RESIDENTIAL ENERGY ASSESSMENT

Findings and Outstanding Items

Property	[redacted]
Program	Whole Home PAYS — utility referral
Prepared for	Ameren Missouri
Prepared by	Johnnie LaCaze
Site visit	August 24, 2026
Report date	August 27, 2026

Purpose and Approach

This assessment was performed under a Whole Home PAYS referral to evaluate the property for qualifying efficiency measures and to characterize the home's electricity consumption.

Findings are presented as observations and measurements. Several questions raised during the assessment remain open and are identified as such rather than resolved.

Property

Conditioned area	2,686 sq ft total — 1,343 above grade, 1,343 conditioned basement
Year built	2005
Construction	Single-story ranch, attached two-car garage
Occupancy	Two adults, both seniors, home most of the day
Heating fuel	Natural gas — space heating and water heating

Methodology and Limitations

This analysis draws on a site visit with equipment nameplate documentation, blower door testing, 48 months of billing history, and homeowner interview.

No electrical load in this report has been measured. All load figures are engineering estimates derived from nameplate ratings, appliance inventory, and billing analysis. Individual line items carry meaningful uncertainty. The hot tub estimate alone could reasonably range from 4,000 to 6,500 kWh per year, and it represents roughly 30 percent of annual consumption.

Billing periods run 29 to 34 days, so all consumption figures in this report are normalized to kWh per day. Degree-day normalization has not been applied; see Outstanding Items.

The site visit covered the dwelling. A detached outbuilding on the property was not entered or inspected, and whether it carries electrical service was not established.

Building Envelope — Measured

Metric	Result	Reference
Blower door	1,413 CFM50	—
Conditioned volume	~21,500 cu ft	—
Air changes per hour	**~3.9 ACH50**	2005-era construction typically 5–8
Attic insulation	R-27.8	R-49 target, Climate Zone 4
Knee wall (220 sq ft)	R-13.3	HD Rock Batt, 3.5 in
Basement rim joists	Insulated	Batt, continuous — no open cavities observed

Homeowner reports no insulation has been added since original construction.

Annual natural gas consumption is 378 CCF, of which approximately 290 CCF is attributable to space heating after backing out the summer baseline.

Equipment Change Affecting the Record

The complete HVAC system — gas furnace and outdoor condensing unit — was replaced in spring 2025. Prior equipment is understood to have been original to the 2005 construction, though specifications of the removed system have not been confirmed.

This affects interpretation of the billing history in two ways. The cooling equipment changed, and the indoor blower changed from a presumed PSC motor to a variable-speed ECM. Blower type affects winter electrical consumption independent of heating fuel, so both the summer and winter portions of the record are divided by this event.

Equipment Inventory

Equipment	Model / Specification	Vintage
Furnace	Lennox ML180UH070V48B — 66,000 BTU in / 53,000 out, 80% AFUE, variable-speed ECM blower	Installed spring 2025
Air conditioning	Lennox ML14KC1-030-230A02 — 2.5 ton, R-454B	Installed spring 2025
Water heater	State GS6-50-BCT 250 — 50 gal natural gas, 40,000 BTU	Built 2019
Refrigerator	Samsung RF28T5001SR — 28 cu ft, R-600a	Mfd May 2022
Freezer	Chest freezer, garage — reported near capacity	Not documented
Compact refrigerator	Dorm-style unit, basement — appears recent; model and rating not documented	Not documented
Hot tub	Bestway SaluSpa — 120V / 12A (11.3A heater, 0.7A pump), 1.36 kW heater, conditioned basement, operated year-round	Acquired spring 2023
Pool pump	Two-speed — 115V, 10A high / 3.2A low (replaced a single-speed unit)	Installed spring 2026
Thermostat	Honeywell Home programmable, non-communicating — fan switch reported set to Auto	—
Range	Electric	—

Dryer	Electric — Kenmore front-load	—
Washer	Kenmore front-load	—
Dishwasher	GE — steam / sanitize capable	—

Homeowner-Reported Operating Conditions

- Thermostat 74°F summer / 69°F winter
- Hot tub covered at all times when not in use, with an insulation blanket underneath
- No electric space heaters
- Electric blanket, infrequent use
- 20 light fixtures, all LED
- 3 televisions, 1 computer, 2 microwaves, 1 treadmill

Ruled Out by Inspection and Interview

Dehumidifier, sump pump, ejector pump, well pump (property is on city water), and electric heat of any type.

