4/22/2016

Some Dam – Hydro News™

And Other Stuff

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Quote of Note: *"It doesn't matter where you are coming from All that matters is where you are going" - Brian Tracy*

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"Good wine is a necessity of life." - -Thomas Jefferson
Ron's wine pick of the week: **2012 Arrowood Cabernet Sauvignon "Sonoma County"**
"No nation was ever drunk when wine was cheap." - - Thomas Jefferson

Dams:

(This guy just doesn't get it.)

Just Hold Your Nose and Do It

mountain-news.com, April 7, 2016

That's what we imagine county supervisors must have quietly thought to themselves Tuesday when they approved the environmental impact report (EIR) for the Lake Gregory Dam, CA rehabilitation project. At a projected repair cost of 12.8 million taxpayer dollars—and the amount could go higher—approving the EIR is just the latest step in a long process which hopefully will fix a dam that the State of California says potentially could fail in a major earthquake. There's a section of the earthen dam which is unstable. Developing the EIR was in itself a long, drawn-out process requiring the county to follow guidelines developed by the California Environmental Quality Act (CEQA). It requires any major project being proposed to examine everything potentially impacted by construction of a project, or the ultimate impact the project itself would have.

The potential negative impacts ahead for Crestline residents, as detailed in the EIR, are scary enough that they might more appropriately be read on Halloween—ranging from noise, dust and

air quality problems to heavy truck traffic, potential landslides and impacts on public utilities and services.

"Construction of the proposed Project would require retrieval and hauling of stockpiled material and imported material from quarries in the San Bernardino valley; excavation and hauling of material from up to two borrow sites; a temporary bridge reinforcement over Houston Creek in privately owned Camp Switzerland; traffic controls along Lake Drive, including a temporary road detour; temporary or permanent relocation of utilities on Lake Drive; restoration of disturbed areas; and road repairs along the haul routes and affected portion of Lake Drive," as outlined in the EIR. The time frame for constructing "an earthen stabilization buttress on the downstream (dry side) slope of the existing Lake Gregory Dam in order to rectify structural inadequacies in the dam" would take six months, some say, and may require Lake Gregory's water level to be lowered by 10 feet or even more. Of course, what the EIR didn't look into—because it wasn't mandated by CEQA—was the potential negative impact on Lake Gregory and Crestline if recreation opportunities for tourists are lost, even for one year. County officials are promising all efforts will be made to avoid losing a summer of fun (and tourist dollars) at Lake Gregory.
So why even travel down this rehabilitation road? The EIR findings give us the answer. "The only true mitigation to remove this (negative) impact would be to not construct the project. This option, however, is not realistic because the dam cannot continue to operate indefinitely in its current state, which does not comply with DSOD (Division of Safety of Dams) safety requirements. Further, if the proposed project is not constructed, additional curtailments in use at Lake Gregory may be required, which could also result in the loss of recreational opportunities. Feasible mitigation to lessen this impact is not possible." In other words, hold your nose and just do it.

(If you don't want something, nothing will convince you.)

Assurances on dam safety little comfort

tennessean.com, 4/7/16

As a Republican, I rarely agree with Rep. Jim Cooper, but regarding his concern for the Old Hickory Dam, I side with him completely. The recent Army Corps of Engineers editorial in the Tennessean states in part, "Based on modeling of worst case blast scenarios conducted by my dam safety professionals, we believe the risks are extremely low for any damage whatsoever to the Old Hickory Lock and Dam project due to the proposed quarry operations." This assertion will be less than comforting to folks downstream on the Stones River who would be potentially affected in the event of a catastrophic dam failure. The Corps' "extremely low risk" assessment reminds me of a scene from an old John Wayne Western, "The Comancheros." Wayne, playing a Texas Ranger named Jake, takes a liking to and tries to help Stuart Whitman, his prisoner wrongly accused of murder. Says Wayne, "I'll have done all I could to keep you from being hanged." Whitman replies, "Oh great, as I drop through the trap, my last thought will be, 'Big Jake did all he could.' " If the dam collapses and Nashville goes underwater a second time, we can take solace that, armed with the Corps' extremely low risk assessment, Brig. Gen. Kaiser "did all that he could." *Ken Joyce, Mt. Juliet 37122*

(Protection in case a whole lot of shakin' goes on.)

TEMECULA VALLEY: Vail Dam may fail in large earthquake

Rancho Water looking into building new dam east of existing dam on Vail Lake to make the structure safer in the event of an earthquake.

BY AARON CLAVERIE / STAFF WRITER, April 9, 2016, pe.com

VAIL DAM FACTS
- Built in 1948 and 1949 by Vail Company to create namesake lake for its ranching business
- Crest length of 790 feet
- Holds 42,680 acre-feet of water, enough water to serve around 10,000 families a year
- Highest arch of dam rises 152 feet from the crest to the lowest point in the foundation
- Rancho California Water District purchased the structure in 1978 when it acquired the lake to boost supply of stored water

The Rancho California Water District is looking into the feasibility of building a new dam at Vail Lake to augment the existing structure, a 68-year-old mass of concrete that has been deemed "deficient" by a state agency.
The dam, which is located about 10 miles east of the Temecula city limits at the northwest corner of the lake, was flagged by the state's Division of Safety of Dams in early 2013. In the event of a large earthquake on one of the two faults in the region -- a temblor of 7.4 magnitude or higher -- there's a chance the dam could fail, the agency stated in its report. District board member Danny Martin, elected in 2015, said he's been told there's no record of an earthquake that size hitting the region and the dam has only overflowed twice in its 68 years of existence. "It's a very remote possibility, very remote," he said, talking about the odds of the dam failing. The district hasn't issued any sort of public notification about the state's findings because there is no imminent danger to surrounding residents and/or businesses. "There were quite a few other dams facing the same thing because a lot of the regulations have changed," said district spokeswoman Meggan Valencia.
The dam -- standing 152 feet at its tallest point -- was built on Temecula Creek in 1948-49 by the Vail Company to service its ranching business.

The district acquired the dam in 1978 from the Kaiser Corporation Macco Realty Company when it bought the lake to boost supply for its customers, which includes most of Temecula, a sliver of Murrieta and the unincorporated communities of Wine Country and De Luz. In 2014, the district purchased the land surrounding the lake in a bankruptcy proceeding to help preserve water quality. There are two active fault zones of the San Andreas fault system in the region: the San Jacinto fault zone to the east of the lake and the Elsinore fault zone to the west. Of the two, the Elsinore zone is closer, which means it is considered the "controlling fault" for purposes of the studies that were done to determine the safety of the structure.

