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REPORT

Co-Siting New Reactors at Existing Nuclear Plants

Owner-controlled land and reactor siting options at 64 U.S. commercial nuclear sites

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AT A GLANCE

This report assesses buildable land at the 64 existing commercial nuclear sites in the United States and how many small modular reactors and large light water reactors that land could accommodate.

- Thirty-three of the 64 commercial nuclear sites in the United States have contiguous undeveloped land of sufficient size and shape for at least one new reactor, and a further 19 have land of sufficient size in shapes where a standard reactor footprint could not be placed.
- At 26 of the 33 sites the buildable land is sufficient only for small modular reactors; at the other seven it is sufficient for at least one large light water reactor, under footprint assumptions of 50 and 500 contiguous acres.
- Site acreage is a poor guide to what can be built. What remains after buildings, open water and floodplain are removed, and whether it lies in one piece, determines the opportunities available.
- Two sites with land for new reactors, Pilgrim in Massachusetts and Monticello in Minnesota, are in states whose laws currently bar building them.
- This analysis independently finds land for new reactors at the two sites where co-siting projects have already been announced, Palisades and Columbia Generating Station.

This assessment covers land only. Transmission capacity, cooling water, market conditions, and offtake were not assessed.

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Executive Summary

The United States has set a target of 400 GW of nuclear generating capacity by 2050, four times what it operates today. Executive orders issued to reach that target direct federal agencies to develop land the federal government controls, at Department of Energy and Department of Defense sites and on public lands. The 64 commercial nuclear sites are a separate category, held by their own operators rather than by the federal government, and they offer their own land, existing infrastructure, and licensing history. Two co-siting projects are already under way on such land, at Palisades and at Columbia Generating Station.

This report, prepared by Good Energy Collective, measures how much land each of the 64 commercial nuclear sites in the United States controls, how much of it could be built on after existing development, open water, and floodplain are removed, and how many small modular reactors and large light water reactors that land could accommodate. The boundaries are traced from county tax parcel records, and every reactor count is a maximum on land alone.

The report finds:

Thirty-three sites have contiguous undeveloped land of sufficient size and shape to fit at least one new reactor. At 26 of these, the land is sufficient only for small modular reactors, because it is fragmented rather than scarce; at the other seven, it is sufficient for at least one large light water reactor. These figures assume a footprint of 50 contiguous acres for a small modular reactor and 500 for a large light water reactor, the minimum of the EPRI siting guide ranges. A further 19 sites have contiguous undeveloped land of sufficient size, 6,250 acres in total, but in shapes — mostly shoreline and riverfront strips — where a standard reactor footprint could not be placed; a site-specific layout would likely find room at many of them, and they are listed separately. Of the remaining 12 sites, two fail physical screening, eight have no contiguous undeveloped land large enough once existing development, open water, and floodplain are removed, and two are in states with nuclear moratoria.

Buildable acreage is concentrated in a small number of states. Illinois, North Carolina and Texas together hold 40.5 percent of all buildable acreage; the top five states hold 55.6 percent. Site count is more evenly spread: those same three states hold 22.2 percent of the 54 sites, and 13 of the 28 states with any buildable land have only one site each.

Buildable Acreage by State, Ranked by Total

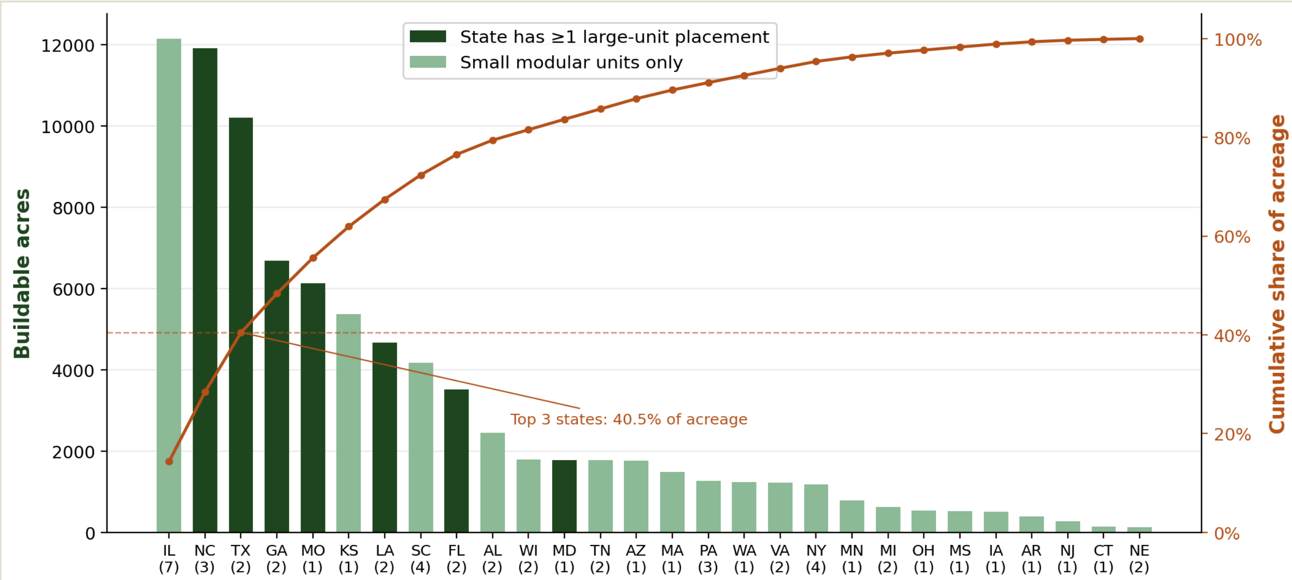

Figure 1. Buildable Acreage by State, Ranked by Total. Illinois, North Carolina and Texas lead the ranking; the dashed line marks cumulative share of the fleet total. Number below each state abbreviation is site count. Dark bars are states with at least one large light water reactor unit placed; light bars are small modular reactor units only.

Gross site acreage is a weak guide to what can be built. What matters is how much of the owner-controlled boundary is already occupied by buildings, roads and switchyards, and whether what remains sits in a single contiguous piece. Catawba holds 1,145 acres, of which 362 remain after development is removed, and no reactor footprint fits any of them. Kewaunee holds 868 acres, of which 713 remain, and three small modular reactors fit on them. Wolf Creek holds 11,079 acres, of which 5,366 remain after its cooling reservoir is removed, enough for 28 small modular reactors but not for a single large unit.

Gross Acreage Is a Weak Predictor of Buildable Land

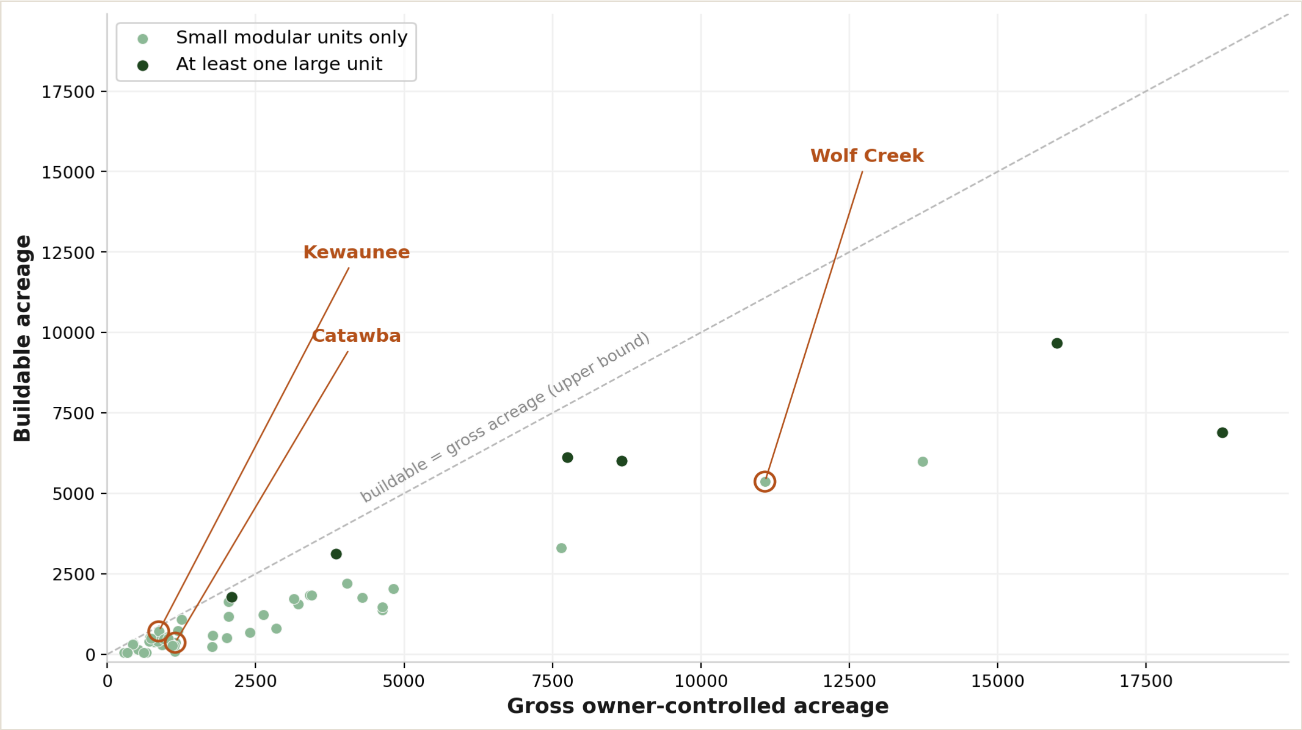

Figure 2. Gross Acreage Is a Weak Predictor of Buildable Land. Each point is a site outside a moratorium state. Wolf Creek has substantial gross acreage but little in a usable contiguous piece, most of it consumed by its cooling reservoir. Shearon Harris and South Texas sit near the line because little of their land is developed. Turkey Point, the largest site in the set at 21,471 acres, is excluded from this chart; 88 percent of its parcel sits in a FEMA flood zone, leaving only 2,051 acres buildable.

Owner-controlled land is unevenly distributed and, at the upper end, far larger than published footprints suggest. The median site holds 1,202 acres, consistent with published plant footprint estimates. The mean is 3,143 acres, roughly 2.3 times larger, because a subset of sites hold large reservoirs or undeveloped buffer land that footprint studies exclude. At Vogtle, the boundary traced from county assessor records is more than twice the extent shown on public mapping.

Two sites have land for new reactors, and state law does not currently permit building them there. Pilgrim in Massachusetts and Monticello in Minnesota together have land for up to 17 small modular reactors, or one large unit and nine small ones. Both states are considering repeal, and New Jersey repealed its own moratorium in April 2026.

Three of the seven LWR-capable sites hold operating licenses expiring in the 2040s. Callaway and Waterford each have land for at least one large light water reactor and a license expiring in 2044; Vogtle units 1 and 2 expire in 2047. Any decision to renew those licenses falls in the same window as any decision to add a reactor.

