Enerji Krizleri **Neden** Önemlidir?

Barış Sanlı
barissanli.com

9 Nisan 2020 – Bilgi Energy Crew

Bu sıralar

Yazılar : bilkenteprc.com/synergy
Ders/video : https://www.youtube.com/c/bilkentenergypolicyresearchcenter
Podcast: https://anchor.fm/enerji-sohbetleri

Web: barissanli.com
Twitter: @barissanli

Neden?

- Enerji politikaları enerji krizleri ile şekilleniyor
- Tarihsel dönüm noktaları
- Kriz → otopilot → kriz → otopilot
- Odaklanma → kurumsallaşma → yeni yön
- Dinamikleri öğrenmek
- Tarihini okuyunca binlerce hayat, onlarca tecrübe
- Uzman kime denir? Tarih ve detay

Krizlerin değişik etkileri

- Beklenen: Küresel ekonomik krizler
- Kaotik zamanlama : Elektrik kesintileri
- Öğretici: Salgın-Pandemik
- Hazırlık: “bilmediğimiz tehlike”

Uç olay kategorileri

Box 1 | Categories of extremes relevant to energy modelling and scenarios research

Category 1: Transient events

Events that might be considered out of the ordinary in the 'statistically low probability of occurrence' sense. These are events that may be anticipated but not necessarily well planned for. They could therefore be disruptive (whether singularly or as a cascading series).

Examples: weather events at the far edges of the 'normal' range; or a sudden and widespread financial and economic meltdown, like the sub-prime mortgage crisis of 2007–2008.

Category 2: Disruptive drivers

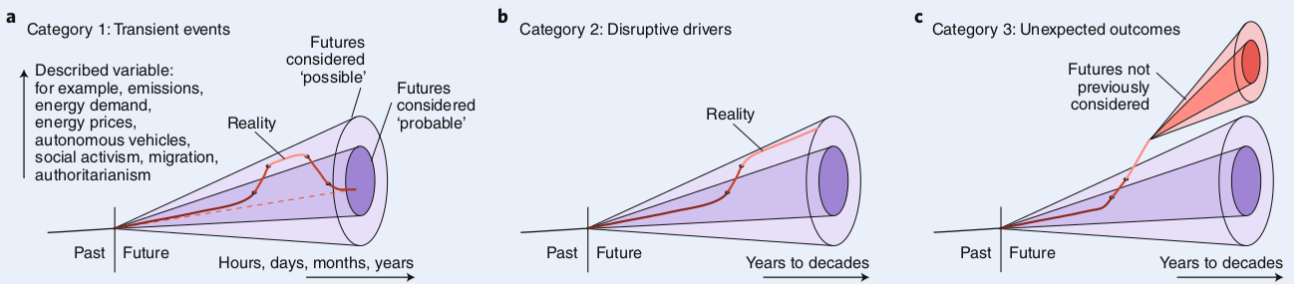
Mega-trends that might be considered out of the ordinary in the 'beyond common perceptions of a probable future' sense. While the rudiments of such drivers may currently be anticipated, at least by some, the speed and scale at which they accelerate change may not be. Therefore, they would almost certainly be disruptive.

Examples: mass automation of service and manufacturing jobs at a rate much faster than currently anticipated; or the disentangling of deep-rooted economic and political alliances, like with Brexit and the China–US trade wars.

Category 3: Unexpected outcomes

Eventualities that might be considered out of the ordinary in the 'not even on the radar' sense — sometimes referred to as 'black swans'. These outcomes would be unanticipated, and in many cases they would be disruptive. Diverging so fundamentally from the status quo, they could push society to states where it has never been, or ever imagined being.

Examples: past surprises like prolonged wars spurred by terrorism; the forceful occupation of nation-states by others; re-emergence of nationalism; the seemingly irreparable fracturing of democratic institutions and political discourse by media; new discoveries in science, engineering, and medicine that redefine what is considered feasible.

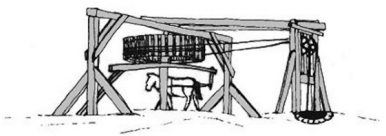


Visualization based on refs. [19–21].

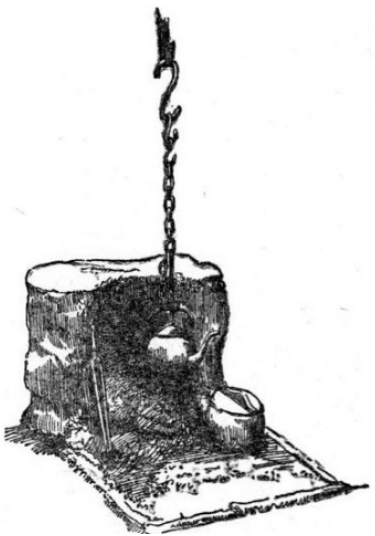
https://www.nature.com/articles/s41560-020-0555-3

Odun krizi

- İngiltere’de 1600’lerde başlayan ve buhar makineleri ile biten süreç



Horse gin.

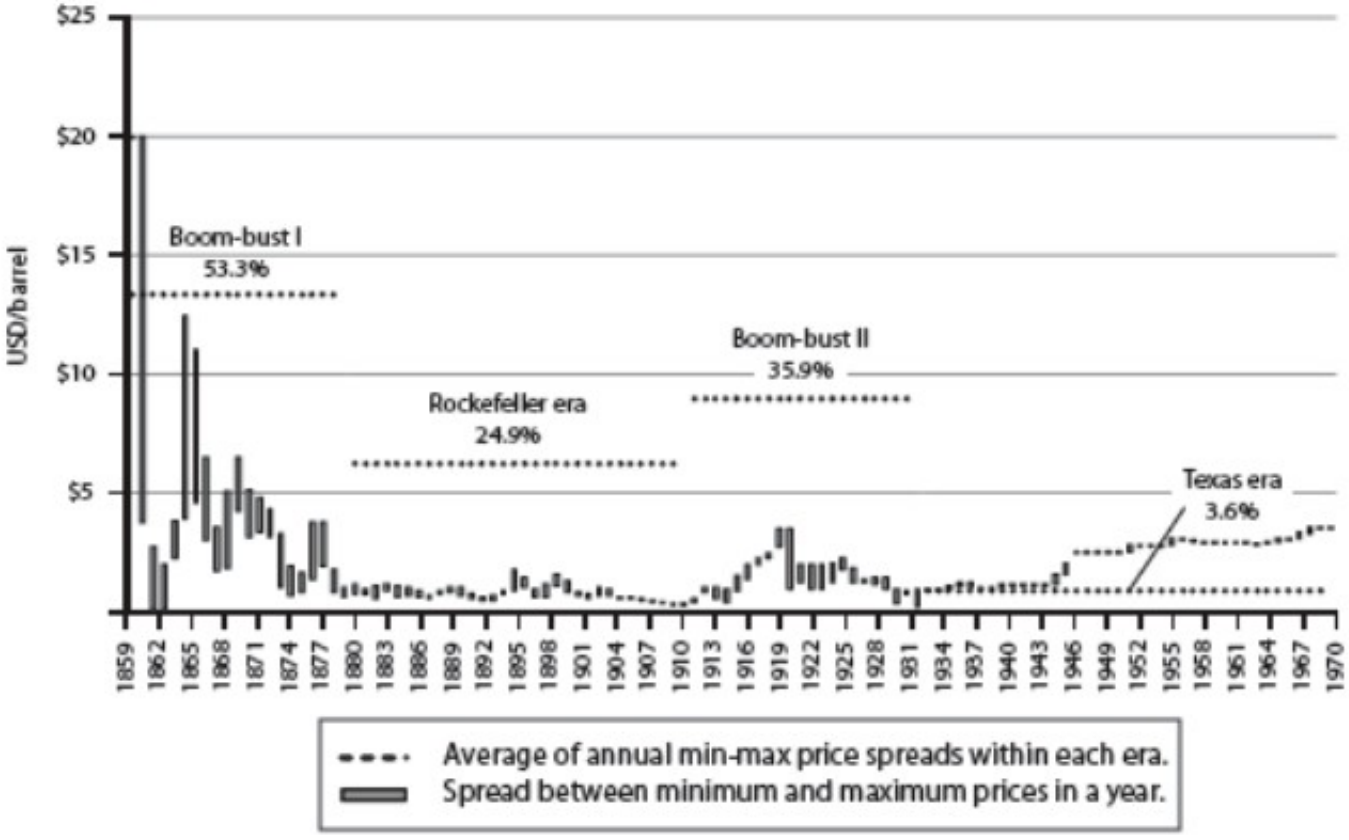


ABD’de tekrarlanan odun krizi

- Krizin gelişimi 1865-1896
- Demiryollaru deneyleri 1880-1896
- Demiryolu uyum sağlar 1896-1914
- Kriz biter 1922

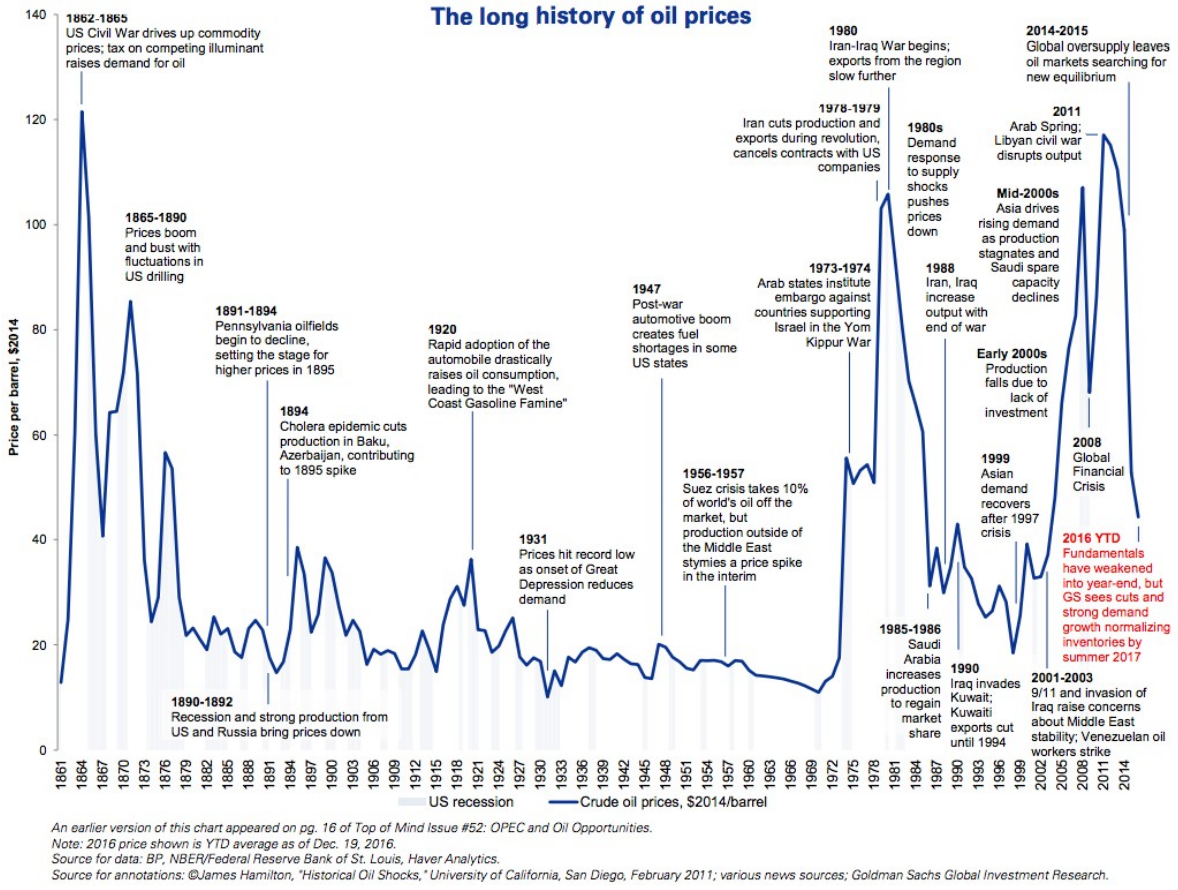
- "US Forest Service 1898-1920" : Uzmanların rolü

Petrol piyasaları kaotik mi?



Crude Volatility, The History and the Future of Boom-Bust Oil Prices, Bob McNally, 2017

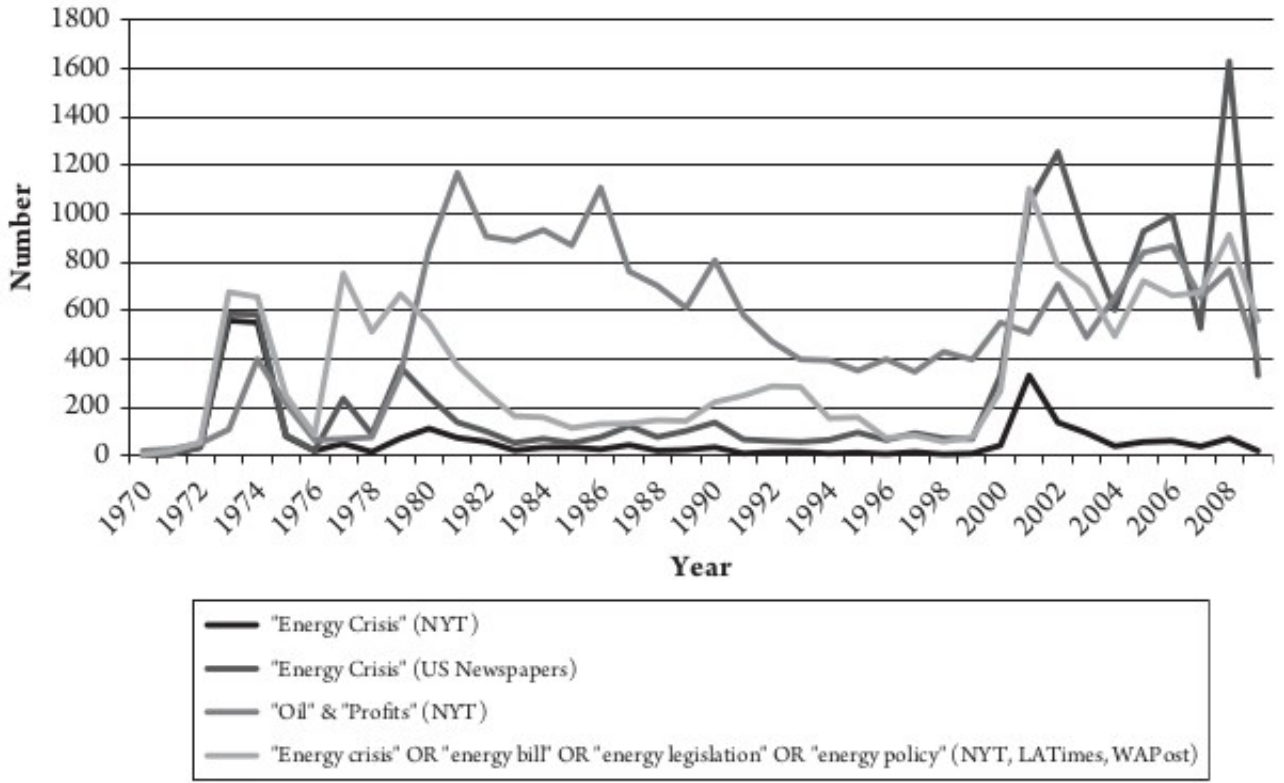
Petrol fiyatlarının uzun tarihi



An earlier version of this chart appeared on pg. 16 of Top of Mind Issue #52: OPEC and Oil Opportunities.
Note: 2016 price shown is YTD average as of Dec. 19, 2016.
Source for data: BP, NBER/Federal Reserve Bank of St. Louis, Haver Analytics.
Source for annotations: ©James Hamilton, "Historical Oil Shocks," University of California, San Diego, February 2011; various news sources; Goldman Sachs Global Investment Research.

