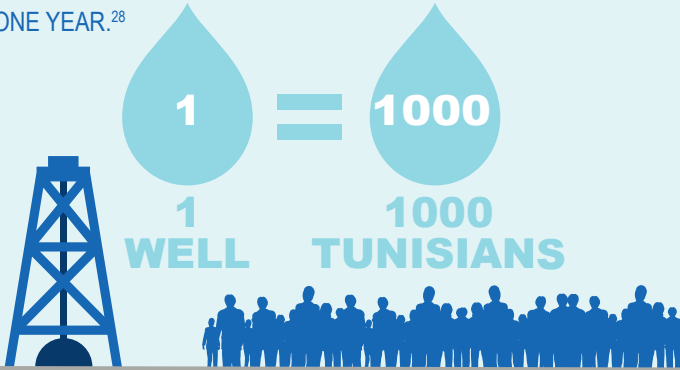


WATER SCARCITY

FRACKING USES A LOT OF WATER. CONSERVATIVE ESTIMATES SUGGEST THAT WATER USED FOR FRACKING RANGES FROM 10,000 TO 20 000M³ PER WELL.²⁷ THIS MEANS THAT THE WATER NEEDED FOR ONE FRACKING WELL IS EQUIVALENT TO THE WATER NEEDS OF APPROXIMATIVELY 1000 TUNISIANS DURING ONE YEAR.²⁸



With severe water scarcity in Tunisia – less than 430m³ per capita²⁹ each year³⁰ – the cumulative impact of fracking could lead to serious shortages in the near future and a full-fledged crisis in the long term. This issue can be especially serious in the desert areas of southern Tunisia where most of the fracking will take place and where the average rainfall is no more than 100mm per year.³¹ All water used in fracking will be sourced locally. The amount of water used varies by region.³² Estimates range from 10-15 000 m³ of water per shale gas well to as much as 18-25 000 m³.³³ Most importantly, all this fresh water is permanently withdrawn from the hydrological cycle and cannot be reused.

WATER POLLUTION

WASTEWATER IS PRODUCED WHEN DRILLING WELLS, DURING FRACKING AND WHEN GAS IS EXTRACTED.³⁴ THIS LEADS TO RISKS ON WATER RESOURCES INCLUDING LAND AND SURFACE WATER POLLUTION, AQUIFER CONTAMINATION AND INCREASED COMPETITION FOR WATER.³⁵ EVERY DRILLING OPERATION USES SEVERAL TONNES OF HIGHLY TOXIC CHEMICALS³⁶. FRACKING FLUID CAN CONTAIN AS MANY AS 300 CHEMICALS, OF WHICH 40 PER CENT ARE ENDOCRINE DISRUPTORS, KNOWN TO INTERFERE WITH THE HORMONE SYSTEM IN ANIMALS AND HUMANS, AND A THIRD OF WHICH ARE SUSPECTED CARCINOGENS. OVER 60 PER CENT OF THE CHEMICALS USED CAN HARM THE BRAIN AND NERVOUS SYSTEM.³⁷



The industry downplays the risks related to the chemicals used in the extraction process³⁸ but water contamination from spills of drilling mud, flow back, and leakage from storage ponds can be very serious. Approximately 90 per cent of the waste water stays at the bottom of the well, posing a potential risk of infiltrating and polluting underground water reserves.³⁹ According to the German federal environment agency, “no company has been able to offer a concept for the sustainable water treatment” of the remaining 10 per cent ‘flow back’.⁴⁰ In other words, there is a pending question about how shale gas operators will treat flow back water, if at all. The most probable outcome will be that waste water is left to evaporate in evaporation pits, as is done in Wyoming in the US.⁴¹ Following extraction, Tunisia will be left with thousands of contaminated water wells in the desert with no opportunity for treatment. Thus a long-term shale gas extraction project in Tunisia could not only cause widespread toxic contamination of public drinking water sources over time but also air pollution with the evaporation of toxic chemicals.

IMPACTS ON WORKERS' HEALTH

THE OIL AND GAS INDUSTRY'S WASTE — PRIMARILY THE LEFTOVERS OF WHAT'S BROUGHT TO THE SURFACE — CONTAIN CORROSIVE SALTS, RADIOACTIVE MATERIAL, TOXIC METALS, HYDROCARBONS, AND FRACKING CHEMICALS.⁴² EXPOSURE TO SUCH ELEMENTS CAN LEAD TO SERIOUS HEALTH ISSUES.