This analysis independently finds land for new reactors at the two sites where co-siting projects have already been announced. Holtec has a construction permit application under NRC review for two SMR-300 units at Palisades. Energy Northwest and X-energy have a joint development agreement for up to twelve Xe-100 modules on the Energy Northwest leasehold adjacent to Columbia Generating Station.

1 Introduction

The United States has set a target of 400 GW of nuclear generating capacity by 2050, approximately four times what it operates today.[1] The executive orders issued in May 2025 to advance that target designate Department of Energy sites and national laboratories, Department of Defense installations, federal brownfields, and Bureau of Land Management and Forest Service holdings as candidate land for new reactors,[2] and direct 5 GW of power uprates at plants already operating.[3] Those orders address land the federal government controls. The commercial fleet sits on land held by its operators, and the extent of that land has not been established. Prior assessments of co-siting potential exist, but none has been based on the verified extent of land each operator controls.[4]

This report establishes, for each of the 64 commercial nuclear power plant sites in the United States, how much land the operator controls, how much of that land could be built on, and how many small modular reactors and large light water reactors it could accommodate. This report measures that land from county tax parcel records for all 64 commercial sites, tracing each owner-controlled boundary in QGIS and subtracting existing development, open water and floodplain to establish what could be built on. The intended use is to let a state energy office, a plant operator or a developer see what is physically possible at a specific site before commercial assessment begins. The reactor counts are maxima on land alone. The report does not estimate national capacity, rank sites against one another, or forecast what will be built, because those outcomes depend on transmission headroom, cooling water, market conditions, offtake, financing and social acceptance, none of which it measures.

The owner-controlled area across the 64 sites is 201,000 acres. Most of it is not available for construction. Two sites fail physical screening, and subtracting existing development, open water, floodplain and parcels too small or too fragmented to hold a reactor leaves buildable land at 54 sites. Of the 52 outside states with nuclear moratoria, all hold at least one contiguous buildable patch large enough for a small modular reactor; at 33 of them a standard reactor footprint could be placed within that patch. The other 19 are reported separately in Table 2 (Appendix B). The variable that separates them is the amount of contiguous undeveloped acreage inside the property line, which varies across the fleet by more than two orders of magnitude and shows little relationship to site size or license status.

2 The Case for Co-Siting at Existing Sites

2.1 Demand Growth and Firm Capacity

Electricity demand in the United States is growing again after roughly two decades of flat consumption, and the growth is concentrated in loads that require continuous power. Grid power supplied to hyperscale, leased and crypto-mining data centers reached approximately 64 GW in 2025, an increase of 25 percent in a single year and close to three times the 2020 figure, according to 451 Research. The same forecast places demand at roughly 183 GW by 2030.[5] Wood Mackenzie attributes 68 percent of total load growth between 2026 and 2030 to data centers alone.[6]

These projections carry wide uncertainty and published estimates of data center consumption in 2030 span 200 to more than 1,050 TWh per year depending on assumptions about buildout pace and utilization.[7] The interconnection queues indicate the scale of what utilities are being asked to accommodate. Texas is processing a queue of 438 GW,[8] and American Electric Power has reported 190 GW of raw interconnection requests against firm customer commitments of 24 GW by 2030.[9] Raw queue volumes overstate real demand, since they include speculative, duplicated and later-withdrawn requests, and the gap between AEP's queue and its contracted commitments illustrates the difference. Whatever fraction materializes, meeting it on any near-term timeline depends less on how much capacity is eventually built than on how fast the first new units can reach commercial operation. That speed is set by how much of what a new site requires a project already has in place: permits, agreements, transmission access, physical infrastructure, and so on.

2.2 Conditions Already Satisfied at Operating Sites

Nuclear construction in the United States is slowed by several factors, of which reactor design and supply chain are two, but the conditions surrounding a site account for a substantial share of the schedule risk. A greenfield project must secure land, establish that the site satisfies NRC criteria for seismicity, flooding, population density and hazard proximity,[10] complete environmental review under NEPA, negotiate grid interconnection, develop emergency planning arrangements with surrounding jurisdictions, recruit and qualify a workforce, and build enough local support to survive a multi-year permitting process. Most of these are serial dependencies, and the resulting schedule exposure is a recognized part of why capital has been reluctant. Vogtle units 3 and 4 received their combined license in 2012 and entered commercial operation in 2023 and 2024.[11]

An operating nuclear plant has likely satisfied most of those conditions, at least for the units it already runs. The site holds an NRC license granted after a siting review examining broadly the criteria a new applicant would face, although the applicable guidance has been revised since most of these plants were licensed. It has transmission interconnection sized for gigawatt-scale output, cooling water rights adjudicated under state law and federal discharge permits, a security perimeter, an established emergency planning zone with agreements across surrounding counties, and in most cases several hundred qualified nuclear workers living within commuting distance.

Location matters as much as infrastructure. The existing fleet was sited near the load it was built to serve and connected to networks sized for gigawatt-scale output, and those networks are still in place. None of this carries over automatically: a new unit requires its own NRC authorization regardless of what reactor type is already on site, and the reactor-specific safety review, covering accident analysis, source term and exclusion area, is necessarily specific to whichever reactor is being proposed. What can carry over is the site characterization, such as seismic, hydrological and meteorological data, since that describes the land rather than the reactor. The emergency planning basis may need revision, and existing water rights and discharge permits are sized for existing units rather than for additional ones.

2.3 Community Familiarity and Acceptance

Community acceptance is the condition least often quantified, and it can be consequential to schedule where opposition translates into litigation or intervention. Survey evidence generally finds that proximity to an operating nuclear plant is associated with higher support for nuclear power, and that residents of host communities report more favorable views than the national average.[12] The association is not necessarily causal, since communities that accepted a plant decades ago may have differed from the outset. It does mean that a developer proposing a unit at an existing site begins from an established relationship with the community, a known local economic contribution, and a population with direct experience of nuclear power.

2.4 Owner-Controlled Land and Published Footprints

The footprint figures available for nuclear plants describe the licensed plant area, where the reactors, switchyard and support buildings already sit. Those figures come from studies comparing land use per megawatt across generating technologies, which exclude buffer land, cooling reservoirs, training facilities and undeveloped holdings because that information falls outside the scope of the comparison they are built to make.[13] For co-siting the excluded land is the land that matters. The Vogtle owner-controlled boundary reconstructed from Burke County assessor records is more than twice the extent shown on public mapping, and it includes a plant training center and a site boat ramp that no footprint estimate would capture. Across the 64 sites, the median owner-controlled area is 1,202

acres, consistent with published footprint estimates, while the mean of 3,143 acres is roughly 2.3 times larger. The difference is the tail: a subset of sites hold reservoirs and undeveloped buffer land that footprint studies exclude, and it is at those sites that most of the land for new units is found.

2.5 License Expiry and the Decision Window

Several of the sites with the most buildable land hold operating licenses that expire during the 2040s: Callaway in 2044, Waterford in 2044, and Vogtle units 1 and 2 in 2047 and 2049. Renewal decisions and expansion decisions therefore fall to the same operator within the same period, and each plausibly bears on the economics of the other. A site preparing for decommissioning is a much less likely candidate for a new unit, though recent restart decisions at previously shuttered plants show it is not necessarily disqualifying, and a site with a credible expansion pathway is one where continued operation is easier to justify.

Two sites in the dataset show what happens when that window closes. Kewaunee ceased operation in 2013 with a renewed license valid to 2033, and Indian Point closed in 2021. Both retain grid interconnection and the physical characteristics that made them viable in the first place. Kewaunee retains 713 acres of buildable land, enough for three small modular reactors. Indian Point does not, because 70 percent of its comparatively small parcel is developed. Closure does not automatically strand a site, but it removes the operator, the workforce and the institutional relationships that make redevelopment simpler.

2.6 Scale of the Opportunity

Thirty-three sites have land for new reactors inside boundaries their operators already control, without acquisition, adjacent to interconnection that already exists. Whether that interconnection can absorb the additional output is a separate question this assessment does not answer.

Reactor counts on land alone are the primary output here, with aggregate capacity secondary. A parcel with land for a given number of units yields capacity according to what a developer chooses to build on it, and that choice depends on commercial and financing conditions the analysis does not model. The two announced co-siting projects illustrate the range: Holtec has applied to build 340 MWe units at Palisades and X-energy is proposing 80 MWe modules at Columbia, a factor of four apart on the same class of site.

2.7 Prior Work

The Oak Ridge and Argonne screening study published in 2024 is the closest antecedent, estimating 60 to 95 GW of co-siting potential across a comparable universe of sites. It approximated site extent using a one-mile radius around each reactor center point, which captures land the operator does not control and omits land it does, and for the larger part of its estimate it relied on records from previously canceled units rather than on geospatial analysis. Establishing ownership from county assessor records is slower, but it produces a boundary corresponding to land a developer could actually build on, and it is the basis for the per-site figures in this report.

3 Results

3.1 Owner-Controlled Land Across the Fleet

The owner-controlled area across all 64 sites totals 201,159 acres. The median site holds 1,202 acres and the mean 3,143. Two sites are measured on a different basis from the rest. Columbia Generating Station sits on land leased from the Department of Energy within the Hanford Site, and the leasehold rather than the reservation is used, 2,626 acres. San Onofre sits within Marine Corps Base Camp Pendleton under a Navy easement, and only the plant site is counted, 75 acres.

The distribution is right-skewed for two different reasons. Sites such as South Texas Project, Wolf Creek, Clinton and Comanche Peak hold large cooling reservoirs, which inflate the owner-controlled figure but are removed later as open water. Sites such as Vogtle and Callaway hold substantial undeveloped land, which survives the netting.

Owner-Controlled Area Across 64 Commercial Nuclear Sites

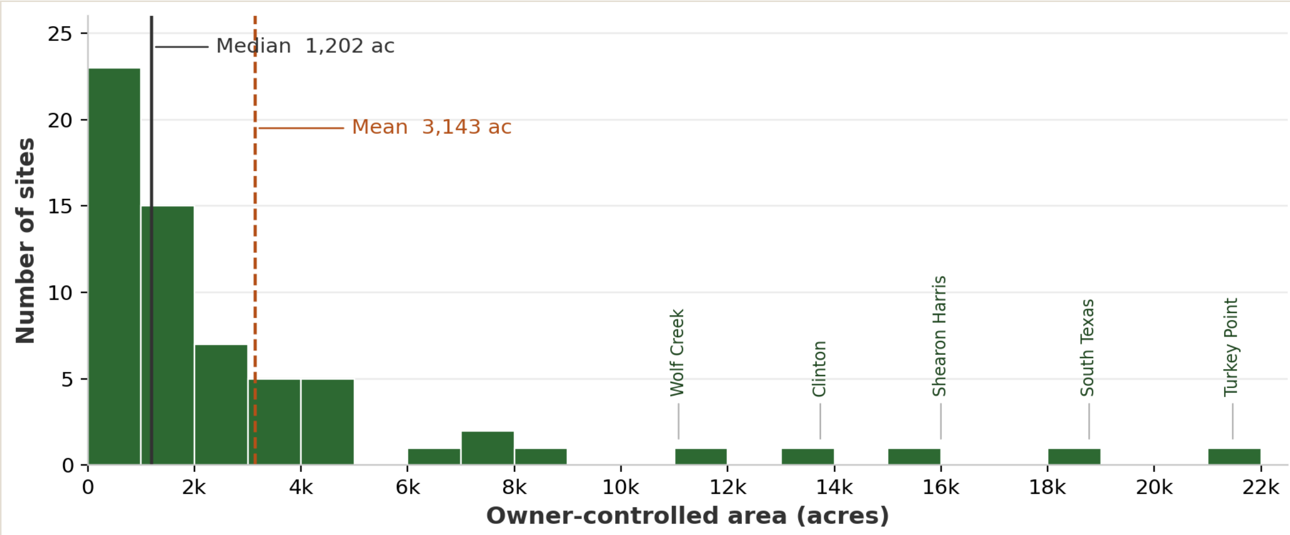

Figure 3. Owner-controlled area across all 64 commercial nuclear sites. Columbia Generating Station is measured on the Energy Northwest leasehold and San Onofre on the plant site.

