

Desalination, Nuclear Waste, Wireless Charging for your EV, and more

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Tech Curiosity

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Windows 11



- [Windows 10 Takes Its Place as Microsoft's 'Forever OS'](#)
 - **Windows 10** was famously called "the last version of **Windows**" by **Microsoft** developer evangelist Jerry Nixon. ... Jan 7, 2019
- That is, until [Windows 11](#) was announced:
 - **What is it?** Windows 11 is the successor to Windows 10
 - **When is it out?** Likely late October
 - **How much does it cost?** Free
 - Microsoft says Windows 11 will be out "[this holiday season](#)" – so likely sometime between late November and Christmas.

Windows 11

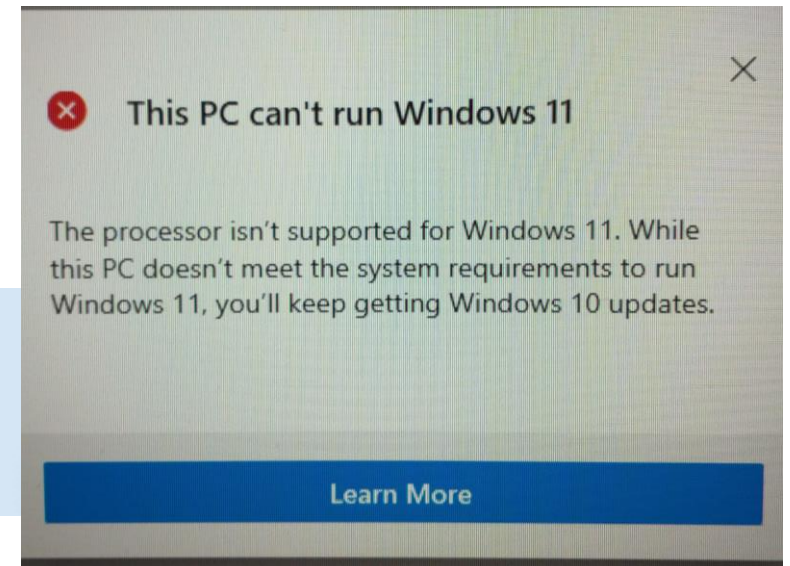


- Since the announcement, there has been confusion as to the requirements of what Windows 11 needs for your PC, mainly due to a mix of a TPM hardware component and a tool, but it looks as though there won't be a need to worry if your PC meets its requirements.
- Editorial comment: "We'll have to see about that."

Check for compatibility

Use the PC Health Check app to see if your current PC meets the requirements to run Windows 11. If so, you can get a free upgrade when it rolls out.

COMING SOON



The Unexplained Phenomena of the U.F.O. Report

- Cutting through the thicket of bureaucratic language and cautious qualifications, readers of the report are left with basically two options:
 - That some of the U.A.P.s could actually be advanced drones or drone swarms, one of the [more compelling explanations](#) for at least some fraction of these encounters
 - And “Other.”
 - When it came to the “Other” category, some of the observed behaviors were so dramatically exotic that they required not only additional study and additional analysis but perhaps **additional physics**: “Although most of the UAP [since 2004] described in our dataset probably remain unidentified due to limited data or challenges to collection processing or analysis, we may require additional scientific knowledge to successfully collect on, analyze and characterize some of them... The UAPTF [task force] intends to focus additional analysis on the small number of cases where a UAP appeared to display unusual flight characteristics or signature management.”
- The report: [‘Preliminary Assessment: Unidentified Aerial Phenomena’](#)

And What is a 'Heat Dome' anyway?

Meteorology 101 - **What is a heat dome?**

- A 'heat dome' is a mountain of warm air built into a very wavy jet stream, with extreme undulations. When the jet stream — a band of strong wind in the upper levels of the atmosphere — becomes very wavy and elongated, pressure systems can pinch off and become stalled or stuck in places they typically would not be.
- This past week, a ridge of high pressure, which is the heat dome, has become lodged in the Pacific Northwest. It is acting as a block in the atmosphere, not allowing the weather to move. The specific type of block is called an Omega block, because it looks like the Greek letter Omega, and the hot air is pooling inside.

Why are these temperatures so extreme?

- Areas of high pressure, like heat domes, have sinking air. This compresses the air on the ground and through compression it heats the air column. In addition, winds are moving downslope from the mountains downward into cities like Seattle and Portland; that downward motion causes heating as well.
- These local effects combined with the background warming of [climate change](#), which has warmed the Pacific Northwest by about 3 to 4 degrees Fahrenheit since pre-industrial times, add intensity to an already strong heat wave.

What areas are currently affected?

