How Impacted Communities Can Challenge The Economic Assumptions Of Oil and Gas Development

A Step-by-Step Guidebook For Developing A Cost-Benefit Analysis On Colorado Oil and Gas Projects

January 12, 2018

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Author: Andrew Forkes-Gudmundson

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Citizens for a Healthy Community (CHC) is a grassroots nonprofit 501(c)3 organization dedicated to protecting the air, water and foodsheds within the Delta County region of Southwest Colorado from the impacts of oil and gas development. CHC is the county's watchdog for oil and gas development, conducts research and advocacy, and works with partner organizations to fight for the health and safety of citizens and implementation of safeguards to protect public health and the environment.

Citizens for a Healthy Community

Office: The Harvester Building, 211 Grand. Ave, Paonia, CO 81428
Mailing address: PO Box 1283, Paonia, CO 81428
Phone: (970) 399-9700
www.chc4you.org

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INTRODUCTION

Many county and local governments around Colorado and the rest of the country within the path of oil and gas development approve proposals without conducting a cost-benefit analysis. Oftentimes the industry claims economic benefits from oil and gas projects due to job creation, severance tax revenue distribution and federal mineral royalty revenue distributions back to the local governments. Counties also claim the economic benefits from property taxes on oil gas production, equipment and pipelines. Unfortunately, calculations of those benefits on a project-specific basis are rarely conducted. More importantly, the costs that the local government and counties may incur from those projects in terms of potential lost tax revenues from residential and sales tax, along with public health, new demands on government services and infrastructure are rarely considered. If an analysis is conducted, counties and local governments often look at infrastructure impact to determine impact on the health of their roads and bridges budget, but to date we have not come across a comprehensive cost-benefit analysis.

Citizens for a Healthy Community (CHC) undertook a cost-benefit analysis on a proposed project within three critical watersheds because our County did not. We recognize the importance of making it easy for other communities to be able to do the same. Communities are being asked to accept and absorb the public health and environmental impacts of oil and gas development because of promised economic benefits. In addition, communities are expected to believe the benefits promised by industry and government without any evidence.

County and local government officials making decisions on projects that will have long-term economic, social, health, and economic impacts should demonstrate due diligence in evaluating these projects and provide the public with documented support for their decisions.

Local governments in Colorado derive income from oil and gas development in three ways:

1) Property taxes on production, equipment, and pipelines
2) Severance taxes; and
3) Federal mineral lease royalties

Promising economic benefits is easy, but calculating them is not. We created this step-by-step guide to developing a cost-benefit analysis, and a template spreadsheet with formulas to make it easy. Part I outlines eight steps for estimating the economic benefits from a proposed oil and gas project. Part II

outlines six steps for estimating the economic costs associated with the project. In Part III, we share our lessons learned from embarking on this novel community response to project-specific promises of economic benefits and gains. Part IV provides recommendations for sharing your findings far and wide. We hope this guidebook will inspire others to question not only the benefits of such projects, but the impact of such projects on other local industries and existing local government revenue streams.

PART I: ESTIMATING ECONOMIC BENEFITS OF THE OIL AND GAS PROJECT

Step 1: Initial Considerations

Note: This guide is intended for project-specific analysis. This is an inherently difficult process, because a single oil and gas project rarely takes place in a bubble. Though the end goal of your analysis might be to quantify the impacts of a single project, the economics of that project will likely be intertwined with existing developments, and future development proposed in the area. Keep this in mind when framing your project.

1) Identify the Proposal you want to analyze.
   a. Keep the analysis project-specific
   b. Use official proposal documents and data to avoid being accused of a biased analysis
2) Identify the geographic scope of the project to be analyzed. Some proposals will span county lines. Determine how much of the proposal is in the county you are considering.
   a. If you are focusing on the impact to a single county, determine how many of the proposed wells will be in that county.
   b. If you are focusing on the impact of the entire project, determine how many wells will be located in each county, as each one will use a different mill levy for property tax collection.
   c. In practice, production will vary from well to well, even on the same well pad. However, estimating production by dividing total estimated project production by the total number of proposed wells or wellpads is the best starting point for this analysis.
3) Determine the breakdown of mineral ownership
   a. Federal minerals generate federal mineral royalties
   b. Fee/private minerals generate state severance tax
   c. *All* minerals generate county property taxes
4) Determine the commodity price to use for your projections. The United States Energy Information Administration is a good starting point for

commodity prices and trend data.[1] The EIA site has downloadable information that can be used to determine average commodity prices.