Figure 4 shows the same buildable acreage aggregated by state. Illinois, North Carolina and Texas lead the ranking; the seven states with at least one large-unit placement, discussed in Section 3.4, are scattered across the ranking rather than concentrated at the top, since acreage and parcel geometry are independent constraints.

Buildable Acreage by State

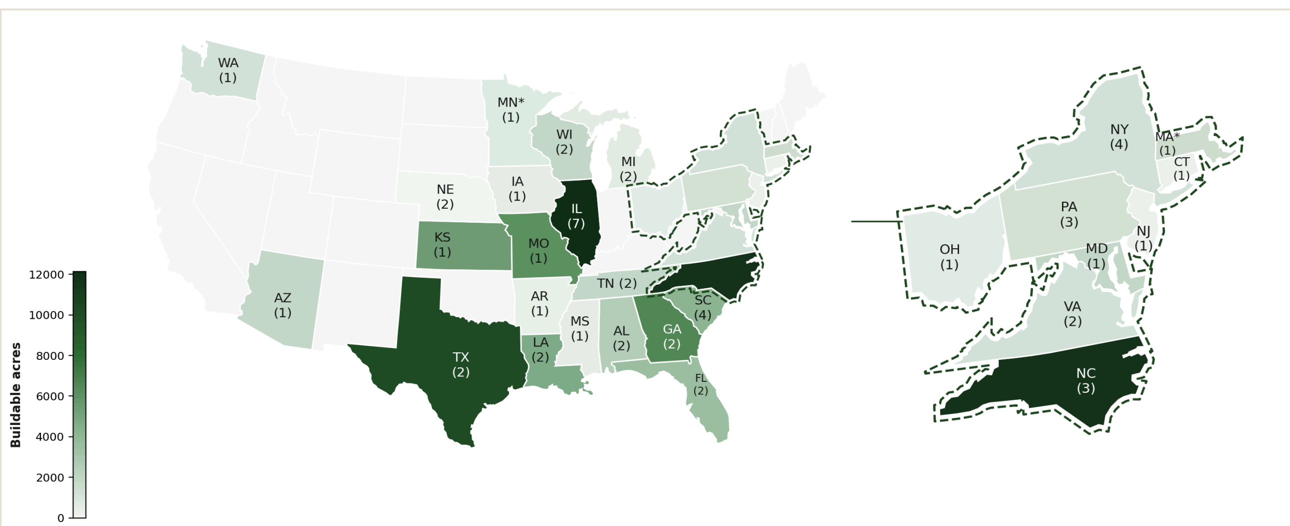

Figure 4. Buildable acreage by state, with a detail panel for the Mid-Atlantic and Northeast, where several states sit too close together to label individually on the main map. Number in parentheses is site count. States marked with an asterisk restrict new nuclear construction under the laws discussed in Section 3.6.

Physical screening removed two sites. Diablo Canyon failed three criteria: seismic hazard, slope and NOAA critical habitat. Prairie Island failed on tribal land. Volcanic hazard and USFWS critical habitat removed none, which is the expected outcome given that all 64 sites passed NRC siting review at the time they were licensed.[14] Developed land, open water and floodplain are then netted from each remaining boundary rather than used to exclude sites; Section 5 sets out why. Eight sites retain no contiguous buildable patch above 50 acres after netting and drop out at that stage: Browns Ferry, Davis-Besse, Limerick, San Onofre, Seabrook, St. Lucie, Three Mile Island and Vermont Yankee. Of the 54 that remain, two lie in states with nuclear moratoria.

3.2 Characteristics that Determine Buildable Acreage

Gross acreage is a weak predictor of how much can be built. Catawba holds 1,145 acres, 47 percent of it developed; 362 acres remain buildable, and no reactor footprint fits any of them. Kewaunee holds 868 acres, 16 percent developed; 713 acres remain buildable, and three small modular reactors fit on them. Wolf Creek holds 11,079 acres and supports 28 small modular reactors but no large unit, while Calvert Cliffs supports a large unit on 2,100. Two characteristics explain most of the variation: the proportion of the owner-controlled boundary already occupied by buildings, roads, switchyards and other impervious surface, and whether the remainder sits in a single contiguous piece.

Figure 5 shows how weak the relationship is across the full set of sites, not just these three. Gross acreage sets an upper bound on what a site could hold, shown as the diagonal line, but most sites fall well below it, and how far below is set by development and fragmentation rather than by size.

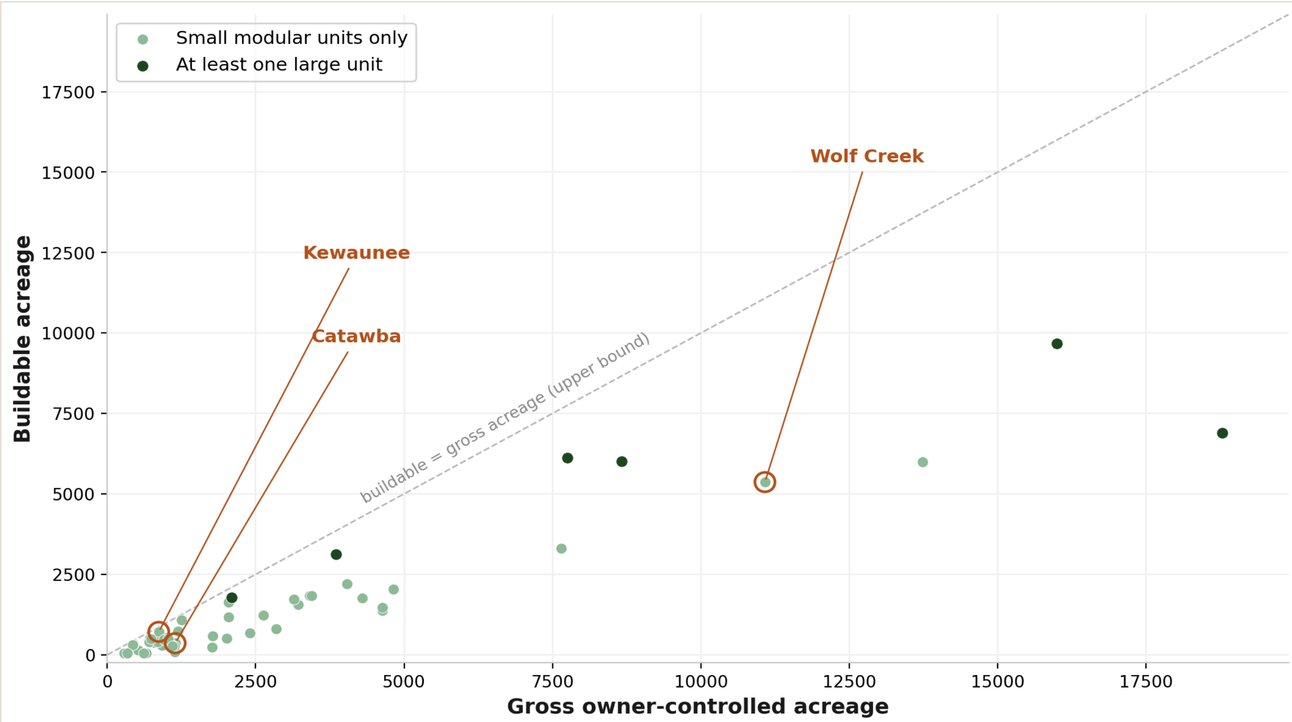

Figure 5. Gross Acreage Is a Weak Predictor of Buildable Land. Each point is one site outside a moratorium state. Wolf Creek has substantial gross acreage but little in a usable contiguous piece, most of it consumed by its cooling reservoir. Shearon Harris and South Texas sit near the line because little of their land is developed. Turkey Point, the largest site in the set at 21,471 acres, is excluded from this chart; 88 percent of its parcel sits in a FEMA flood zone, leaving only 2,051 acres buildable.

Development share sets a hard limit at the top of the range. No site with more than 55 percent of its area developed accommodates anything: Indian Point at 70 percent, Sequoyah at 61 and Millstone at 56 all return zero, and Browns Ferry at 72 percent retains no contiguous parcel at all. Below that, the relationship is weak. Twenty-one sites outside moratorium states hold at least 2,000 acres with less than a quarter developed, and only seven of them have land for a large light water reactor: Callaway, South Texas Project, Shearon Harris, Turkey Point, Vogtle, Waterford and Calvert Cliffs.

Parcel geometry is the second constraint and is often the binding one. The analysis assumes a footprint of 500 contiguous acres for a large light water reactor and 50 for a small modular reactor, the minimum of the ranges in the EPRI siting guide, which notes that the figures can be significantly reduced at an existing nuclear plant.[15] Appendix C (Table 4) sets out the basis. Byron holds 2,042 acres, V.C. Summer 3,443 and Wolf Creek 11,079, and none has a parcel with room for a large unit, so all three are limited to small modular reactors despite being among the larger sites in the set. Across this set, fragmentation is the binding constraint, regardless of total acreage.

3.3 Worked Example

Callaway illustrates the difference between a published footprint and an owner-controlled boundary, and how the placement step turns a buildable patch into a reactor count.

Figure 6 shows both extents at once. The cross-hatched area is the best available plant extent from public mapping, centered on the Callaway Energy Center. The surrounding grey area is the owner-controlled tax parcel, approximately 7,746 acres, and it is the base footprint for all subsequent analysis.

