

# An Introduction to Energy Subsidies

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*Synapse Energy Economics, Inc.  
Webinar Series*

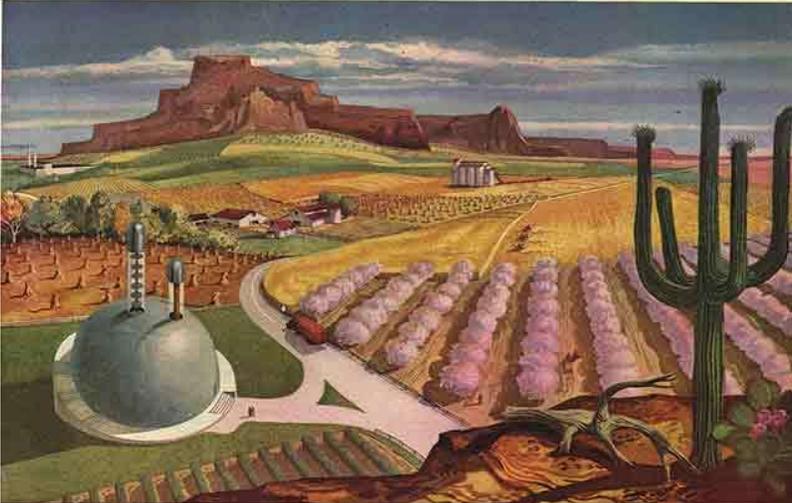
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## Overview

# Selling the Dream: It's For *All of Us*

BY MEN WHO PLAN BEYOND TOMORROW



**Deserts Will Bloom Through Atomic Power**

NEW "BREAD BASKETS" of the world can grow where only sand and scrub had been. Harnessed atomic energy will transform deserts into rich fruit and grain country... provide power to tap subterranean water for irrigation, power to run machines, to operate utilities. Already Atomic scientists are adapting the world's newest wonder to this peacetime use.

AMONG the good things of life, Americans by the millions rate high the wholly unique Canadian whisky they order by name—Seagram's V.O. This lightest of all Canadian whiskeys, this clean-tasting imported blend is Canadian whisky at its glorious best.

This Whisky Is Six Years Old—86.6 Proof. Seagram-Distillers Corporation, N.Y.



**Seagram's V.O. Canadian**

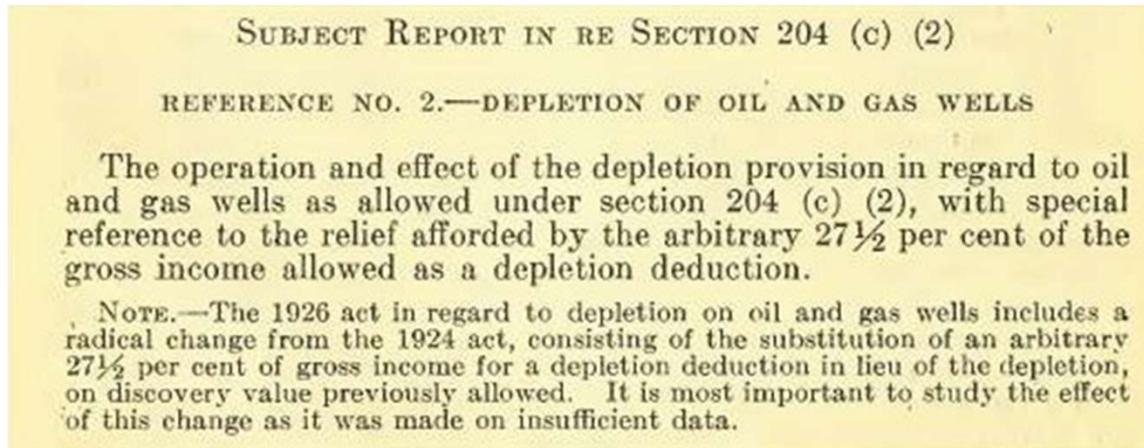
CANADIAN WHISKY—A BLEND... OF RARE SELECTED WHISKIES

Advertisement ran in magazines such as *Life* and *Colliers* in 1947.

- Dreams are always better when you are spending somebody else's money (and drinking Seagram's).
- *But whose dream?*
- *What timeframe?*
- *What options foregone?*
- *What measures of success?*
- *New problems created?*

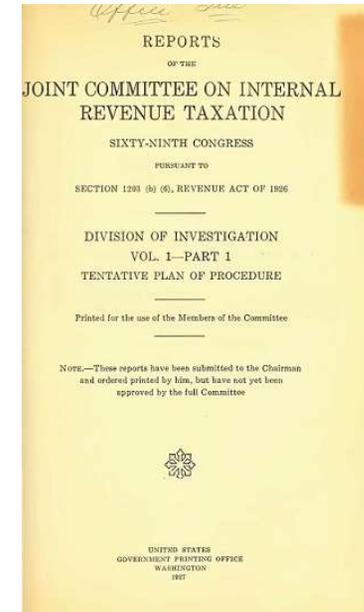
## Overview

# Oops: Subsidies Aren't for Everybody After All



-US Joint Committee on Taxation, Division of Investigation, 1927

“Texas Sen. Tom Connally, who sponsored the break, later admits, ‘We could have taken a 5 or 10 percent figure, but we grabbed 27.5 percent because we were not only hogs but the odd figure made it appear as though it was scientifically arrived at.’” (Kroll et al., 2014)



## Overview

# Why Energy Subsidies Matter

- Act as negative taxes.
- Often support environmentally damaging activities.
- Create competitive impediments to cleaner substitutes, other GHG reduction strategies.
- Divert limited public funding from key social objectives.
- Often hidden; only the recipient firm knows the full picture.