A new study from the US Center for Disease Control⁴³ finds dangerous levels of benzene in the urine of workers in fracking fields. It is known that benzene and methane leak from wells during fracking operations,⁴⁴ but this new information shows how exposed workers really are. Benzene is a known carcinogen that is present in fracking flow back, gasoline and chemical manufacturing⁴⁵. Daily exposure can lead to serious health issues like higher risks of developing blood cancers such as leukaemia. The problem is that even in small doses, the chemical products used in fracking have a direct negative impact on health especially for people chronically exposed to them,⁴⁶ such as workers on fracking sites. The mix of these chemicals further compounds their toxicity. All together, the data shows that **fracking jobs are killing jobs.**

THE EVIDENCE IS CLEAR.

FRACKING CREATES SIGNIFICANT PUBLIC HEALTH AND ENVIRONMENTAL RISKS AND HARMS. THE IMPACTS ON WATER USAGE AND WATER POLLUTION CONTRIBUTE TO LONG-TERM HEALTH, ENVIRONMENTAL, AND ECONOMIC RISKS. THE FULL EXTENT OF THESE RISKS AND THE DAMAGES POSED BY FRACKING TO AIR AND WATER QUALITY ARE YET TO BE FULLY KNOWN.⁴⁷

FRACKING



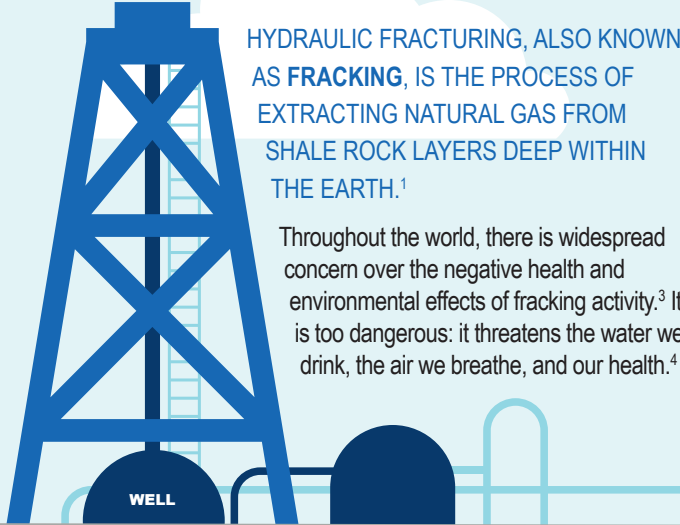
WHAT EVERY TUNISIAN SHOULD KNOW

²⁷ The Energy Collective: “Energy Facts: How much water does fracking for shale gas consume?” www.theenergycollective.com
²⁸ http://www.fao.org/nr/water/aquastat/countries_regions/TUN/index.stm
²⁹ Per person
³⁰ Source: FAO Aquastat Database
³¹ http://sdwebx.worldbank.org/climateportal/index.cfm?page=country_historical_climate&ThisRegion=Africa&ThisCCCode=TUN
³² Linn, Anne, [Rapporteur], (2014), “Development of Unconventional Hydrocarbon Resources in the Appalachian Basin: Workshop Summary,” Washington, DC: National Academy of Sciences at 5.
³³ <http://theenergycollective.com/jessejenkins/205481/friday-energy-facts-how-much-water-does-fracking-shale-gas-consume>
³⁴ http://ec.europa.eu/environment/integration/research/newsalert/pdf/hydraulic_fracturing_consumes_most_water_in_shale_gas_production_396na3.pdf
³⁵ Vengosh et al. 2014 at 8334
³⁶ <http://fracfocus.org/chemical-use/what-chemicals-are-used>
³⁷ <http://endocrinedisruption.org/chemicals-in-natural-gas-operations/introduction>
³⁸ http://www.foeeurope.org/sites/default/files/publications/foee_shale_gas_unconventional_unwanted_0.pdf
³⁹ http://documents.foodandwaterwatch.org/doc/urgent_case_for_ban_on_fracking.pdf
⁴⁰ http://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/texte_53_2014_umweltauswirkungen_von_fracking_28.07.2014_0.pdf
⁴¹ <http://www.theguardian.com/environment/2013/oct/04/fracking-us-toxic-waste-water-washington>

⁴² http://documents.foodandwaterwatch.org/doc/urgent_case_for_ban_on_fracking.pdf
⁴³ <http://blogs.cdc.gov/niosh-science-blog/2014/08/21/flowback-2/>
⁴⁴ <http://stateimpact.npr.org/pennsylvania/2014/08/28/new-study-shows-gas-workers-could-be-exposed-to-dangerous-levels-of-benzene/>
⁴⁵ <http://stateimpact.npr.org/pennsylvania/2014/08/28/new-study-shows-gas-workers-could-be-exposed-to-dangerous-levels-of-benzene/>
⁴⁶ <http://concernedhealthy.org/wp-content/uploads/2014/07/CHPNY-Fracking-Compendium.pdf>
⁴⁷ http://www.environmentamerica.org/sites/environment/files/reports/EA_FrackingNumbers_scrn.pdf



WHAT IS FRACKING?