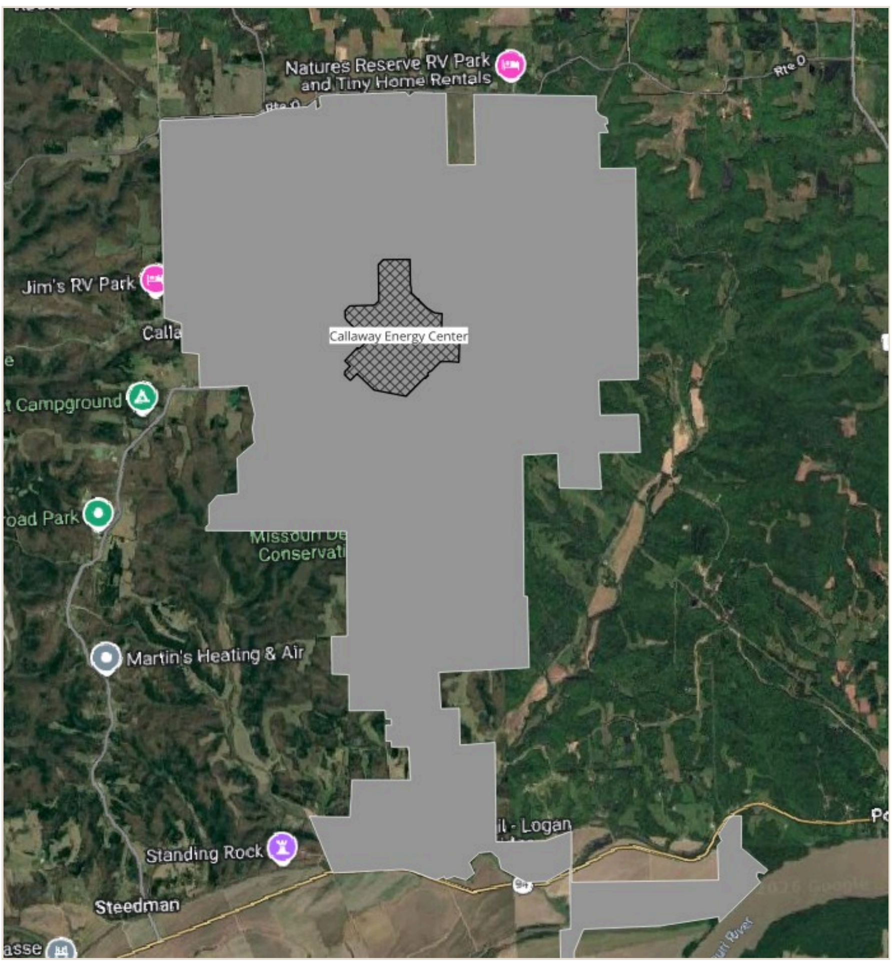

Figure 6. Callaway owner-controlled tax parcel (grey) against the plant extent shown on public mapping (cross-hatched).

Figure 7 shows what remains after subtracting floodplain, open water, and existing development, identified from NLCD 2021 land cover, with the remainder divided into contiguous parcels and sized individually. Total buildable area is approximately 6,130 acres across nine parcels.

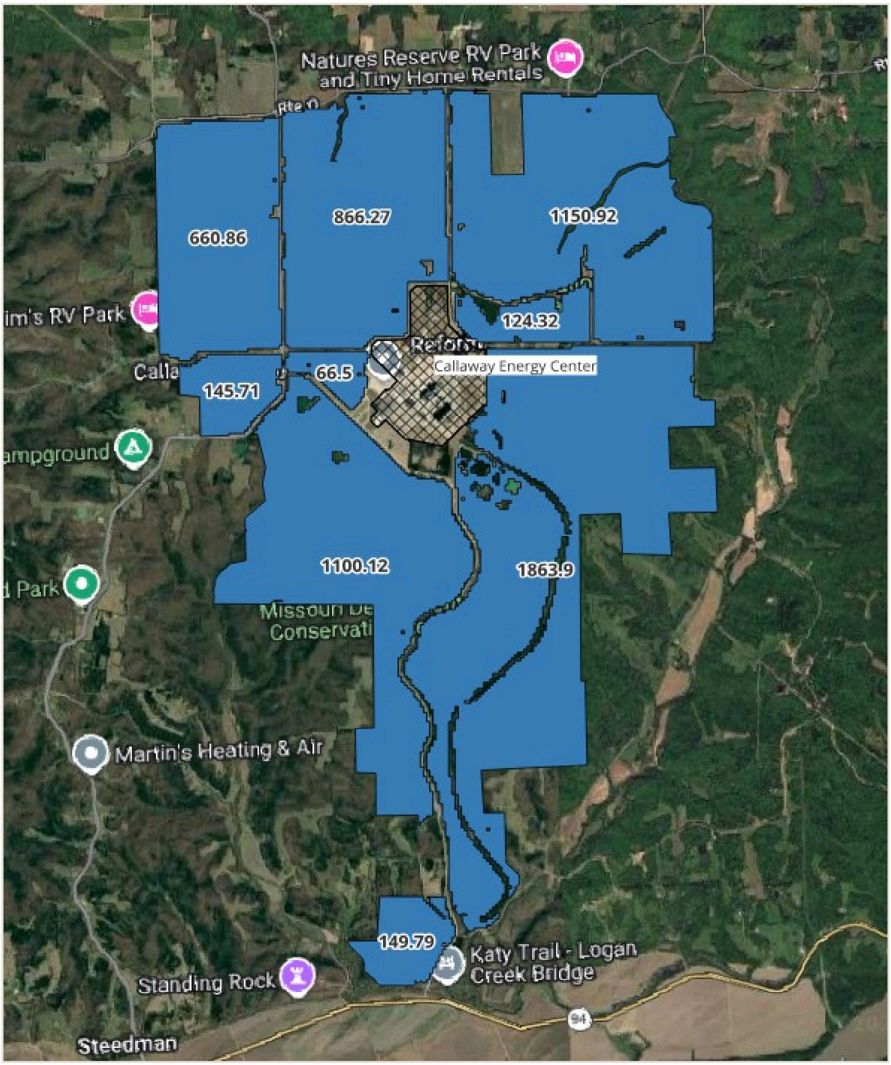

Figure 7. Callaway buildable parcels after netting flood, water and developed area.

Figure 8 shows the placement step applied with no large units: a 50-acre square small modular reactor footprint is tested at multiple grid alignments within each parcel, and the alignment yielding the most units is kept. This produces 39 small modular reactors across the nine parcels. Rotated grid alignments beyond the ones tested were not evaluated and would likely place additional units on the irregular parcels, so this count is conservative.

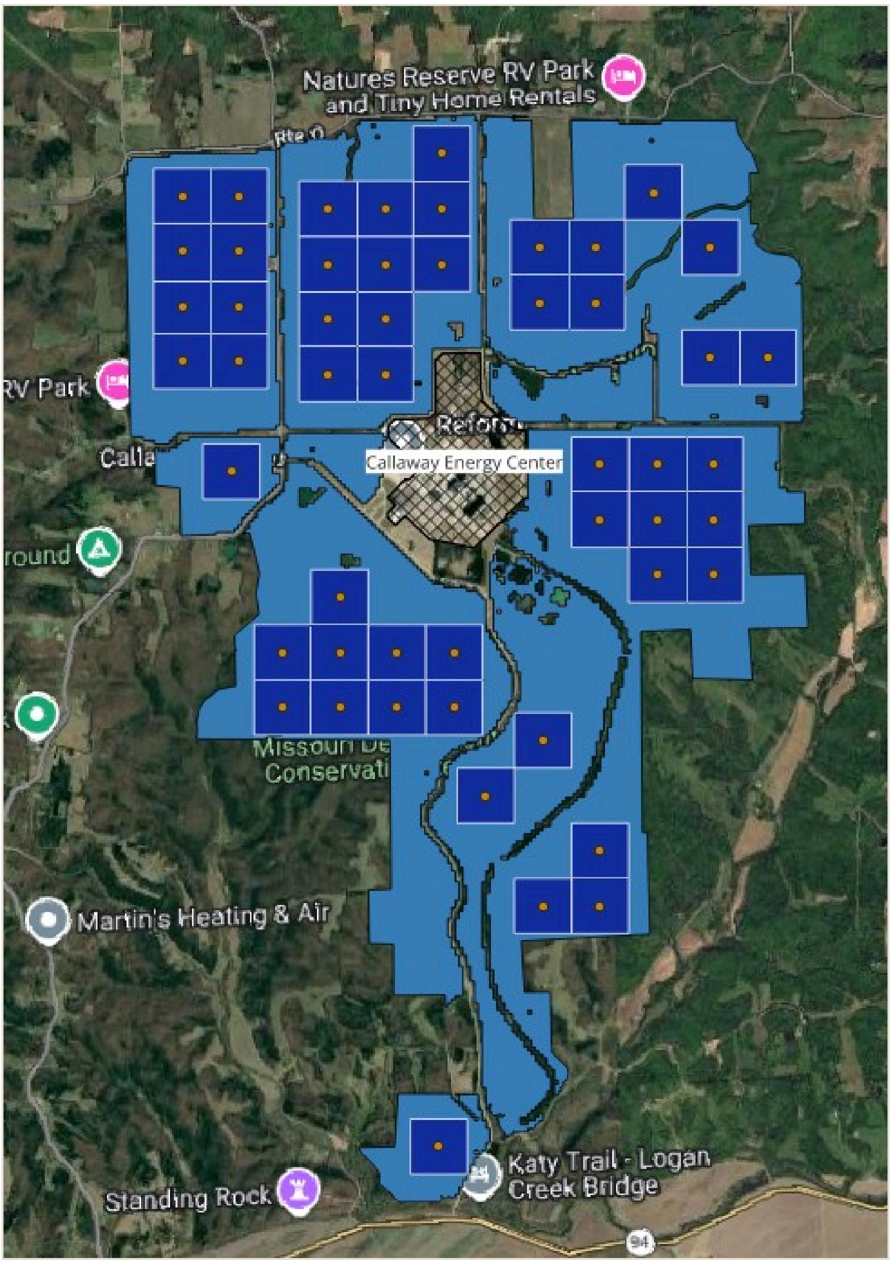

Figure 8. Callaway small modular reactor placement, zero large units.

Figure 9 shows the same parcels with four large units placed. The placement step finds a rectangular block of adjacent small-reactor footprints reaching 500 acres for each large unit; where a parcel cannot support a full rectangle, adjoining footprints are added and the rectangle is extended to the parcel edge to close the remaining gap. The four largest parcels each yield one large unit, and the placement step fits 16 small modular reactors around them.