In its report, the Division of Safety of Dams said the stresses induced by strong ground shaking during an earthquake would exceed the dam's allowable strengths on the downstream (western) face of the arch dam.

"The extent and duration of the overstress is such that a failure of the dam could occur during a maximum credible earthquake," the report states. The land surrounding the lake is mostly vacant, aside from an RV resort to the south and winery and ranch properties to the west. Per the state's rules, the district sought out a second opinion by an independent consultant, which confirmed the state's findings. The same consultant, Orange-based URS Corp., has presented the district with two options to retrofit the dam.

(Almost failed completely.)

Dams D

The average age of the 84,000 dams in the country is 52 years old. The nation's dams are aging and the number of high-hazard dams is on the rise. Many of these dams were built as low-hazard dams protecting undeveloped agricultural land. However, with an increasing population and greater development below dams, the overall number of high-hazard dams continues to increase, to nearly 14,000 in 2012. The number of deficient dams is estimated at more than 4,000, which includes 2,000 deficient high-hazard dams. The Association of State Dam Safety Officials estimates that it will require an investment of $21 billion to repair these aging, yet critical, high-hazard dams.
Full report at: http://www.infrastructurereportcard.org/a/#p/dams/overview

(What's new? There's always someone against everything.)

Environmental groups oppose proposed dams near Pascagoula

By The Associated Press, April 12, 2016, gulflive.com

JACKSON, Mississippi — Environmental groups are calling on a federal agency to reject a potential dam-construction project near the Pascagoula River in southeast Mississippi. The Army Corps of Engineers is considering a proposal by the George County Board of Supervisors to build dams on two of the Pascagoula's tributaries — Big Cedar Creek and Little Cedar Creek.
The project, which would make artificial reservoirs out of the creeks, is also backed by the Pat Harrison Waterway District, a state agency that manages water systems in the Pascagoula River Basin in southeastern Mississippi. The Pascagoula River is part of the basin and runs through George and Jackson counties before dumping into the Gulf of Mexico. But the proposed project puts the Pascagoula in a "make or break" situation, said Jessie Thomas-Blate, a spokeswoman for the Washington, D.C.-based American Rivers. The national river-conservation advocacy group joined the Mississippi chapter of the Sierra Club and the Louisiana-based Gulf Restoration Network in opposing the project when it put the Pascagoula on its list of Top 10 most endangered rivers in the country this year. More details were to be released Tuesday.

Thomas-Blate said the Pascagoula is the largest undammed river in the country by volume. She said that while she welcomes the environmental impact study, the Corps should ultimately reject George County's proposal. She said the project would lose more water while damaging the river's ecosystem by changing water levels and temperature, hurting plant and animal species.
Pickering Firm Inc., a Memphis, Tennessee-based architecture firm, consulted George County officials and prepared the official proposal submitted to the Corps. Project Manager Jeff Ballweber said the dams would help manage the Pascagoula River's water levels and store backup water that could be released in case of drought. He said the river's water levels have dropped dramatically every few years after a record drought in 2000, with more on the way.
Ballweber also said the permit application is the beginning of a yearlong, transparent process during which the proposal could be changed if necessary to protect the river's environment.
Army Corps of Engineers spokesman Michael Moxie said the agency received more than 700 letters from about 15 environmental organizations and federal or state agencies that oppose the project.

He said that according to the proposal, the project would eliminate more than 1,000 acres of forested wetlands and 41.6 miles of streams. The Corps is requiring a full-scale environmental impact statement to study how exactly the project would affect the natural wildlife along the river before the agency decides whether to approve the project, he said. Andrew Whitehurst, water

program director at the Gulf Restoration Project, said the dam project would actually result in more water loss, not conservation. The dams would leak because the soil is too sandy to hold the water, and water evaporates from lakes at a higher rate than it does from forested creeks, he said. "What gain is made by making dams that leak and then evaporate?" he said. He said water conservation would be a better solution to problems with the water supply, and that the project is actually aimed at developing recreational lakefront property. "There are ways to conserve water that haven't been explored or implemented," he said. "This is a recreational development that will wreck the water supply."

(What's a safer design? Thought that's what you'd do in the first place. Do something before an accident does happen.)

Ames Considering Safer Design for Skunk River Dam

By Roger Riley, April 12, 2016, whotv.com

AMES, Iowa -- The Ames City Council is expected to vote on a proposal to work with the Iowa Department of Natural Resources on possible replacement of the Skunk River Dam. The dam structure is a low-head dam, meaning it can create some dangerous flows that can cause death to people in fishing vessels, powerboats, sailboats and canoes. There have been no fatalities reported with the Skunk River Dam, however, the Skunk River Paddlers, the Story County Conservation Board, and others have approached the city about putting in a safer dam.

"There's progress toward having a big chunk of the South Skunk be a water trail including this section. It's really quite pretty working from Story City downstream. It gets a little more channelized as you head south of Ames toward Cambridge. It's quite lovely up above. There's this whole green belt section and it's beautiful paddling," said Piper Wall, of Skunk River Paddlers. The dam was constructed in 1984 to hold back water to recharge the Ames water well field nearby. The DNR is offering an $85,000 grant toward designing a new structure. The total cost would be around $300,000. If the project moves forward, it could be built in the summer of 2017.

(Not everybody is for it.)

Siskiyou residents protest Klamath dams proposal

By Megan Allison, April 12th 2016, ktvl.com

Dam removal protest, Apr. 12th 2016, (KTVL/Megan Allison)

YREKA, Ca. -- Siskiyou County residents gathered to make their voices heard about dam removal Tuesday afternoon. Grace Bennett is the chair for the Siskiyou County Board of Supervisors. She said after working with engineers, she's worried about the sediment moving down the river. "My main thing is the sediment that's behind the dams. In the first reports that we got, the CDM reports, it said it would raise the riverbed anywhere from three to five feet," Bennett said. Erin Ryan is a field representative for Congressman Doug LaMalfa. She said the sediment behind the dams is toxic and dangerous.

"That's not going to be good for the fish. It's not going to create more water. The hatchery will be gone. There are a lot of bad outcomes from this," Ryan said. Shirley Fisher has lived along the Klamath River her entire life. She said she's worried about property damage.
"It has helped us so much in keeping our properties safe. There are floods but...they keep this back for the reservoir which is a wonderful thing for recreation and it keeps the water back," Fisher said. The Siskiyou County Board of Supervisors is looking at other solutions such as creating a fish bypass around the dam. "In other areas they trap and haul the fish around dams and then they collect the fingerlings when they come back. And that's not even been considered," Bennett said. Overall, protesters said the biggest concern is the document was signed without public scrutiny.

(Try using common sense sometimes, it helps.)