HYDRAULIC FRACTURING, ALSO KNOWN AS **FRACKING**, IS THE PROCESS OF EXTRACTING NATURAL GAS FROM SHALE ROCK LAYERS DEEP WITHIN THE EARTH.¹

Throughout the world, there is widespread concern over the negative health and environmental effects of fracking activity.³ It is too dangerous: it threatens the water we drink, the air we breathe, and our health.⁴

HEALTH ISSUES CAUSED BY FRACKING

FRACKING IS EXEMPT FROM MAJOR ENVIRONMENTAL LAWS, INCLUDING THE SAFE DRINKING WATER ACT IN THE US, AND SPILLS AND ACCIDENTS ARE FAR TOO COMMON.⁵ SPILLS OF TOXIC FRACKING WASTEWATER⁶ AND REGIONAL AIR POLLUTION PROBLEMS⁷ HAVE BEEN REGULARLY REPORTED AROUND MAJOR FRACKING SITES IN THE US.

Because every drilling operation uses several tonnes of highly toxic chemicals⁸ (approximately 133 tonnes of chemicals for a typical shale gas site), water contamination by spills from drilling mud, flow back, and leakage from storage ponds can be serious. In its December 2012 report, the US Environmental Protection Agency (EPA) highlighted the possible link between fracking and water contamination.⁹

The entire shale gas extraction process poses a threat to the environment, endangers water and the health of local communities. Fracking and the injection of fracking wastewater can trigger earthquakes and minor tremors, such as those documented in the UK in 2011.¹⁰ Furthermore, the US Geological Survey confirmed that an earthquake in Oklahoma was linked to fracking waste water injection.¹¹ The bottom line is that the track record of modern fracking is shrouded in incomplete information, severe incidents and distorted arguments that narrowly define what counts as contamination from fracking.¹² Even in these countries where civil society is strong and transparency too, things are far from perfect.

FRACKING IN TUNISIA – FACTS AND FICTION

ACCORDING TO A 2011 REPORT BY THE US ENERGY INFORMATION ADMINISTRATIONS¹³, THE FIRST INSTANCE OF SHALE GAS EXTRACTION WITH HYDRAULIC FRACTURING IN TUNISIA TOOK PLACE IN MARCH 2010 AND SINCE THEN, TUNISIA ACTIVELY SUPPORTS THIS METHOD.¹⁴

Former prime minister Mehdi Jomaa (who once worked for Hutchinson Aerospace, a subsidiary of oil company Total) said in September 2014 that his government is determined to explore shale gas and that critics will not stop Tunisia pursuing its extraction.¹⁵ Jomaa added that shale gas was a natural resource that could bring economic benefits for the country,¹⁶ but did not mention the potential harmful environmental effects caused by its extraction.



TUNISIA 2061: 742 WELLS

FALSE PROMISES OF RICHES

FORMER INDUSTRY MINISTER LAMINE CHAKHARI ARGUED THAT THE SHELL PROJECT IN KAIROUAN WOULD SUBSTANTIALLY CONTRIBUTE TO THE REGION'S ECONOMY AND EMPLOYMENT AND WOULD GUARANTEE TUNISIA'S ENERGY NEEDS FOR 80 YEARS.²⁰ HE FURTHER ARGUED THAT THE SHELL PROJECT WOULD CREATE A CONSIDERABLY LARGE AMOUNT OF JOBS AND FOSTER EMPLOYMENT THROUGHOUT THE REGION.²¹

But according to the Tunisian National Institute of Statistics, energy-related jobs in Tunisia accounted for just over one per cent between 2006 and 2014, while the agricultural sector, which is under threat from the fracking industry, accounted for more than 18 per cent.²²



A large fracking project run by Shell in Kairouan is already underway. In 2013, ignoring demands from the ministries of environment, regional development, planning and health, the government allowed Shell to start fracking 742 wells until 206.¹⁷ The permit for Shell was granted by the Ministry of Industry in 2011. The first phase involves the digging of two initial wells followed by another ten. After drilling these initial twelve wells, Shell plans to establish another 30 over four years at a total cost of USD 1.1 billion.¹⁸