- The worst heat extends from British Columbia in Canada south into Washington, Oregon, Idaho, Montana and California. The town of Lytton in British Columbia hit 116 degrees on Sunday, breaking Canada's all-time record high by 3 degrees.
- Portland broke its all-time record Saturday, hitting 108 degrees, and then blew past it again Sunday with a 112-degree reading. Monday afternoon, the city reached an astonishing 115 degrees.
- Seattle also set a new all-time record of 104 on Sunday and then beat it handily on Monday with a high of 108.

How unusual is this heat wave?

- "Unprecedented" does not do it justice. Statistically speaking, this would be a [once-in-a-1,000-year occurrence](#) in a normal climate. But our climate is no longer normal...
- Between a warming climate and a more wavy jet stream, we might see more extreme heat waves, more extreme storms and more extreme floods. This is because a [wavy jet stream](#) forces more warm air north and more cold air south, and it also slows down the forward pace of systems.
- See also: [Jet stream: Is climate change causing more 'blocking' weather events?](#), and associated [video](#)

Water Scarcity

- Water scarcity can mean scarcity in availability due to physical shortage, or scarcity in access due to the failure of institutions to ensure a regular supply or due to a lack of adequate infrastructure.
- Water scarcity already affects every continent. Water use has been growing globally at more than twice the rate of population increase in the last century, and an increasing number of regions are reaching the limit at which water services can be sustainably delivered, especially in arid regions.

Water Scarcity

Challenges

- Water scarcity will be exacerbated as rapidly growing urban areas place heavy pressure on neighboring water resources. Climate change and bio-energy demands are also expected to amplify the already complex relationship between world development and water demand.

Water Scarcity

Opportunities

- There is not a global water shortage as such, but individual countries and regions need to urgently tackle the critical problems presented by water stress. Water has to be treated as a scarce resource, with a far stronger focus on managing demand. Integrated water resources management provides a broad framework for governments to align water use patterns with the needs and demands of different users, including the environment.

Water Scarcity

Links

- FAO: [Aquastat](#)
- FAO (2020): [The State of Food and Agriculture 2020](#)
- FAO (2016): [Coping with water scarcity in agriculture: a global framework for action in a changing climate](#)
- FAO (2008): [Coping with water scarcity: An action framework for agriculture and food security](#)
- UN (2006): [UN World Water Development Report 2006: 'Water: a shared responsibility'](#)
- UNDP (2006): [Human Development Report 2006: 'Beyond scarcity: Power, poverty and the global water crisis'](#)
- UNICEF (2021): [Water Security for All](#)
- UNICEF (2017): [Thirsting for a Future: Water and children in a changing climate](#)
- UN-Water Activity Information System: [National Drought Management Policies Initiative](#)
- UN-Water (2021): [Summary Progress Update 2021: SDG 6 – water and sanitation for all](#)
- UN 2018: [SDG 6 Synthesis Report](#)
- World Resources Institute: [Blog: What we know about water scarcity](#)

Can Sea Water Desalination Save The World? (13.5 min)

- Today, one out of three people don't have access to safe drinking water. And that's the result of many things, but one of them is that 96.5% of that water is found in our oceans. It's saturated with salt, and undrinkable. Most of the freshwater is locked away in glaciers or deep underground. Less than one percent of it is available to us. So why can't we just take all that seawater, filter out the salt, and have a nearly unlimited supply of clean, drinkable water?

Why is desalination not the answer to all the world's water problems, considering that two-thirds of the earth's surface is ocean?

Richard Muller, CoFounder, Berkeley Earth, Prof Physics UC Berkeley

- “The world doesn’t have a shortage of water; it has a shortage of cheap water. And the cost of desalination has a physics limit: it will always take 1 kWh or more of energy to desalinate a cubic meter of seawater.”

Why is desalination not the answer...

- It is based on the Second Law of Thermodynamics, a fundamental law of physics. Desalination decreases the entropy of the water and salt (by separating them, that is, by making them less disordered). Any process that does that must be accompanied by an entropy increase elsewhere. From that we can show that energy must be “expended”, that is, turned from a useful organized form (such as electricity) into a less useful disorganized higher-entropy form (such as heat). The calculation shows that the energy needed is (roughly):
 - 1 kilowatt-hour to desalinate 1 cubic meter of seawater
 - 1 Megawatt-hour to desalinate 1 acre-foot of seawater
 - 1 Megawatt-hour to desalinate 1 hectare-cm of seawater

Why is desalination not the answer...

In the US, the cost of electricity is about 15¢ per kWh retail, 5¢ wholesale. Farmers in California can currently buy fresh water at \$4 per acre foot, if they are near the aqueduct. Putting this into a list, we get the costs of fresh water today for an acre-foot of fresh water in California:

- \$4 (river water from aqueduct)
- \$50 (desalinated water, physics limit, wholesale electricity, not yet achieved)
- \$150 (desalinated water, at physics limit, retail electricity, not yet achieved)
- \$1100 (desalinated water at Santa Barbara California, using best desalination technology available when it was built in the 1980s) – yikes!