Correction: a compact refrigerator in the basement was not recorded during the site visit and was identified subsequently during review of site photographs. It has been added to the inventory and to the load breakdown. Its model, capacity, and rating were not documented, and the figure carried for it is a general estimate for a recent compact unit.

Billing History

Period	Annual kWh	kWh/day
Sep 2023 – Sep 2024	25,121	68.6
Sep 2024 – Sep 2025	23,212	63.6
Aug 2025 – Aug 2026	18,134	49.7

The final period is the sum of the twelve billing statements from 09/19/2025 through 08/20/2026, spanning 08/20/2025 to 08/20/2026 — 365 days exactly.

July Consumption by Year

Month	kWh/day	HVAC system
July 2024	91.2	Prior
July 2025	72.8	Current
July 2026	64.9	Current

National Weather Service records show 2024 as the second-warmest year on record for St. Louis, with 56 days at or above 90°F. Some portion of the summer reduction is attributable to weather rather than equipment. Degree-day normalization would be required before assigning savings to the equipment change.

Estimated Load Breakdown — Current Year

The following is an engineering estimate. No line item has been measured.

Load	Estimated kWh/yr
Hot tub	~5,100
Cooling	~2,200
Pool pump	~1,100
Electric dryer	~900
Refrigerator	~650
Compact refrigerator (basement)	~220
Furnace blower and inducer	~600
Chest freezer	~550
Electric range	~500
Dishwasher and washer	~400
Televisions (3)	~400
Lighting (20 LED)	~350
Computer	~250
Microwaves (2)	~150
Water softener	~75
Treadmill	~50
Estimated total	**~13,495**
Metered total	**18,134**
Difference	**~4,640 (12.7 kWh/day, ~530 W continuous)**

The difference falls within the cumulative uncertainty of the estimates above. I am not able to determine from this data whether it reflects estimation error or another cause.

The pool pump figure reflects the operating practice reported by the homeowner: low speed, approximately 70 percent of the day, during the swimming season only. See Pool Operation below.

The breakdown covers the dwelling only. A detached outbuilding on the property was not inspected and no allowance for it is included; see Detached Outbuilding below.

Hot Tub Estimate — Derivation and Sensitivity

Because this single load represents roughly 30 percent of estimated annual consumption, the derivation is set out below so the assumptions can be reviewed or replaced.

Nameplate and Physical Parameters

Parameter	Value

Unit	Bestway SaluSpa, inflatable vinyl shell
Electrical service	120V, 12A total — 11.3A heater, 0.7A circulating pump
Heater power	1,356 W (4,627 BTU/hr) — hard maximum, cannot be exceeded
Circulating pump	~84 W
Water volume	~220 gallons (~840 L)
Dimensions	71 in x 71 in x 28 in
Surface area	~125 sq ft — 35 top, 55 sides, 35 bottom
Location	Conditioned basement, estimated 62–68°F ambient
Operation	Year-round; cover in place when not in use; insulation blanket beneath

Method

Standby heat loss is calculated as $Q = U \times A \times \Delta T$, where A is 125 sq ft. Duty cycle is that loss divided by the heater's 4,627 BTU/hr output. Annual consumption is duty cycle × 32.5 kWh/day (the heater's 24-hour maximum) × 365 days.

Two values are not known and must be assumed: the effective U-value of the shell, cover, and bottom insulation as installed; and ΔT, the difference between water setpoint and basement ambient. Neither was measured.

Sensitivity — Estimated Annual kWh

Rows are effective U-value (BTU/hr·sq ft·°F). Columns are temperature difference between water and ambient.

U-value	ΔT 30°F	ΔT 35°F	ΔT 40°F	ΔT 45°F
0.30 (well insulated)	2,886	3,373	3,848	4,335
0.40 (mid estimate)	3,848	4,489	**5,131**	5,772
0.50 (minimal)	4,810	5,617	6,413	7,222

The figure carried in the load breakdown (~5,100 kWh) corresponds to U = 0.40 and ΔT = 40°F — for example, a 104°F setpoint against a 64°F basement. That is the center of the grid, not a measured result.

Across the full range shown, annual consumption spans approximately 2,900 to 7,200 kWh. Circulating pump consumption (~740 kWh/yr if continuous) is not included above and would be additive depending on the filtration schedule.