Dams and groundwater storage go hand in hand

By Buddy Mendes, 4/14/16, fresnobee.com

A new public joint powers agency, the San Joaquin Valley Water Infrastructure Authority, is stepping up to back both groundwater and surface water projects
Yes, we need more groundwater storage, particularly now that the Valley must meet the state's new groundwater sustainability standards
To capture floodwaters and percolate them into below-ground storage will take a far bigger above-ground cup – that "cup" is Temperance Flat Reservoir

Californians are becoming more attuned to the crucial need to develop additional water storage. California's historic drought, now possibly stretching into a fifth straight year, has made clear that we need to capture and store much more of the high runoff flows from the mountains in big water years for use in dry years. Unfortunately, a significant number of environmental advocates are supporting only half the water-storage solution. They either misunderstand or just hate the idea of new dams and reservoirs, maybe both. Evidence of this was found in a recent Fresno Bee column. It encouraged additional groundwater storage development but slammed, most inaccurately, Temperance Flat and other new California surface storage projects under consideration.

The new public joint powers agency, the San Joaquin Valley Water Infrastructure Authority, is stepping up to back both groundwater and surface water projects. However, use of both types of projects is not a new idea. The Central Valley Project's Friant Division was designed in the 1920s and built in the 1940s with the new surface water to be used in conjunction with groundwater to create a more reliable water supply and stop land subsidence. This has worked well for more than 60 years. It has slowed and at times virtually halted groundwater overuse, stabilizing the East Side aquifer through recharge and by turning off pumps through irrigation deliveries made from the Friant-Kern and Madera canals. Only when consecutive years have been very dry (or like the past two years when the Bureau of Reclamation gave Friant users zero allocations of surface water) has the water table dropped dramatically. As built and operated, the Friant system is the primary reason agriculture – including the high-value citrus belt – along the Valley's east side has been able to thrive. The project's centerpieces – Millerton Lake and Friant Dam – are much too small to be able to handle San Joaquin River normal yearly natural runoff (1.8 million acre-feet) without flood releases down the river. Since 1977, San Joaquin flood releases from Friant Dam have added up to more than 15 million acre-feet (approximately 100 years of water supply to Fresno), most of which has flowed to the ocean. In eight of Friant Dam's most recent 16 flood release years, more than a million acre-feet was released each year. Millerton Lake holds only 520,500 acre-feet. The simple reality is that Sierra flood-event runoff flows head toward the Valley in massive volumes over short periods of times (days versus months). These high flows can be our source for recharging and storing groundwater but they occur much faster and in far greater quantities than can be handled.

The flows would have to be conveyed to the recharge sites, all of which are many miles away and lots of time is needed for the water to percolate into the soil. It's a very slow process.

The Friant-Kern Canal can only convey 4,100 cubic feet per second south of the Kings River and Millerton flood inflows are many times higher. In 1997, the inflow to Millerton was 120,000 cfs. The reservoir can't possibly capture all of it. Nor can the canals move that amount of flow. Yes, we need more groundwater storage, particularly now that the Valley must meet the state's new groundwater sustainability standards. But we must realize that to capture these floodwaters and percolate them into below-ground storage will take a far bigger above-ground cup. That "cup" is Temperance Flat Reservoir. One thing is certain. We have to be prepared to capture this precious commodity when it is available and not allow it to be discharged to the ocean. *Buddy Mendes is vice president of the San Joaquin Valley Water Infrastructure Authority and chairman of the Fresno County Board of Supervisors.*

Hydro:

(Who said was going to be easy?)

No painless option for dam issue

By Wm. Duke Harrington Staff Writer, 2016-04-08 / post.mainelymediallc.com

KENNEBUNK, ME — Here's the lesson from the last year or so in Kennebunk – if you really want to pack a meeting hall, advertise that it will be about the Mousam River dams. An overflow crowd of more than 100 people stuffed a March 29 meeting of the Kennebunk Light and Power District (KLPD) Board of Trustees, held in selectmen's chambers at town hall Similar crowds attended informational meetings on federal relicensing requirements for the Mousam River dams in March and November 2015. What made last week's meeting notable, however, was that it was the first time trustees have weighed in publicly on the dam issue, which is expected to hit KLPD ratepayers hard, regardless of whether the power company renews its license with the Federal Energy Regulatory Commission (FERC) or decides to tear down the dams.

KLPD has a March 2017 deadline to file an advance notice of intent to pursue FERC relicensing of its three dams – the Kesslen Dam, located in downtown Kennebunk at Route 1, and its upstream sisters, known as the Twine Mill and Dane Perkins dams. All are due for federal relicensing in 2022.

Previously, KLPD trustees have held their tongues on the issue, limiting themselves at the public informational sessions and their regular meetings to questions for Portland engineering firm Wright- Pierce, which has studied the dams and prepared a 90-page draft report that details KLPD's four options:

- Pursuing a new license for all three dams
- Tear down all three dams
- Tear down one or two dams
- Try for an exemption to FERC's normal licensing requirements, an arduous and expensive task that could take as long as five years and $16.9 million, given the presumed need to build fish ladders at all three dams.

The Wright-Pierce report initially released last fall was updated and posted online the week before the March 29 meeting, hence the reason for it. According to Wright-Pierce Senior Vice President John Edgerton, the net cost for relicensing the dams should run to between $2.8 million and $6.4 million, when factoring out revenues from the dams during and after the relicensing period, but also accounting for a projected 2 percent inflation rate and 3 percent increase in energy prices.

Assuming a 3.1 percent interest rate on a $4 million bond, paid back over 20 years at a rate of about $270,000 per year, Edgerton said the average KLPD customer using 750 kilowatt hours per month, would pay an extra $2 per month or $24 per year. That, said Edgerton, was a "reasonable and uniformly conservative assumption" on costs. But while that may seem nominal, given the scope of the project, and the fact that KLPD only generates about 1.5 percent of the power it sends to its 6,500 customers from the dams, other factors have been at play. Many environmental groups, including Maine Rivers and the Mousam and Kennebunk Rivers Alliance, have stumped for restoration of the Mousam to its natural pattern, while many local residents, including those who live along the river, have questioned what it might be reduced to after the dams are breeched, and what that might do to property values. "I think we all know at this point that this is a pretty emotional and complex topic we are dealing with," KLPD Chairman Jonathan "Jay" Kilbourn said. "There's a lot of strongly held views, hopes, fears, feelings. There are facts circulating around town and there are also rumors circulating around town."