Why is desalination not the answer...

Desalinated water is cheaper than bottled water, but 275x more expensive than currently available farm water in the central valley of California. It is affordable if you need water to drink and to take showers, but not if you are using it for agriculture in a world market. Santa Barbara installed their desalination plant during a severe drought (see link: [Meyer Desalination Plant](#)). The drought ended in the late 1980s, so they turned it off (the water was too expensive), and they have not operated it since. But they will use it if a severe drought returns.

Why is desalination not the answer...

The high costs and the physics limit make it look as if desalination will never be cheap enough for agriculture. But there is a potential loophole: there are cheaper forms of energy than electricity. If you have big ponds of saltwater, you can use solar heating directly. The cost of this approach is not clear, but there are regions in the Middle East where it is being tried with brackish water. They have substituted the cost of maintaining large salt-water pools for the cost of electricity, and it isn't clear if it can truly be done cheaply enough. Salt water pools have their own problems, including their size, the corrosive power of salt water, and the growth of algae and other plants in the pools.

In the News

- **China started [operating two turbines](#) at its Baihetan Hydropower Station.** The station, which is still under construction, will become the world's second-largest hydropower plant, with 16 turbines producing 62.4 terawatt-hours of electricity a year. China plans to rely heavily on new hydropower projects to become [carbon neutral by 2060](#). According to Chinese state media, Baihetan will help China reduce carbon dioxide emissions by 52 million metric tons per year.
- **More:**
 - The Baihetan Hydropower Station is located in southwest China and sits across a tributary of the Yangzi River.
 - It is a \$34B project and is being built by the China Three Gorges Corporation.
 - It will have a total capacity of 16 gigawatts, second in the world only to China's Three Gorges Dam.
 - It is part of China's latest five-year plan to generate electricity for high-consumption regions on the eastern coast. The plan aims for the Sichuan province to complete the construction of ten hydropower plants and start another seven.

Finland Might Have Solved Nuclear Power's Biggest Problem (7 min)

- Finland is building the largest and most powerful nuclear reactor in Europe - and may have worked out what to do with spent nuclear fuel once and for all. Discover how to build in 2030 with Bluebeam - <https://bit.ly/3v8uTER>
- Full story here - <https://www.theb1m.com/video/finland-...>

It's time to cut the cord on electric vehicles

- EVs can truly bring about a transportation revolution—but not if we charge them like gas-powered cars
 - The movement to electrify vehicles is now irreversible and stands to be among the largest public health and economic transformations in history
 - The breakthrough in **wireless charging** is that fueling can be done automatically, and therefore, more frequently, more reliably, and without conscious effort
 - Intelligent automated charging enables every type of vehicle operator to adopt the en route “**grazing**” model of partial recharging done opportunistically and in the background
- It's time to cut the cord...
- ***READ MORE: [Electric cars are coming, and gas stations will have to adjust](#)***

Can a \$110 Million Helmet Unlock the Secrets of the Mind?

Bryan Johnson, who made a fortune in online payment processing, has spent a lot of it building hardware meant to radically expand science's understanding of the brain's aging and effects on the body.

“To make progress on all the fronts that we need to as a society, we have to **bring the brain online,**” says Bryan Johnson

Interesting man, interesting story...



The 'Flow'



Johnson eats once a day, first thing.

Wormholes Explained – Breaking Spacetime (start :39-8:08)

- And this: [Why Black Holes Could Delete The Universe](#) (10 min)

Brutally Honest Noom Review & First Impression | My Issues with Noom

- And another good resource:
 - [I GOT KICKED OUT! | Noom review from a dietitian & shocking experience with a Noom coach](#)

Grunt, the Curious Science of Humans at War by Mary Roach

- Tackles the science behind some of a soldier's most challenging adversaries—panic, exhaustion, heat, noise—and introduces us to the scientists who seek to conquer them.
- She answers questions not found in any other book on the military:
 - Why is DARPA interested in ducks?
 - How is a wedding gown like a bomb suit?
 - Why are shrimp more dangerous to sailors than sharks?
 - How can diarrhea can be a threat to national security?

Will Gamers Change Science Forever? (19 min)

- Gamers are the world's largest group of scientists. When you play games like Borderlands 3 and Eve Online you can contribute to cutting edge research. Scientists have a problem with data...there is just too much of it! By utilizing Citizen Science, gamers are able to band together and help change the world. In this video we speak with game developers, players and top researchers who have helped bring Citizen Science into the world of gaming.
- View the full episode on Amazon Prime:
<https://www.amazon.com/Off-the-Cuf/dp...>