Recommended Verification

This is a 120-volt cord-and-plug load, so it can be measured without an electrician. A plug-in energy monitor placed between the receptacle and the unit's GFCI cord would produce an exact figure within one week, and would replace the entire grid above with a single measured value.

Because heat loss scales with ΔT, a measurement taken in summer will understate winter consumption for a tub in a basement. A summer reading plus a winter reading would bound the annual figure.

Foundation and Grade — Site Photographs

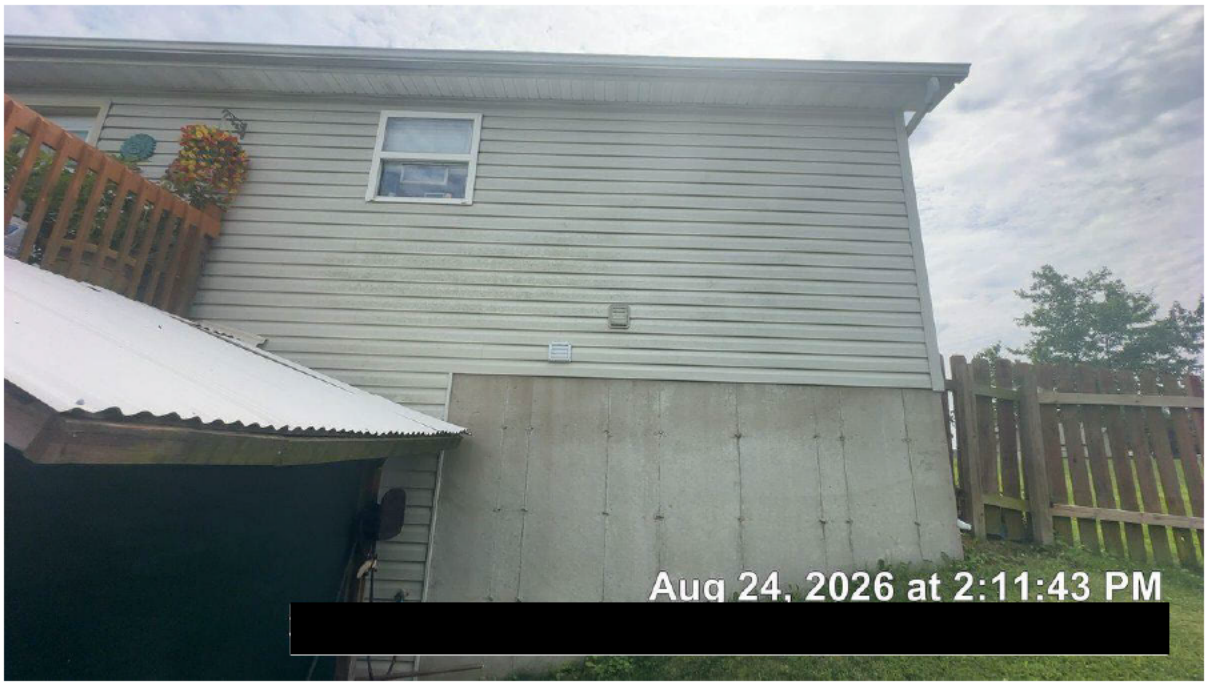
Photographs taken during the site visit, August 24, 2026. Included to document foundation exposure above grade, which bears on the basement temperature discussion that follows.