https://www.businessinsider.com/timeline-155-year-history-of-oil-prices-2016-12

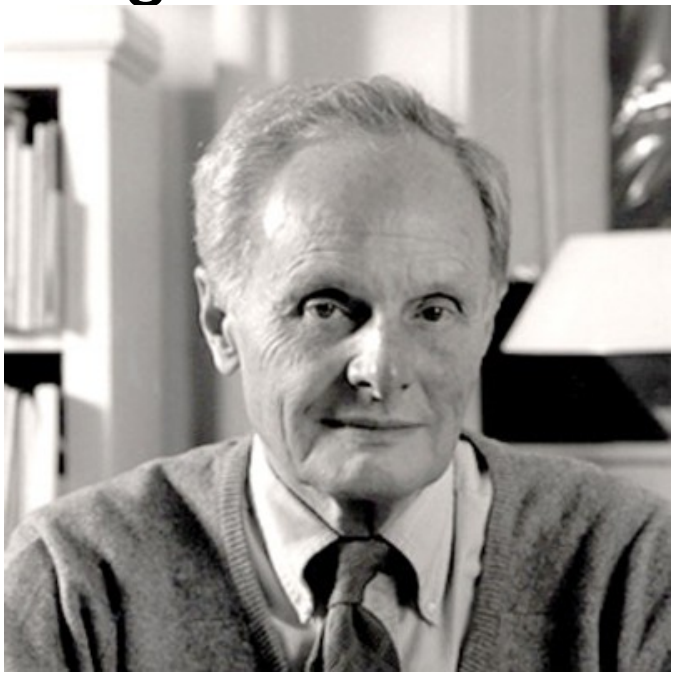
Makale sayıları

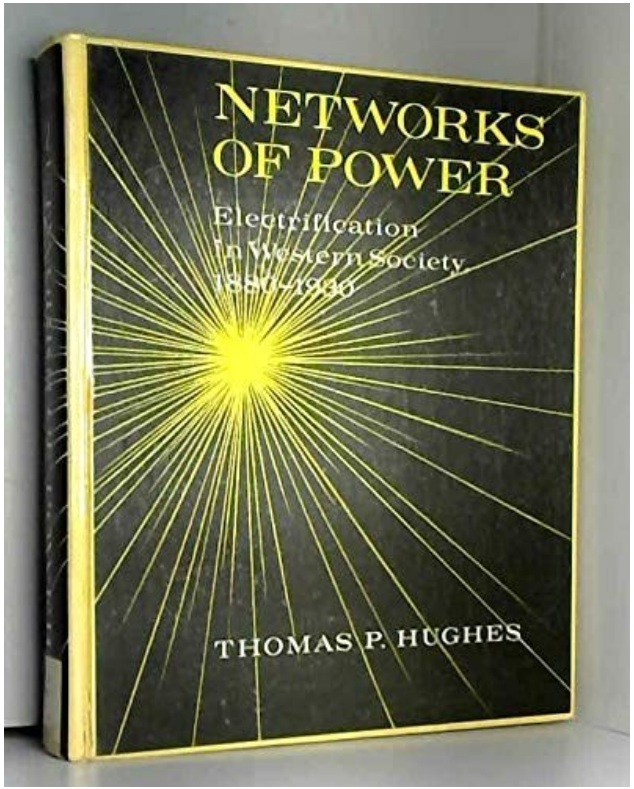


The Politics of Energy Crises, Eric R.A.N. Smith, Juliet E. Carlisle, Jessica T. Feezell, and Kristy E.H. Michaud, 2016

Networks of Power: Electrification in Western Society, 1880-1930."

- Thomas Hughes





http://news.mit.edu/2014/tom-hughes-remembering-non-lifer

Berlin - Elektropolis

- Berlin elektrik teknolojisinin merkezi
- Ülkedeki elektrik mühendislerinin %40-50

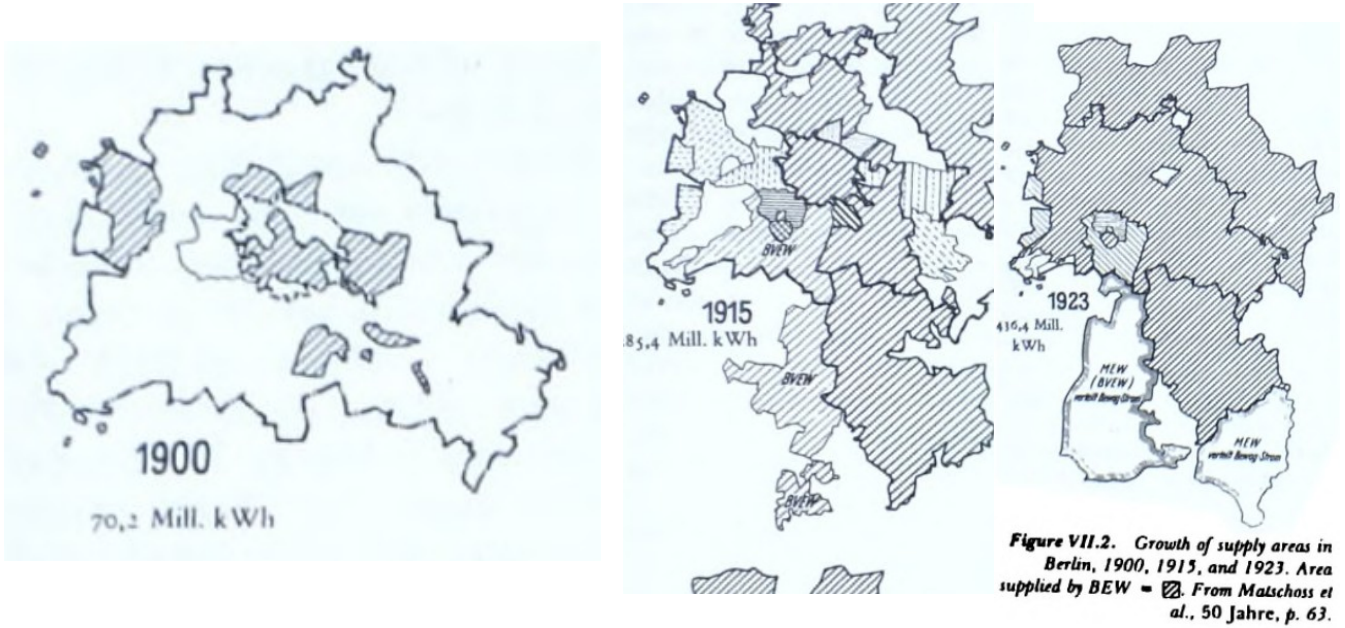


Figure VII.2. Growth of supply areas in Berlin, 1900, 1915, and 1923. Area supplied by BEW = ▨. From Matschoss et al., 50 Jahre, p. 63.

CHAPTER VII

Berlin: The Coordination of Technology and Politics

Networks of Power, T.P.Hughes

Büyük şirketler

- AEG
- Siemens

Figure V.14. Oil-filled, three-phase transformer used in the Lauffen-to-Frankfort transmission system. From Offizielle Zeitung . . . Frankfurt am Main 1891, *p. 1045.*

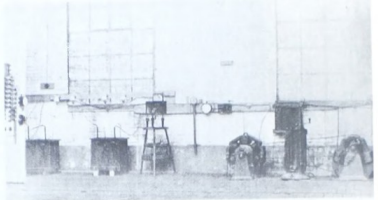


Figure V.15. Model designed by Charles E. L. Brown for testing alternating-current transmission system (January 1891): Generator (center); *two oil-insulated transformers* (left); *and motor* (right) *which drove the generator. Courtesy of Brown, Boveri & Co., Baden, Switzerland.*

Figure V.16. Three-phase motor designed by Dolvo-Dobrowsky (the type used in the Lauffen-to-Frankfort transmission system). From Offizielle Zeitung . . . Frankfurt

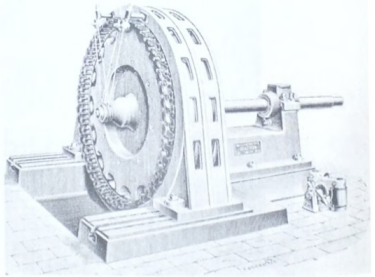


Figure V.17. Three-phase generator (designed by Charles E. L. Brown of the Maschinenfabrik Oerlikon) driven by water turbines at Lauffen. From Offizielle Zeitung . . . Frankfurt am Main 1891, *p. 599.*

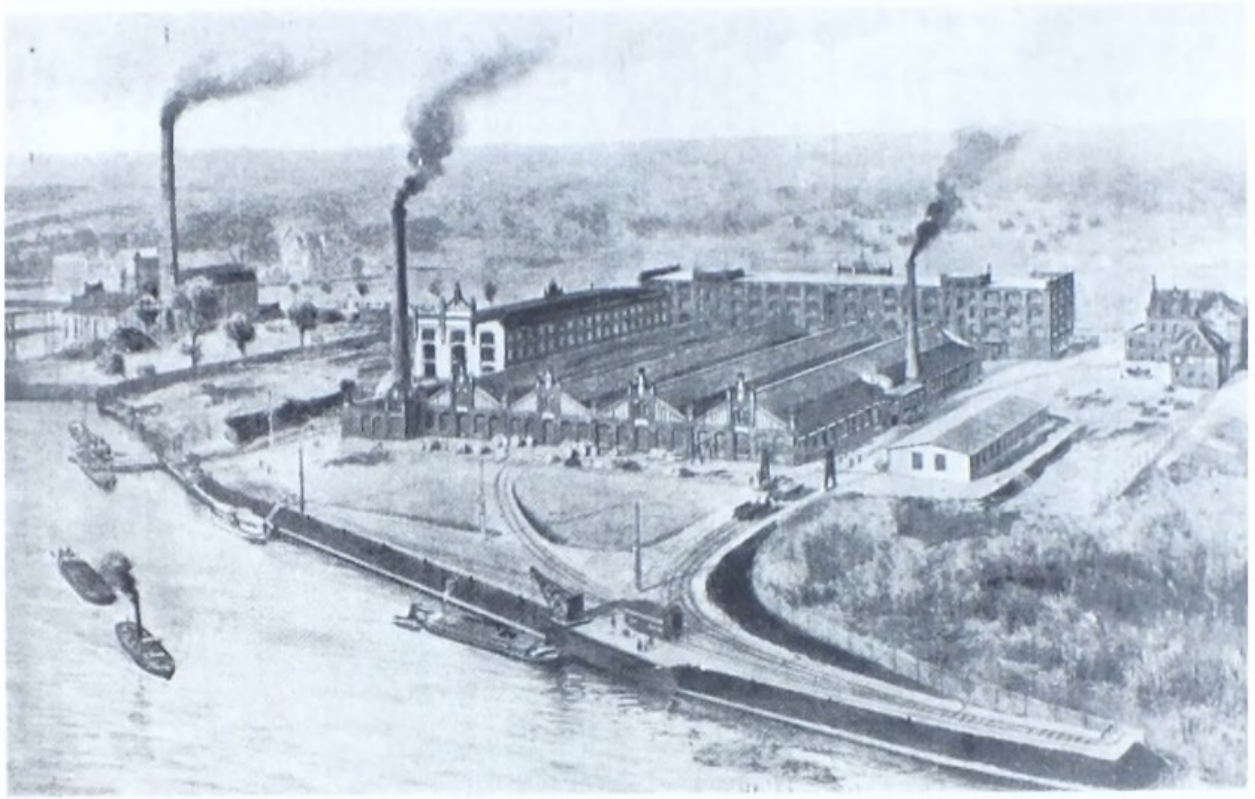
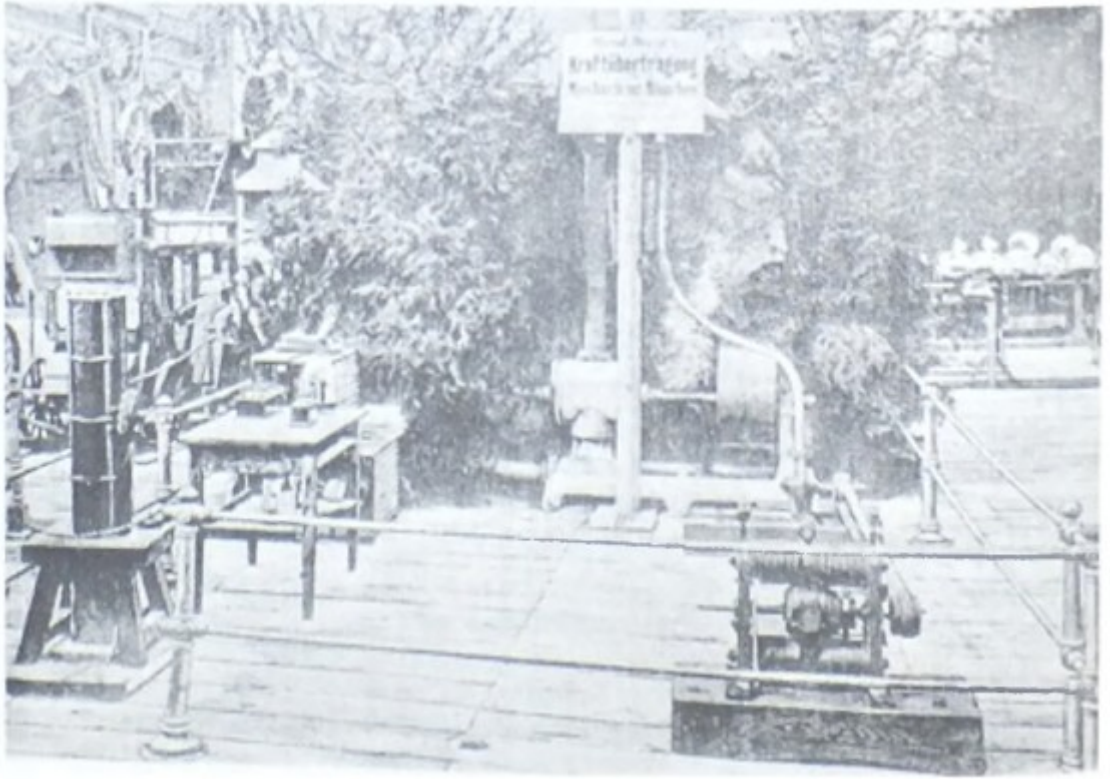


