984	0.36076442
raccess	0.17787919	0.255511261	0.51061984	1.00000000	0.78807211
uaccess	0.09448646	0.183326114	0.36076442	0.78807211	1.00000000
ren	-0.39242469	-0.402218559	-0.27306619	-0.31885798	-0.24488729
TFEC	0.18890813	0.004571554	0.12171639	0.13801542	0.10889748
renTFEC	-0.28325301	-0.351673536	-0.47461212	-0.77630611	-0.64488873
elec	0.18682479	-0.015528385	0.15295673	0.15998241	0.12029398
pop	0.19009804	-0.004611034	-0.09313894	-0.03684994	0.01407148
logTFEC	0.22160976	0.143687148	0.17106637	0.26171615	0.21064511
logGDP	0.17867476	0.253767402	0.84278274	0.76100278	0.61114590
elecPerPop	0.04197416	0.066263007	0.65355469	0.47167661	0.33043191
TFECPerPop	0.07542586	0.259728808	0.81117274	0.49756093	0.34507919
logelec	0.26660477	0.141924238	0.30491340	0.55685895	0.47209715

Mikro bakış

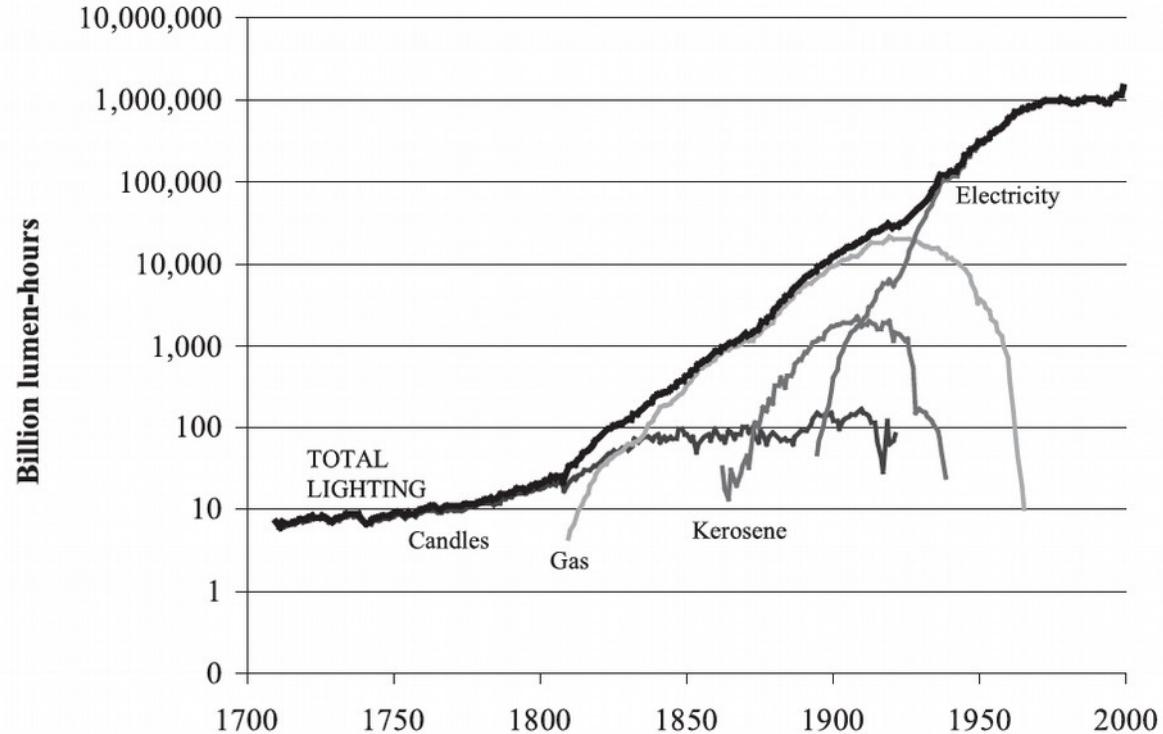
Aydınlatma için çalışma süresi



Maliyet

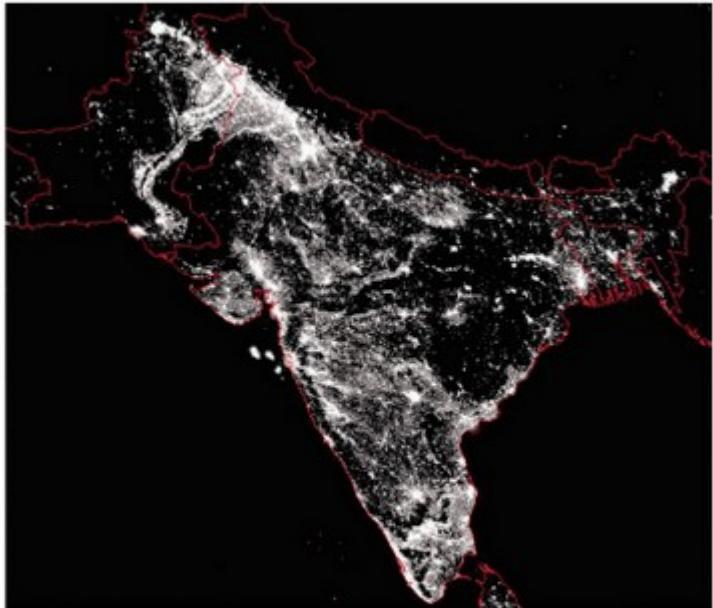


Daha az mı tüketiyoruz

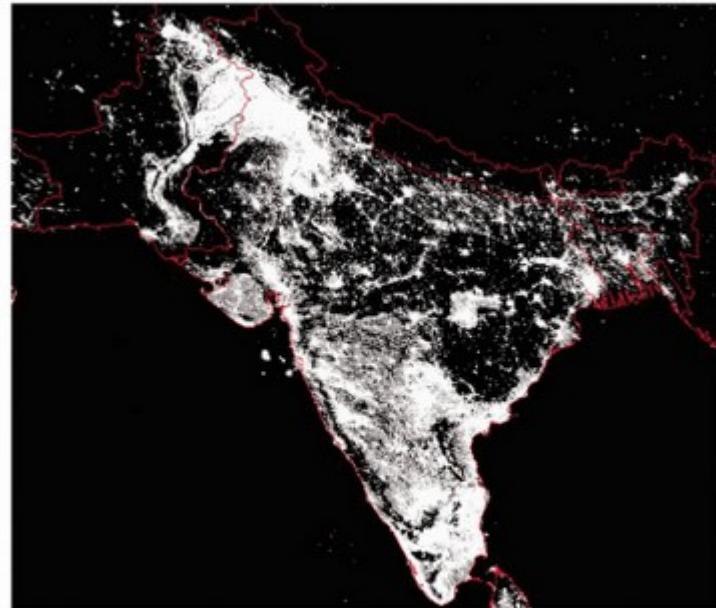


Gelişen ülkeler

Satellite images of South Asia by night