5) Identify the number of proposed pipelines, including size and length proposed, and the size and length of existing pipelines within the County.
   a. Contact your County Assessor and County GIS department for information on existing pipelines.
   b. Review the Environmental Impact Statement or Environmental Assessment conducted on the pipeline if it crosses federal lands for information provided to the public.
   c. Review pipeline project proposals.
   d. Contact the Colorado Oil and Gas Conservation Commission or the Pipeline Safety Program at the Colorado Department of Regulatory Affairs for questions regarding pipelines.
   e. *Note: Pipelines are not required to be accurately mapped, which often makes this is a difficult step. Pipeline maps are hard to come by in many places, but they are vital in understanding how the project you are analyzing will impact the value of these existing pipelines to the County. For example, rural gas gathering pipelines are exempt from federal pipeline safety regulations and will not show up on the Pipeline Hazardous Materials Safety Administrations interactive online pipeline map.*
6) Contact your County Assessor to determine current oil and gas revenues collected by the County. In your request, be sure to explain to the County Assessor the objective of your project, and ask them to include equipment related to oil and gas extraction activities (generally classified as personal property), pipelines, and production.
7) Review Volume 5, Chapter 6 of the Assessor's Reference Library Manuals for valuation of oil and gas property in your Oil and Gas Basin.[2]
   a. This manual prescribes how the County Assessor is required to value oil and gas property, and provides a good starting point for determining the basic necessary equipment associated with certain types of oil and gas wells in a variety of different basins, and the value of that equipment.
   b. It also provides examples of the calculations you'll need to do when determining pipeline values.

Step 2: Calculating Production Value

*Note: See **Attachment A Step 2** for the formula and template to calculate production value.*

[1] *Henry Hub Natural Gas Spot Price*, United States Energy Information Administration (available at: https://www.eia.gov/dnav/ng/hist/rngwhhdm.htm)
[2] Available at: https://www.colorado.gov/pacific/dola/assessors-reference-library-manuals

1) No estimate is perfect. Unconventional oil and gas wells have heavily front-loaded production curves, and production will vary from well-to-well even within a single project or among wells on the same well pad. [3]
2) Get your measurement units correct. In our experience, development proposals often list expected production for natural gas in *cubic feet (CF)*, which is slightly annoying, as commodity prices are in dollars per million BTUs (mBTU). This requires some lengthy conversions. For example, 1 CF = 1020 BTUs, so if the price of natural gas is $2.00/mBTU, and a project will extract 1 billion cubic feet of natural gas per year, then 1,000,000,000 CF * 1020 BTU/CF* $2.00/mBTU = $2,040,00 in production value per year. That is essentially the gross value of the natural gas to the operator.

Once you have determined the total production value, you can use it to estimate county property taxes, state severance taxes, and federal mineral royalties generated by the project.

Step 3: Calculating Severance Tax

*Note: See **Attachment A Step 3,** for the formula and template to calculate severance tax based on production value.*

1) Severance tax is based on production. However, severance tax and property tax are inter-related in Colorado, because operators are allowed to deduct 87.5% of their prior year's property tax burden from their severance tax bill. According to Headwaters Economics, while severance tax in Colorado is assessed on a sliding scale from 2-5% (based on production), the 10-year average effective severance tax rate in Colorado is 1.86%.[4]
2) Once you have calculated the total severance tax generated by a project, you will need to calculate the amount re-distributed to the County of origin. 50% is returned to the State, however that 50% is subject to a complex redistribution formula. You can use the flowchart in Attachment B, to determine how much of that revenue will be distributed to specific agencies and returned to your county.
3) For severance tax in Colorado, 15% of the total amount generated is directly distributed to the county of origin. The remainder of the State and local government share is redistributed through a wide array of

[3] See *How States Return Revenue to Local Governments from Unconventional Oil Extraction*, Headwaters Economics, 2014 (available at: https://headwaterseconomics.org/wp-content/uploads/state-energy-policies-report.pdf) for examples of production and revenue curves.

[4] *How Colorado Returns Unconventional Oil Revenue to Local Governments,* Headwaters Economics, January 2014, p. 5

governmental agencies and programs, primarily through competitive grants or loans.[5]

Step 4: Calculating Federal Mineral Leasing Revenues and Distribution

*Note: see **Attachment A Step 4,** for the formula and template for calculating Federal Mineral Leasing Revenues and Distribution.*

1) The On-shore mineral royalty rate for oil and gas is 12.5%
2) Once you have calculated the total royalty revenue generated by a project, you will need to calculate the amount re-distributed to the County of origin. 50% is returned to the State, however that 50% is subject to a complex redistribution formula. You can use the flowchart in Attachment C, to determine how much of that revenue will be distributed to specific agencies and returned to your county.
3) For federal royalties, roughly 9.8% of the total generated is directly redistributed to the county of origin. The remainder of the State and local government share is redistributed through a wide array of governmental agencies and programs, primarily through competitive grants or loans.[6]