Also of concern is that power-generating equipment at the Kesslen and Dane Perkins dams is at least 75 years old and deemed by Wright-Piece to be "operable, but inefficient." Additionally, Edgerton noted that water flow down the Mousam only spills over the top of the dams at a few times of the year. That means there is not enough water available to fill any required fish ladders and power the dam generators to full capacity, a concern given the limited use KLPD gets from the dams as it is. "So, you're basically saying the fish ladders could potential reduce our flow through the turbines to zero," said KLPD board member Wayne Berry. "I don't know if it would be to zero," Edgerton said. "Well, if you're using the water to get the fish downstream, you can't use that same water to generate electricity," Berry said. "Right," Edgerton said. "Every year has different hydrologic characteristics, but at any time at which the dams are not spilling, you're going to be taking water for the fish passages away from the turbines." Trustees made no decisions at the March 29 meeting, but based on their conversations, two of the four options appeared to come off the table entirely, while continuing to use the dams seemed in doubt.
The presumably axed options include trying to get an exemption to the usual licensing process. That option is predicted by Wright- Pierce to carry a net cost of $2.1 million. However, KLPD General Manger Todd Shea said that course might be "financially risky" because FERC could demand a so-called "re-opener" clause in the contract that would allow federal or state agencies to suspend the exemption that would allow KLPD to run the dams as is at any time it feels environmental enhancements (i.e. fish ladders) are warranted. Wright-Pierce did not update its report with a ratepayer cost for this option, not did it do so for the option seeking a licensing exemption to keep running the Kesslen dam, while tearing out its two upstream sisters.
Edgerton said there is no precedence for this option, making it sound like an untenable choice. Kilbourn and Berry agreed it seems fraught with legal and financial question marks. "This is a long shot," Kilbourn said. "It's not a very enticing pathway with the uncertainties and costs and questionable potential."

Finally, surrendering the FERC license and tearing down the dams was predicted to be the least costly option, pegged at a net cost of $1.85 million. Edgerton said that would require a $2.5 million bond, equating to annual payments of $172,871 and an annual hike of $15.55 to ratepayers. A parade of residents and other interested parties helped stretch the meeting out to more than three hours, even when limited to just three minutes each of talk time. Most of those comments ran parallel to arguments made at the previous informational meetings.
Meanwhile, with removal of the dams appearing more likely, 196 supporters had signed on as of Monday to a Save the Mousam Dams petition on change.org. Shea said KLPD trustees are considering putting the question to a nonbinding straw poll vote at the annual town meeting in June. Town Clerk Merton Brown has said wording for any such warrant article would have to be

submitted to him by April 27 to make the ballot. KLPD meet next on April 27, but have said they will not be discussing the Mousam dams at that session. Instead, they are slated to weigh in on the issue again at their May 11 meeting, which also will be held at town hall.

(Huh!)

UN excludes large dams from renewables

By Patricio Segura, patagonjournal.com, 08 April 2016

The United Nations Environment Programme (UNEP) has reaffirmed what the world understands to be clean energy, a conviction that should also be advanced here in Chile. In late March the UNEP launched the tenth edition of its report, "Global Trends in Renewable Energy Investment 2016." The report, conducted jointly by the Frankfurt School and Bloomberg New Energy Finance, accounts for global annual growth of sustainable technologies. One of the first conclusions the report makes is that the installed generation capacity to be added worldwide during 2015 reached 134 GWh in the case of renewables; 22 GWh for large hydro; 15 GWh for nuclear; 42 GWh for coal, and 40 GWh for gas. That is, non-renewable projects added 47% of capacity to the global matrix, while 53% came from renewables. This is where we must stop and consider. Look at what the UN understands to be renewable energy. It encompasses "wind, solar, biomass and waste-to-energy, biofuels, geothermal, marine and small hydro," which are qualified as "clean" and "modern." It specifically excludes "large hydro-electric projects of more than 50 megawatts," especially "investment in large hydro-electric dams."

The UN's decision is consistent with a discussion going on for years that large dams in particular should not be considered a form of renewable generation. Their impacts, including forest loss, displacement of people and communities, generation of greenhouse gases through decomposition of vegetation, destruction of watersheds by drastic increases and decreases in flows, and the blocking of nutrients which prevent supply to rich fjord zones, are just some of the aspects that are repeatedly challenged. These impacts and others were collected and expanded upon in the work "Silenced Rivers: The Ecology and Politics of Large Dams" by Patrick McCully.

For Chile, the discussion should not be just a minor detail, considering efforts by the government- at the hands of Energy Minister Maximo Pacheco- to convert the Country's southern and far southern regions into energy reserves through large hydroelectric projects. A concrete example of this are the recent approvals given by the Committee of Ministers to two such initiatives in Chilean Patagonia: the Puelo plant (210 MW) owned by Mediterráneo, and the dam on the Cuervo River (640 MW) belonging to Energía Austral, which is owned by multinational mining company Glencore.

The idea of "development zones" (polos de desarrollo) being advanced by the Electricity Transmission Law currently being reviewed by the Senate Commission on Mining and Energy serves to reinforce this goal, by including largescale hydropower in the definition of renewables, including large dams. During its passage through the House Mining and Energy Commission, lawmakers managed to ensure that the territories classified as such would have at least 70% non-conventional renewable energies. However, a statement filed with the President Michelle Bachelet's signature directed the Finance Committee to reduce this percentage to only 20%. The UN's definitions could prompt a new discussion in Chile, this time not only about the steps we are taking to move towards sustainable energy generation given that as the report shows Chile was

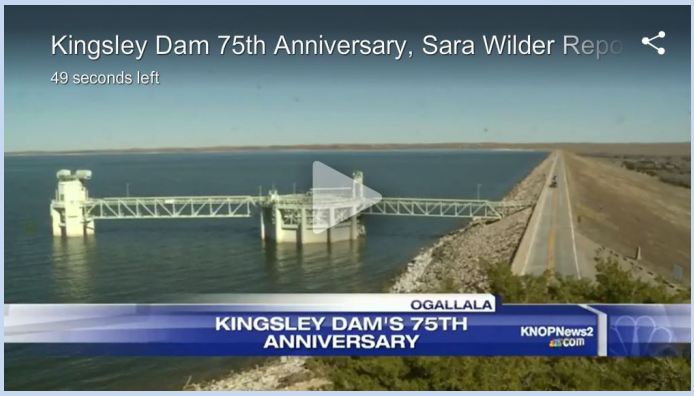
one of 10 in the world that invested the most in non-conventional renewable energies (NCREs). The data shows that this area experienced 151% growth compared to 2014, totaling US$3.4 billion allocated to early-stage technology, research and development, and installation of new capacity. Of the total, roughly $2.2 billion was spent on solar sources. The other, more fundamental discussion is whether dams can be considered renewable energy. This becomes an even more urgent question in the context of climate change, which each day further complicates hydroelectric generation over the long-term.