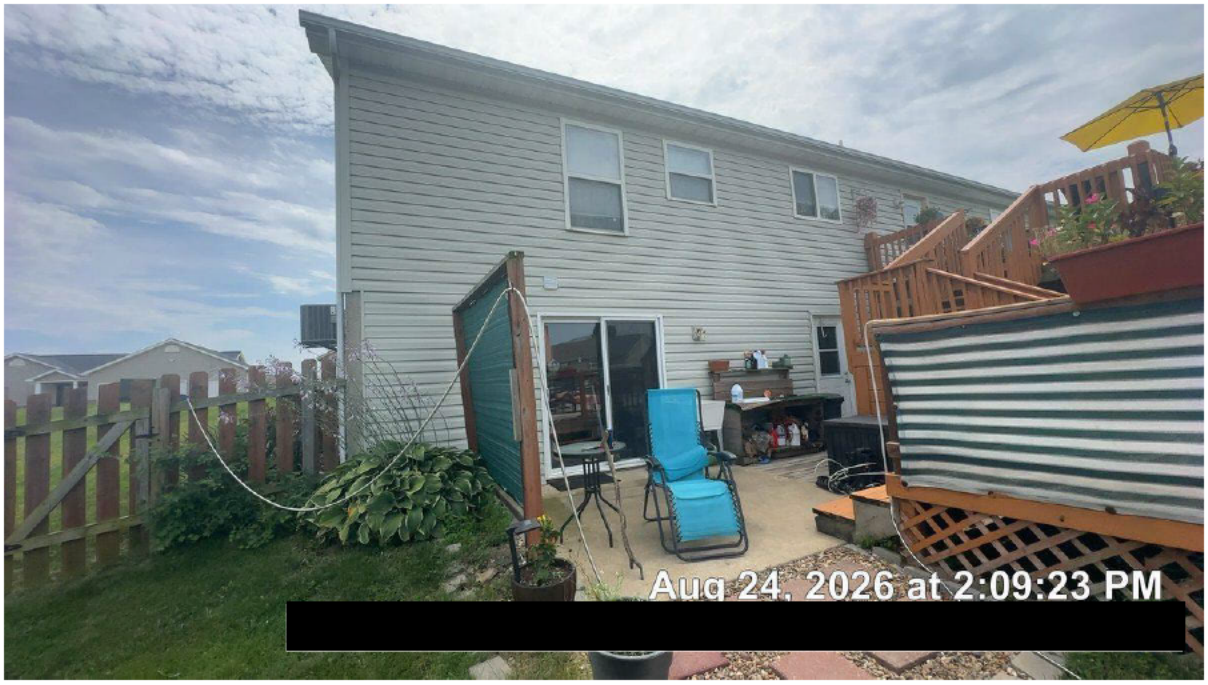
Front elevation (west). Grade meets brick veneer at the main floor level. No foundation wall exposed at this elevation.



Side elevation, utility side. Approximately three to four feet of poured concrete foundation wall exposed above grade. Basement window visible at this elevation. Gas meter, electric meter, and wall-mounted condensing unit shown.



Side elevation toward rear. Exposed foundation wall continues along this elevation, increasing in height toward the rear of the structure.



Rear elevation. The basement level is at grade, with a sliding patio door and secondary entry door opening directly onto a patio. Deck at main floor level above. This is a walkout configuration.



Opposite gable elevation. Foundation exposure at this elevation is approximately one foot.

Observations

- The lot slopes from front to rear. The front elevation is at main floor grade; the rear elevation is at basement floor grade.
- The basement is a walkout, with a full-height door and glazing at the rear.
- Foundation wall exposure varies by elevation, from approximately one foot to full height at the rear.
- A substantial share of the basement enclosure is therefore above grade and exposed to outdoor conditions rather than buffered by soil.
- A detached outbuilding is visible in two of the photographs above. It was not inspected; see Detached Outbuilding below.

Below-grade walls are buffered by ground temperature, which in this region remains in the fifties year-round. Above-grade walls are exposed to outdoor air, which in January averages well below freezing. A basement with the exposure shown above will lose materially more heat during the heating season than the conditioned-area figure alone would suggest.

Detached Outbuilding — Not Inspected

A detached outbuilding is present on the property and is visible in the site photographs. It was not entered or inspected during the site visit.

The homeowner reports by telephone (27 August 2026) that the structure contains a single light fixture and is used for storage only. On that basis its consumption would be negligible. This has not been verified by inspection.

What Remains Unverified

- Whether the structure is fed from the dwelling's panel or from a separate service and meter.
- If fed from the dwelling's panel, which circuit serves it.

- Confirmation by inspection that no other equipment is present.

Effect on This Report

No allowance for outbuilding consumption is included in the estimated load breakdown. On the homeowner's account, none is warranted. The structure is retained in this report as an item verified by statement rather than by inspection.