Step 5: Calculating Property Tax on Production

*Note: See **Attachment A Step 5**, for the formula and template to calculate property tax on production.*

1) The basic formula for property tax calculation is: Annual production volume * commodity price * assessment ratio * mill levy = tax revenue.
2) The most difficult phase of this step is determining the correct mill levy to apply. Determining the correct mill levy is difficult because there are different mill levies applied to different tax districts, but with some consultation with your County Assessor, you can determine an appropriate mill levy to apply in estimating the tax revenue. It is likely that your County Assessor's office has published some sort of summary of mill levies across the county, and that makes a great starting point.
3) In addition to the mill levy, you must also apply the assessment ratio. In Colorado, this is 87.5%, meaning oil and gas production is assessed at 87.5% of its total value.
4) The entire amount of property tax generated by oil and gas development stays with the County.
5) Example: 1,000,000,000 cf production * 1020 BTUs/cf * $2.00/mBTU * 87.5% assessment ratio * 4.8934% mill levy = $87,347 in property tax.

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[5] Beyond what is directly redistributed to the County of origin, it is extremely difficult to determine how much benefit will accrue to the County of origin from a specific project. Therefore, we limited our analysis to the direct distributions.

[6] See footnote 5.

Step 6: Calculating Property Tax from Oil and Gas Equipment

*Note: See **Attachment A Step 6,** for the formula and template for calculating property taxes on oil and gas equipment.*

1) Work closely with your County Assessor. The County Assessor is privy to confidential information from the oil and gas operator, which the public is not. In addition, the County Assessor works with actual data, whereas the public must work with estimated data.
2) Get a basic understanding of equipment normally required per well. Back in Step 1, we recommended that you read Volume 5, Chapter 6 of the Assessor's Reference Library Manuals. That Volume also provides Basic Equipment Lists (BELs) for a variety of well types in a variety of oil and gas basins. These BELs should be your starting point, but it is highly recommended that you contact your County Assessor to ensure that the BELs are complete for your project. The Assessor's Manual also provides valuations for many of the individual pieces of equipment that your County Assessor recommends adding to the BELs. **The BELs represent the minimum possible value for wells of a certain type.** A well cannot be valued at less than the listed BEL value, however, according to the Delta County Assessor, the actual value of a specific well could be as much as double the BEL value.
3) Once you have determined the value of the equipment associated with the wells in your project, multiply that value by the assessment ratio for oil and gas equipment. As of the writing of this manual, that ratio is 29%, but that ratio can change. Be sure to confirm with your County Assessor that 29% is the correct ratio.
4) After applying the assessment ratio, apply the mill levy. See Step 5 above for a discussion on mill levies.
5) Example: Value of Equipment from BEL and additional equipment is $1,000,000. Value ($1,000,000) * Assessment Ratio (29%) * Mill Levy (4.5%) = County tax revenue from equipment ($130,500).

Step 7: Estimating Property Tax from Pipelines

*Note: See **Attachment A Step 7**, for the three formulas and template used to calculate property taxes from pipelines.*

1) We saved the most complicated calculation for last. Pipelines are an essential part of the value of oil and gas projects, and their contribution to County tax revenues are often substantial. This is another area where consultation with your County Assessor, and an understanding of Volume 5, Chapter 6 of the Assessor's Reference Library Manuals will be extremely helpful.
2) The basic formula for calculating the value of pipelines looks like this: (Cost New of the Pipeline * Percent Good) – Functional Obsolescence =

Actual Pipeline Value. The basic formula for calculating property tax = actual pipeline value * assessment ratio * mill levy.

   a. Cost New is difficult to determine. While your County Assessor will have this information, it is most likely confidential. You will therefore most likely be forced to estimate, based on the length and diameter of the pipelines referenced in the Operator's proposal. According to industry analysis, pipelines in the western US cost an average of $200,000 per inch-mile, though this can vary greatly in practice.[7] For example, 20 miles of 10-inch diameter pipeline would be $200,000 * 20 miles * 10 inches = $40,000,000.