## Overview

# Many Mechanisms Used to Transfer Value

### Intervention Category and Description

**Direct spending.** Government programs, public grants to private parties, funding for energy R&D.

**Tax expenditures.** Special exemptions, deductions (included accelerated) or credits.

**User fees.** Energy-related fees applied to fund sector-related activities, albeit often only partially.

**Terms of access to resources.** Auction competitiveness, royalty rates, advantaged duration or risk sharing.

**Credit.** Primarily below market loans, loan guarantees. Includes favorable interest rates, terms, repayment schedules, or fees.

**Risk.** Government-provided market insurance or indemnification at below-market prices; statutory caps on private market responsibility for damages.

**Induced transfers.** Includes purchase mandates (RPS, RFS, FIT); price controls; import or export restrictions, tariffs; cross-subsidies.

**Regulations and Externalities.** Differential rules applied to activities with similar environmental or health impacts.

**State-owned enterprises.** SOEs often entail multiple levels and types of subsidy.

# Below the Surface: Largest Subsidies to Fossil Fuels Routinely Left Out of Tallies

## Solar, Wind, Geothermal

### Visible and Quantified

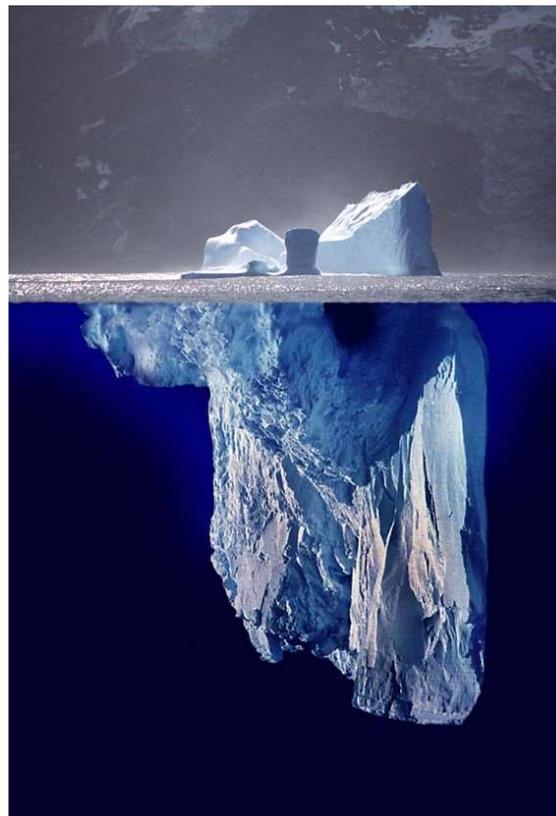
- Tax credits.
- Accelerated depreciation.
- Price premiums via RPS or Feed-in-tariff programs.
- Government R&D.

### Visible but Poorly Quantified

- Federal loan guarantees.

### Excluded from Subsidy Tallies

- Water use, centralized solar plants.
- Post-closure site reclamation.



Photomontage credit: Uwe Kils

## Fossil Fuels

### Visible and Quantified

- Special depletion and expensing rules and deductions.
- Government R&D.

### Visible but Poorly Quantified

- Federal loan guarantees.
- Dual-use taxpayers/FTC.
- Accident liability caps.
- Accelerated depreciation.

### Excluded from Subsidy Tallies

- Leasing and royalty subsidies.
- Tax-exempt corporate structures; support to state-owned enterprises.
- Tax-exempt debt for plants.
- Energy security, stockpiling costs.
- Free use of water for mining and power.
- Bulk shipping infrastructure.
- Insufficient user fees.
- Mine and well closure, reclamation.
- Health, environmental damages

## Constraints to Reform Powerful Opposition, the Fog of Money

*Since its inception, the U.S. tax code has allowed corporate taxpayers the ability to recover costs. These cost-recovery mechanisms, also known in policy circles as “tax expenditures,” should in no way be confused with “subsidies” – direct government spending or “tax loopholes.”*

*-Stephen Comstock, API tax policy lead, 2014*

Organization	Spending in FY 2016
American Petroleum Institute	\$220.8 million
Independent Petroleum Association of America	\$11.1 million
Oil Change International	\$2.5 million
Greenpeace, Inc.	\$39.0 million
Natural Resources Defense Council	\$133.4 million

*Source: Form 990 PF filings with the IRS for most recent available for all organizations.*