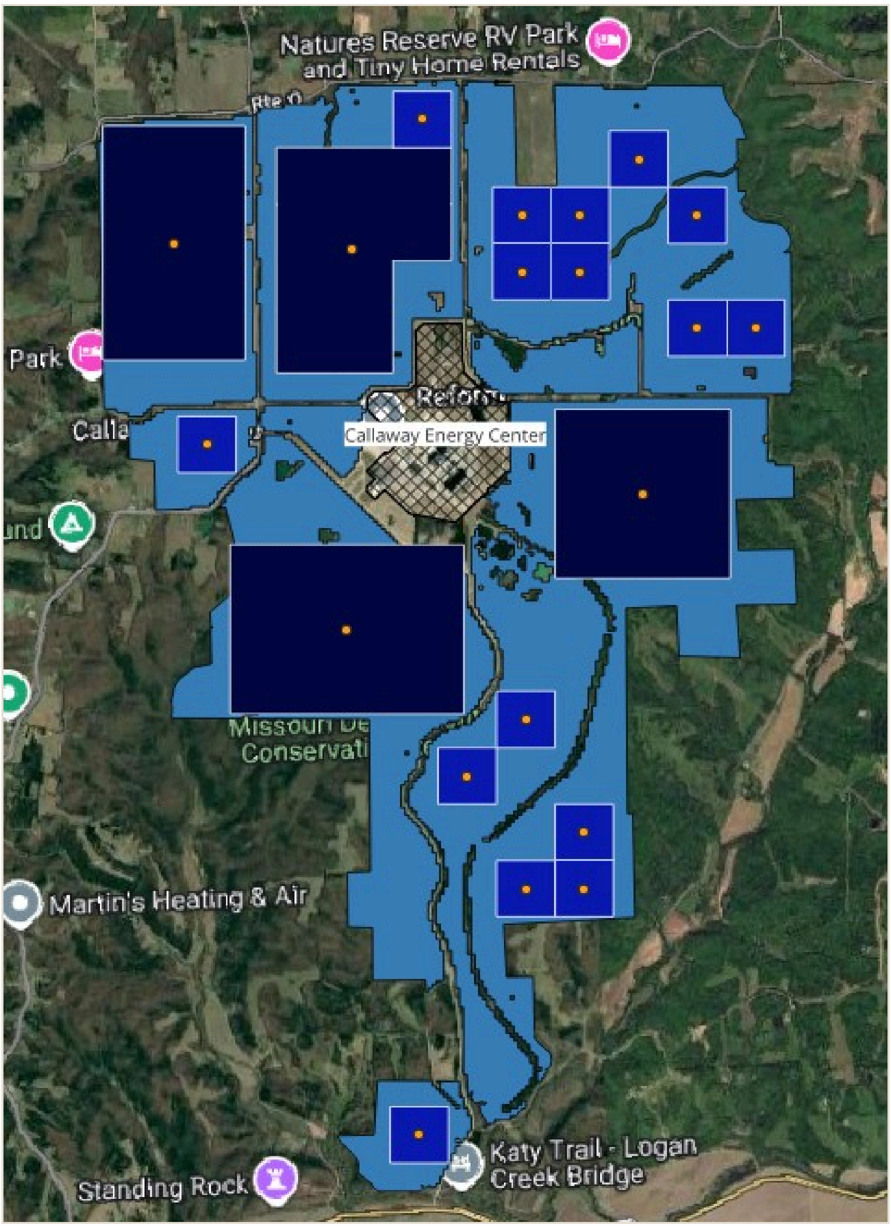

Figure 9. Callaway small and large reactor placement, four large units. The footprint is drawn as a simple square or rectangle for clarity. The placement algorithm tests it at multiple grid alignments against the parcel's actual, irregular shape, so a small apparent overlap with the parcel boundary in the map does not indicate an error.

3.4 Reactor Combinations the Land Could Accommodate

Each site is reported as the range of hypothetical reactor combinations its buildable land could accommodate, not as a single allocation and not as a proposal. A site with land for large units could equally be developed entirely with small modular reactors, or with a mix, and which of those a developer chooses depends on commercial, transmission and offtake conditions outside this analysis. Reporting a single optimized figure would imply a build order the analysis cannot justify. All counts in this section are upper bounds on land alone.

Of the 52 sites outside moratorium states, 33 have land for at least one reactor. Seven have land for a large light water reactor: Callaway for four, South Texas Project for three, Shearon Harris and Turkey Point for two each, and Vogtle, Waterford and Calvert Cliffs for one each. Twenty-six have land for small modular reactors and none for a large unit under any combination. Reactor counts are produced by a placement step that fits assumed footprints, 500 acres for a large light water reactor and 50 for a small modular reactor, into each contiguous buildable patch as compact shapes. Appendix C (Table 4) sets out the footprint basis and the placement method. The remaining 19 sites outside moratorium states hold patches large enough but not shaped to take one. Each holds at least one contiguous buildable patch above 50 acres, 6,250 acres across the 19, and twelve hold more than 250 acres. The placement step fits no footprint on any of them because their patches are long, narrow or irregular, as shoreline and riverfront parcels tend to be. Surry is the clearest case: a single contiguous patch of 488 acres, nearly ten times a small modular reactor footprint, on which no standard footprint could be placed. These 19 sites are not ruled out. They are the upper end of the range, and they are listed with their patch acreage in Table 2 (Appendix B). Site-specific layout at any of them would likely find room the rule does not.

If every parcel with land for a unit were used for small modular reactors, the 33 sites have land for 383 units. If every parcel that could take a large unit were used that way first, they have land for 14 large units and 251 small modular reactors. Neither is a projection; both are bounds on what the land alone permits.

Figure 10 shows the two bounding combinations at each of the seven sites with land for a large unit, with reactor footprints drawn to scale. Each large unit would displace roughly ten small ones, which is the footprint ratio showing through, and the range is widest at Callaway and South Texas Project. Turkey Point is the one site where two large units would consume the entire buildable area.

Reactor Combinations at the Seven Large-Capable Sites

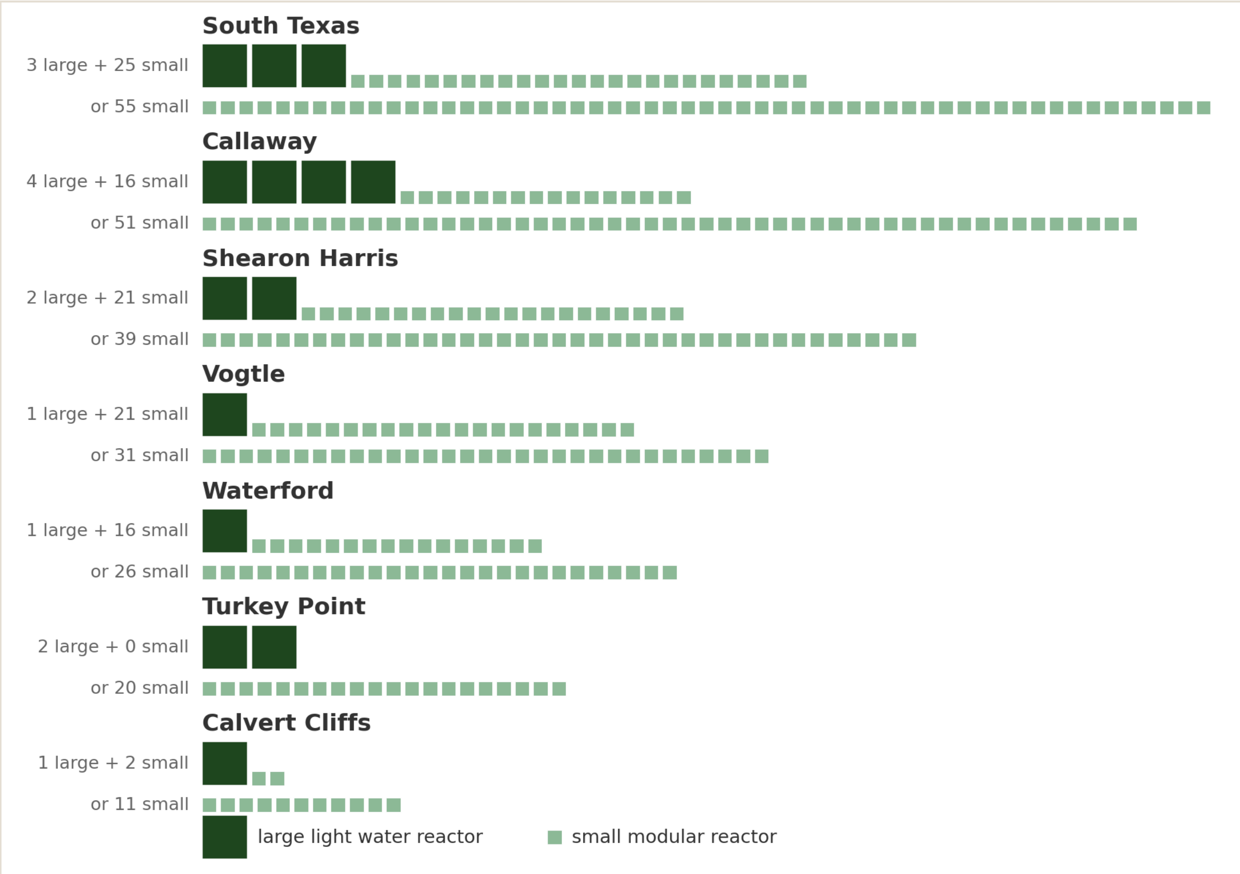

Figure 10. Reactor combinations the land could accommodate at the seven sites with land for a large light water reactor, showing the two bounding cases. Each tile is one reactor footprint drawn to scale; a large unit occupies ten times the land of a small modular reactor. These are maxima on land alone, not proposed layouts.

Figure 11 shows the 26 sites with land for small modular reactors but not for a large unit. Most accommodate between two and nine units. The two sites where a co-siting project has already been announced, Columbia and Palisades, are marked in orange.