3) Once you have estimated the Cost New of the pipeline, you will have to determine the Percent Good. This term is determined based on the effective age of the pipeline, and is defined in a table found on page 7.57 of Volume 5, Chapter 6 of the Assessor's Reference Library Manual.[8]
4) The last factor to calculate is the functional obsolescence. Functional obsolescence accounts for the difference between actual throughput in the pipeline and the pipeline's built capacity. This is the only part of the pipeline's value that is dependent on the amount of gas or oil being transported through the pipeline. Simply put, functional obsolescence is the factor by which operators can reduce the value of their pipelines for tax purposes based on actual throughput instead of potential capacity.
   a. Calculating functional obsolescence requires understanding both the amount of pipeline capacity that exists in the area around your project, and how much throughput your project will contribute.
   b. The units in this section are a bit odd. Pipeline capacity is measured in MMCFDs, which is millions of cubic feet per day. Getting to this unit requires converting the cubic feet of estimated production from the Operator's proposal. The basic conversion is: Total CF Produced/Lifespan of Project in years/365 days. Example: 100,000,000,000 CF total/30 years lifespan/365 days per year = 9.1MMCFD.
5) The calculation of functional obsolescence is difficult, and it looks like this: 1-(1+√(Actual Throughput/Normal operating pipeline capacity))/2).[9] Please see the **Attachment A Step 7c** for the formula and template for the calculation. This formula results in a percentage.
   a. Example: Actual throughput = 10 MMCFD. Capacity = 12 MMCFD. 1-(1+(√(10/12))/2) = .043 (4.3%)

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[7] *2012 Pipeline Construction Report,* Underground Construction, Vol 67 No. 1, January 2012. (Available at: https://ucononline.com/2012/01/16/2012-pipeline-construction-report/)

[8] Volume 5, Chapter 6 of the Assessor's Reference Library Manuals, page 7.57. (Available at: https://www.colorado.gov/pacific/dola/assessors-reference-library-manuals)

[9] Volume 5, Chapter 6 of the Assessor's Reference Library Manuals, page 7.26. (Available at: https://www.colorado.gov/pacific/dola/assessors-reference-library-manuals)

b. Actual throughput can be a tricky thing to determine. If pipelines already exist in the project area, and the proposal you are analyzing does not call for the construction of any new pipelines, you will have to add the potential throughput resulting from the proposed project to the existing throughput in the pipeline network. If the proposal calls for new pipelines to be constructed, then you can use the throughput from the proposed project on its own.

6) Multiply the estimated Cost New of the pipeline by your recently calculated functional obsolescence percentage. That gives you the dollar amount used in the formula in bullet point 2 above.
7) Then, run through the formula from point 2 above. Example: ($10,000,000 (Cost New of pipeline) * 80% (Percent Good from table in the Assessor's Manual)) - $435,645 (Functional obsolescence calculated using formula above) = $7,564,354.
8) Finally, once you have determined the actual value of your pipeline, multiply it by your county's assessment ratio (29% for oil and gas property in Delta County) and then by your county's mill levy, and you have the property tax generated by the pipeline network.

Step 8: Add It All Together

1) Share of state severance tax directly redistributed to the county + share of federal mineral royalties directly redistributed to the county + property tax on production + property tax on oil and gas development equipment + property tax on pipelines = total county revenue generated by oil and gas development.
2) Compare this estimate with what the oil and gas operator projects as benefits back to the County.

PART II: ESTIMATING COSTS

Step 1: Initial Considerations

1) One of CHC's goals when we undertook this analysis was to quantify the unique contributions of the North Fork Valley (essentially the eastern third of Delta County) to the Delta County economy and County budget. The majority of Delta County's general fund revenues comes from residential property taxes and sales tax. Determining potential sales tax impact required identifying the economic sectors that were both unique to our particular area and had quantifiable impacts on the County budget. The three economic sectors we studied were agritourism, outdoor recreation, and residential and agricultural property values.
2) Determine how the various economic sectors generate revenue for the county. The most universal consideration is property values, but everything else requires specific knowledge of your county and its economy.
3) Be creative.

Step 2: Impact on Relevant Sales Tax Revenue

1) The first thing CHC realized when we undertook this project was that there is a significant lack of local data—economic data and sales tax data broken down by activity, so you will have to be creative and resourceful when attempting to quantify local economic impacts. It is important to note that the state does not disclose sales tax by industry, so organizations must rely on models, based on surveys, to predict the impact of various economic sectors or activities.

2) Research the economic sectors. Industry associations, The Department of Local Affairs, and Colorado Department of Tourism. As we focused on Outdoor Recreation and Agritourism, Colorado Parks and Wildlife, and the Colorado Department of Agriculture were also good starting points.
   a. When considering outdoor recreation, the Outdoor Industry Association has published substantial data on the statewide and national levels, and are working on smaller breakdowns. Their work can be found at: https://outdoorindustry.org/state/colorado/
   b. Agritourism is difficult to quantify. At CHC, we consulted with several local businesses and organizations that either generate revenue through agritourism or work with businesses that do. We then estimated the number of unique agritourism visits in the North Fork Valley. We then used that number, and an estimate of tax dollars generated per tourism visit from Colorado's tourism office, to estimate tax dollars generated by agritourism.