# Global Subsidies Even Low-End Estimates are Massive

## 2017 Global Energy Subsidies are Massive, **But Nobody is Tracking Support to Nuclear**

Fuel type	IEA (1)	OECD (2)	IMF (pre-tax) (3)	IMF (post-tax) (3)
	<i>Price Gap</i>	<i>Total Support Estimate</i>		<i>Pre-tax + tax breaks, externalities</i>
Fossil fuels	302	141	296	5,200
Nuclear electric	NE	NE	NE	NE
Renewables electric	140	NE	NE	NE
Biofuels, transport*	<u>30</u>	<u>NE</u>	<u>NE</u>	<u>NE</u>
<i>Total all fuels</i>	472	141	296	5,200
FF Subsidies as % Global GDP	0.4%	0.2%	0.4%	6.5%

\*2015 is most recent year available for subsidies to transport biofuels.

NE = Not estimated.

Sources: (1) IEA, *WEO 2018* (2018); *WEO 2015* for transport biofuels; (2) OECD (2019); IMF (2019).

# Benefits of reform

## Limited Public Funds Diverted from Better Uses

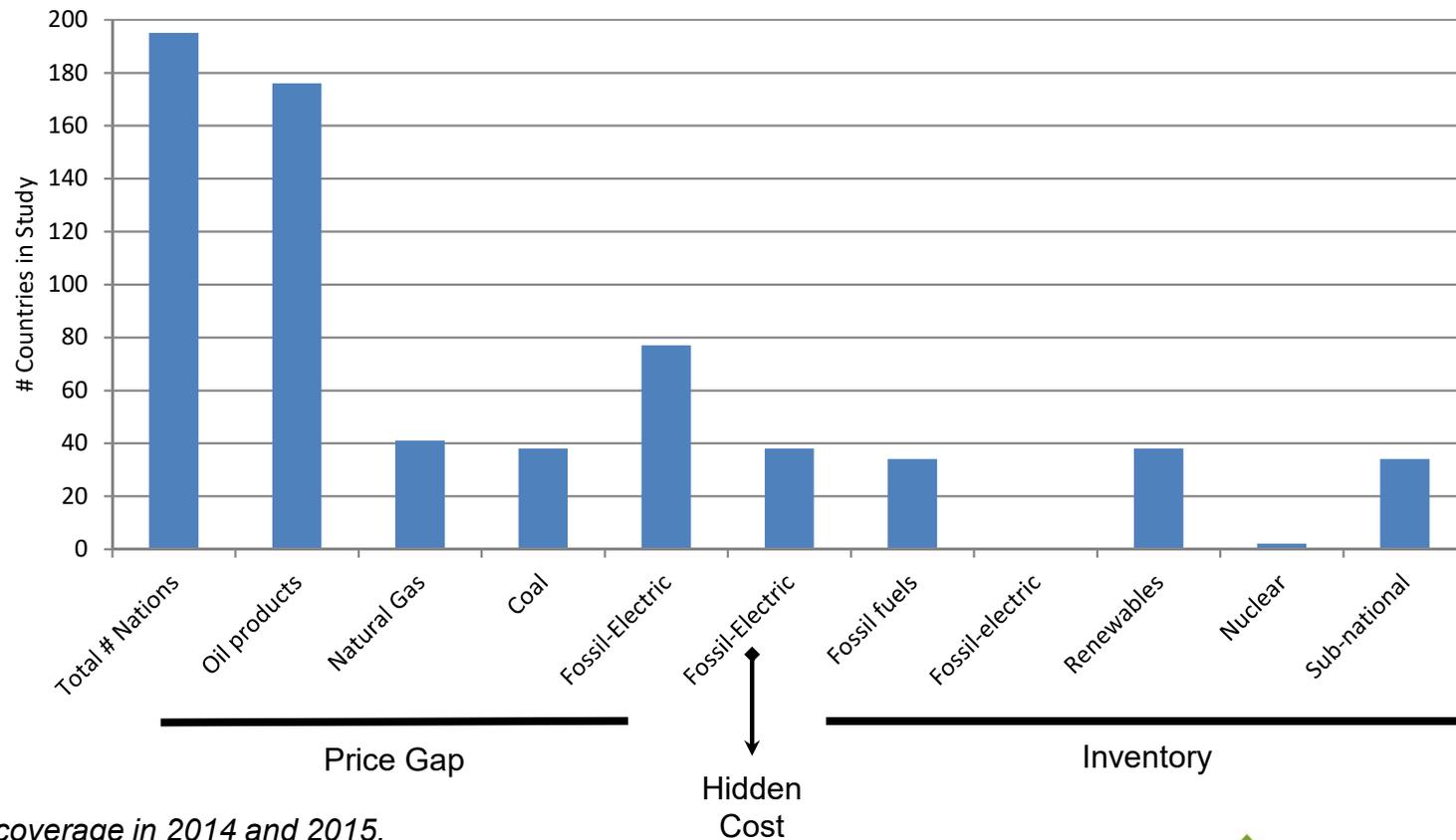
### Subsidies to fossil fuel consumers crowd out other spending priorities