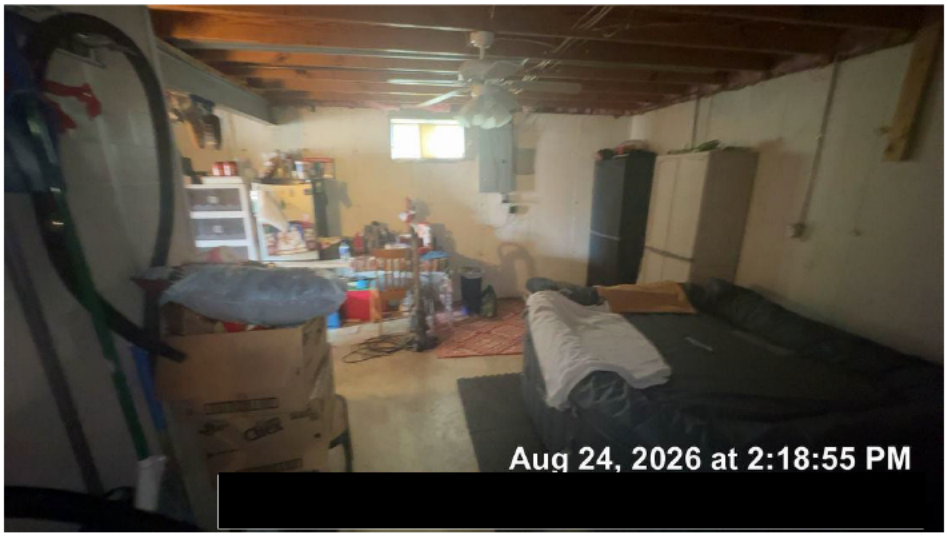
If circuit-level monitoring proceeds, any feeder serving the outbuilding should be identified and instrumented. Where the structure proves to be on a separate service, its meter should be identified so that its consumption is not attributed to the dwelling in error.

Basement Conditioning — Unresolved Variable

The hot tub estimate in this report assumes a basement ambient temperature of approximately 64°F, consistent with fully conditioned space. That assumption was not verified, and it is the single largest source of uncertainty in the winter figures.

The basement is 1,343 sq ft and is counted as conditioned area. As documented in the photographs above, it is a walkout with significant foundation exposure above grade. Walkout basements in this climate commonly run cooler than the floor above during heating season, particularly where supply air to the space is limited relative to its heat loss.

Observed Conditions



Basement interior. Floor framing is exposed with no finished ceiling; foundation walls are unfinished. The space is in use for storage. Electrical service panel visible at center. Compact refrigerator at left. Hot tub at right. Rim joist cavities along the top of the wall are insulated with batt insulation throughout.

The basement is unfinished. Floor framing is exposed, foundation walls are unfinished, and the space is in substantial use for storage rather than as finished living area.

Rim joists were inspected and are insulated with batt insulation throughout. No open cavities were observed. This is noted because open rim joists are a common deficiency in basements of this type and would otherwise represent a qualifying measure; they do not here.

Conditioned area figures used in program documentation reflect the space being within the thermal envelope. They do not indicate how much conditioned air is actually delivered to the space, nor what temperature it holds during heating season. Neither was measured during this assessment.

Effect on the Hot Tub Estimate

Standby heat loss scales directly with the difference between water temperature and ambient. A basement running 52°F rather than 64°F increases that difference by 12°F, which shifts the estimate substantially and does so only during heating season.

Assumed basement temp	ΔT at 104°F setpoint	Est. annual kWh	Winter kWh/day
68°F (fully conditioned)	36°F	~4,600	~13
64°F (assumed in report)	40°F	**~5,100**	~14
58°F (partially conditioned)	46°F	~5,900	~19
52°F (minimally conditioned)	52°F	~6,700	~24

Figures assume U = 0.40 and a 104°F setpoint. Actual setpoint was not documented and would shift all values.

Relevance to the Winter Figures

Two consequences follow, both bearing on the seasonal table below.

- A cooler basement raises hot tub consumption specifically during heating season. Because the baseline is drawn from April and May, when basement and outdoor temperatures are moderate, that increase would appear in the January and February columns rather than being absorbed into the baseline.
- Heat shed by the tub into the basement offsets furnace demand. A cooler basement therefore means the tub works harder while simultaneously reducing measured gas consumption, which affects the heating load derived from the gas record.

A related observation, presented without conclusion: the gas record indicates approximately 290 CCF attributable to space heating. For 2,686 conditioned square feet including a walkout basement in this climate, that figure is lower than the enclosure would ordinarily require. Possible explanations include reduced conditioning of the basement, heat contributed by the hot tub, or both. This has not been resolved.

This variable has not been measured, and no conclusion about the winter figures should be drawn without it. Basement temperature logging is included in the recommended verification below.

Pool Operation — Unresolved Variable

The homeowner reports that the pool is winterized and that the pump is operated on low speed for approximately 70 percent of the day during the swimming season. This was confirmed by telephone on 27 August 2026, after the site visit.