3) Once you have determined the revenue generated by the activities you are considering, you can begin researching the impact oil and gas development could have on them.
    a. Note: this research is extremely hard to come by. CHC used studies by the Western Values Project that quantified the impact of large-scale industrial oil and gas development on national park visitation figures[10] as a starting point for the potential impact on outdoor recreation and agritourism in Delta County.
    b. Research tips: Consult where possible with universities, professors, other organizations that work in the field. Additional research can be found at Headwaters Economics, Penn State, and the Center for Western Priorities.

Step 3: Impact on Property Tax Revenue

1) This is another area in which consultation with your County Assessor is essential.
2) Understand how your County defines different property types, such as residential property, agricultural property, commercial property, or vacant land.
3) Your County Assessor should be able to create a report with the market value and assessed value of all the different property types within the geographic area of your study. The Assessor routinely updates these valuation reports, so make sure you are using the most recent complete fiscal year's numbers so they don't change throughout your analysis.
4) Calculate the mill levy. We discussed mill levies above in the section on property tax collection on oil and gas production. You can use the data provided by your County Assessor to tailor the mill levy to the specific geographic areas your report will focus on.
5) Research oil and gas impact on such property designations.[11]
6) Calculate potential impact. CHC used a study that found that fears of groundwater contamination from hydraulic fracturing equated to a 26% reduction in property values to calculate potential real estate property tax revenue impact. However, impacts are more complicated than simple property devaluation. Every real estate market is different as it is driven by different dynamics. For example, despite oil and gas activity property values might still be growing due to scarcity of inventory and scarcity of affordable housing. There are many other ways that investments in

[10] That report is available at: http://westernvaluesproject.org/report-on-100-year-anniversary-oil-gas-development-threatens-americas-best-idea/

[11] These reports can provide a good starting point: *Analysis: U.S. Drilling Boom Leaves Some Homeonwers in a Big Hole*, Michael Conlin, Reuters, December 2012. See also: *Drilling vs. The American Dream: Fracking Impacts on Property Rights and Home Values*, Resource-Media, March 201439 and *Shale Gas Development and the Costs of Groundwater Contamination Risk*, Lucija Muehlenbach, et al., March 2013, p. 29

property can be impacted: consider boom and bust real estate cycles, laterals going under homes, proximity to homes, schools, playgrounds, and home insurance exclusions.

Step 4: Consider Costs of Project on Other Aspects of the County Budget and Services

The economic impact of oil and gas development is based on much more than its effects on the existing economy. There are myriad externalized costs that accrue to the County as a result of industrialization, and while we referenced these additional costs based on research from Headwaters Economics, we did not calculate these costs. We recognize the need to quantify these costs, such as:

1) Roads and bridges
2) Emergency Services
3) Public health services
4) Social services
5) School budget
6) Transportation
7) Law Enforcement and Safety

Step 5: Consider Public Health Costs

There are now over 600 studies on the impacts of oil and gas chemicals to human health, and a number of studies in the works attempting to quantify the economic costs associated with the human health impacts of air, water, and ground pollution associated with oil and gas development. Communities are currently absorbing those costs in the form of increased health insurance premiums, increased health care costs, foregone medical attention, decreased productivity and ability to work. Our report recognized this potential, but did not attempt to quantify these variables.

As Health Impact Analyses become more common, it will be possible to include these costs in this type of analysis.

Step 6: Consider Environmental Costs of Accidents and Spills

There are many ways that spills and accidents increase the economic burden on County governments. For one, the bonding requirements on operators are terribly inadequate, leaving local governments and individuals to shoulder the burden of environmental remediation or the consequences of inability to remediate. Spills can impact both surface water and groundwater, potentially damaging irrigation districts and domestic water supplies. Research on the costs associated with these events is limited, but it is important to consider them in this type of analysis.

Part III: LESSONS LEARNED

This section could be several pages long all on its own, but I will keep it simple.

First, many of the processes by which counties generate revenue are opaque and complex. There are only a few people who truly understand how counties assess oil and gas production and property for tax purposes, and even where they do, a lot of the necessary data is confidential.