Country counts	Fossil fuel subsidy amount as percentage of:		
	GDP	Federal revenues	Public spending on health care
<b>Total countries</b>	37	38	37
<b>Subsidies &gt; 100% of metric</b>	0	0	18
<b>Subsidies &gt; 50% of metric</b>	0	2	26
<b>Subsidies &gt; 25% of metric</b>	0	5	32
<b>Subsidies &gt; 10% of metric</b>	6	22	33

Source: Koplow, Doug (2015). "Global energy subsidies: Scale, opportunity costs, and barriers to reform." In *Energy Poverty: Global Challenges and Local Solutions*, edited by Antoine Halff, Benjamin K. Sovacool, and Jon Rozhon, Oxford: Oxford University Press.

# Data Gaps - Global Geographic Coverage Varies Widely

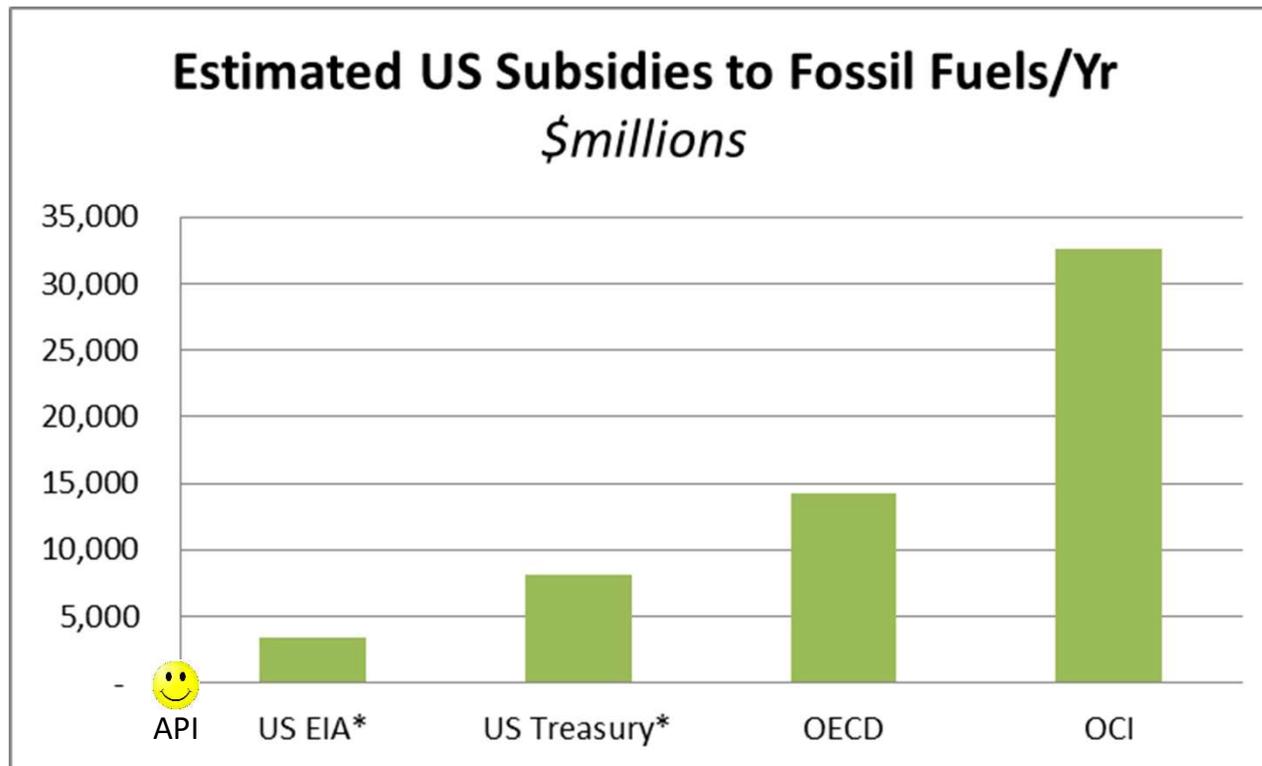
## Big Gaps in Geographic Coverage Remain



Based on coverage in 2014 and 2015.  
 Maximum country coverage per fuel; quality  
 may vary within sample.