Figure VII.8. *The polyphase central station at Oberspree* (left) *and the AEG Cable Works, its primary load* (right), *1897. From Matschoss et al.,* 50 Jahre, *p. 30.*

Networks of Power, T.P.Hughes

1882 - Munich

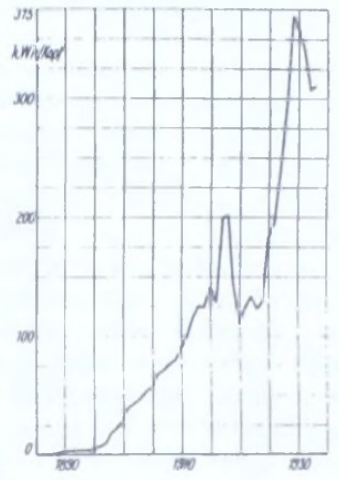
NETWORKS OF POWER



Berlin’in elektrik tüketimi

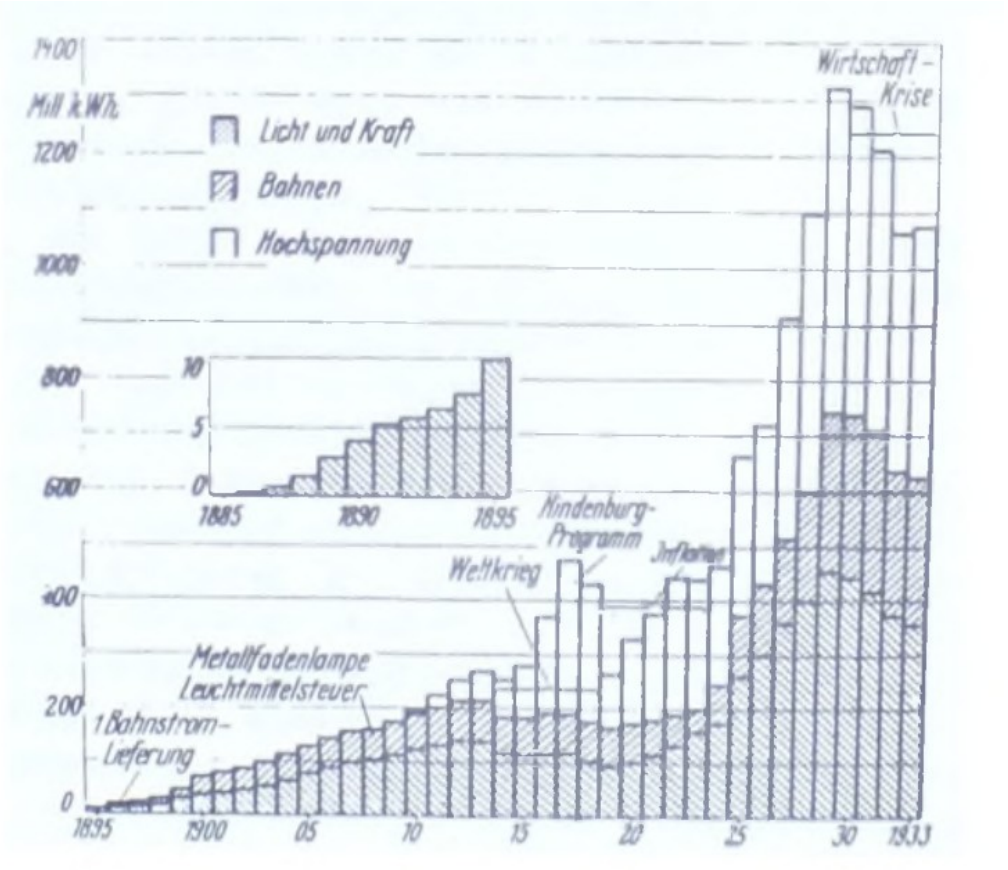
Figure VII.5. *Increase in electricity consumption in Berlin: Percentage of Berlin households connected* (table left); *increase in kilowatt-hours consumed per capita* (graph right). *From Matschoss et al.*, 50 Jahre, *p. 56.*

Jahr	angeschlossene Berliner Wohnungen vH
1910	3,5
1914	5,5
1918	6,6
1922	11
1925	25
1927	50
1928	55
1929	60
1930	68
1931	70
1932	74
1933	76



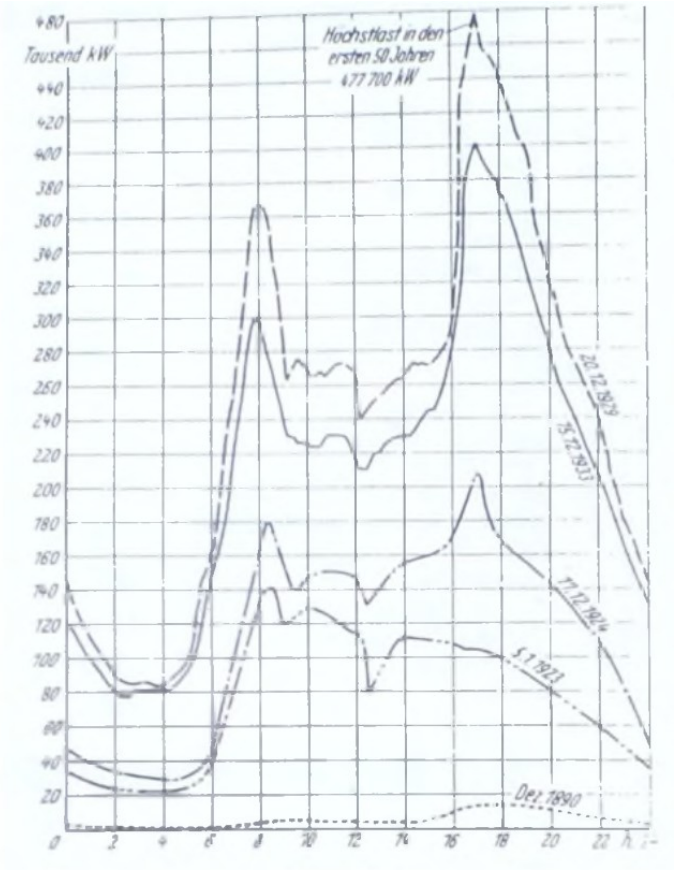
Berlin’in elektrik tüketimi

Figure VII.6. *Development of various loads. BEW: Light and power* (Licht und Kraft); *electric traction* (Bahnen); *and high-voltage transmission* (Hochspannung). *From Matschoss et al.,* **50 Jahre**, *p. 89.*

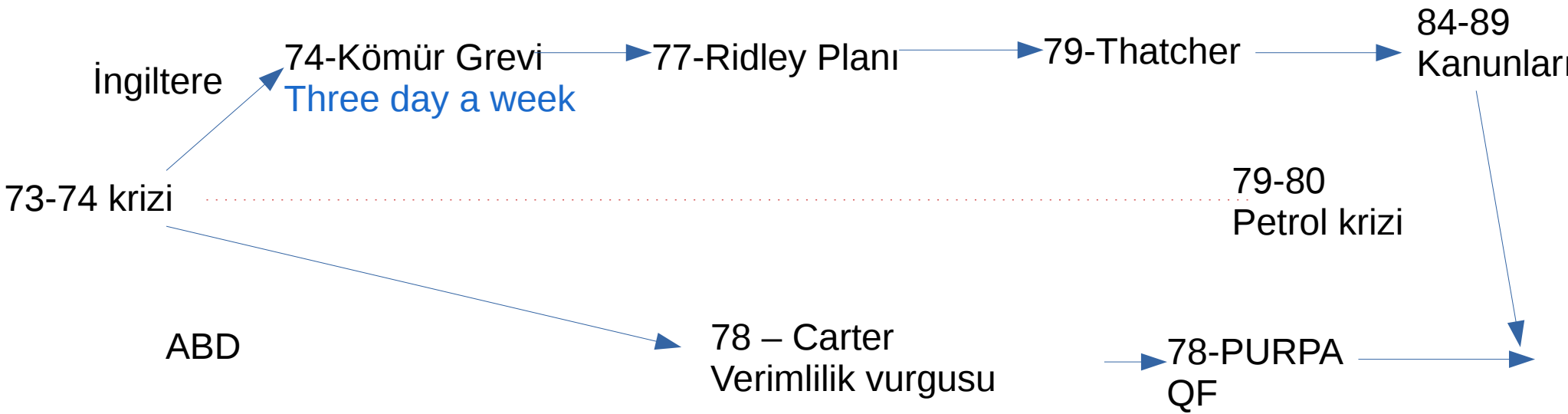


Berlin’in elektrik tüketimi

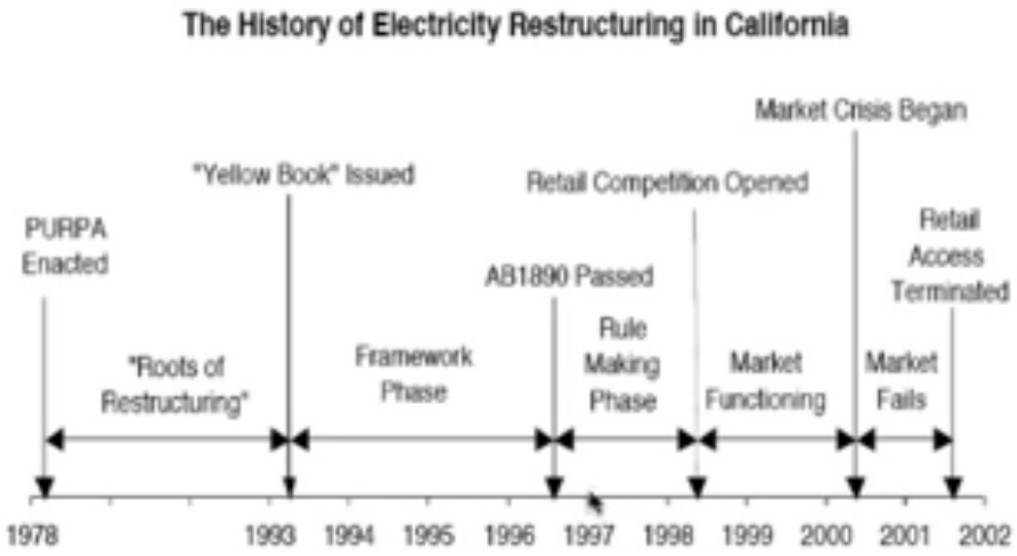
Figure VII.7. *BEW load curves on days of highest load* (Höchstlast). *From Matschoss et al.*, 50 Jahre, *p. 71.*