(75 years young.)

75th Anniversary of Kingsley Dam

By Sara Wilder | Apr 08, 2016, knopnews2.com

2016 marks the 75th anniversary of Lake McConaughy's Kingsley Dam.



Built in 1941, the dam is still here and doing exactly what it was designed to do. The Kingsley Dam is the second largest hydraulic fill dam in the world, and it changed the way of life for the Platte Valley. From irrigation and recreation to ground water recharge and hydro power, the dam still functions 75 years later. "I think it's only fitting that we come together on the 75 anniversary of the completion of the dam, and kind of become reacquainted with the importance of Kingsley Dam," Jeff Buettner, Public Relations Coordinator at the Central Nebraska Public Power and Irrigation District, says. The dam was dedicated for the first time in 1941, and dignitaries from all over the country came out to mark this special occasion. There will be a public event July 23 at Kingsley Dam to rededicate the dam and to celebrate its rich history.

(It can't do everything. Solution: They gave them the land, give them the dam and PH too. Let them operate it and do the O&M. The Company gets whatever power they generate free.)

Utility Says Hydro Dam Restrictions Could Affect Green River Reservoir

By AMY KOLB NOYES • 4/9/16, digital.vpr.net

The hydroelectric dam at Green River Reservoir is undergoing federal relicensing, and proposed restrictions have the utility that operates the dam questioning its viability. And it appears that decision could potentially have a big impact on Green River Reservoir State Park. In 1999, Morrisville Water & Light sold the land surrounding Green River Reservoir to the state, creating Green River Reservoir State Park in Hyde Park. And according to Michael Snyder, commissioner of the Department of Forest, Parks and Recreation, it's been a popular destination. "Green River Reservoir State Park is one of the absolute gems in a pretty phenomenal state park system," says Snyder. "It's a boat-access remote camping experience ... It's hard to find anybody who doesn't just love it." But Morrisville Water & Light created the reservoir when it built its hydroelectric dam in the 1940s, and it says it could take it away if it's no longer cost-effective to run the facility. The Vermont Agency of Natural Resources is responsible for issuing a water

quality certificate as part of the federal dam relicensing process. This winter it issued a draft certificate, which calls for changes in the way the dam operates.

Currently, Morrisville Water & Light is allowed to draw the reservoir down 10 feet throughout the winter for power generation. The reservoir fills back up during spring runoff. But the draft water quality certificate the state has issued for the project reduces the winter drawdown to 18 inches. "Fluctuating water levels downriver from the dam are one of the issues the water quality certificate addresses. " Fluctuating water levels downriver from the dam are one of the issues the water quality certificate addresses. General Manager Craig Myotte says that will have a significant impact on power generation. "It's going to reduce it by about a third," says Myotte. "We generate about a million kilowatt hours now from the Green River project. So that will cut it back to something in the neighborhood of 650,000. And that's a dramatic loss for that hydro facility." Myotte says if the state imposes stricter water quality regulations but doesn't pitch in to help cover the utility's losses — or flat-out buy the dam — then he'll look into decommissioning the dam and returning the Green River to its natural state. "If it becomes uneconomic to operate," he says, "I can't ask Morrisville Water & Light's customers to pay for operating something that's really only benefiting the state and the recreation use for the state park. It just doesn't make sense." And, as Michael Snyder points out, a drained reservoir would have a significant impact on the state park.

Habitat downriver from the dam is one focus of the draft water quality certificate issued by the Vermont Agency of Natural Resources. Credit Amy Kolb Noyes / VPR

"Clearly the water is the main attraction," he says, "and at Green River Reservoir the camping experience is all boat access. [It's] kind of hard to boat without water."

"Green River Reservoir State Park offers a unique remote camping experience on islands throughout the reservoir, accessed primarily by non-motorized boats." Green River Reservoir State Park offers a unique remote camping experience on islands throughout the reservoir, accessed primarily by non-motorized boats. However, Agency of Natural Resources Deputy Secretary Trey Martin says decommissioning the dam and draining the reservoir isn't that simple. He says decommissioning would require a federal review similar to the relicensing process now underway. And he doesn't think draining the reservoir would be something the agency would support.

The reason the proposed drawdown limits are so different from what is currently allowed is that federal rules around water quality have changed since the dam was last licensed in the early 1980s. Martin says the state's water quality certificate is just one piece of the federal relicensing process. And, he says, it's limited to addressing specific environmental, aesthetic and recreational impacts. Other factors will be taken into consideration by the Federal Energy Regulatory Commission (FERC) when it issues a license. "That certificate that we issue gets incorporated up into the FERC process where economics and other considerations might come into play," Habitat downriver from the dam is one focus of the draft water quality certificate issued by the Vermont Agency of Natural Resources. Martin says once the FERC process is complete, the state will consider ways to help keep the dam a viable clean energy source. "What we would like to do is get the certificate issued, and then figure out are there ways for them to optimize and create more efficiencies and generate more power," Martin says. "And what will it take to do that and what can we, as the state, help?" The Agency of Natural Resources is on schedule to issue

its final water quality certificate for the Green River Reservoir hydro dam in a matter of weeks. Meanwhile, Morrisville Water & Light plans to hire a consultant to assess the dam facilities and provide cost estimates of any needed improvements.

(The understatement of the century. Is it really a power project anymore?)

Connecticut River Dams Come With Tasks for Next Owner

By Peter Hirschfeld, Vermont Public Radio, April 11, 2016, vnews.com

Montpelier, VT — Lawmakers will soon get a report on whether Vermont should purchase a series of hydroelectric dams along the Connecticut and Deerfield rivers. In the meantime, they're discovering that the next owners of the dams will be under heavy pressure to address a range of environmental concerns. Power produced by large-scale hydroelectric dams is considered renewable energy, according to Vermont law. But that doesn't necessarily mean it's good for the environment. Connecticut River Watershed Council Executive Director Andrew Fisk told lawmakers last week that if the state of Vermont wants to purchase the dams, then it better be ready to take on the environmental responsibilities that will come with them. "Our interest is in, whoever owns those facilities is going to operate those in such a way that the ecological footprint is as small as possible," Fisk said.