Second, the oil and gas industry has the deck stacked in their favor. Research on the industry is often funded by the industry, and citizens groups like CHC are drastically out-funded. This allows industry representatives to attack your work with impunity. When we presented our findings to our County Commissioners, the Director of the West Slope Colorado Oil and Gas Conservation Commission spoke after us and submitted a letter to the commissioners that blew the local impact of severance taxes dramatically out of proportion. The onus was then on us to refute these outsized claims. The industry relies on total aggregate industry data, and counts competitive grants and loans as benefits back to the County to make its case. Be prepared to face harsh, rapid response from industry. Be prepared to challenge the assumptions. Don't take it personally.

Third, there needs to be more research on the local impacts of oil and gas development on various economic sectors. We faced criticism for failing to use studies that focused on the North Fork Valley. These studies don't exist at the moment.

Fourth, don't let the fear of not being complete prevent you from starting this type of project. You will almost certainly be attacked for failing to include x, y, or z, regardless of how complete your analysis is. What is really important is bringing this conversation to the forefront. While the information you will be working with is technically publicly available, it is not always accessible. People need to know that oil and gas development is not the cut and dry economic booster that many people claim it is.

Fifth, the immediate economic impact issue is not the end of the story. The boom/bust cycle of the extractive industry is dangerous, no matter how large the immediate boom might be. The pollution and contamination of our water, air, and food is dangerous no matter how much money the oil companies stand to make through these projects. The economic impact is only one piece of the story, but unfortunately it is the piece that many people and local governments tend to fall for, without challenging the assumptions and potential pitfalls.

And finally, knowing which questions to ask is critical. This is why it is so important to explain clearly to people what you are trying to do. Because this is

such an opaque area, not everyone will be forthcoming with information absent asking the right questions. This guidebook is the result of what we learned, and hope that it will help you in asking the right questions when undertaking a similar project.

PART IV: Sharing Your Results

Once your analysis is complete, don't keep it to yourself! Develop a roadshow plan for sharing your results far and wide across your county, regulatory agencies, stakeholders, and elected officials. Here are some suggestions for where to present your findings:

- County Commissioners
- Town Council
- County Economic Development Agency
- County Planning Commission
- County Tourism Office
- Chambers of Commerce
- Community, Civics and Service Organizations
- Realtors
- Media
    - Radio Station
    - Newspapers
    - Magazines
    - Local blogs
- State Representatives
- Congressional Representatives
- If activity impacts public lands, the Bureau of Land Management, US Forest Service
- Local business groups likely impacted
- Local environmental/conservation groups

We found that people were very receptive to having us present our findings. At the presentations, we had people thank us for undertaking this analysis and challenging the assumptions put forth by the industry and county and local government.

The industry will come out in full force to discredit you, so make sure you reach as many people as possible as quickly as possible to counter this tactic.

The interactive spreadsheet, where you can fill in data and calculate revenue is available at http://www.chc4you.org/guidebook-to-oil…benefit-analysis/

Attachment A: REVENUE CALCULATION SPREADSHEET TEMPLATE

STEP 2: Calculating PRODUCTION Value

Calculating Production Value:	Total Volume Produced (CF)	Share of Production Originating in County (Percentage)	Convert CF to mBTU (1020 BTU/CF)	Commodity price of NG ($/mBTU)	Per million BTU	Length of Project (Years)	EQUALS Annual Value of Extracted NG ($)
	[Enter Value]	[Enter Value	1020	[Enter Value]	1000000	30	**#VALUE!**

STEP 3: Calculating SEVERANCE Tax

Calculating Severance:	Annual Production of NG in County (CF)	Share of gas produced on NON-Federal Land	Severance Tax Rate (Sliding Scale in CO)	EQUALS Total Severance Tax Generated
	#VALUE!	[Enter Value]	1.86%	#VALUE!

STEP 4: Calculating FEDERAL ROYALTY REVENUE Tax

Calculating Royalty:	Annual Production of NG in County (CF)	Share of gas produced on FEDERAL Land	Federal Royalty Rate (12.5%)	EQUALS Total Federal Royalties Generated
	#VALUE!	[Enter Value]	12.50%	**#VALUE!**

STEP 5: Calculating COUNTY Property Tax On Production

Calculating COUNTY Property Tax	Annual Produced Value Originating in County (value of extracted NG($)	Assessment Ratio (87.5%)	Mill Levy (Percentage)	EQUALS Annual Property Tax for County
	#VALUE!	87.50%	[Enter Value]	**#VALUE!**

STEP 6: Calculating COUNTY Property Tax from Equipment

Calculating Equipment Property Tax	Equipment Value (From BEL)	Assessment Ratio	Mill Levy	EQUALS Equipment Property Tax
	[Enter Value]	29%	[Enter Value]	#VALUE!