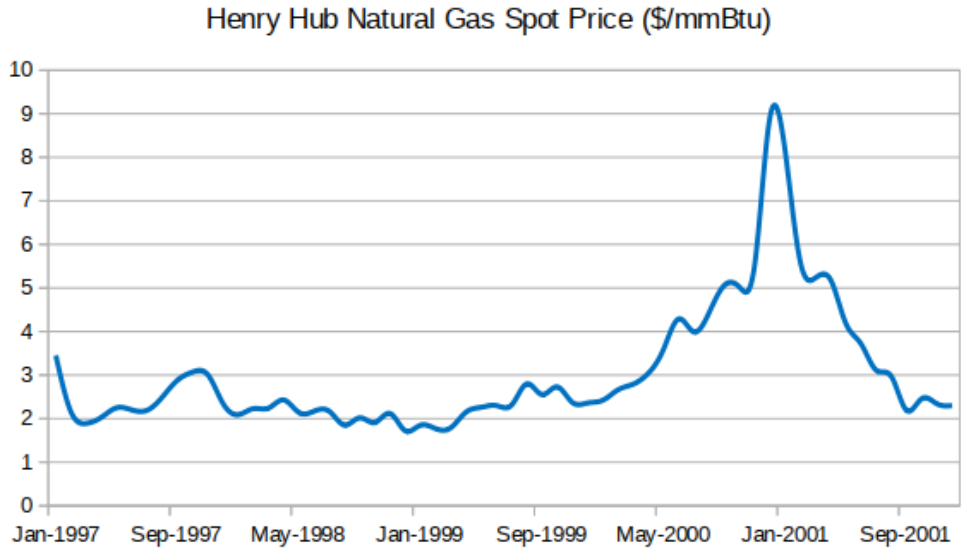


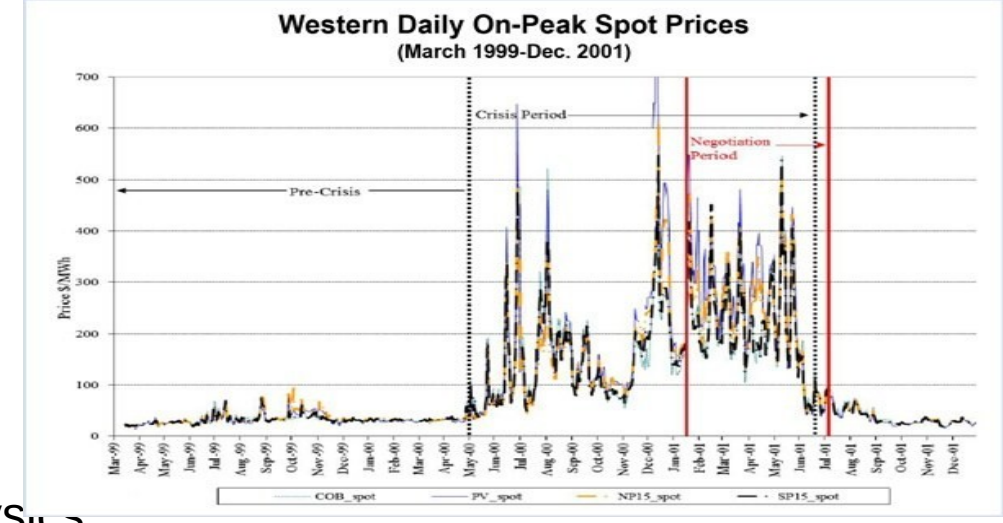
Kalifornia öncesi tarihsel süreç



California Krizi - Enron

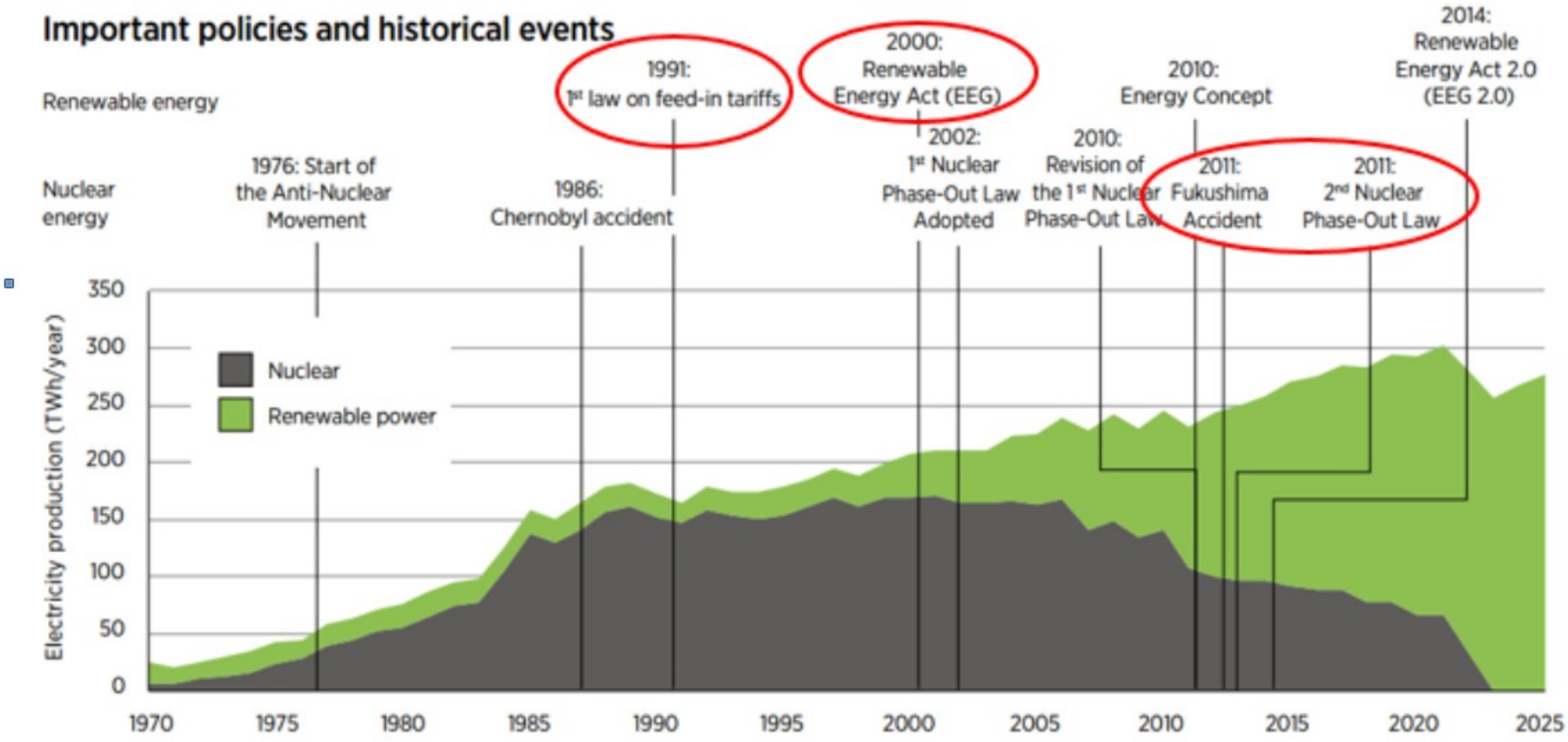




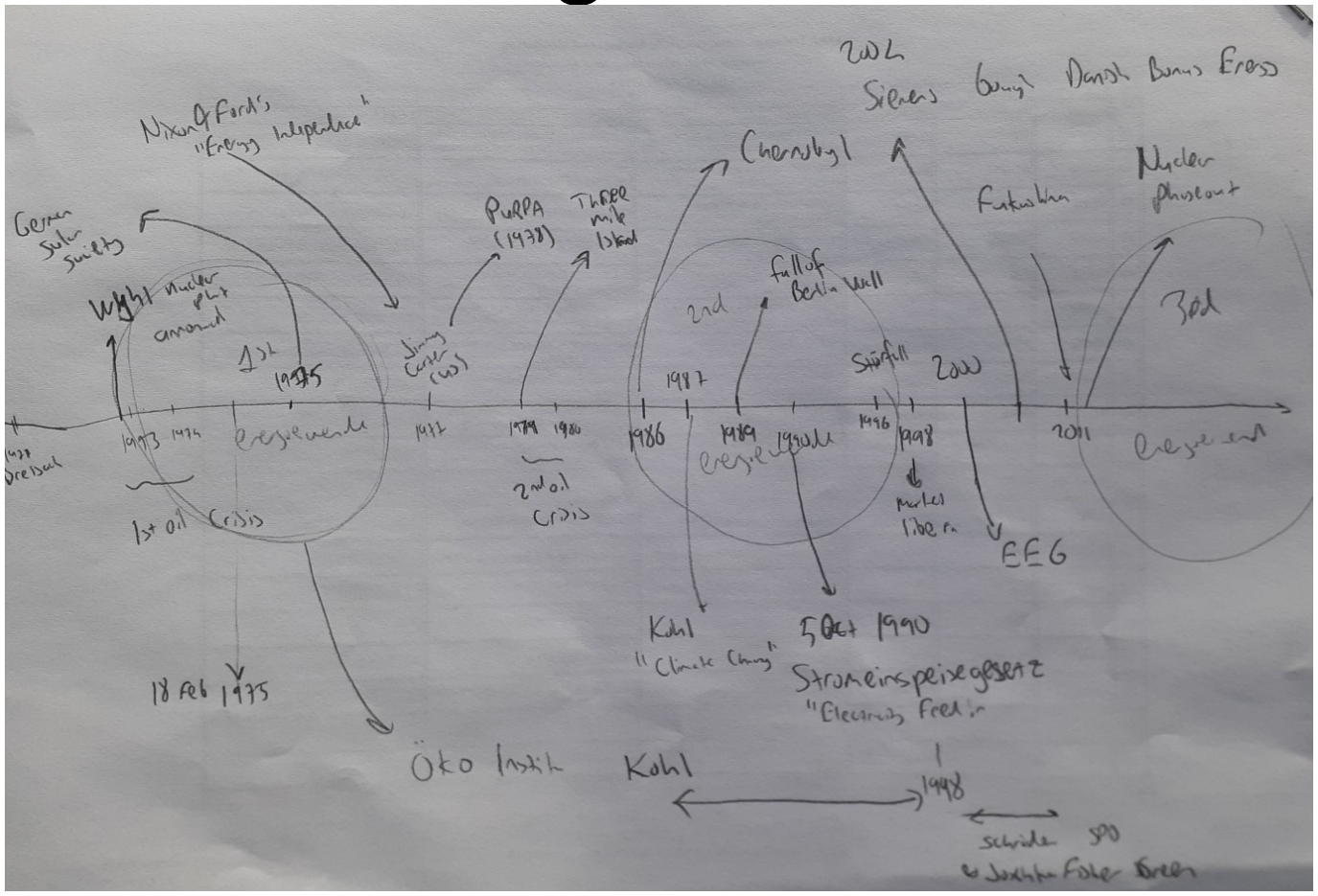


9b California Energy Crisis; Schwartz Cal Poly Physics ;
https://www.youtube.com/watch?v=SC5mAZg2SN4

Energiewende - Olaylar



Energiewende



Gaz krizleri – Tarihsel süreç

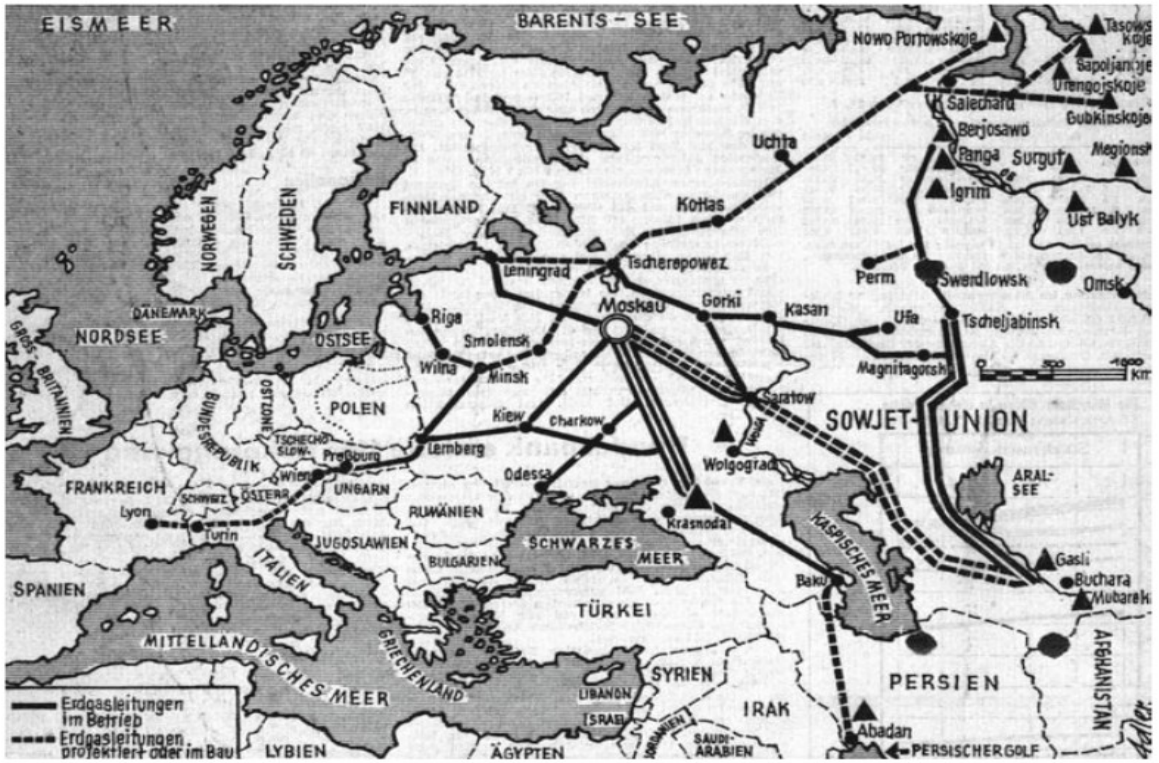


Figure 4.3 The vision of a Trans-European Pipeline for exports of Siberian natural gas to Austria, Italy, and France.

Source: Süddeutsche Zeitung, April 22, 1967. Reproduced by permission.

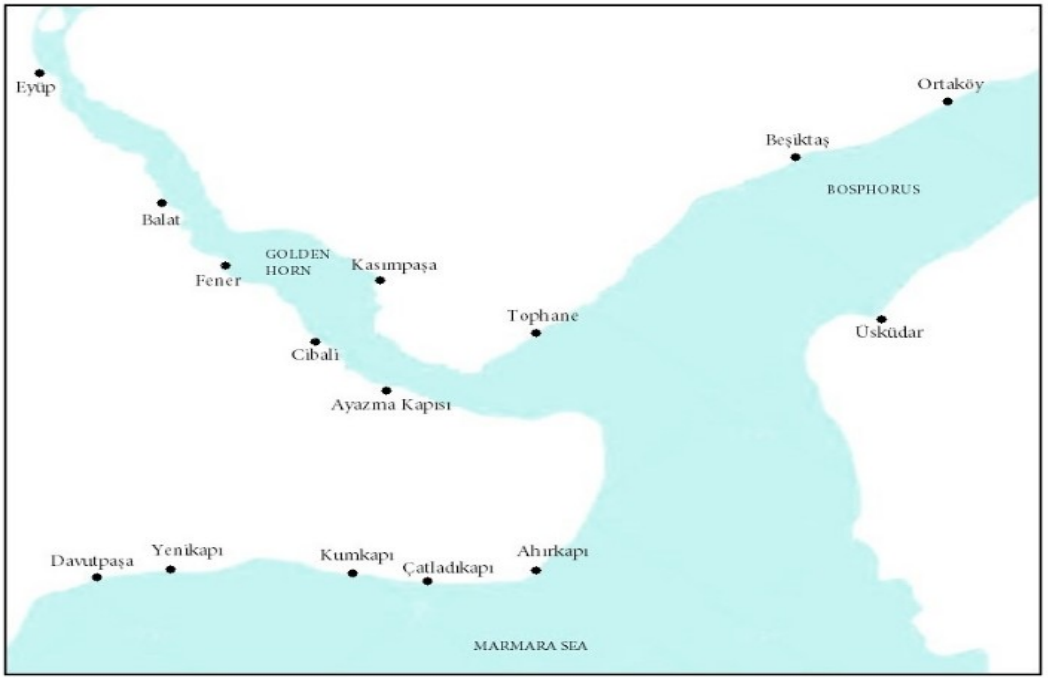
Red Gas: Russia and the Origins of European Energy Dependence, Per Högselius, 2013