The 26 Sites With Small Modular Capacity Only

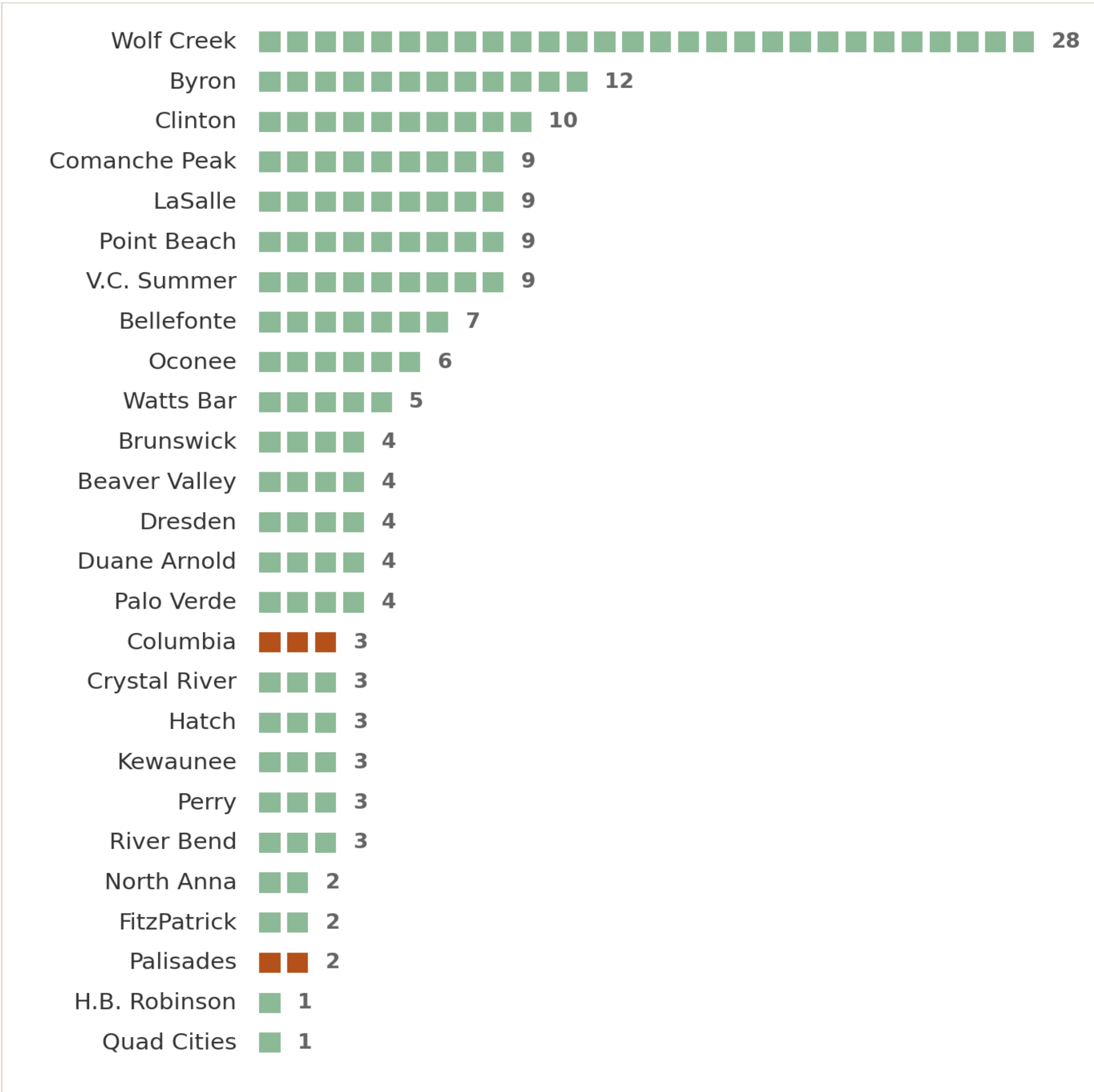

Figure 11. The 26 sites with land for small modular reactors but not for a large unit, showing the maximum count on land alone. Orange tiles are units carried as an announced-project floor at Columbia and Palisades under the rule in Section 5.

The full range for every site, including every intermediate combination, is given in Table 1 (Appendix A) and in the published dataset.

License standing and buildable land are largely independent. Among the plants holding granted subsequent license renewals, V.C. Summer to 2062, North Anna to 2058 and 2060, and

Oconee and Browns Ferry to 2053 are limited to small modular reactors or, in Browns Ferry's case, have no buildable land at all. Conversely most of the sites with the most buildable

land hold ordinary renewed licenses. A long regulatory horizon does not indicate land for new units, and the two attributes should be read together.

3.5 Announced Co-Siting Projects

Two co-siting projects are in progress at sites this assessment independently identifies as viable, which provides a check on the method.

Holtec submitted the first part of a construction permit application to the NRC on 31 December 2025 for two SMR-300 units, Pioneer 1 and Pioneer 2, at 340 MWe each, co-located with the restarted 800 MWe Palisades plant. The NRC accepted the application in early 2026 and opened environmental impact statement scoping in June 2026. The Department of Energy awarded $400 million in December 2025, and first commercial operation is targeted around 2030. Holtec has stated that co-locating on the same complex as the existing plant streamlines operations and workforce needs. Palisades holds 330 acres of buildable land. The placement step fits no footprint there, because its shoreline parcel does not admit a compact shape, and the two announced units are carried as a floor under the rule set out in Section 5.

Energy Northwest and X-energy signed a joint development agreement in July 2023 for up to twelve Xe-100 modules at 80 MWe each, now named the Cascade Advanced Energy Facility, with Amazon committing approximately $334 million to an initial feasibility phase. The project is to be developed on land Energy Northwest controls adjacent to Columbia Generating Station, on the previously licensed WNP-1 parcel rather than on newly awarded federal land. The project is in feasibility rather than in the regulatory process, and should be read as announced, not committed. The placement step fits one unit on Columbia's 1,233 buildable acres; the three announced plants are carried as a floor.

The two projects bracket the small modular reactor class used here in opposite directions, at 340 MWe and 80 MWe against a 150 MWe assumption. That is the clearest available evidence that unit counts by footprint class are the defensible output. They are also evidence that the placement step is conservative at shoreline parcels, since both developers have found room it did not.

3.6 State Statutory Constraints

Four states with sites in the dataset restrict new nuclear construction: California, Massachusetts, Minnesota and Vermont. Six sites sit in those states. Diablo Canyon and Prairie

Island fail physical screening, and San Onofre and Vermont Yankee retain no contiguous buildable patch, so the moratoria never bind at those four. Two sites have land for new reactors, and state law does not currently permit building them there: Pilgrim in Massachusetts and Monticello in Minnesota. Neither has a proposal before it. This is the only constraint in the analysis that a legislature can remove directly. Pilgrim holds 1,482

buildable acres, with land for one large unit and five small modular reactors, or thirteen small modular reactors alone. Monticello holds 789 buildable acres, with land for four small modular reactors.

Both states are considering repeal.[17] In Massachusetts a repeal of the 1982 nuclear freeze passed the House but was absent from the Senate bill and remains unresolved. Minnesota's moratorium, in Statutes 216B.243 subdivision 3b, has stood unamended since 1994; Senate File 468 would allow certificates of need for reactors up to 300 MW, which is the class Monticello has land for. New Jersey repealed its own moratorium on 8 April 2026, so that restriction no longer applies at Salem and Hope Creek; that site holds 275 buildable acres in two patches on which the placement step places no unit, and it is listed in Table 2 (Appendix B).[18]

Of the four that drop out earlier, Vermont Yankee holds 143 acres, 68 percent of it developed, and retains no contiguous patch above 50 acres. San Onofre is measured on the 75-acre plant site held under a Navy easement within Marine Corps Base Camp Pendleton, an easement that reached its original term in 2024, and it likewise retains no buildable parcel. Diablo Canyon fails on seismic hazard, slope and NOAA critical habitat, and Prairie Island on tribal land. Maine, Oregon, Hawaii and Rhode Island also restrict new nuclear construction but hold no site in the dataset.

4 Implications

The findings bear on several sets of decisions. They are set out here as implications rather than recommendations, since the analysis establishes what the land could accommodate and not the commercial or regulatory case for any particular project.

Scale of the opportunity

Co-siting at existing commercial sites is, at fleet level, principally a small modular reactor opportunity. Twenty-six of the 33 sites with buildable land accommodate small units only, and the large-unit opportunity is confined to seven named sites. How much new capacity the land at existing sites could accommodate therefore depends more on which reactor class is assumed than on how much land is available: the same 33 sites have land for 383 small units if every parcel were used for small units, or 14 large units and 251 small if large units were placed first. Both are bounds on land, not forecasts. The reactor count is the stable quantity; the capacity figure moves with the technology choice.

Licensing Timelines

Three of the seven LWR-capable sites, Callaway, Waterford and Vogtle, hold licenses expiring in the 2040s, putting the renewal decision and any expansion decision in the same planning window. More broadly, whether any of the seven large-unit sites pursues either reactor class depends on commercial, transmission and offtake conditions this analysis does not assess; the land supports either class at all seven, with roughly ten small units displaced per large one.

What Repeal Would Unlock

Two sites, Pilgrim and Monticello, have land for new reactors that state law currently bars building. The question has a specific answer at each: Pilgrim could hold up to 13 small modular reactors, or one large unit and five small; Monticello could hold four small units, matching the class Minnesota's pending Senate File 468 would permit.

How sites are screened

Gross acreage does not predict what can be built; development share and parcel contiguity do. A site with 11,079 acres accommodates no large unit while one with 2,100 does. Screening approaches that rank sites by size, or that approximate site extent with a fixed radius around the reactor, will misidentify where the room is. The parcel-level inventory published with this report is intended to replace that approach for the commercial fleet.

A Floor, Not a Ceiling

The counts in this report understate what these sites can hold. The placement step is conservative at shoreline and riverfront parcels, and the two announced projects prove it: developers at Palisades and Columbia found room the method did not. The reported site count, 33, is the lower end of a 33-to-52 range, and site-specific assessment at the 19 sites in Table 2 (Appendix B) would likely find more.

5 Method

The analysis proceeds in four stages: parcel delineation, physical screening, netting of unusable land, and reactor placement. Appendix C sets out the full method, including the data sources in Table 3, exact thresholds, and the reasoning behind each step; this section summarizes it.

01 Owner-controlled boundaries were traced from county tax parcel records and collated into a single geodatabase.[19]

02 Physical screening criteria drawn from NRC greenfield siting guidance were applied within those boundaries, covering seismic hazard, slope, critical habitat, tribal land and volcanic hazard.[20]

03 Developed land, open water and floodplain were then netted from the remaining boundary, using NLCD land cover and the FEMA National Flood Hazard Layer; floodplain is netted rather than used to exclude a site, for the reasons set out in Appendix C.[21]

04 The remainder was divided into contiguous patches and reactor footprints were placed within them, following the EPRI-derived thresholds and method set out in Appendix C, which also sets out why the site-specific flood reevaluations every plant filed with the NRC would be a better input than the FEMA layer used here.[22] Unit counts are land-derived and uncapped, with an announced-project floor applied at two sites. Large light water reactors are modeled at 1,100 MWe per unit and small modular reactors at 150 MWe.[23]

6 Scope

Interconnection headroom and cooling water headroom are not assessed. The volume of additional generation an existing switchyard and network can absorb is likely the binding constraint on an addition of several gigawatts at a single site, and it varies substantially between sites; interconnection queue data offers the nearest publicly available proxy. Every site holds adjudicated cooling water, but consumptive use and thermal discharge limits under state water rights and NPDES permits, not water availability, are the discriminating factor, and streamflow figures retrieved from gauge records proved unreliable at this scale and are not used.

Land is one input into whether a reactor is built, not the only one. The commercial case for a specific project, and the community's acceptance of it, are separate factors that will determine the outcome alongside land availability. Section 2.3 discusses the survey evidence on community acceptance near existing sites.

Reactor size assumptions, 150 MWe for small modular units and 1,100 MWe for large ones, are inputs to the placement step, not results, and real announced projects fall well outside them, from 80 MWe Xe-100 modules to 340 MWe SMR-300 units.

Two parts of the method are conservative in a known direction. Netting FEMA flood-zone acreage removes land that is buildable with engineering at sites already designed against a more severe flood, so buildable area is understated, and flood zones cut across a parcel rather than sitting at its edge, so netting fragments parcels more than the acreage subtraction alone suggests. The placement step is similarly conservative at shoreline and riverfront parcels, since it requires a compact contiguous area and a long, narrow parcel can hold ample acreage without satisfying that test; nineteen sites outside moratorium states hold patches large enough and return no units from the placement step, twelve of them with more than 250 buildable acres, and are listed in Table 2 (Appendix B). The two announced projects at Palisades and Columbia both sit on parcels where the step placed zero or one unit, which indicates it understates what shoreline sites can hold; those two are corrected by the announced-project floor, and the other 19 are not.