STEP 7a: Calculating COUNTY Property Tax from Pipelines

Calculating Pipeline Property Tax:	Actual Pipeline Value (See Below)	Assessment Ratio (29% in Delta County)	Mill Levy	EQUALS Property Tax from Pipelines
	#VALUE!	0.29	[Enter Value]	#VALUE!

STEP 7b: Calculating Actual Pipeline Value

Calculating Actual Pipeline Value	Cost New of Pipeline	Percent Good (From Chart)	Functional Obsolescence Value (See Below)	EQUALS Actual Value
	[Enter Value]	[Enter Value]	#VALUE!	#VALUE!

STEP 7c: Calculating Functional Obsolescence Value

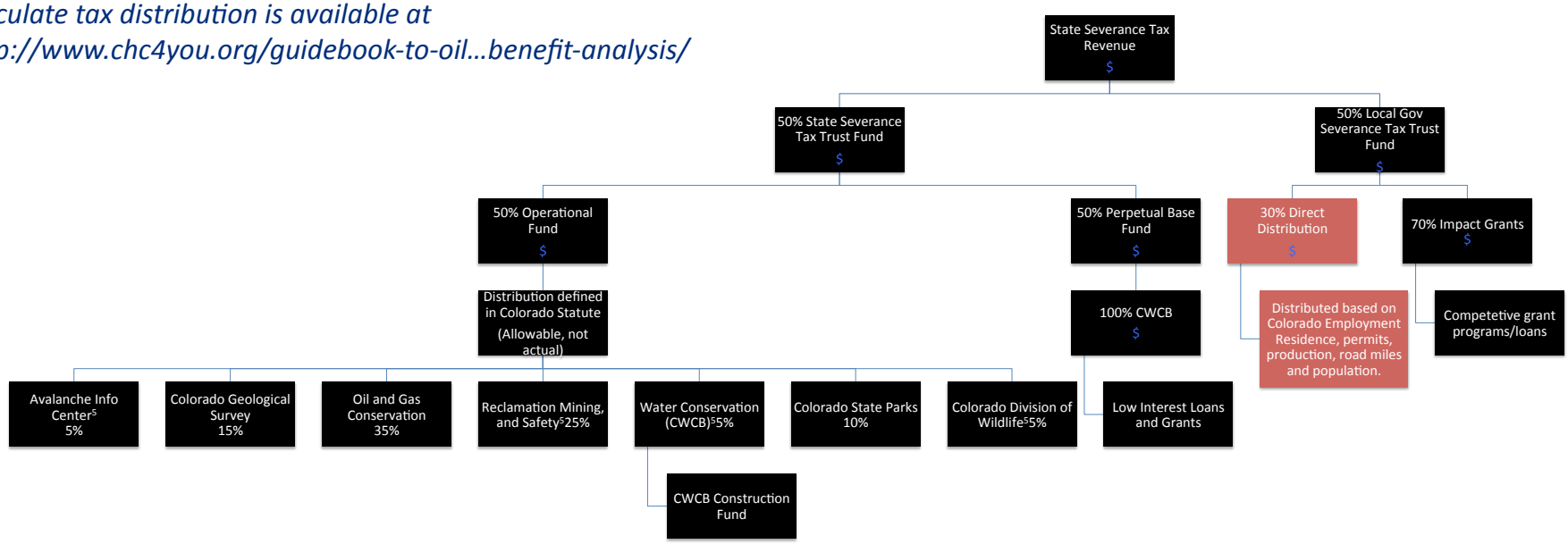
Functional Obsolescence	Step 1:((project throughput+existing Throughput)/Capacity)	Step 2:(1+(√(Step 1)))/2	Step 3: 1-(Step 2)	EQUALS Function Obsolescence Value
	[Enter Value]	#VALUE!	#VALUE!	#VALUE!

Distribution of Severance Tax in Colorado					
TOTAL Severance Generated ($)	#VALUE!				
50% State Sev Tax Trust Fund				**50% Local Gov Sev Tax Trust Fund**	
0.5				0.5	
#VALUE!				#VALUE!	
50% Operation Fund	**50% Perpetual Base Fund**			**30% Direct Distribution**	
0.5	0.5			0.3	
#VALUE!	#VALUE!			#VALUE!	
				70% Impact Grants	
				0.7	
				#VALUE!	