Osmanlı - Odun kömürü taşımacılığı

Photograph 2.1 Camel Caravan Transporting Charcoal to Istanbul c.1880.
(Photograph by Guillaume Berggren)

PhD Thesis, From Wood to Coal: The Energy Economy in Ottoman Anatolia and the Balkans, Alaaddin Tok, December 2017, Boğaziçi University/İstanbul

Osmanlı -Yakıt depoları



Map 3.1 Major Wood Fuel Wharfs in Istanbul

Photograph 3.1 A Firewood Dealer and Woodpiles in Ahırkapı (c.1880)
(Photograph by Sebah & Joaillier)

PhD Thesis, From Wood to Coal: The Energy Economy in Ottoman Anatolia and the Balkans, Alaaddin Tok, December 2017, Boğaziçi University/İstanbul

Buharlı gemiler

Photograph 4.1 Steamships in the Port of Istanbul (c. 1900) (http://www.levantineheritage.com/constantinople.htm, Photograph by Guillaume Berggren)

PhD Thesis, From Wood to Coal: The Energy Economy in Ottoman Anatolia and the Balkans, Alaaddin Tok, December 2017, Boğaziçi University/İstanbul

Yerli madencilik

Photograph 5.1 Coal Miners at Kozlu (Abülhamid Collection)

PhD Thesis, From Wood to Coal: The Energy Economy in Ottoman Anatolia and the Balkans, Alaaddin Tok, December 2017, Boğaziçi University/İstanbul

Ana savaşlar

- Kırım Savaşı (1853-1856)
- Balkan Savaşı (1912-1913)
- World War 1

Ereğli Kömürleri

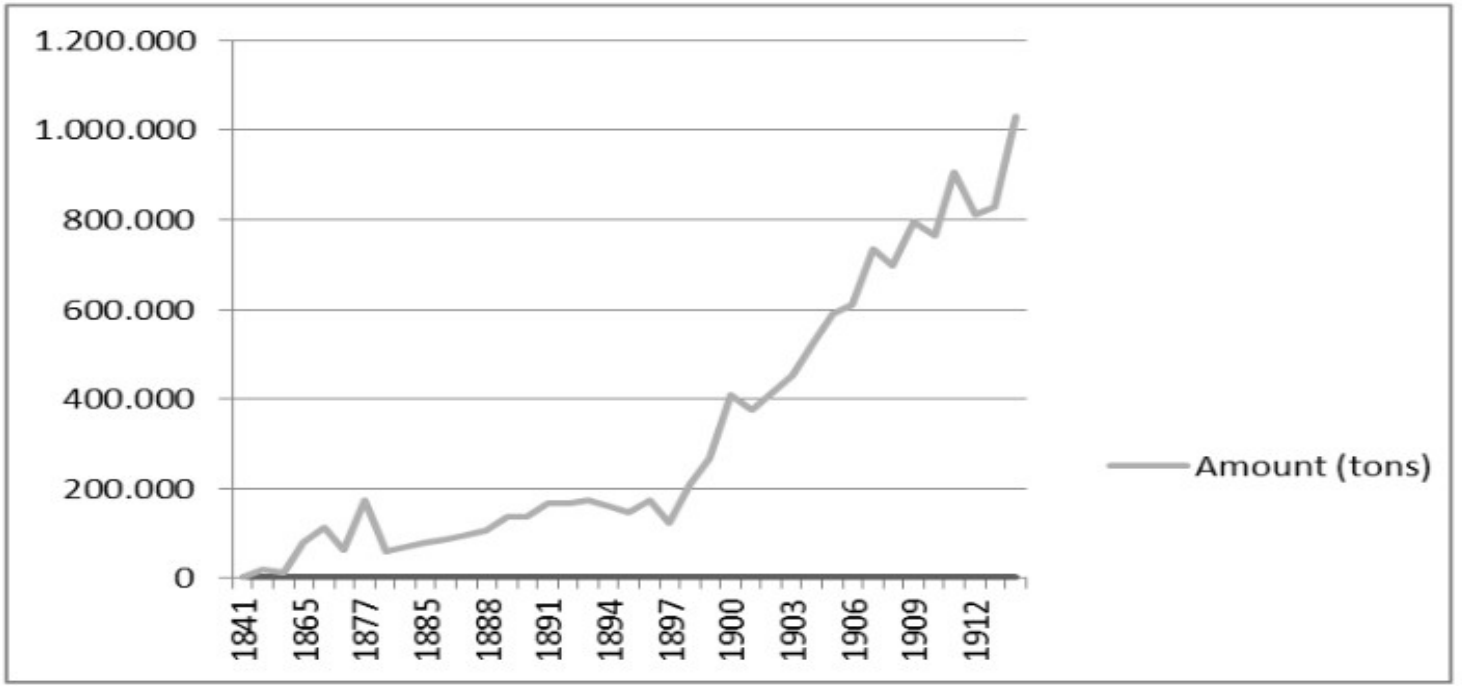


Figure 5.1 Annual Output in the Ereğli Coalfield. (Source : BOA HH.d.. 21171 ; Genç, "Ereğli Kömür Madenleri," 89; *Revue Commerciale du Levant*, no.259, 544)

PhD Thesis, From Wood to Coal: The Energy Economy in Ottoman Anatolia and the Balkans, Alaaddin Tok, December 2017, Boğaziçi University/İstanbul

Keban Megaprojesi

Keban barajı için görüşme başlıyor

Barajın finansmanına İştirak eden devletlerin delege ve müşahitleri toplantıya katılacak

ANKARA, ÖZEL

KEBAN Barajı finansmanı ile ilgili olarak yarın Devlet Plânlama Teşkilâtında başlayacak olan toplantıya Amerika, Batı Almanya, Avrupa Yatırımlar Bankası, AID temsilcileri ile Fransa, İngiltere, İsviçre, Avusturya, Para Fonu müşahitleri katılacaklardır. Türk heyetine Plânlama Teşkilâtı Müsteşarı Mehduh Aytür başkanlık edecektir.

Toplantıda, dünyanın beşinci büyük barajı olacak ve Türkiye'nin ekonomik ve sosyal kalkınmasında büyük rol oynayacak olan Keban Barajı inşaasında lüzumlu olan 307 milyon dolarlık iç ve dış finans-

Devamı Sa. 7, Sü. 4 de

KEBAN BARAJININ MAKETİ. SANTRAL BİNASI, DOLU SAVAK VE TRAFO TESİSLERİ

1974 Kıbrıs Barış harekatı

Keban

Keban Barajının 8 yıllık öyküsü...

CUMHURİYET HABER MERKEZİ

Dünyamızın hiçbir yerinde enerji sorununu çözümlemeden kalkınabilen bir ülke görülmedi; Keban bu yolda atılan dev bir adımdır

Keban Barajının inşaatına 1966 yılında nihayet başlandığında toplam enerji tüketimi gülünçtü: 6 milyar kilovatsaat

En ucuz enerji sudan...

Ünlü Yengeç mağarası

Yurtlarından olan 40 bin kişi ne olacak ?

CUMHURİYET HABER MERKEZİ

Evsiz yurtsuz kalanlar

Üvey evlatlık

İşsizlik sorunu

7 MİLYARA MALOLAN KEBAN, TÜRKİYE'NİN TOPLAM ENERJİ ÜRETİMİNİN YARISINI SAĞLAYACAK: 5 MİLYAR KİLOVATSAAT

İnşaat 8 yıl sürdü

Keban'ın öteki yüzü: İstimlâk yolsuzlukları

DEVLETE 742 MİLYON YERİNE 3 MİLYARIN ÜZERİNDE BİR MİKTARA MALOLAN YOLSUZLUKLARI ORTAYA ÇIKARAN RAPORDA, OLAY, «ŞER KUVVETLERİNCE SÜRDÜRÜLEN TAM BİR HAZİNE YAĞMASI» OLARAK NİTELENİYOR

Cumhuriyet Gazetesi arşivi

Keban hatlarında sorunlar

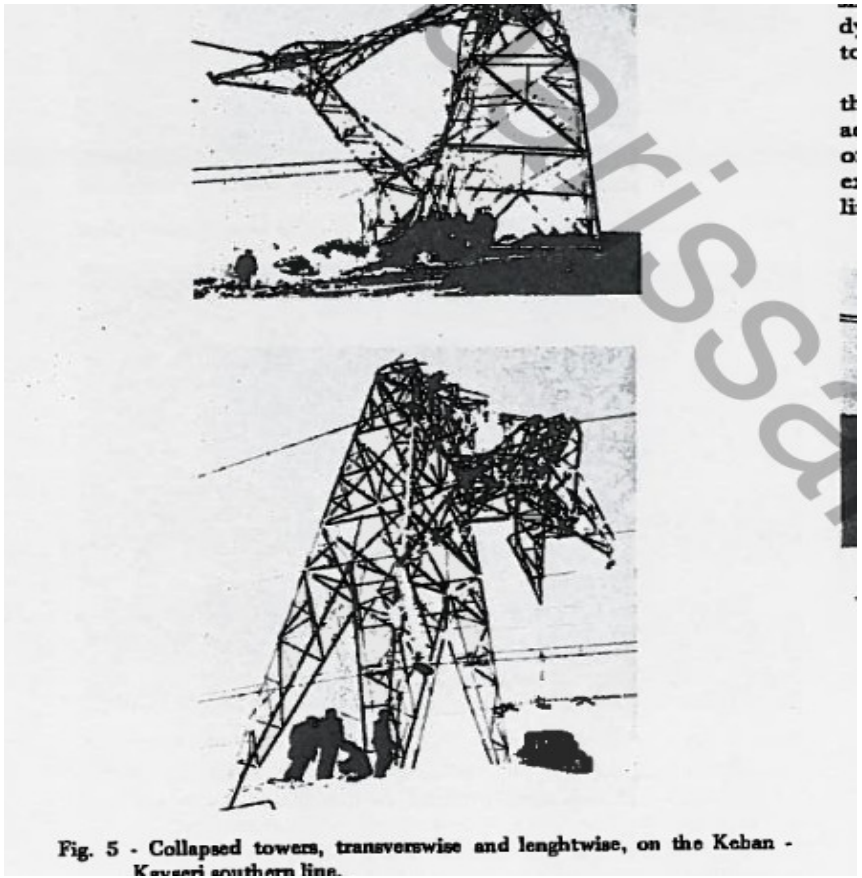
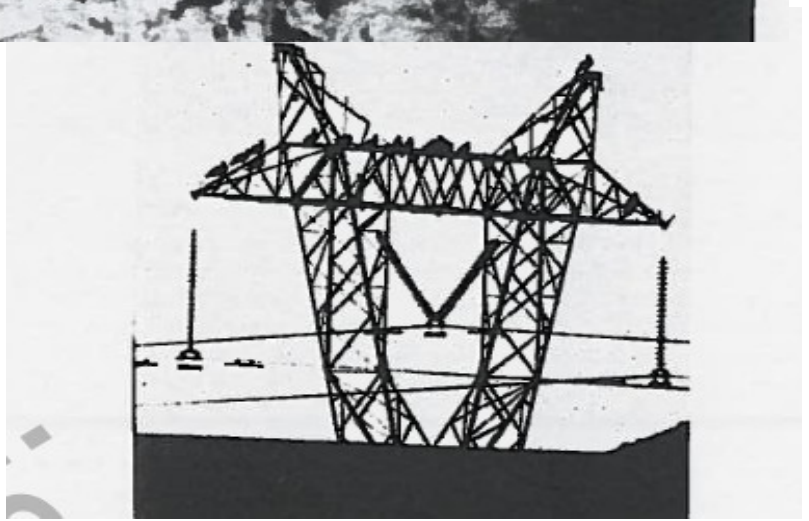
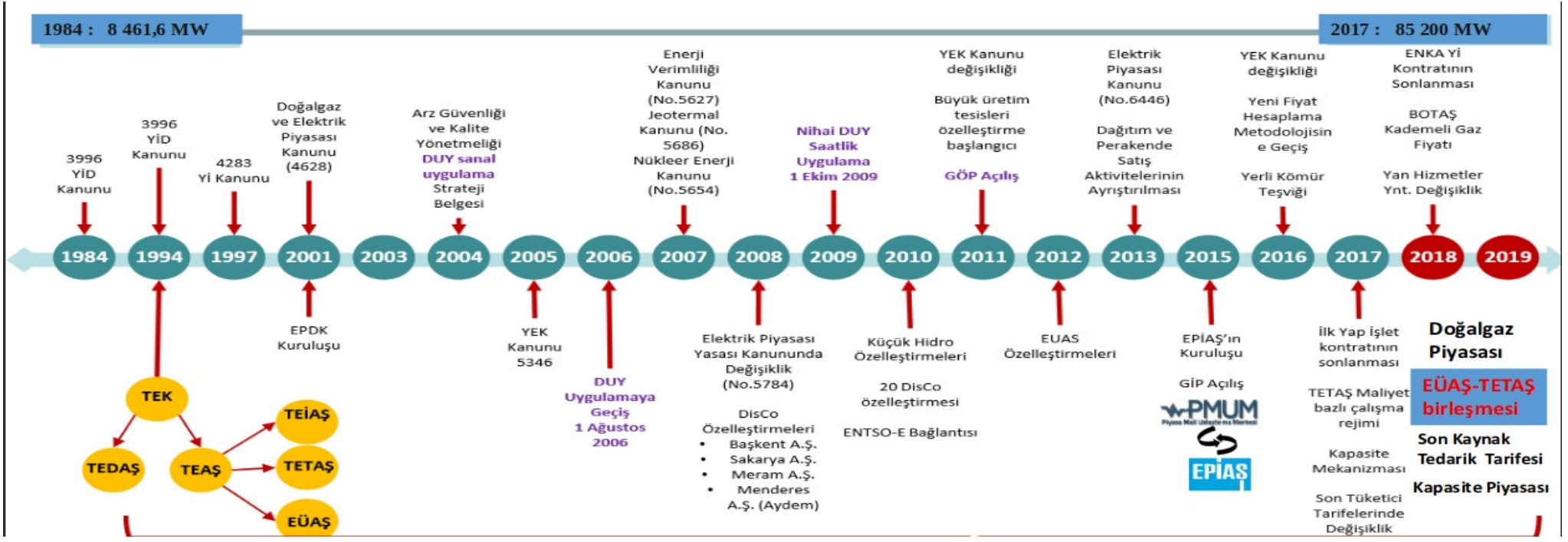


Fig. 5 - Collapsed towers, transverswise and lenghtwise, on the Keban - Kayseri southern line.



http://barissanli.com/calismalar/tarih/iliceto2.pdf

Elektrik sistemi yakın tarihi



https://www.dunyaenerji.org.tr/wp-content/uploads/2018/09/FYazitasSunum22Eylul.pdf

Enerji kurumları nasıl şekillendi?