The underlying data carry their own limits. Physical screening thresholds derive from NRC greenfield siting guidance and were applied unchanged to sites that had already passed NRC siting review at licensing; Diablo Canyon failed on seismic hazard, slope and NOAA critical habitat, and Prairie Island on tribal land, with no other site failing any criterion, and the thresholds are adjustable in the accompanying map tool. Parcel boundaries are derived from county assessor records and are planning-level rather than legal survey boundaries, with the retrieval date for each county record carried in the published dataset. License status reflects NRC renewal and subsequent renewal dockets as of the publication date;[24] pending applications are recorded as pending, and where a site holds multiple units with staggered expirations, the earliest unit expiry is reported and the full range is given in the dataset.

References

1. Executive Order 14300, Ordering the Reform of the Nuclear Regulatory Commission, May 23, 2025. Federal Register 2025-09798. federalregister.gov/documents/2025/05/29/2025-09798/ordering-the-reform-of-the-nuclear-regulatory-commission
2. Executive Order 14299, Deploying Advanced Nuclear Reactor Technologies for National Security. federalregister.gov/documents/2025/05/29/2025-09796/deploying-advanced-nuclear-reactor-technologies-for-national-security. Executive Order 14301, Reforming Nuclear Reactor Testing at the Department of Energy, both May 23, 2025. federalregister.gov/documents/2025/05/29/2025-09799/reforming-nuclear-reactor-testing-at-the-department-of-energy. Executive Order 14154, Unleashing American Energy, January 2025. federalregister.gov/documents/2025/01/29/2025-01956/unleashing-american-energy
3. Executive Order 14302, Reinvigorating the Nuclear Industrial Base, May 23, 2025. federalregister.gov/documents/2025/05/29/2025-09801/reinvigorating-the-nuclear-industrial-base
4. Evaluation of nuclear power plant and coal power plant sites for new nuclear capacity, August 16, 2024. sai.inl.gov/content/uploads/29/2025/02/evaluation-of-npp-and-cpp-sites-aug-16-2024.pdf
5. S&P Global Market Intelligence and 451 Research, Surging US data center power demand tests sustainability targets, May 2026. spglobal.com/market-intelligence/en/news-insights/articles/2026/5/surging-us-data-center-power-demand-tests-sustainability-targets-101100707
6. Wood Mackenzie, Data center demand drives US electrical equipment market to $65B, reshaping industry dynamics, April 2026. woodmac.com/press-releases/data-center-demand-drives-us-electrical-equipment-market-to-$65b-reshaping-industry-dynamics
7. World Resources Institute, Powering the US Data Center Boom: The Challenge of Forecasting Electricity Needs. wri.org/insights/us-data-centers-electricity-demand
8. Utility Dive, Texas, facing 438 GW queue, approves initial large-load interconnection process, June 22, 2026. utilitydive.com/news/texas-facing-438-gw-queue-approves-initial-large-load-interconnection-pro/823367
9. S&P Global, Data center grid-power demand to rise 22% in 2025, nearly triple by 2030, October 2025. spglobal.com/market-intelligence/en/news-insights/articles/2025/10/data-center-grid-power-demand-to-rise-22-in-2025-nearly-triple-by-2030-93605983
10. 10 CFR Part 100, Reactor Site Criteria; NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations.
11. U.S. Department of Energy, Vogtle Electric Generating Plant, energy.gov/edf/vogtle; Southern Nuclear, Plant Vogtle.
12. Ephraim Bonah Agyekum, Bashar Tarawneh, Farhan Lafta Rashid, Pankaj Kumar, Flavio Odoi-Yorke, Hussein Togun, Wulfran Fendzi Mbasso and Vladimir Ivanovich Velkin, A systematic review of nuclear energy and public acceptance: a detailed analysis of evolution, emerging trends, and future research potentials, Energy Exploration & Exploitation, 2025. doi:10.1177/01445987251339845.
13. Strata, The Footprint of Energy: Land Use of U.S. Electricity Production, 2017.
14. NRC license renewal and subsequent license renewal application status. nrc.gov/reactors/operating/licensing/renewal/applications.html
15. Electric Power Research Institute, Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (Siting Guide), 2022 Revision. EPRI, Palo Alto, CA, 2022. Report 3002023910.
16. USGS Multi-Resolution Land Characteristics Consortium, National Land Cover Database 2021. mrlc.gov/data
17. Green Energy Consumers Alliance, Healey bill sets stage for reintroduction of nuclear in Massachusetts; WBUR, Massachusetts energy bill and utility rates, June 25, 2026; Minnesota Senate, S.F. 468, Partial Repeal of the Nuclear Moratorium, Senate Counsel summary, January 24, 2025; Governing, Minnesota Reconsiders Its Three-Decade Ban on New Nuclear Power, July 8, 2026.
18. New Jersey P.L.2026, c.9 (S3870/A4528), signed April 8, 2026; American Nuclear Society, New Jersey moves on from de facto nuclear moratorium, April 10, 2026; U.S. Department of Energy, What Is a Nuclear Moratorium?

REFERENCES, CONTINUED

19. County and state assessor parcel records for all 64 commercial nuclear sites. Individual county sources and retrieval dates are recorded in the published dataset. Columbia acreage from Washington Energy Facility Site Evaluation Council facility records for Columbia Generating Station and WNP 1 and 4.
20. USGS 2023 National Seismic Hazard Model, peak ground acceleration grid; USGS 3D Elevation Program 10-meter digital elevation model; U.S. Fish and Wildlife Service ESA Critical Habitat and NOAA National Marine Fisheries Service National ESA Critical Habitat Mapper; U.S. Census Bureau TIGER/Line American Indian Areas 2020 and American Community Survey 5-Year Estimates; USGS Volcano Hazards Program.
21. FEMA National Flood Hazard Layer. msc.fema.gov/portal
22. NRC, Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendations 2.1, 2.3 and 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, March 12, 2012, ADAMS ML12053A340; closure plan at COMSECY-15-0019, June 30, 2015.
23. Yifan Sun and Ken Kurosaki, Technical Overview of Recent Developments in Small Modular Reactors in the United States, arXiv:2504.02599, April 2025.
24. Holtec International construction permit application for Palisades SMR-300 units, NRC docket, December 31, 2025; Energy Northwest and X-energy joint development agreement, July 19, 2023.

Appendix A — Site Detail

All 54 sites carried to the packing stage, ordered by buildable acreage. Buildable acres is the owner-controlled area remaining after developed land, open water and floodplain are subtracted. All unit counts are hypothetical maxima on land alone. Max large units is the greatest number of large light water reactors the packing places. The two small modular reactor columns give the count if no large unit is placed and the count alongside the maximum number of large units. Palisades and Columbia Generating Station carry announced-project floors as described in Section 4. License and expiry data are in the published dataset.

Table 1. Site Detail, All 54 Sites.

Site	ST	Gross acres	Devel-oped	Buildable acres	Max LWR	SMR only	SMR + LWR	Moratorium
Shearon Harris	NC	15,998	6.7%	9,674	2	39	21	
South Texas Project	TX	18,778	5.6%	6,892	3	55	25	
Callaway	MO	7,746	9.2%	6,128	4	51	16	
Vogtle	GA	8,661	21.8%	6,010	1	31	21	
Clinton	IL	13,736	6.7%	5,991	0	10	10	
Wolf Creek	KS	11,079	5.5%	5,366	0	28	28	
Comanche Peak	TX	7,644	9.3%	3,304	0	9	9	
Waterford	LA	3,854	17.1%	3,119	1	26	16	
Bellefonte	AL	4,036	8.3%	2,211	0	7	7	
Turkey Point	FL	21,471	1.8%	2,051	2	20	0	
LaSalle	IL	4,820	10.6%	2,042	0	9	9	
Brunswick	NC	3,408	9.5%	1,841	0	4	4	
V.C. Summer	SC	3,443	41.3%	1,829	0	9	9	
Calvert Cliffs	MD	2,100	12.7%	1,784	1	11	2	
Palo Verde	AZ	4,296	29.3%	1,765	0	4	4	
Watts Bar	TN	3,142	22.7%	1,720	0	5	5	
Byron	IL	2,042	13.9%	1,634	0	12	12	
River Bend	LA	3,220	16.6%	1,556	0	3	3	
Pilgrim	MA	1,725	11.3%	1,482	1	13	5	Yes
Crystal River	FL	4,637	20.0%	1,468	0	3	3	
Braidwood	IL	4,638	11.2%	1,375	0	0	0	
Columbia Generating Station	WA	2,626	43.2%	1,233	0	3	3	
Oconee	SC	2,040	28.6%	1,184	0	6	6	
Point Beach	WI	1,256	14.2%	1,077	0	9	9	
H.B. Robinson	SC	2,848	23.7%	798	0	1	1	
Monticello	MN	1,501	22.4%	789	0	4	4	Yes

Table 1, continued. Site Detail, All 54 Sites.

Site	ST	Gross acres	Devel-oped	Buildable acres	Max LWR	SMR only	SMR + LWR	Moratorium
North Anna	VA	1,194	29.5%	735	0	2	2	
Kewaunee	WI	868	16.4%	713	0	3	3	
Hatch	GA	2,406	17.2%	676	0	3	3	
Dresden	IL	1,777	25.6%	583	0	4	4	
Perry	OH	1,001	33.4%	537	0	3	3	
Grand Gulf	MS	2,016	19.2%	519	0	0	0	
Beaver Valley	PA	721	27.3%	508	0	4	4	
Duane Arnold	IA	843	19.3%	504	0	4	4	
Peach Bottom	PA	737	22.2%	488	0	0	0	
Surry	VA	1,024	24.7%	488	0	0	0	
Quad Cities	IL	953	31.8%	470	0	1	1	
Nine Mile Point	NY	848	32.4%	410	0	0	0	
FitzPatrick	NY	705	22.2%	401	0	2	2	
McGuire	NC	1,049	40.1%	390	0	0	0	
Arkansas Nuclear One	AR	795	34.5%	388	0	0	0	
Catawba	SC	1,145	47.3%	362	0	0	0	
Palisades	MI	442	23.8%	330	0	2	2	
R.E. Ginna	NY	425	24.7%	310	0	0	0	
D.C. Cook	MI	921	39.9%	296	0	0	0	
Salem / Hope Creek	NJ	1,133	33.9%	275	0	0	0	
Susquehanna	PA	1,101	31.4%	272	0	0	0	
Farley	AL	1,770	31.6%	235	0	0	0	
Millstone	CT	524	56.4%	148	0	0	0	
Cooper	NE	1,134	15.2%	81	0	0	0	
Indian Point	NY	283	70.2%	56	0	0	0	
Fort Calhoun	NE	655	23.8%	54	0	0	0	
Sequoyah	TN	615	60.8%	52	0	0	0	
Zion	IL	337	20.8%	52	0	0	0	

Appendix B — Sites with Buildable Patches on Which No Standard Footprint Could Be Placed

These 19 sites outside moratorium states hold at least one contiguous buildable patch above the 50-acre small modular reactor footprint threshold, and no standard reactor footprint could be placed on any of them because the patch geometry does not admit a compact shape. They are the upper end of the site range and are not ruled out. Buildable acres is the total after developed land, open water and floodplain are subtracted. Patches above 50 acres is the number of contiguous patches meeting the footprint threshold, and the final column is their combined area. Salem and Hope Creek is included; New Jersey repealed its moratorium in April 2026.