South Asia in 1994

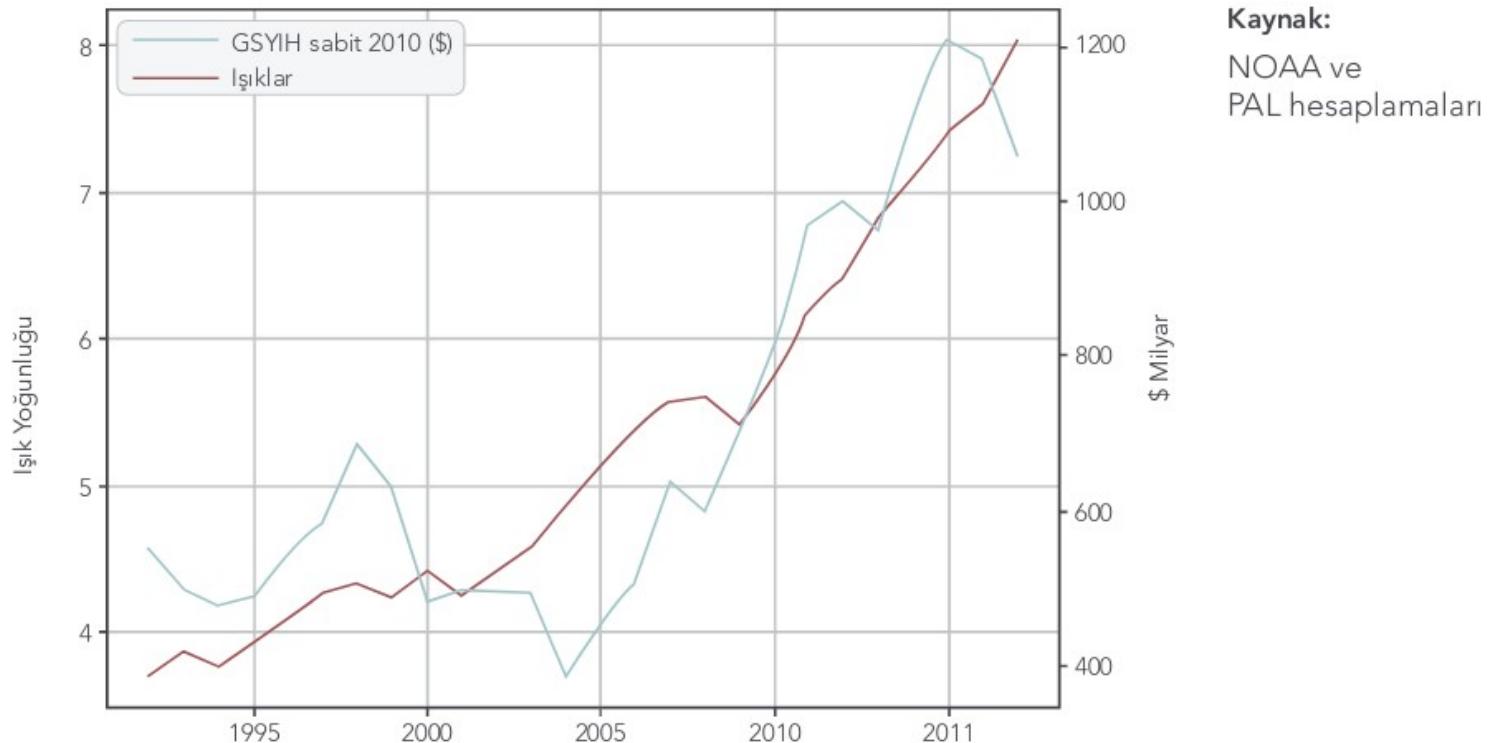


South Asia in 2010

Images are taken from Maxim Pinkovskiy and Xavier Sala-i-Martin (2016) – *Lights, Camera ... Income! Illuminating the National Accounts-Household Surveys Debate*. The Quarterly Journal of Economics

Türkiye

Şekil 1: 1992-2017 YILLARI ARASINDA TÜRKİYE'NİN GSYH'Sİ (SABİT 2010 \$) VE GECE İŞIK DEĞERLERİ

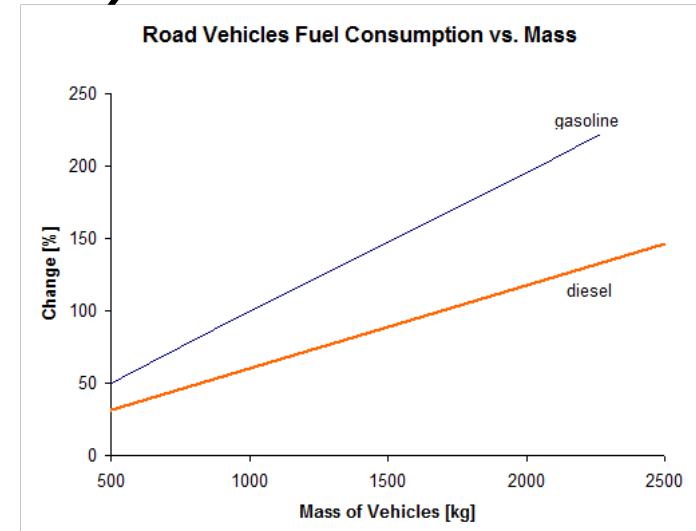


Kaynak:
NOAA ve
PAL hesaplamaları

Aynı dönüşüm ulaştırmada olabilir mi?