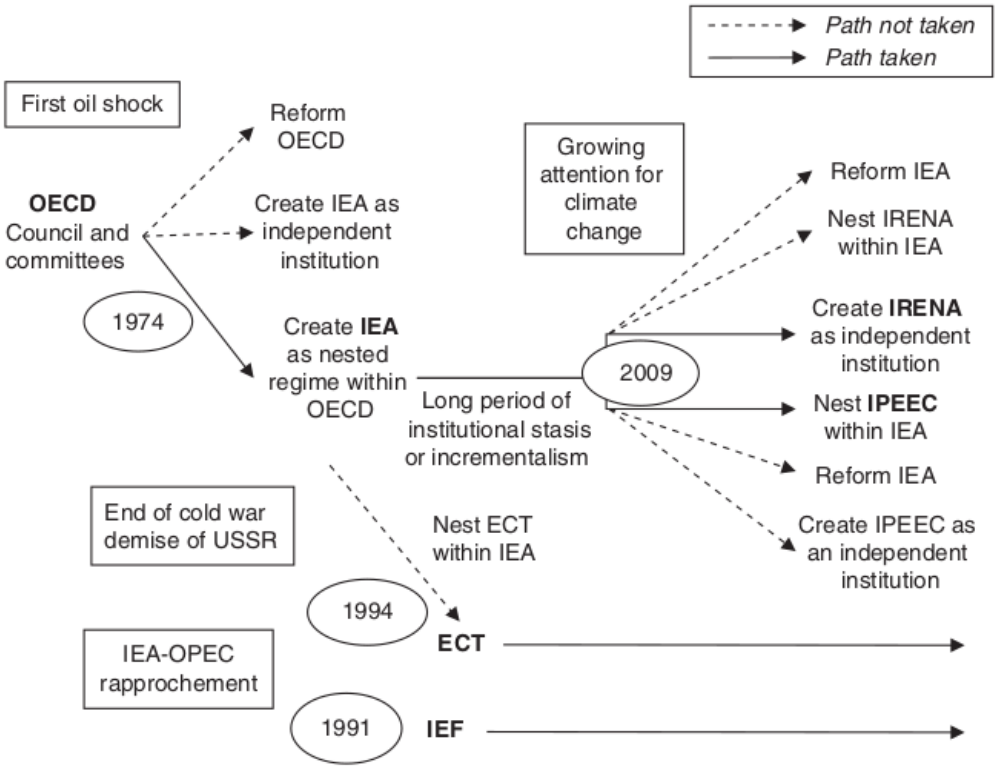
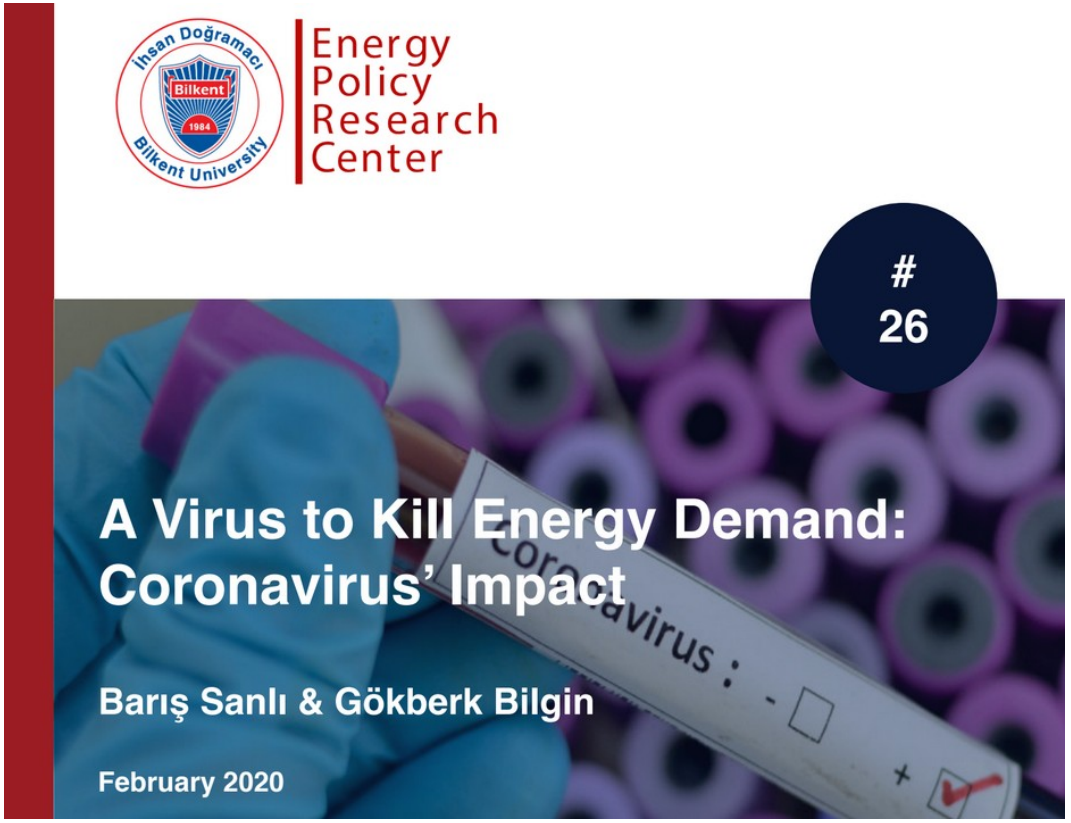


Figure 4.3 Institutional trajectories in the energy regime complex

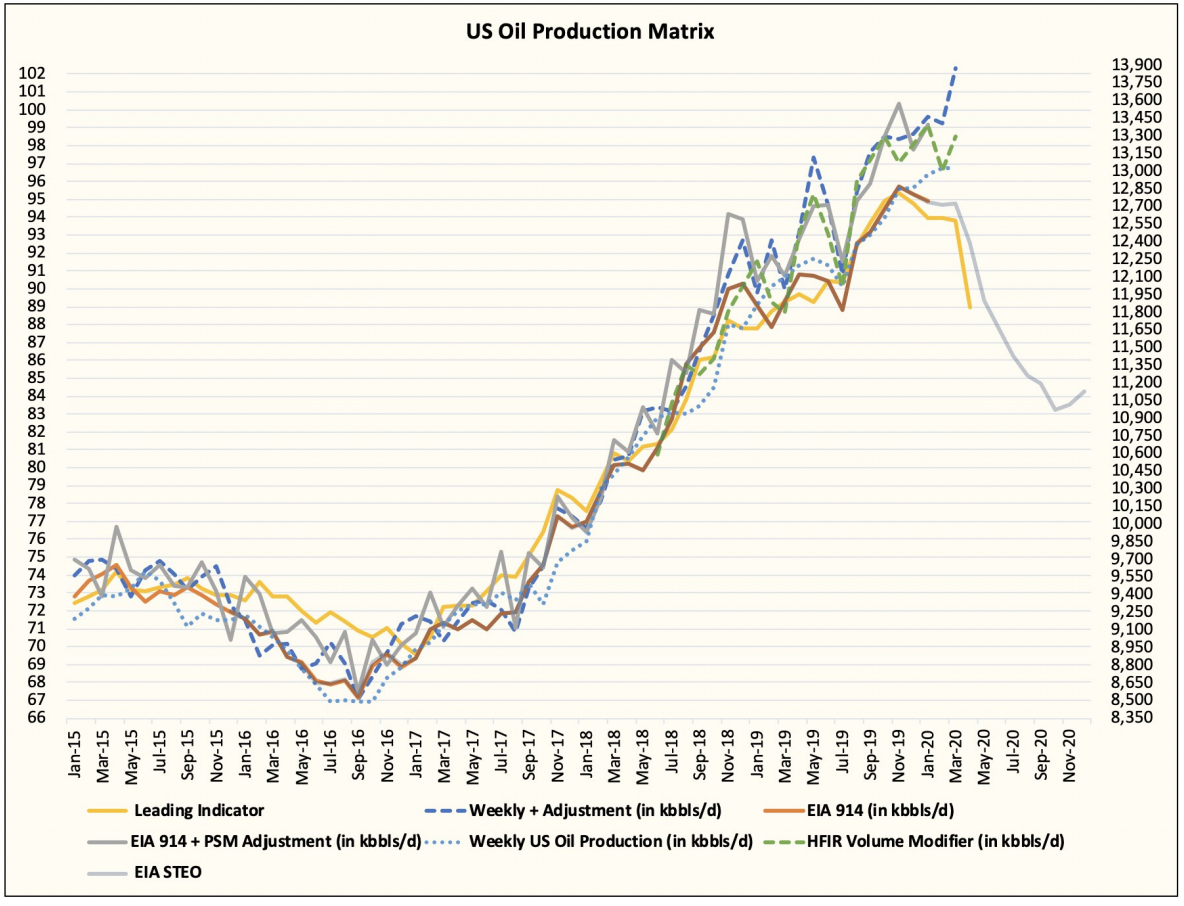
The politics and institutions of Global Energy Governance, Thijs Van de Graaf, 2010

Yakın dönem



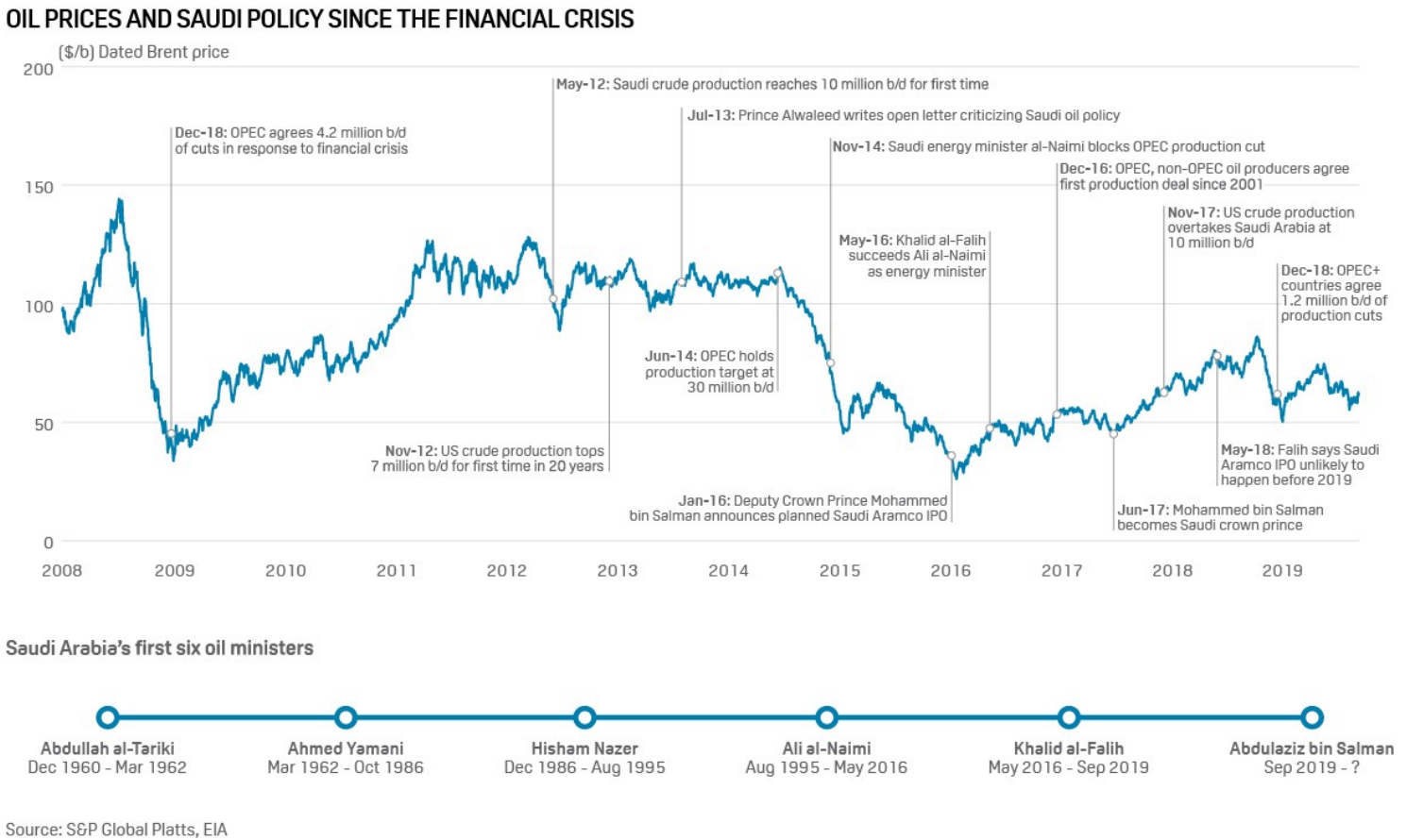
https://www.bilkenteprc.com/bilkentenergynotes