## Data Gaps - US

# Numerical Friction: Scope, Definitions, Valuation



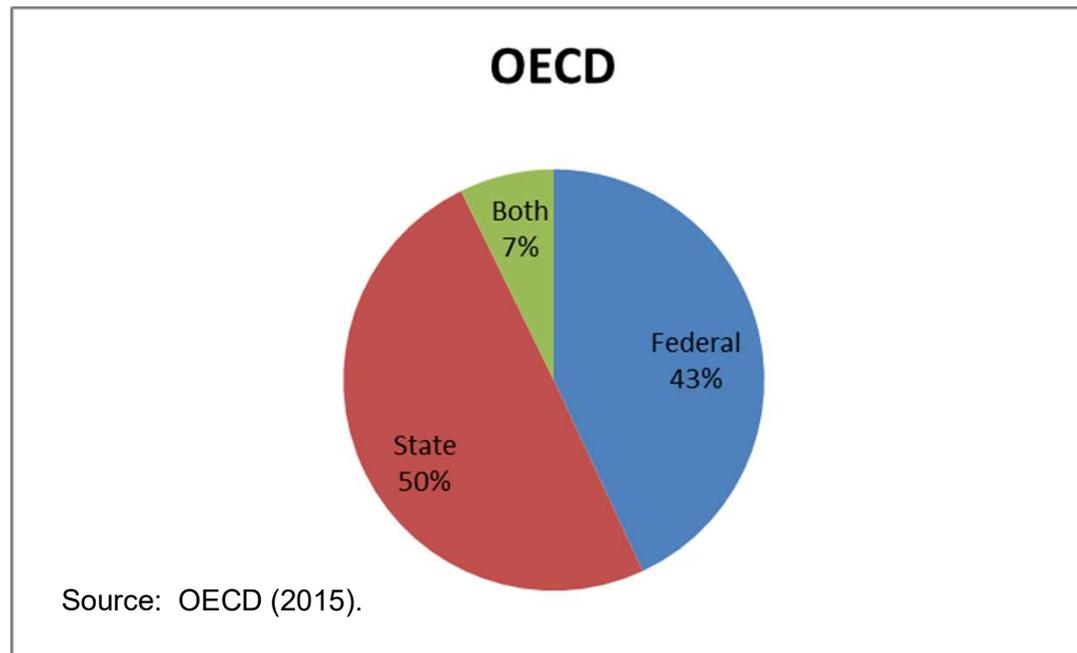
Sources: EIA (2015); US Treasury (2015); OECD (2015); OCI (2014); API (1993-2016).

\*Federal subsidy estimates only; no sub-national data in totals.

Data years: 2013 (EIA, OCI); 2014 (OECD); Average projected 2016-25 (US Treasury).