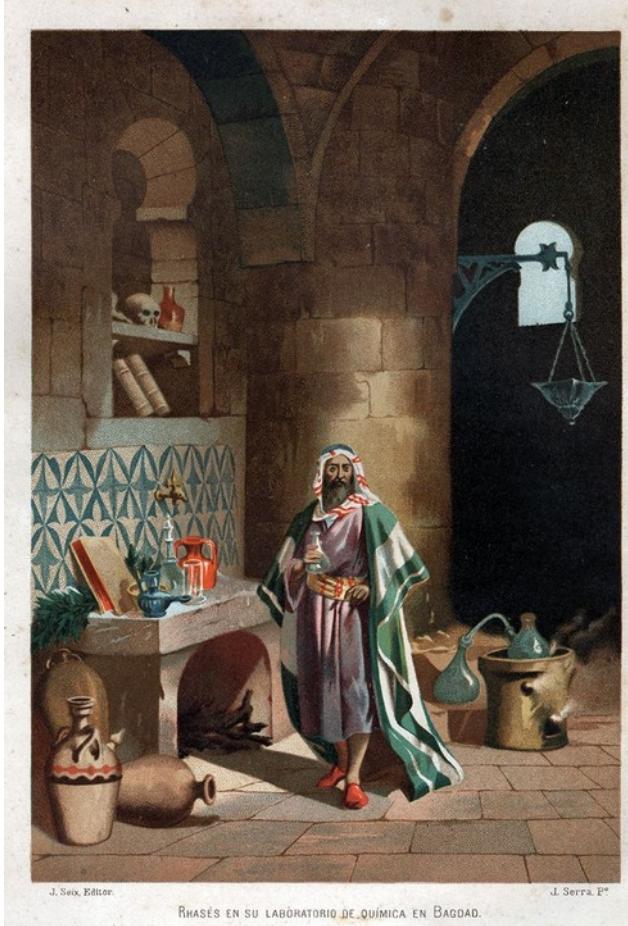
Örnek

- Ortalama araba 1000 kg
- 100 km'de 8 litre ~ 80 kWh (dizel)
- 100 km'de 20 kWh (elektrikli araba)
- Ağırlık 500 kg~ 10 kWh
- Katı hal soğutma?



Tarihsel

Kitab-al Asrar – Petrol distilasyonu



Persian scholar Abū Bakr Muhammād ibn Zākariyyā al-Rāzī describes the process of distilling oil to produce kerosene in his *Kitāb al-Asrār* (The Book of Secrets). Credit: Leemage/Getty