Five of the 13 dams put up for sale by international energy giant TransCanada are up for state and federal re-licensure in the next few years. Fisk said prospective buyers need to understand that getting those licenses will require some changes to the business model. "If you are looking at this, I would say with a very high certainty, that they will be required to operate very differently," Fisk said. Fisk said efforts to maximize profit have seen the dam owners unleash the torrents when market prices are up, then stanching the flow when they go down. "We have for decades suffered, both Vermont and New Hampshire … significant impacts from that stage height or water-level fluctuation, which causes erosion," Fisk said. He expects the re-licensing process to demand more ecologically responsible river flows. He said he also expects the new owners to retrofit the dams in ways that allow migratory fish species like shad, lamprey and eel to navigate the impoundments. Fisk's message to lawmakers? Running the dams responsibly is going to eat into profits. And that's exactly why some environmentalists are so keen on the state buying them. Jon Groveman, policy and water program director for the Vermont Natural Resources Council, told lawmakers it'd be good to have an owner that wasn't "a purely for-profit private entity." "You have an opportunity to be in control of renewable, base load power, and have the public overseeing and responsible for the licensing and the operating and the management of these facilities," Groveman said. Groveman said it's also a challenge, since the state, were it to purchase the dams, might find its environmental and economic missions at cross-purposes. Groveman said he thinks that tension can be resolved with the proper oversight structure. Last week, top elected officials appointed a seven-person working group to vet the purchase of the dams.

(Another great old mill.)

Roots of the Blues at Hagood Mill Historic Site

April 11, 2016, goupstate.com

Hagood Mill and the Greater Clemson Music Festival present "Roots of the Blues" Saturday April 16. The site is open 10 a.m. until 4 p.m. with music from noon until 3 p.m. Upcountry South Carolina is a historical mecca for the Blues. Throughout the 1920s and '30s the streets of Laurens County, Greenville, Spartanburg, and Anderson reverberated with the music of bluesmen/street-preachers as they were strolling with their tin cups extended. Many of these musicians became famous on the streets of New York City in the folk revival of the 1950s and 1960s. It is this tradition that will be celebrated at Hagood Mill. This year's lineup features Jean Laney Harris Folk Heritage Award winner and bluesman Freddie Vanderford and the Mill Billy Blues Band playing some red hot tunes. Warming up the stage for Freddie and the boys will be the up-and-coming singer/songwriter, Bailey George, from Pauline. Hear the old music that made upcountry South Carolina a famous "roots environment" for the Piedmont Blues -- some tunes primitive in nature

and others coming from the sweet soul of the South Carolina bluesmen of long ago. As a special treat, Vanderford will be hosting a harmonica workshop immediately following his performance. Anyone interested in attending the workshop should bring along their favorite “harp” in the key of “C”.

There will be lots of other things to see on April 16 as Hagood Mill hosts a variety of folklife and traditional arts demonstrations. There will be blacksmithing, bowl-digging, flint knapping, chair-caning, moonshining, broom-making, basket-making, pottery, quilting, spinning, knitting, weaving, woodcarving, metal-smithing, bee keeping, leather-working and much more! You can ask questions of the artists and purchase their traditional arts to take home. Visitors are encouraged to bring their favorite old-time instruments and join in on the “open jam” which takes place throughout the day under the ancient cedar beside the 1791 log cabin.

The centerpiece of the Hagood Mill historic site is the water-powered 1845 gristmill. It is one of the finest examples of 19th-century technology in the Upcountry and operates just as it has for the last century-and-a-half. PHOTO PROVIDED From Staff Reports

The centerpiece of the Hagood Mill historic site is the water-powered 1845 gristmill. It is one of the finest examples of 19th-century technology in the Upcountry and operates just as it has for the last century-and-a-half. The mill will be running throughout the day. In the old mill, fresh stone-ground corn meal, grits, and wheat flour will be available. In addition rye flour, Basmati rice flour, oat flour, oatmeal, popping corn meal, and grits, organic yellow corn meal and grits, and buckwheat flour are produced and may be available. Hagood Mill cookbooks and a variety of other mill-related items are also available. There is a $5 parking fee for the day but admission is free to the Hagood Mill Site as well as the Hagood Creek Petroglyph Site. All proceeds from parking go to help the Hagood Mill. The Hagood Mill Historic Site is open Wednesday through Saturday from 10 a.m. until 4 p.m. all year long. The Mill operates, rain or shine, for a special festival the third Saturday of every month. The Hagood Mill is located just three miles north of Pickens off Highway 178 or 5 ½ miles south of Cherokee Foothills Scenic Highway 11 just off Highway 178 at 138 Hagood Mill Road. For additional information, please contact the Hagood Mill at 864-898-2936 or check out our website at www.visitpickenscounty.com/calendar

(A century, wow.)

Cabot Hydroelectric Station celebrates 100 years in Turners Falls

April 13, 2016, recorder.com

What do you get a hydroelectric station for its 100th anniversary?

Well, GDF SUEZ Energy North America — the parent company of the Cabot Hydroelectric Station — has produced commemorative calendars and will conduct open house tours (the facility is usually closed to the public) on June 11 and 12 to celebrate a century of supplying power to the Montague area and communities throughout the Connecticut River Valley. There is also a special exhibit — called Vintage Powerhouse — detailing the station’s history. It opened on April 9 and can be found at the Great Falls Discovery Center in Turners Falls.

The station began generating electricity in February 1916 and was the largest hydroelectric station east of Niagara Falls at the time of its construction, according to Kim Noyes, the environmental program coordinator at Northfield Mountain Recreation and Environmental Center. "It's still standing," she said. "That, to me, is the piece that's really cool. … Though very old, it's still very modern and very present."

Northfield Mountain Recreation and Environmental Center provides year-round public programming in conjunction with the Northfield Mountain Pumped-Storage Hydroelectric Plant's federal licensing. Northfield Mountain and Cabot are operated by FirstLight Power Resources and GDF SUEZ Energy North America. Gus Bakas works for FirstLight as the director of Massachusetts hydro operations. He said he handles the operational and budgetary responsibilities of all the company's stations in the state, including Cabot. He said Cabot was constructed to support the area's milling operations during the boom of the industrial revolution. He said Cabot is a unique entity.

"The power plants that are built today will not be in operation 100 years from now," he said, adding that increasingly advanced technology results in regulations that create prohibitive costs. Bakas explained Cabot is a hydro facility, meaning "water drives the turbine that drives the generator" that produces power. This is not a complicated process. Other types of stations, ones that run on fossil fuels, sustain more wear and tear. Bakas explained fossil fuel power plants burn oil, gas or coal in a boiler that creates steam. This steam drives the turbines, which in turn drive the generator, which produces electricity. Bakas said this process requires a lot of upkeep. Cabot, he said, is a different story. "With proper care and maintenance, it could be around for another 100 years," he said. Bakas said he has a crew of 13 "hard-working men." "They're a great bunch of guys," he said. "The folks at Cabot demonstrate a sense of pride and ownership in their daily responsibilities."