During the 40-year production phase, 700 wells will be drilled, at a total cost of USD 12.5 billion. What this all means is that one well is planned every 5 square kilometres, with a distance of two kilometres between each and a new well being built every month. Less fracking will take place in Kairouan than in the southern regions of Tunisia where other projects are planned (like the Perenco project in Kebili¹⁹). Some sources have recently mentioned that Shell may have decided to leave Tunisia.²⁰

Foreign energy companies who exploit shale gas do not buy drilling supplies from local businesses²³, and the jobs created by a new fracking installation go to migrant workers with previous experience in the shale industry.²⁴ Contrary to the arguments of the Tunisian government in 2012, the fracking industry will neither create an employment boom for the local workforce nor significant economic benefits.²⁵ Tunisians need to know that the promise of broad-based economic growth from drilling and fracking is false.²⁶

¹ BBC News: "What is fracking and why is it controversial?" 27/06/2013
² Blundell D., (2005). "Processes of tectonism, magmatism and mineralization: Lessons from Europe". Ore Geology Reviews 27: 340.
³ Finkel ML, Hays J (October 2013). "The implications of unconventional drilling for natural gas: a global public health concern". Public Health (Review) 127 (10): 889-93.

⁴ Food and Water Watch – www.foodandwaterwatch.org/water/fracking
⁵ Food and Water Watch – www.foodandwaterwatch.org/water/fracking
⁶ "Crews stop flow of drilling fluid from Pennsylvania well". Associated Press. April 22, 2011; Aaron Jeffrey. "Pa. Fracking blowout spews fluid onto state forest lands" Star Gazette (Elmira, New York). January 25, 2011; York, Kate and Brad Bauer. "Fracking wastewater leaked onto Ohio roads." The Marietta Times (Woodsville, Ohio). December 24, 2011; Maykuth, Andrew. "Pa. Suspends gas drilling at Marcellus rupture site". The Philadelphia Inquirer. June 7, 2010.
⁷ Wolf Eagle Environmental. "Town of DISH, Texas Ambient Air Monitoring Analysis: Final Report." September 15, 2009 at 6; Steingraber, Sandra. Ithaca College. Testimony on Health Impacts of Hydraulic Fracturing Techniques.
⁸ http://fractofocus.org/chemical-use/what-chemicals-are-used
⁹ http://pubs.usgs.gov/ds/718/
¹⁰ http://www.bbc.com/news/uk-england-lancashire-15550458
¹¹ http://www.usgs.gov/newsroom/article.asp?ID=3819#_VK-yNcVf9qV
¹² http://ecowatch.com/2013/11/08/industry-mislead-americans-on-fracking/

¹³ http://www.eia.gov/analysis/studies/worldshalegas/
¹⁴ http://ejatlas.org/conflict/fracking-opposition-tunisia
¹⁵ http://www.africanmanager.com/site_eng/detail_article.php?art_id=22487
¹⁶ Hammi, Med Dha. "Feu vert à Shell pour 742 puits de gaz de schiste 1" Nawaat, 18/10/2013
¹⁷ Hammi, Med Dha. "Feu vert à Shell pour 742 puits de gaz de schiste 1" Nawaat, 18/10/2013
¹⁸ Rebbi, Hafawa. "Governance: Tunisia presses ahead with fracking despite counter arguments" International Anti-Corruption Conference. 02/10/2014.
¹⁹ Hammi, Med Dha. "Feu vert à Shell pour 742 puits de gaz de schiste 1" Nawaat, 18/10/2013
²⁰ Rebbi, Hafawa. "Governance: Tunisia presses ahead with fracking despite counter arguments" International Anti-Corruption Conference. 02/10/2014.
²¹ This information is not confirmed at the time this document is written.

²² Nawaat: « Feu vert à Shell pour 742 puits de gaz de schiste 1 » 18/10/2013
²³ http://www.oxfordeconomics.com/recent-releases/economic-impact-of-shale-exploration-in-tunisia
²⁴ Institut National de la Statistique "Répartition de la population active occupées selon le secteur d'activité 2006-2014 – en milliers » www.ins.nat.tn
²⁵ Food and Water Watch. "Fracking: The New Global Water Crisis" – Fact Sheet, March 2012.
²⁶ Christopherson, Susan and Ned Rightor. "How shale gas extraction affects drilling localities: what policy makers need to know." International Journal of Town and City Management. Spring 2012.
²⁷ Barth, Janette M. "Hydrofracking offers short-term boom, long-term bust". Engineering News-Record. March 7, 2011.
²⁸ Food and Water Watch. "Fracking: The New Global Water Crisis" – Fact Sheet, March 2012.