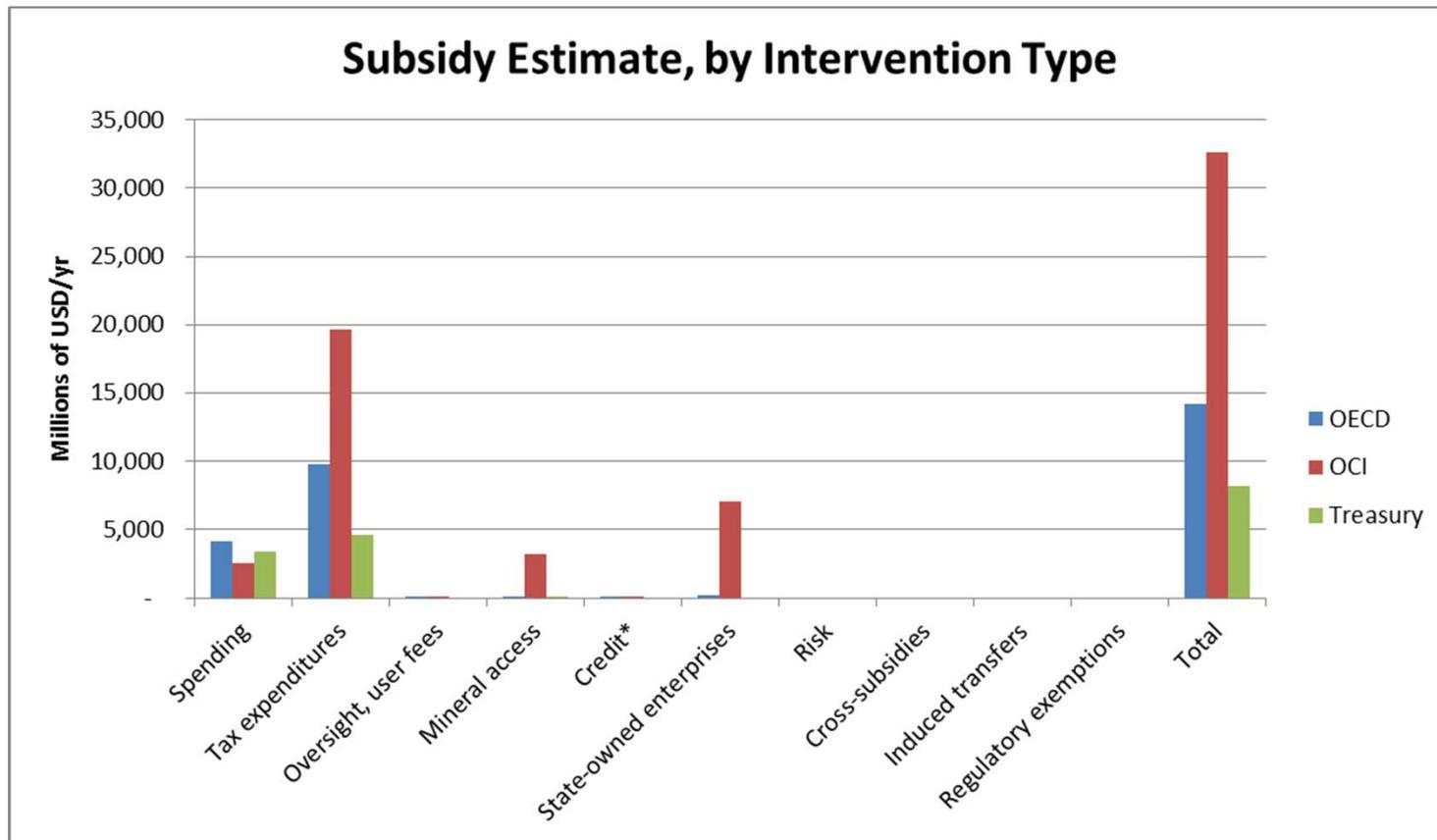
Data Gaps - US

## US Sub-national Data Can't be Ignored



# Data Gaps - US

## Missing Subsidy Types Understates Magnitudes, Distorts Inter-Fuel Comparison



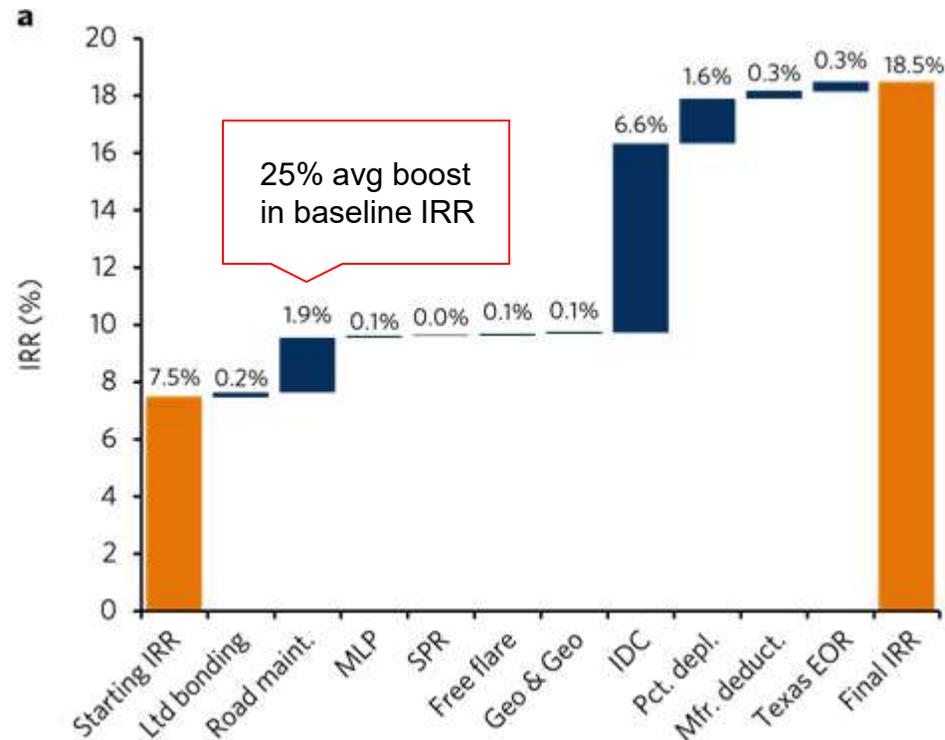
Sources: Earth Track analysis of OECD (2015), OCI (2014), and Treasury (2015).

\*Insufficient data to calculate credit subsidies. Face value of commitments to fossil fuel projects in 2013 were about \$4.5b/year (OCI 2014).

# US Case Study

## Hidden Supports are Important to Capture

Figure 2. Average effect of subsidies analyzed in the Permian Basin of Texas at \$50 per barrel (average effect on production-weighted basis across all fields)



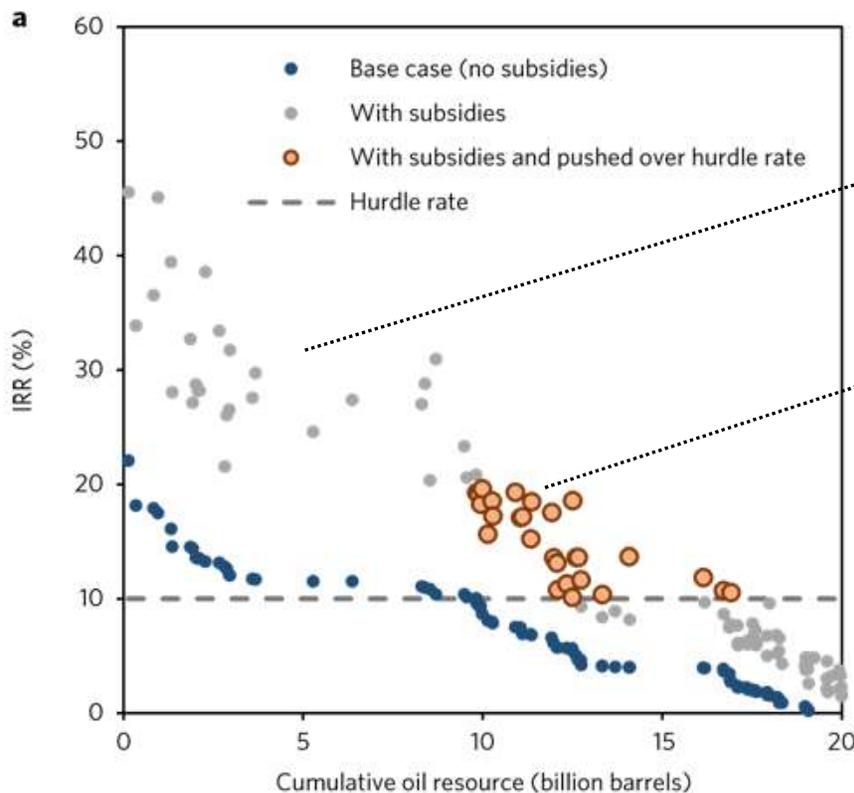
Source: Erickson, Down, Lazarus, and Koplou, *Nature Energy*, 2017