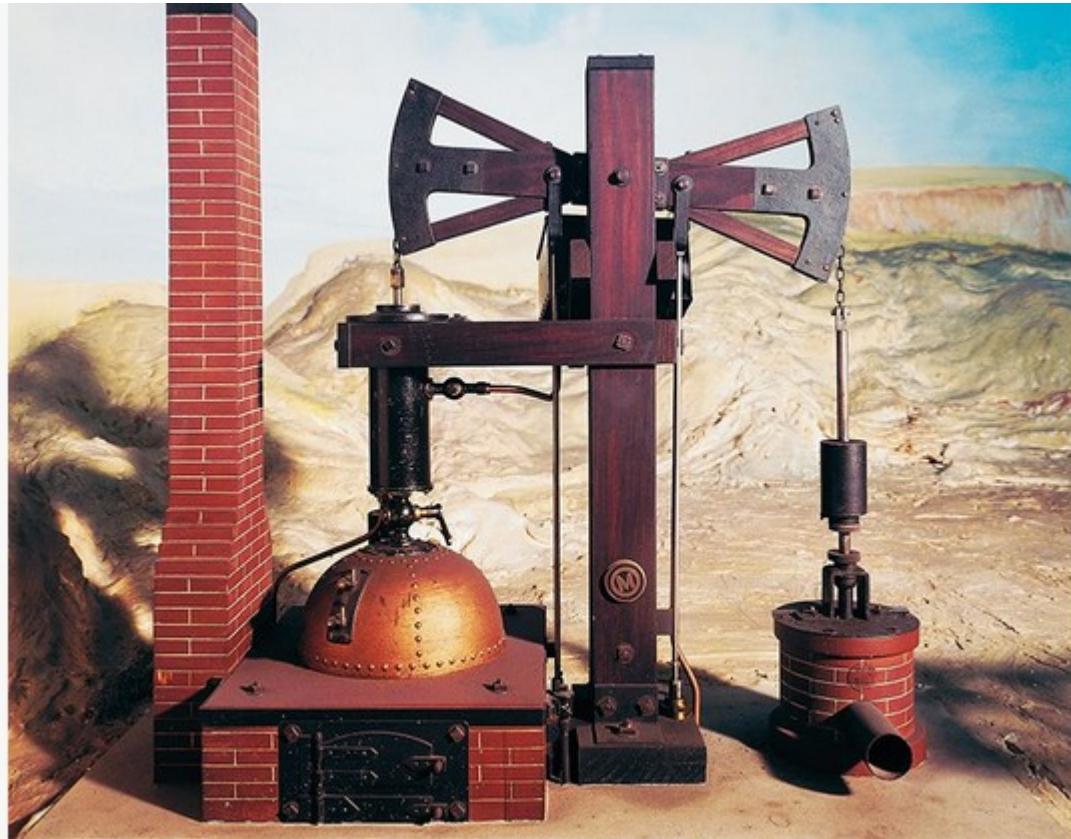
<https://www.nature.com/articles/d41586-017-07506-z>

1086 ve 1534

- 1086 : Kıyamet kitabı – 5624 su dejirmeni
 - 350-440 kişiye bir dejermen
- 1534: İngiltere
 - Kömür maden artışı
 - 1620 enerjinin yarısı

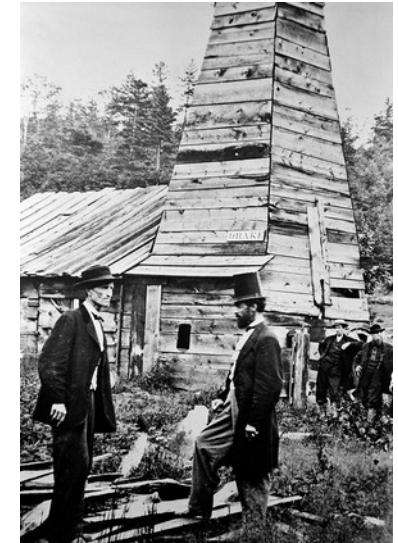


1712



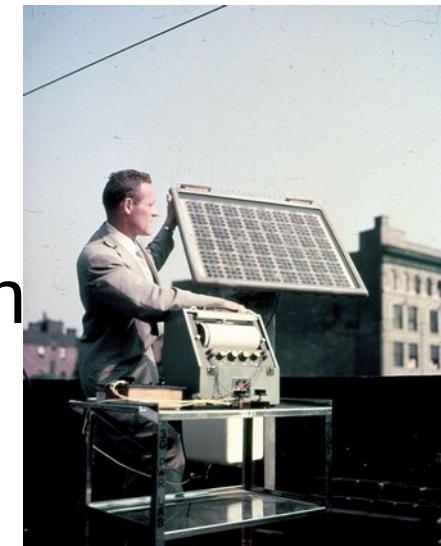
1800'ler

- 1858-1859 Titusville
- 1882 Edison – Pearl istasyonu
- 1886 Benz-Daimler



1904-1954

- 1904 ilk jeotermal elektrik deneme
- 1911 – Larderello jeotermal elektrik üretimi
- 1954 – İlk pratik güneş paneli
- 1954 – Rusya ilk nükleer elektrik
- 1975 – Brezilya Ethanol (şeker kamışından)
- 1980 - Rüzgar



Sonuç

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