Noyes said Phillip Cabot, the president of the Turners Falls Power and Electric Company, was instrumental in the station's construction during a time that saw a lot of changes in the electric industry. The station was named after him when he retired in 1919. The Cabot Centennial Calendar features historical photographs dating from 1912 to 1917 during the construction of the new concrete dam, hydroelectric station and power canal expansion in Turners Falls. Each month also includes a historical highlight from 1916 (including Albert Einstein publishing his theory of general relativity on March 20). The calendars are free and can be picked up at the Northfield Mountain Recreation and Environmental Center (99 Millers Falls Road, Northfield), the Great Falls Discovery Center (2 Avenue A, Turners Falls) or the Carnegie Library (201 Avenue A, Turners Falls). For more information, call the Northfield Mountain Recreation and Environmental Center at 1-800-859-2960 or visit https://www.facebook.com/CabotCentennial/

Water:
(Will it ever happen?)

CALIFORNIA FORUM

Another View: Better water plan would yield billions of gallons a year

Three solutions would produce more water than new dams

Environmentally sustainable, economical solutions would meet water needs

By Eric Wesselman, Jim Anderson and Dru Rivers, Special to The Bee, APRIL 9, 2016, sacbee.com

The Sacramento Bee's editorial "California's most pressing need: Water" (April 3), rightly states that Sen. Dianne Feinstein runs afoul of environmentalists and salmon fishermen with her water bill, S. 2533. And that's before anti-environmentalists in the House of Representatives get their hands on it. The senator would have more support from conservationists and others with a bill that moves the whole state forward. Instead, the legislation focuses on picking winners and losers in the state's water wars. The bill calls for spending hundreds of millions to expedite and fund new and destructive dams, and includes a mandate to "maximize water supplies" to increase water exports from the beleaguered Sacramento-San Joaquin Delta. It's not exactly tunnel-neutral either because projects like Sites reservoir or enlarging Shasta Dam make sense only if there is capacity to move more water through the Delta. We already have more than 1,400 dams in California and a vast network of canals and pumps. Building more would cost taxpayers billions and destroy rivers without providing much water. The Public Policy Institute of California reported in 2015 that the top five dam projects pushed by proponents would cost roughly $9 billion, before cost overruns, to increase average annual water supply by about 134 billion gallons per year. It sounds like a lot, but that's just 1 percent of annual farm and city use. Even with high-end yield assumptions, these projects still don't get us a 2 percent increase because storage volume is not the same as the more relevant figure: water yield.

What are the better solutions?

We have advanced dozens of positive solutions available at friendsoftheriver.org. Three would yield 539 billion gallons per year – four times what we'd get from new dams. Let's start with leaks. A 2010 study conducted for the California Public Utilities Commission estimated that 10 percent of urban water is lost to leaks and that 40 percent could be cost-effectively recovered through pressure management, leak repair and targeted pipe replacement. That amounts to 114 billion gallons per year. We have widely available technology and expertise to identify system water losses and repair them. Last year state Sen. Lois Wolk moved this ball forward with Senate Bill 555, and Feinstein could take it much further. Second, we can improve irrigation efficiency by using local climate and soil information to more accurately determine crop water requirements and irrigation scheduling. A 2009 report from the Pacific Institute titled "Sustaining California Agriculture in an Uncertain Future" found that improving irrigation scheduling in California can save more than 1.1 trillion gallons of water each year. Realizing just 15 percent of that potential would yield more than 165 billion gallons per year – more water than all of the proposed reservoirs combined. We don't have to choose between fish and farms. We need to invest in more efficient farming for healthy waterways and vibrant communities – especially since farms account for 80 percent of the water we use. Third, we treat wastewater to be as clean as, or cleaner than, it was before we used it. Close to 500 billion gallons of this highly treated wastewater are dumped into the Pacific Ocean annually. A 2010 study by Heal the Ocean found that 260 billion gallons can be safely recycled and reused or stored in aquifers. Orange County is already recycling wastewater along with a few cities. We would be happy to work with and support Feinstein in advancing modern, environmentally sustainable and economical solutions like these so we can meet our water needs without doing more harm to waterways and communities. If you support water legislation that truly prepares us for future drought and climate change instead of wasting taxpayer dollars, please give her a call. *Eric Wesselman is executive director of Friends of the River. Contact him at eric@friendsoftheriver.org. Jim Anderson is founder of Foundation Capital. Contact him at jamescanderson@yahoo.com. Dru Rivers is co-owner of Full Belly Farm. Contact her at Drurivers.fullbelly@gmail.com.*

(Rain would solve all the problems. Another way to solve the problem is move.)

Water Woes Divide California into Haves, Have Nots

Climate change may be causing a modern-day Dust Bowl situation in California.

By Tori Richards April 8, 2016, usnews.com

LOS ANGELES — People have long predicted that California could eventually collapse into the ocean following a mega earthquake. Now, an eerily similar true-life scenario is playing out -- but it's thanks to the weather. The Gold Rush State has sunk more than 45 feet since 1935 – something the U.S. government calls the "largest human alteration of the earth's surface." But earthquakes aren't the cause. It's happening because of excessive groundwater mining brought on by drought, and geologists say all the rain in the world won't reverse cave-ins of dirt and rock in underground aquifers. California is entering its fifth year of drought, with the past two years being the warmest on record. Several recent storms have dumped much needed water, but it's barely made a dent. It will take several years of rain to bring the state out of its crisis mode regardless of how many spring showers occur. If the state gets the intense rain storms that Californians pray for, they will produce floods as the water has nowhere to go. But if the drought continues, things will just get worse.

"If we have another four years of this [drought], then all bets are off. That would be devastating," says University of California professor Jay Lund, director of the Center for Watershed Science at UC Davis. "You have several hundred square miles of this and the only way to do something about it is to stop drilling. Then it will keep sinking for a year or two even if it's stopped."
In a harbinger of one worst-case scenario, the town of East Porterville ran out of water when its wells went dry. Residents are urged to drill new wells – at a cost of $30,000 each. Portable showers have been installed at a local church and bottled drinking water is delivered. Emergency state funding has paid for delivery of 2,500-gallon water drums to residents' front yards for washing and bathing. It's been that way for two years. "We've not seen anything like this in recent history," Lund said. "The last time we saw this was in the '20s and '30s when we had the Dust Bowl." Water has pitted the haves against the have nots, citizens against the farming industry and both farming and citizens against the government. The problems associated with California's drought are vast: infrastructure damage from the altitude drop; two million acres of dead farmland; disappearing wildlife; $2.7 billion in economic losses; 21,000 lost jobs; and rising food and utility costs. Driving south on Interstate 5 from the Oregon border you will pass by many of California's largest lakes and reservoirs – the state's primary sources of water for its 39 million residents. The most massive is 518-foot deep Lake Shasta, a 21-mile maze of red rock canyons that normally hold water. But during the past several summers, the area has looked like a miniature version of the Grand Canyon with its stark red walls showing off an earlier era when free flowing water carved the land.