# US Case Study

## Mapping “Leakage” and “Carbon Abatement”™

### Moving from National Averages to Project-Specific Impacts

Figure 1. Effect of subsidies on project economics at \$50 per barrel, for fields discovered but not yet producing – Permian Basin



**Leakage zone:** taxpayer \$ flows to profits. *In general, higher oil prices increase leakage rates.*

**Abatement zone:** taxpayer \$ unlocks ghg emissions that would not otherwise have been developed.

Source: Erickson, Down, Lazarus, and Koplow, *Nature Energy*, 2017.

# US Case Study

## Linking Subsidies to Projects and Problems

**Table 2 | Effect of subsidies on undeveloped oil resources and CO<sub>2</sub> emissions at US\$50 per barrel**

Area	Economic oil resources, discovered but not yet producing (billion barrels)	Percentage subsidy-dependent	Increase in economic oil resources due to subsidies		Increase in co-produced gas resources due to subsidies	
			(billion barrels)	(GtCO <sub>2</sub> )	(billion barrels oil equivalent)	(GtCO <sub>2</sub> )
Williston Basin	3.8	59%	2.3	0.9	0.2	0.1
Permian Basin	16.3	40%	6.5	2.4	1.6	0.5
Gulf of Mexico	2.1	73%	1.5	0.6	<0.1	<0.1
Rest of US	13.1	48%	6.3	2.4	1.3	0.4
Total US	35.3	47%	16.5	6.2	3.2	0.9

Source: Erickson, Down, Lazarus, and Koplw, *Nature Energy*, 2017.

This is up to 20% of available emissions from US oil production to 2050, based on models (e.g., McGlade and Ekins 2015) that assign oil production geographically to minimize the cost of abatement within a 2° C. target.

## Pricing Carbon – Global Need Taxes AND Subsidy Reform

- Pricing carbon yields better economic decisions.

Year	% CO <sub>2</sub> Priced	Average Price/mt
2014 (IEA 2015)	11% global energy-related CO <sub>2</sub>	\$7
2018 (IMF 2019)	15% of ghg emissions	\$2

- But carbon subsidies can negate the benefits.
  - 13% of global energy-related CO<sub>2</sub> received consumption subsidies in 2014.
  - Average subsidy level of \$115/tonne of CO<sub>2</sub>.

International Energy Agency (2015). *Energy and Climate Change: World Energy Outlook Special Report*, Paris, p. 23; IMF (2019).

## Carbon Pricing

# Surmounting Regressivity in Subsidy Reform

- GHG emissions aren't priced accurately if they are subsidized at the same time.
- Some states fear taxing core energy goods or transport fuels due to regressivity.
- But carbon taxes or permits have similar regressivity concerns; these are addressed in policy design.
- The same needs to happen with subsidy reform; don't just punt on subsidy elimination.

## Subsidy Reform – Acting Locally

# RGGI for MA Transport only a Start

- Regulatory pricing of MA carbon
  - **Transport sector.** Anticipated gross revenues from carbon trading: \$475 million (S. 1926 @ \$15/mt CO<sub>2</sub> minimum for mobile source emissions).
  - **Power sector.** Average annual MA proceeds, RGGI carbon auctions, 2008-18: \$65 million.
- Concurrent underpricing of carbon
  - **Heat and power.** Tax exemptions for fossil-fuel energy use by residential, small commercial and selected industrial customers: \$474 million (MA TE 3.304,3.401 - 404).
  - **Transport.** Sales tax exemption for MA motor fuels: \$509 million (roughly 10% of which can be attributed to ethanol). (MA TE 3.202).
  - Do have excise on fuels, but total tax burden in MA (excise plus sales) mid-level for US.
  - Local spending on roads, net of state chapter 90 grants: \$500 million.
  - Local option gas tax would have many benefits.