ABD Petrol üretimi



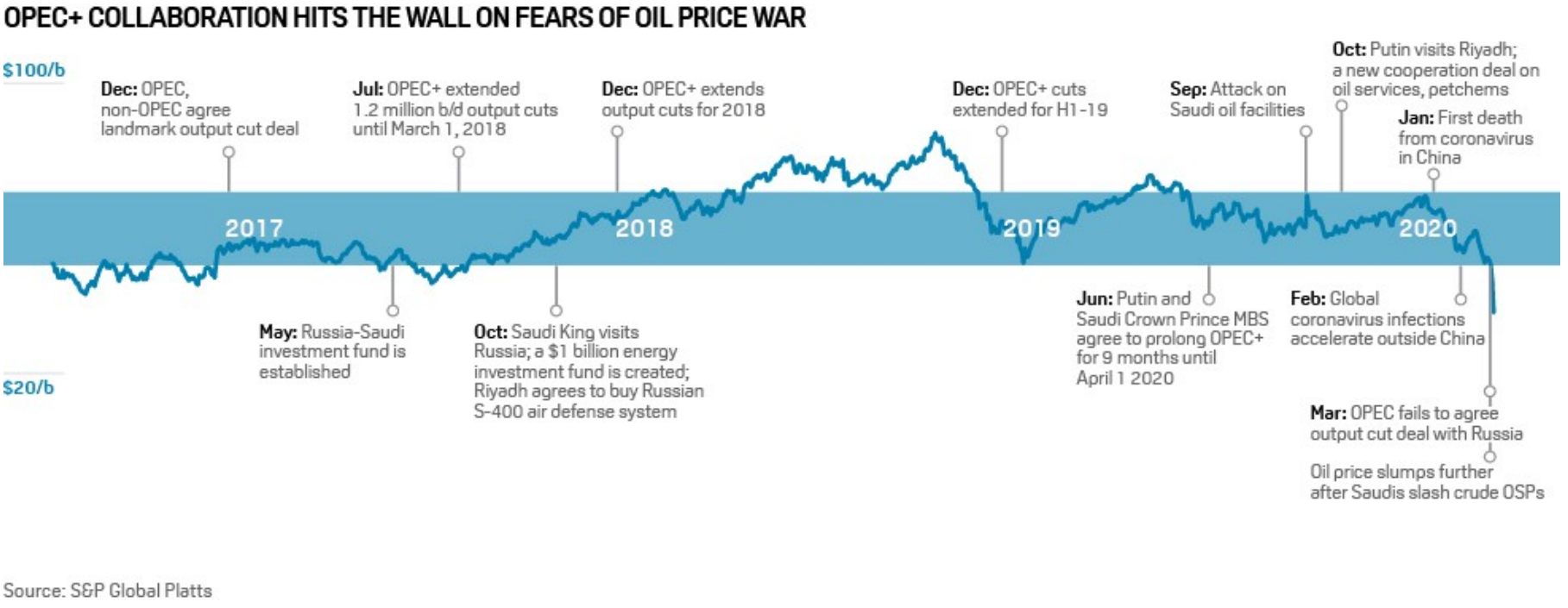
https://seekingalpha.com/article/4336530-oil-shale-treadmill-is-going-to-be-thing-of-beauty

Finansal krizden bu yana



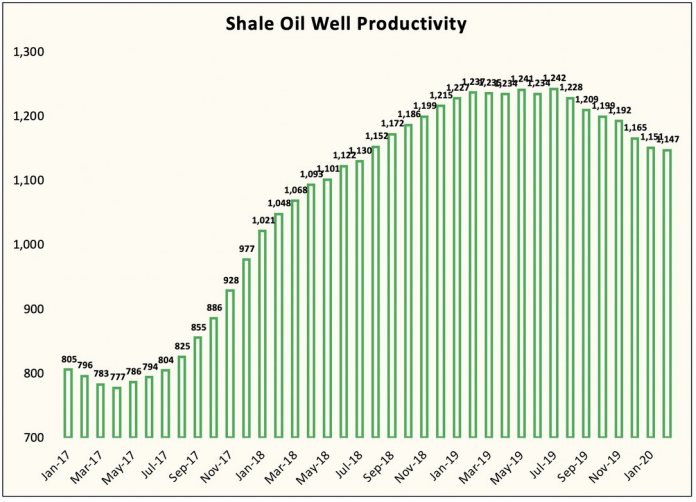
https://www.spglobal.com/platts/en/market-insights/latest-news/oil/090919-analysis-saudi-arabias-new-oil-minister-faces-economic-battle

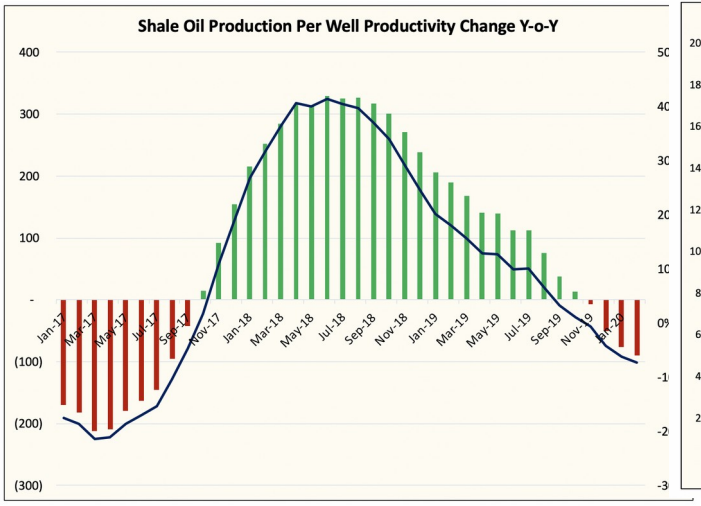
Daha yakın

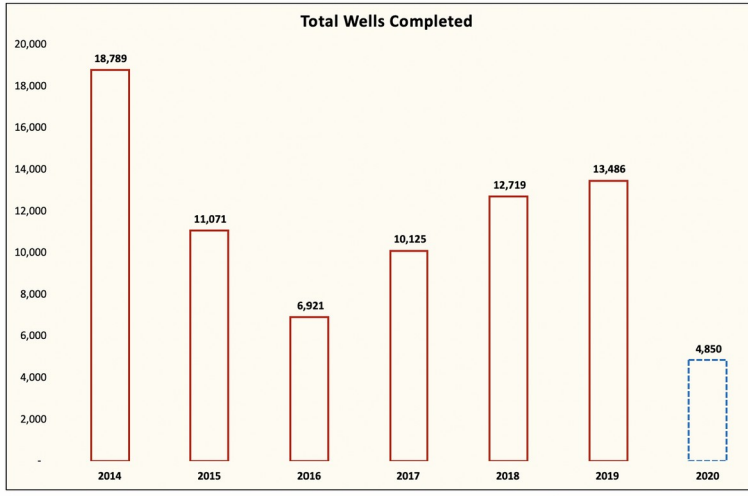


https://www.spglobal.com/platts/en/market-insights/latest-news/oil/030920-opec-members-brace-for-protracted-price-war-but-still-hope-for-a-deal-with-russia

Şeyl'in geleceği

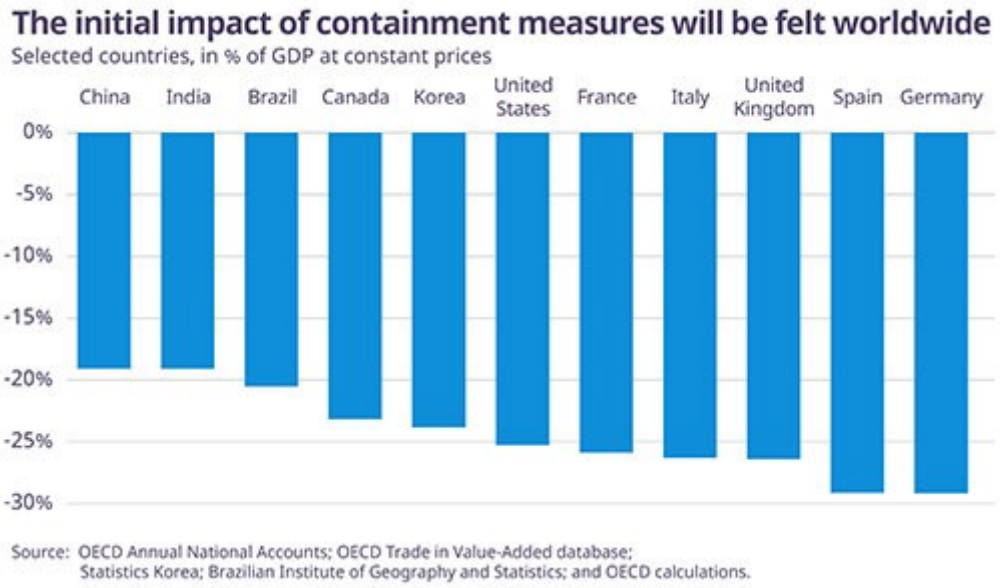


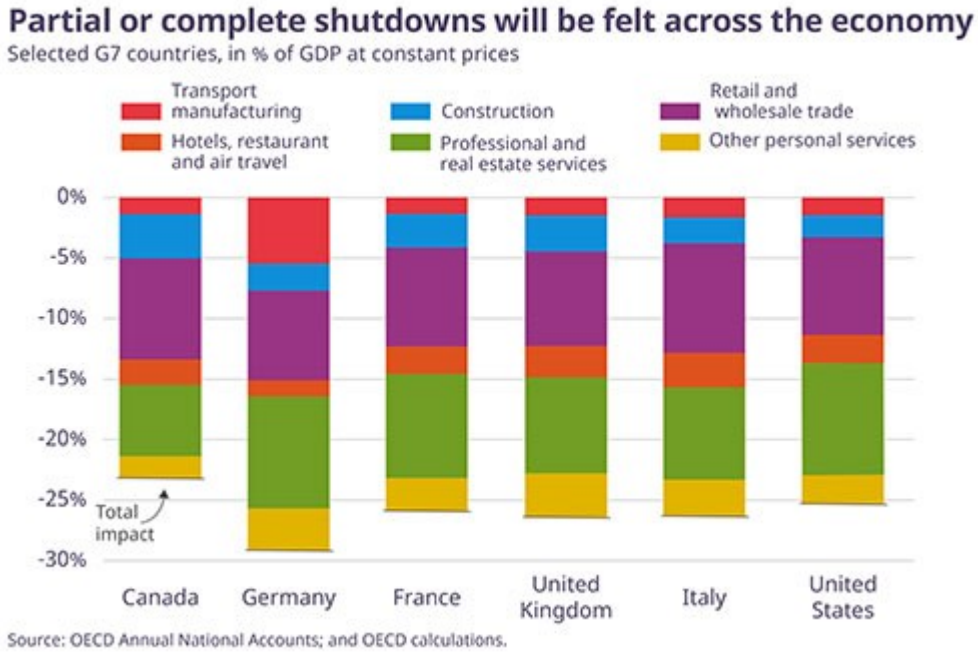




https://seekingalpha.com/article/4336530-oil-shale-treadmill-is-going-to-be-thing-of-beauty

Ekonomik büyümeden başlar

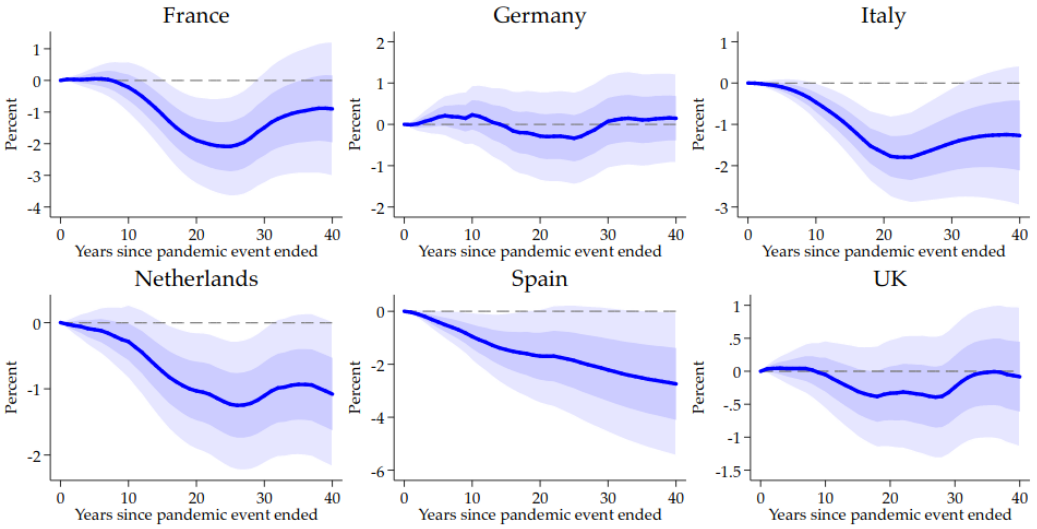




http://www.oecd.org/newsroom/oecd-updates-g20-summit-on-outlook-for-global-economy.htm

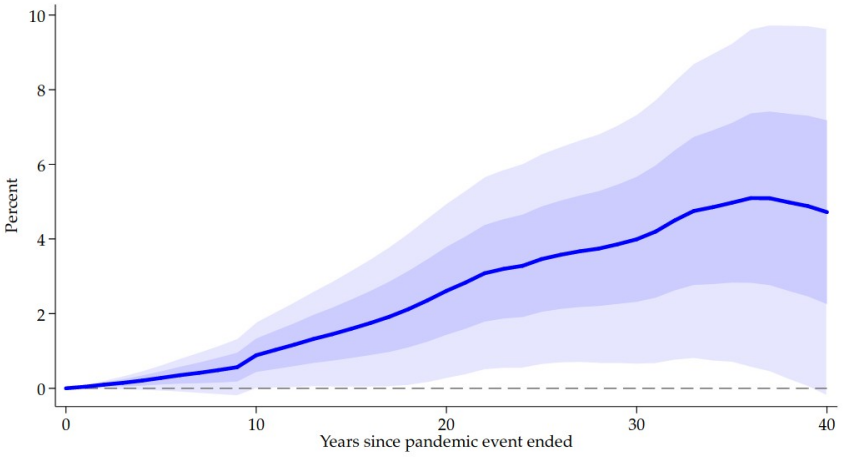
Geçmiş tekrar etmese de etkiler...

Figure 3: *Country-specific response of the real natural rate of interest following pandemics*



Notes: Responses calculated using Equation 2. Shaded areas are 1 and 2 s.e. bands around response estimates. See text.