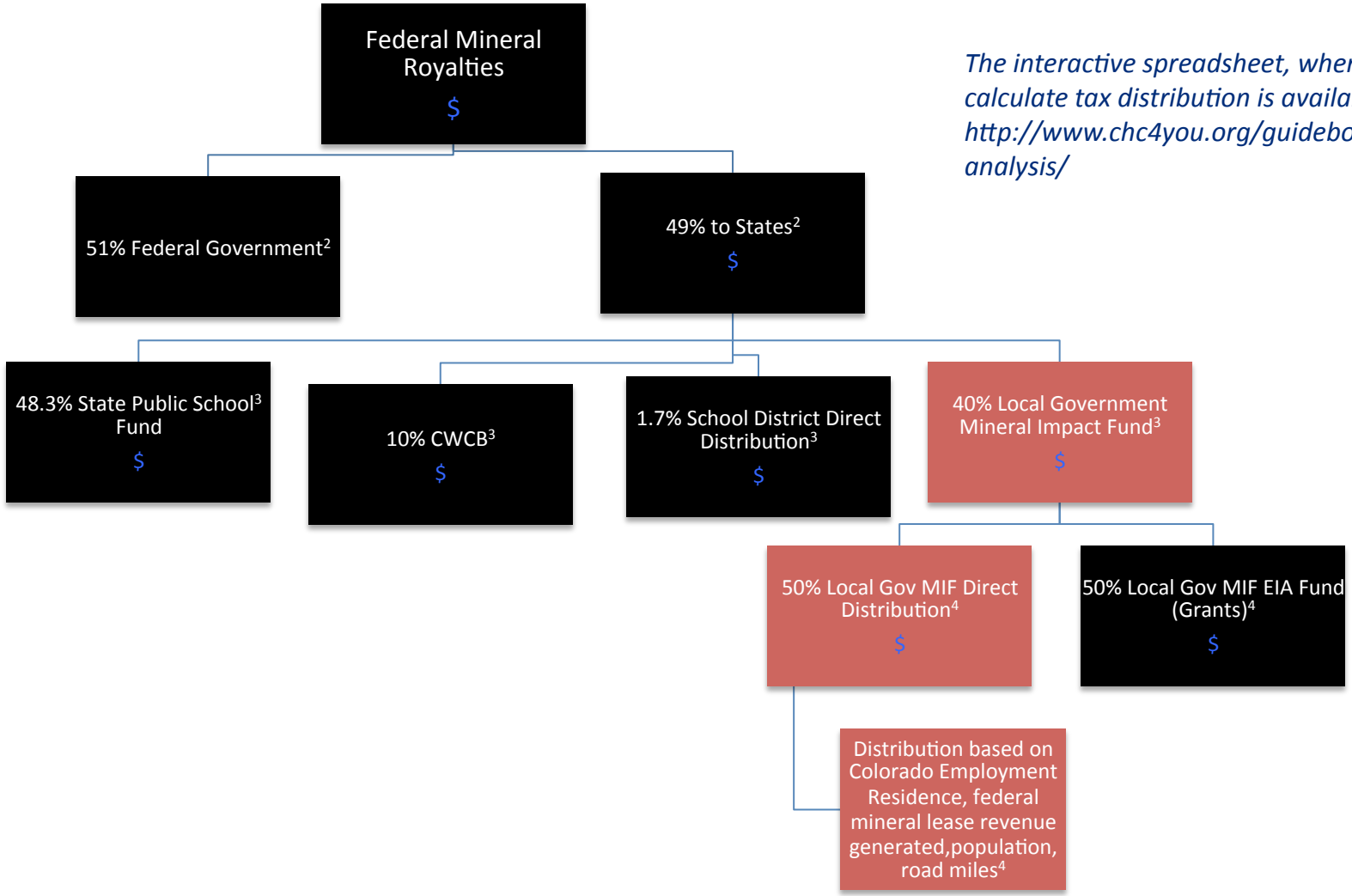
Distribution of Royalties in Colorado					
TOTAL Royalties Generated	#VALUE!				
51% to Federal Gov't (Distribution not described here)					
49% to States					
0.49					
#VALUE!					
48.3% State Public School	**10% CWCB**	**1.7% School Dist Direct Distribution**	**40% Local Gov MIF**		
0.483	0.1	0.017	0.4		
#VALUE!	#VALUE!	#VALUE!	#VALUE!		
			50%Local Gov MIF Direct Distribution	**50% Local Gov MIF EIA Fund**	
			0.5	0.5	
			#VALUE!	#VALUE!	

Attachment B
Severance Tax Distribution Flowchart

The interactive spreadsheet, where you can fill in data and calculate tax distribution is available at http://www.chc4you.org/guidebook-to-oil…benefit-analysis/



Attachment C
Federal Mineral Royalties Tax Distribution Flowchart



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