## Subsidy Reform - Acting Locally

# Even California Ignores FF Subsidies

- Pricing carbon
  - Carbon capped for 80% of ghgs from largest emitters (CARB 2019).
  - Average annual carbon auction proceeds, 2012-18: \$1,583 million (CARB 2019).
- Concurrent subsidies to carbon
  - **Sales tax** exemption on most delivered electricity, gas, LPG, water.
  - Related revenue loss 2019-20 (not just fossil fuels): \$3,382 million in 2019-20. (CA 2018-19 Tax Expenditure Report).
  - **No severance tax** on oil and gas production (proposals at 10% would yield up to \$900m/year) (Nemec, 2019).
  - CA is the fourth largest producer of crude oil in the US (after only TX, ND, and AK). (EIA 2018).

## Subsidy Reform – Acting Locally

# Pennsylvania – Buying NG Market Share?

- Like CA, PA is among the very few states in the US with zero severance tax on fossil fuel extraction.
- State share of US NG production has risen from 0.7% of national total in 1982 to nearly 20% in 2017; second only to TX.
- Efforts to introduce a severance tax have been defeated over many years.
  - About 80% of PA production consumed out-of-state.
  - Implemented an “impact fee” in 2011; averages only about 1.7% of wellhead value.
  - Adding a severance tax to equal total tax take in similar states would more than double state revenues from the sector and raise \$1.6 billion in revenues over five years. (PA Budget and Policy Center, 2018).

## Emerging Issues

# Subsidy Landscape is Always Changing

- Firms and individuals *always* looking for ways to leverage government's power to tax and set market rules to their advantage.
- Innovations in corporate structure or tax planning; shifts in commodity values or legislation can trigger rapid and large subsidy surges.
- Firms like to make their problems our problem, if they can.
- Examples:
  - Selling your closed nuclear reactor.
  - Cleaning up your coal mine site in a declining market and weak financial assurance.
  - Expanded eligibility for O&G MLPs via IRS private letter rulings.
  - Threats to shutter nuclear plants.
  - Special ISO rules to boost baseload coal plants.

## Emerging Issues

# “Selling” Your Closed Reactor

- Isolating liabilities is common strategy for declining business lines or firms under financial pressure.
  - Removes uncertainty from original firm shareholders.
  - Can simplify business lines.
- But the liability and uncertainty don't disappear.
  - Specialist firms that can do a better job...
  - OR simply socializing risk of funding shortfalls, bankruptcy and creating incentives for cutting corners?
  - Taxpayer recourse to original utilities if shortfalls?
- Approximately 13 reactors with full or partial license transfers; the strategy is quickly ramping up.
- The six most recent are Holtec and appear on track to be full liability transfers.

## Emerging Issues

# Holtec's Big Adventure (And Ours Too)

Deal Announcement	Facility	Seller	Reference Unit Power (MW)	NDT Balance, 12/2016 (\$mils)	Decomm. Funding Per MW (\$mils)
July 2018	Oyster Creek (NJ)	Exelon	619	889	1.44
August 2018	Pilgrim (MA)	Entergy	677	960	1.42
August 2018	Palisades (MI)	Entergy	805	426	0.53
April 2019	Indian Point 1, 2, 3 (NY)	Entergy	257	443	1.72
			1,020	564	0.55
			<u>1,040</u>	<u>719</u>	0.69
<b>Total</b>			<b>4,418</b>	<b>\$4,001</b>	

Sources: Holtec press releases; IAEA Power Reactor Information System, accessed 5/9/19; NRC Decommissioning Funding Status Reports, March and April 2018.

## Emerging Issues

# Potential Risks in Holtec Deal Structure

### Cash Flows to Related Parties

- **Nuclear Decommissioning Trusts** (>\$4 billion), future investment gains.
- **Self-billings to NDT** for decommissioning work to be performed, with built-in (though non-transparent) profit margins.
- **Nuclear waste**
  - Clawback from DOE on waste storage and disposal fees.
  - Sale of dry-storage casks and management of wastes on-site.
  - Planned move of wastes to a firm-owned interim storage facility in NM, with associated revenues.

### Potential Cost Risks to Taxpayers

- **Isolating liabilities.** Partnership with SNC-Lavalin into single-asset LLCs.
- **Legal.** Some recent legal issues with key partners.
- **Cost escalation concerns.**
  - Decommissioning costs very uncertain; historically have risen much faster than inflation.
  - Little or no recourse if funding too low.
  - Contingencies for surprise discoveries are low.
- **State push-back.** Pilgrim under litigation (MA Attorney General and Pilgrim Watch).

## Subsidy Reform

# Where are Our Leverage Points?

- **International**
  - Increased collaboration on subsidy data collection.
  - More regular reporting (OECD, IEA, IMF), though still many gaps.
  - World Bank capacity for training and subsidy reform planning.
  - Emerging role of UN Environment, reporting lead on FF subsidies via the Sustainable Development Goals.
- **United States**
  - Subsidy reform should be integral to carbon pricing efforts.
  - Many opportunities for sub-national subsidy reforms that benefit climate.
  - New subsidies need to be watched; strong intervention early is critical, as small decisions or statutory changes can result in rapid and widespread implementation, scaling.