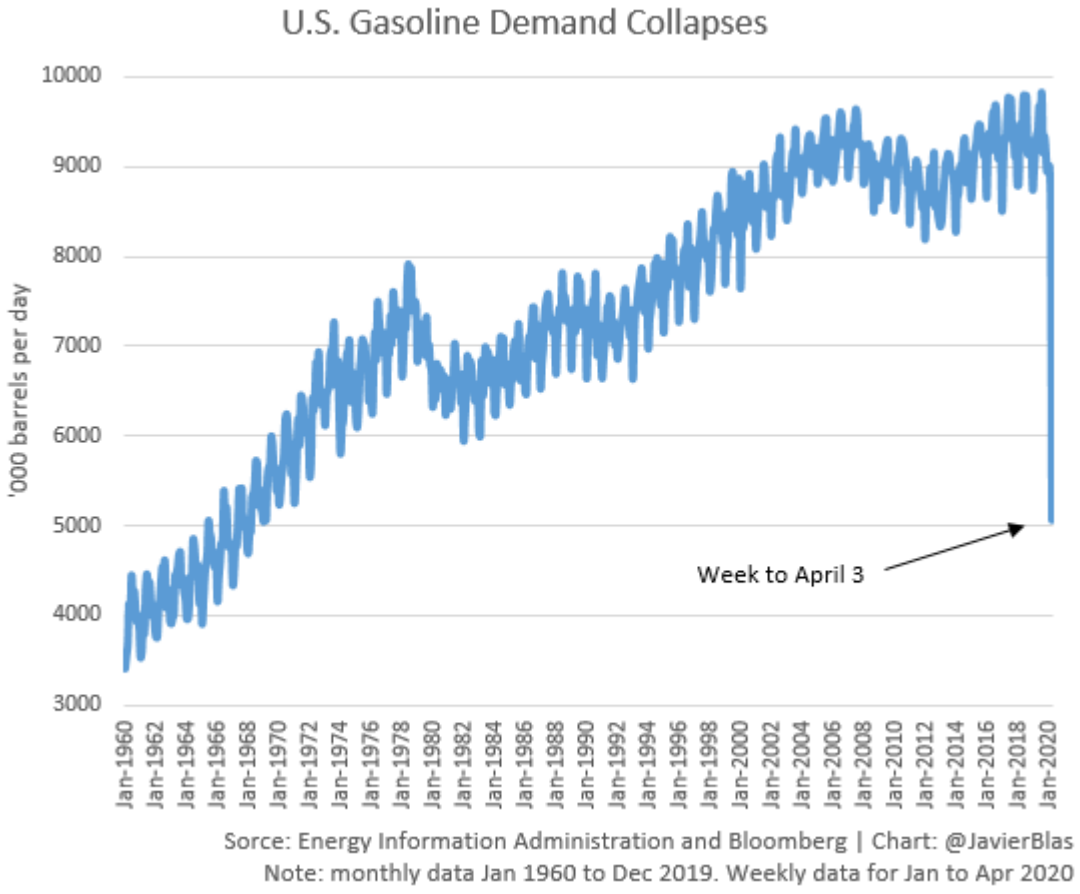
Figure 4: *The response of real wages in Europe following pandemics*



Notes: Response calculated using Equation 2. Shaded areas are 1 and 2 s.e. bands around response estimates. See text.

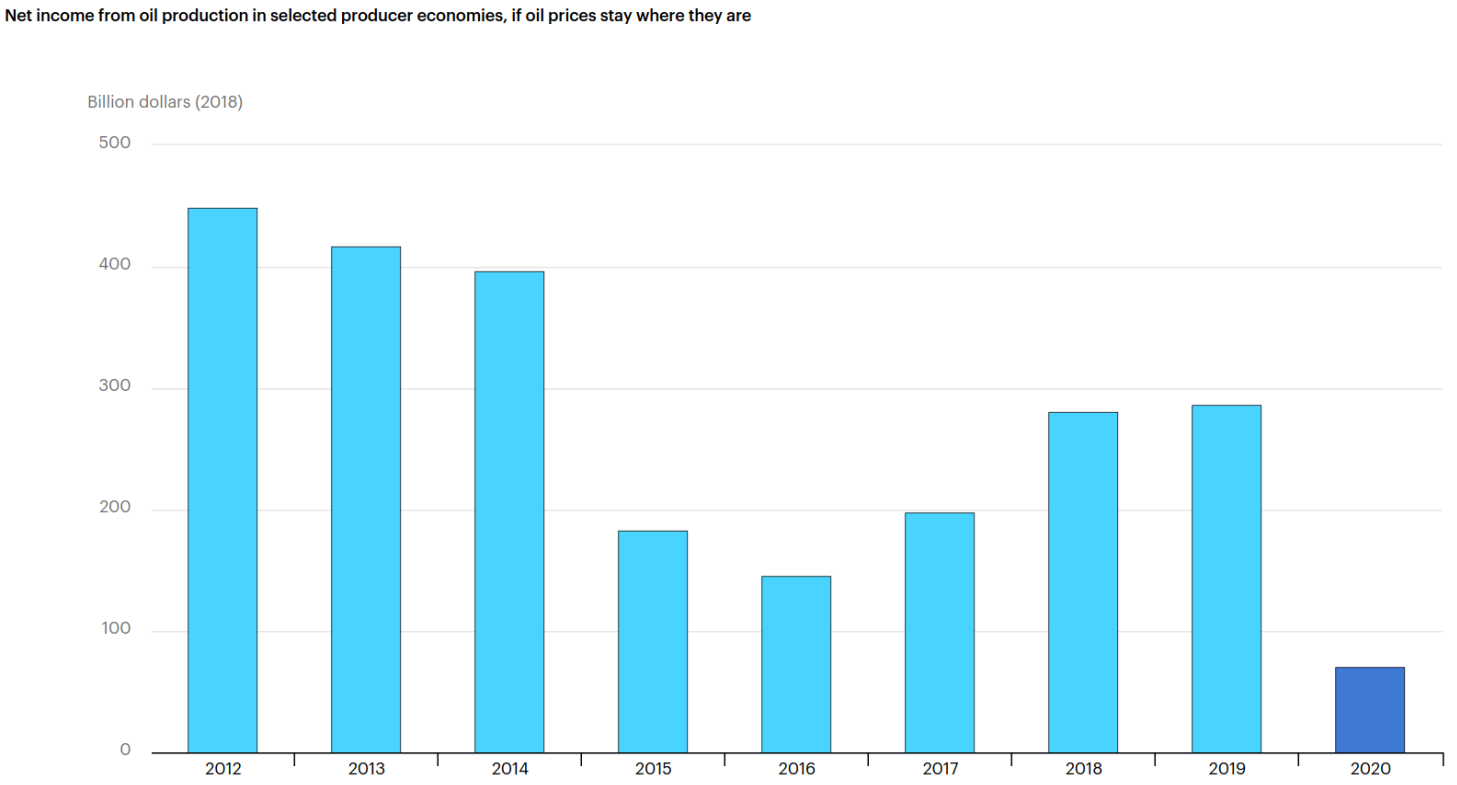
https://www.nber.org/papers/w26934

ABD Benzin Talebi



https://twitter.com/JavierBlas/status/1247954560565547009/photo/1

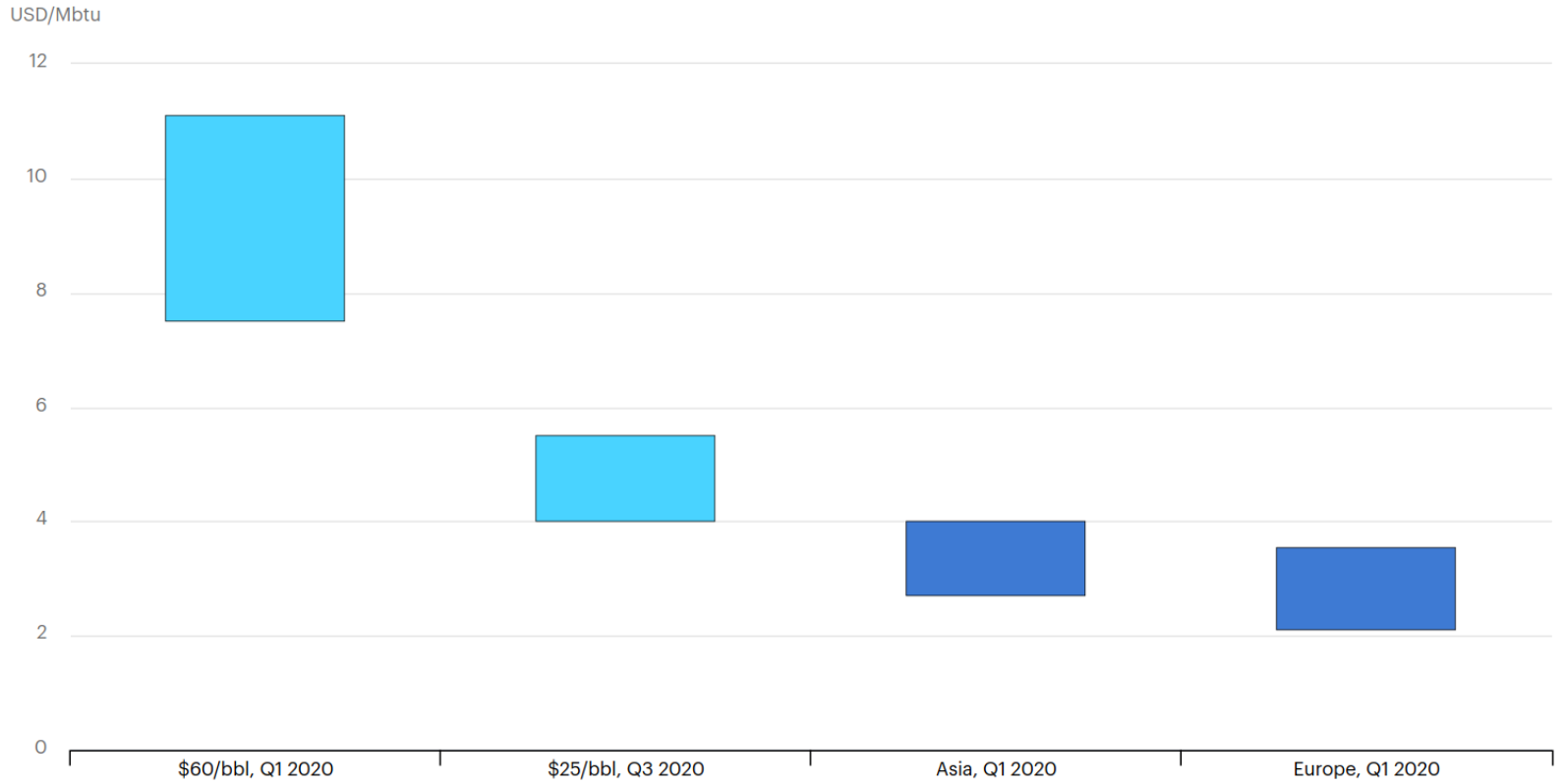
Petrol üreticilerinin gelirleri



https://www.iea.org/articles/the-global-oil-industry-is-experiencing-shock-like-no-other-in-its-history

Fiyat rejimlerine etkisi

Natural gas price ranges for oil-indexed supply (Q1/Q3 2020) and current spot prices (Q1 2020)



Temiz Enerji Gereksinimleri

China today exerts vast control over every step of the supply chain

BENCHMARK MINERAL INTELLIGENCE

Stage One: Mining

	EU	US	China
Nickel	8%	0%	31%
Cobalt	0%	0%	1%
Graphite[1]	1%	0%	65%
Lithium	0%	1%	0%
Manganese	0%	0%	6%

Mining

Chemical Processing

Stage Two: Chemical Processing/Refining

	EU	US	China
Nickel	13%	1%	65%
Cobalt	17%	0%	68%
Graphite[1]	0%	0%	100%
Lithium	0%	4%	59%
Manganese	7%	0%	93%

Stage Three: Cathode or Anode Production

	EU	US	China
Cathode	0%	0%	61%
Anode[1]	0%	0%	83%

Cathode Production

Application

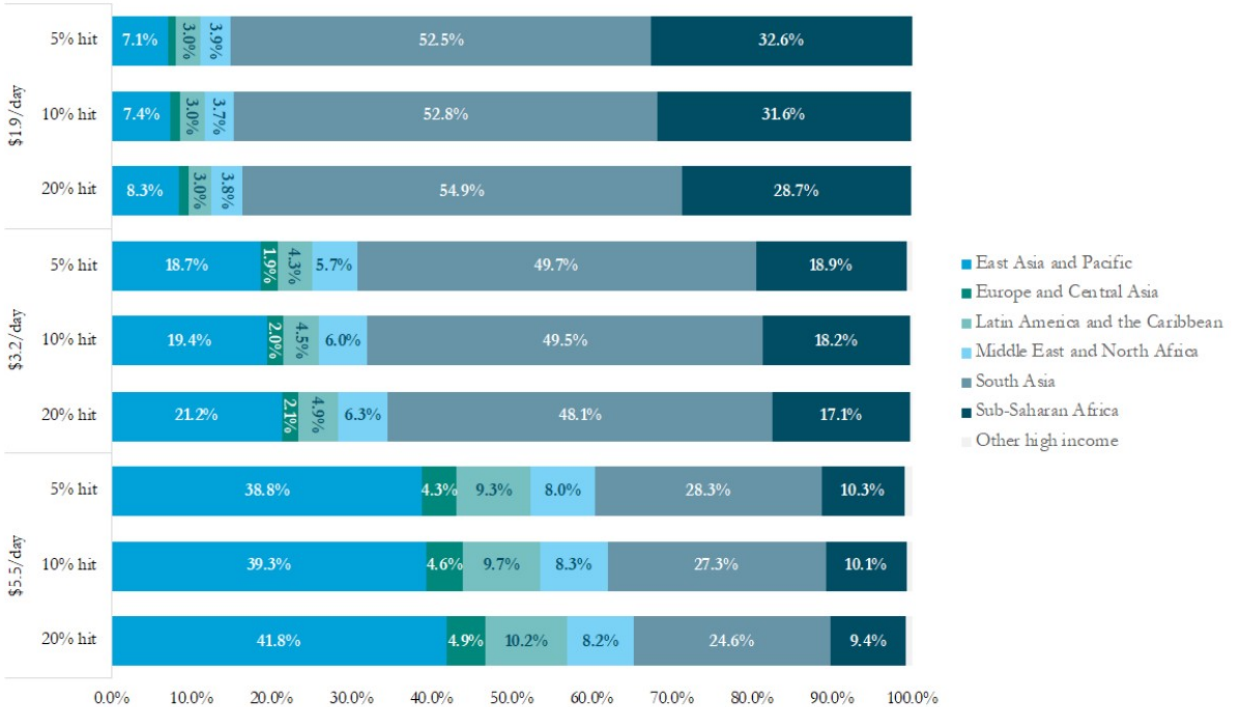
Cell Manufacturing

Stage Four: Lithium ion battery cell manufacturing

	EU	US	China
Cells	6%	10%	73%

Dünyada fakirlik

Figure 3: Distribution of additional number of poor by region and contraction scenario



Source: authors' estimates based on PovcalNet.

https://www.wider.unu.edu/sites/default/files/Publications/Working-paper/PDF/wp2020-43.pdf

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