Table 2. Sites with Buildable Patches on Which No Standard Footprint Could Be Placed.

Site	ST	Gross acres	Devel-oped	Buildable acres	Patches above 50 ac	Acres in those patches
Braidwood	IL	4,638	11.2%	1,375	9	1,375
Grand Gulf	MS	2,016	19.2%	519	3	519
Peach Bottom	PA	737	22.2%	488	3	489
Surry	VA	1,024	24.7%	488	1	488
Nine Mile Point	NY	848	32.4%	410	4	410
McGuire	NC	1,049	40.1%	390	3	390
Arkansas Nuclear One	AR	795	34.5%	388	4	388
Catawba	SC	1,145	47.3%	362	4	362
R.E. Ginna	NY	425	24.7%	310	2	310
D.C. Cook	MI	921	39.9%	296	2	296
Salem / Hope Creek	NJ	1,133	33.9%	275	2	275
Susquehanna	PA	1,101	31.4%	272	1	272
Farley	AL	1,770	31.6%	235	4	235
Millstone	CT	524	56.4%	148	1	148
Cooper	NE	1,134	15.2%	81	1	81
Indian Point	NY	283	70.2%	56	1	56
Fort Calhoun	NE	655	23.8%	54	1	54
Sequoyah	TN	615	60.8%	52	1	52
Zion	IL	337	20.8%	52	1	52

Appendix C — Detailed Method

This appendix sets out the full method behind the four stages summarized in Section 5: parcel delineation, physical screening, netting of unusable land, and reactor placement, including data sources, exact thresholds and the reasoning behind conservative choices.

The analysis draws on the datasets below, grouped by the stage of the method each supports. Vintage is the version or access date used in this analysis; several of these layers are updated on a rolling basis and a later run would use a newer version.

Table 3. Data Sources by Method Stage.

Stage	Dataset	Used for	Vintage
Parcel delineation	County and state tax assessor parcel records	Owner-controlled boundary at each of the 64 sites	Varies by county; retrieval dates in the published dataset
Parcel delineation	WA Energy Facility Site Evaluation Council facility records	Columbia Generating Station and WNP-1/4 leasehold boundary	Current facility filings
Physical screening	USGS National Seismic Hazard Model	Peak ground acceleration threshold	2023 model
Physical screening	USGS 3D Elevation Program	10-meter digital elevation model for slope	Rolling
Physical screening	USFWS ESA Critical Habitat; NOAA National Marine Fisheries Service Critical Habitat Mapper	Critical habitat screening	Current designations
Physical screening	U.S. Census Bureau TIGER/Line American Indian Areas	Tribal land screening	2020
Physical screening	USGS Volcano Hazards Program	Volcanic hazard screening	Rolling
Netting	USGS/MRLC National Land Cover Database (NLCD)	Developed land and open water	2021
Netting	FEMA National Flood Hazard Layer	Floodplain	Rolling
Footprint assumptions	EPRI Advanced Nuclear Technology Siting Guide, 2022 Revision	Large and small modular reactor footprint minimums	2022 revision
Footprint assumptions	Small modular reactor capacity literature (arXiv:2504.02599)	150 MWe small modular reactor assumption	—
Footprint assumptions	DOE and Southern Nuclear Vogtle project records	1,100 MWe large reactor assumption, AP1000 basis	—
License status	NRC license renewal and subsequent license renewal dockets	License expiry and SLR status by site	As of publication
License status	NRC 10 CFR 50.54(f) request and COMSECY-15-0019	Basis for the flood reevaluation discussion	2012 request; 2015 closure plan
Moratoria	Massachusetts, Minnesota and New Jersey legislative sources	State moratorium and repeal status	Current as of publication; see Section 3.6
Announced projects	Holtec International NRC construction permit application	Palisades floor and validation case	Filed December 2025
Announced projects	Energy Northwest and X-energy joint development agreement	Columbia floor and validation case	Signed July 2023

Owner-controlled boundaries at each of the 64 sites were established from local and state county tax parcel maps, georeferenced and traced in QGIS against the recorded owner, and collated into a single geodatabase. The retrieval date for each county record is carried in the published dataset. Two sites are measured on a different basis. Columbia Generating Station is measured on the Energy Northwest leasehold from the Department of Energy, comprising the Columbia site and the adjacent WNP-1/4 parcels, 2,626 acres in total, rather than the much larger Hanford Site within which it sits. San Onofre is measured on the 75-acre plant site held under a Navy easement within Marine Corps Base Camp Pendleton, rather than the full base.

Physical screening criteria were applied within the delineated boundaries: seismic hazard above 0.5g peak ground acceleration at a 2,475-year return period, slope exceeding 12 percent across more than 60 percent of the parcel, final ESA critical habitat, tribal land, and moderate or higher volcanic hazard. These criteria derive from NRC greenfield siting guidance and are applied here as conservative screening thresholds rather than as regulatory determinations, since every site in the dataset already passed NRC siting review at licensing. State nuclear moratoria were applied separately, after screening, since they are a matter of state law rather than physical suitability.

Developed land, open water and floodplain were subtracted from each screened boundary. Developed land and open water are identified from NLCD 2021 land cover, treating classes 11 (open water), 21 through 24 (developed, open space through high intensity) and 31 (barren land) as unavailable. Floodplain is taken from the FEMA National Flood Hazard Layer.

Floodplain is netted rather than used to exclude a site outright, and this is a deliberate and conservative choice. Flood presence does not disqualify land for a nuclear plant: plants are routinely built on land inside flood zones, on raised grade or behind engineered protection, and every site in this dataset was licensed on that basis. Nuclear siting requires protection against the probable maximum flood, an event far more severe than the one percent annual chance flood that FEMA Zone A represents. Land inside a FEMA polygon is therefore a construction cost at these sites rather than a bar to building, and subtracting it removes acres that could plausibly be built on; netting rather than excluding is the more conservative of the two errors available. Every operating plant filed a site-specific flood reevaluation with the NRC under the 10 CFR 50.54(f) request issued in March 2012, and those reevaluated elevations, intersected with site topography, would be the more precise input for a site-specific assessment than the national FEMA layer used here.

The reactor counts in this report depend on two assumptions: how much land a single reactor of each class occupies, and how that footprint is fitted into a buildable patch. This appendix sets out both, the source for the first, and the direction in which each errs.

The analysis assumes a footprint of 500 acres for a large light water reactor and 50 acres for a small modular reactor. Both figures are the minimum of the overall-site range in Table 1-1 of the EPRI Siting Guide, 2022 Revision, reproduced below. The guide gives ranges rather than single values, and it distinguishes the plant footprint, meaning the power block, switchyard, cooling, parking, offices, waste storage and protected area, from the overall site, which adds the exclusion area boundary and any further land the owner declares part of the site.

Table 4. EPRI Siting Guide Overall-Site Land Ranges by Reactor Class.

Class	Output	Plant footprint (acres)	Overall site (acres)	Additional construction (acres)
Micro	50 MWe or less	0.1 to 4	1 to 8	2 to 10
Small modular	50 to 300 MWe	25 to 200	50 to 500	50 to 100
Medium	300 to 600 MWe	60 to 250	250 to 800	75 to 200
Large	More than 600 MWe	100 to 400	500 to 2,000	100 to 500

Source: EPRI, Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (Siting Guide), 2022 Revision, Table 1-1. Values are per unit and represent typical ranges consolidated from the 2015 Siting Guide, the NRIC 2021 plant parameter envelope report, and recent COL and ESP submittals.

Three features of the EPRI guidance bear on sites that already host a reactor, and all three run in the same direction.

First, the overall-site figure includes the exclusion area boundary and the support infrastructure that a new site must establish. At an operating plant those already exist. The guide states directly that if a new plant or units are being constructed on or near an existing nuclear plant, the size of the overall site can be significantly reduced. The plant footprint column, 25 to 200 acres for a small modular reactor and 100 to 400 for a large unit, is therefore closer to what a co-sited unit requires than the overall-site column this analysis uses.

Second, the values are per unit and multi-unit deployment is not additive. The guide notes that deployment of multiple units on a site is not necessarily a multiple of the single-unit figures, since units share infrastructure. The placement step fits each footprint as a separate block, so a four-pack or a twin-unit plant is counted at four or two times the single-unit land requirement.

Third, the analysis uses the bottom of each overall-site range, not the range itself. A reader should not take 50 and 500 acres as figures EPRI specifies; EPRI specifies 50 to 500 and 500 to 2,000, and this analysis selected the minimum of each.

Announced projects illustrate the gap. Rolls-Royce states a 10-acre footprint for its 470 MWe design. At Vogtle, site preparation for units 3 and 4 disturbed more than 1,000 acres, including temporary laydown and parking, or roughly 500 acres per unit at the construction stage, which is the basis for the large-unit figure. The two co-siting projects at Palisades and Columbia are discussed in Section 3.5.

Buildable land at each site is divided into contiguous patches after developed land, open water and floodplain are removed. A patch above 500 acres is classed as large enough for a large light water reactor and a patch above 50 acres as large enough for a small modular reactor.

Reactor counts are then produced by a placement step rather than by dividing patch area by a fixed acreage-per-unit figure, so that the count fits the actual shape of each patch. For small modular reactors, a 50-acre square footprint is tested at multiple grid alignments within each patch, and the alignment yielding the most units is kept. For large light water reactors, the step searches for a rectangular block of adjacent small-reactor footprints reaching 500 acres; where a patch cannot support a full rectangle, adjoining footprints are added and the rectangle is extended to the patch edge to close the remaining gap. Section 3.3 shows this method applied at Callaway.

This is a conservative method in one specific respect: grid alignments beyond those tested are not evaluated, and rotated or offset alignments would likely place additional footprints on irregular patches. It is also why long, narrow or irregular patches, which shoreline and riverfront parcels tend to produce, can hold substantial acreage and admit no footprint at the tested alignments. Nineteen sites outside moratorium states fall in that position and are listed in Appendix B.

An earlier draft of this analysis applied a usable fraction of 60 percent to buildable area before counting units. That factor is not used here; the placement step fits actual footprints and the usable fraction is implicit in the geometry.

The reactor counts reported are therefore maxima on land alone under conservative footprint assumptions. Different footprint assumptions would change the counts, and for the reasons above the change would more likely be upward than downward.

Good Energy Collective

Good Energy Collective is a nuclear policy and research organization focused on the practical implementation of nuclear energy at scale, advancing community-informed policy for the responsible deployment of clean nuclear power.

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CITATION

Good Energy Collective. *Co-Siting New Reactors at Existing Nuclear Plants: Owner-controlled land and reactor siting options at 64 U.S. commercial nuclear sites*. September 2026.

Per-site boundary data is available upon request.