Recent storms have brought some reservoirs back to their average levels but, according to a state website, many others are still below average as summer approaches. As lakes dried up, the water tap was shut off to farmers in Central California where 60 percent of the nation's fresh vegetables are grown. For the past two years, farmers have received no above-ground water and have had to rely solely whatever they can pull out from earth. The state is in its second year of mandatory 25 percent water cuts. Lush green lawns that have been a staple of the California landscape are now allowed to go brown or die off all together. Some cities have moratoriums on planting grass in new developments. Desert decoration, like rocks and succulents, are the new trend. The drought has caused neighbor to turn against neighbor as cities and water districts have initiated a snitch program for water wasters. One Northern California water district even posted a list naming and shaming 1,098 of its biggest offenders, like Oakland A's executive Billy

Beane, who reportedly uses 5,996 gallons a day. Major metropolitan areas have mandated the number of days landscaping can be watered, costs are on the rise, districts keep close tabs on usage and anyone going over a certain amount is slapped with a hefty surcharge.
But for some, the drought doesn't appear to be a concern. Places like Disneyland and country clubs and hotels in Palm Springs continue to welcome visitors with lush foliage, fountains, reflecting pools and water misters. Celebrities show that they have the funds to pay whatever hefty water bill comes their way, apparently oblivious to conservation efforts as a CBS slideshow of several estates reveals.

"Wealthy people don't care, they will find a way [to use water]," said Republican state Sen. Jim Nielsen, a lifelong farmer and farming advocate. "But it's not the urban use that's sucking the state dry, it's the farmers," he added sarcastically. Farmers use 40 percent of the state's water supply. Residential and commercial usage is 10 percent, and the rest is released into the waterways or used by the government. Federal and state water agencies share control over California's maze of lakes, dams, canals, rivers and the aqueduct – the largest waterway system in the world. Most of the controversy centers around the state's largest water intersection in Northern California, the Sacramento-San Joaquin River Delta.

But while celebrities shell out for green lawns and farmers struggle to water their crops, an environmental showdown is taking place between the U.S. Fish and Wildlife Service and conservative lawmakers, farmers and residents who accuse the agency of wasting millions of gallons of water to protect salmon and an endangered anchovy called the delta smelt. Low river levels means an increase in water temperature, and the government periodically releases enough water to decrease the temperature so fish won't die. Several state House and Senate bills have been introduced by both Republicans and Democrats regarding water rights and construction of new dams, but there hasn't been a consensus. Republican state Assemblyman Devon Mathis, whose district includes East Porterville, criticized the state for not advocating for its citizens and hastening to tie them to a main water line. "The fact that we have people in California today who don't have running water is just ridiculous," he says. "If California doesn't get its act together with water, this isn't just going to be a San Joaquin issue. This could be the city of LA. Or imagine the city of Pasadena without water going to a church parking lot for a shower." But others say California's ecosystem itself is at risk. In addition to saving the fish, they say, enough fresh water needs to be released to keep seawater from infiltrating the area. "Last year was the worst of the drought so far," says U.S. Rep. Jared Huffman, D-Marin County. "How much water was wasted because of the smelt? Zero gallons. It's the worst drought in anyone's lifetime that has caused this."

John McManus, executive director of Golden Gate Salmon Association, says salmon have been dying off in record numbers during the past several years and that has hurt fisherman and others who live in the area and rely on the fish for food. "It takes three years between salmon eggs and becoming an adult ready to go into the ocean," he said. "We are seeing massive losses of fertilized eggs that got too hot." But California's water problem is bigger than fishes or farmers. A famous photo on the U.S. Geological Survey website shows geologist Joseph F. Poland in 1977 standing next to a telephone pole where placards are placed up to 30 feet above his head marking various ground levels dating back to 1925. Poland began publicizing the disaster of disappearing groundwater back in the 1940s.

As the population exploded and farming acreage increased, the land collapse accelerated – one area dropped nearly 40 inches between 2007 and 2010. And in just eight months leading up to February 2015, it sank another 13 inches. Recent photographs show that between May 2014 and January 2015 the ground sank up to 2 inches per month. An area around the California Aqueduct – a canal that brings water from northern to southern California – fell a total of a foot in the same time period. This has caused the concrete to buckle and one bridge now sits below the water line. As aquifers are depleted, farmers are drilling deeper and deeper for water. In some places, the drilling is pulling up water that last saw sunlight during the Ice Age. The San Joaquin River runs through the Central Valley, dividing the haves and have nots. Smaller family-owned farms line the

east side of the river, while the west is home to the area's wealthiest corporate landowners. The drought has prompted farms on the east side to produce costlier crops like almonds and pistachios – mostly imported to China and elsewhere – to make up for production cutbacks. Those two crops require 35 times the water compared to the traditional vegetables. Parts of some farms lie fallow, but still, farmers need to draw water for their fields, which draws the ire of the government and water rights groups. The losses from fallowed fields affect the entire economy, not just fruit and vegetable pickers who have lost their jobs. In a scene out of the Great Depression, thousands of people line up for blocks every two weeks to receive boxes of food from the state. "It's like the 'Grapes of Wrath,'" said Mario Santoyo, spokesperson for the Californian Latino Water Coalition. "No one has escaped the pain."

WHAT ROLE DOES WATER PLAY IN ENERGY PRODUCTION?

dailymail.co.uk, 4/12/16

Water is used in power plants to produce steam to turn turbines. It is also required to cool the steam Water use is at the heart of most of our energy production. In thermoelectric plants, which include nuclear and fossil fuel plants, fuel is used to boil water. The resulting steam is used to turn turbines, which generate electricity. But more water is required to cool the steam, to change it back to its liquid state so it can be used again. Colder water is a better coolant and leads to more effective generation of electricity. While many plants use fresh water as a coolant, waste water and sea water can be used. However, these have implications for local ecosystems.

Hydroelectric power plants use water in a more direct way than thermoelectric plants. Instead of generating steam, they route fast flowing water from a river or reservoir to turn turbines and generate electricity. In a recent study, scientists warn that a rise in droughts and heatwaves, linked to climate change, could threaten access to water resources for power plants around the world. But changes to the way plants operate, including improving the efficiency of hydropower plants by 10%, could address this looming problem, the authors explain.

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