Reported Operation

Nameplate for the current pump is 115V, 10A on high speed and 3.2A on low — approximately 1,150 W and 368 W respectively. At low speed for 70 percent of the day, consumption is approximately 6.2 kWh/day during the season.

The pump installed prior to spring 2026 was single-speed, so only the higher figure was available in earlier years. The twelve-month window used in this report spans that equipment change: roughly 40 days of the 2025 season on the prior single-speed unit, and the 2026 season on the current two-speed unit. The figure carried in the load breakdown reflects that split. Runtime of the prior unit was not established.

Winter operating scenario	Power	kWh/day
Winterized — pump drained and off	0 W	0
Low speed, 12 hr/day	368 W	4.4
Low speed, continuous	368 W	8.8
High speed, 12 hr/day	1,150 W	13.8
High speed, continuous (freeze protection)	1,150 W	**27.6**

Relevance to the Winter Figures

Pool equipment is commonly operated continuously during freezing conditions to prevent damage to plumbing and equipment. Where that practice is followed, the resulting load is confined to the coldest weeks of the year and does not appear in the April/May baseline, and it would be a substantial contributor to a winter excess.

That is not the case here. The homeowner reports the pool is winterized. On that basis, pool equipment contributes nothing to the January and February figures, and freeze-protection operation is eliminated as an explanation for the winter excess.

For reference, the winter excess values in the seasonal table range from +23.3 to +36.1 kWh/day. With pool equipment eliminated, no identified load accounts for consumption of that magnitude in the January and February columns.

Seasonal Pattern

The homeowner characterizes the issue as more pronounced in winter than summer. The table below separates seasonal consumption from year-round consumption so the two can be examined independently.

What the Baseline Is

Household electricity divides into three categories: loads that run year-round regardless of weather, loads that run only in cooling season, and loads that run only in heating season.

April and May are the months when heating and cooling are both effectively off. Whatever the meter records in those months is therefore the year-round load operating on its own. That figure is used as the baseline.

For this property, the baseline includes: refrigerator, compact refrigerator, chest freezer, hot tub (operated year-round), lighting, televisions, computer, microwaves, range, dishwasher, clothes washer and dryer, water softener, treadmill, and standby draw from all connected electronics. It does not include air conditioning or furnace operation.

How Each Value Is Calculated

Each month's figure is that month's daily average consumption, minus that same year's April/May daily average. The result is the amount by which that month exceeded the year-round load.

Worked example — July 2023:

Step	Value	Source
July 2023 consumption	2,604 kWh	Billing record
Days in billing cycle	30	06/20 – 07/20/2023
July 2023 daily average	86.8 kWh/day	2,604 ÷ 30
April/May 2023 daily average	52.5 kWh/day	Baseline for 2023
Difference	**+34.3 kWh/day**	86.8 – 52.5

Interpretation: in July 2023 the home consumed 34.3 kWh/day more than it consumed in that same year's April and May. Because the year-round loads listed above were running in both periods, they cancel out. The 34.3 figure represents air conditioning and any other cooling-season load.

Why Each Year Uses Its Own Baseline

Each year is compared only against its own April and May, never against another year's. This removes the effect of anything that changed between years but stayed constant within a year — occupancy, appliance additions, rate changes, or equipment replacement.

The hot tub illustrates this. It was acquired in spring 2023 and operates year-round, so from 2024 onward it appears in both the baseline and the monthly figure and therefore subtracts out. Its effect on the table is limited to the extent its consumption differs between seasons, which for a basement installation is estimated at 3 to 5 kWh/day between winter and shoulder season. Standby loss scales at approximately 0.35 kWh/day per degree of temperature difference for this unit, so even a 14°F seasonal swing in basement temperature produces roughly 5 kWh/day.

Values Observed

Values are excess consumption over that year's own April/May baseline, in kWh per day.

Year	Baseline (Apr/May)	Jan	Feb	Jul	HVAC
2023	52.5 kWh/day	+2.9	+8.7	+34.3	Prior
2024	50.0 kWh/day	+28.3	+23.5	+41.2	Prior
2025	47.2 kWh/day	+36.1	+33.3	+25.6	Prior | Prior | Current
2026	36.3 kWh/day	+23.3	+27.3	+28.6	Current

Context for Interpretation

- Space heating at this property is natural gas.
- The hot tub was acquired spring 2023 and is located in a conditioned basement. Because it operates year-round it is present in both the baseline and the monthly figures from 2024 forward. Only its seasonal variation — an estimated 3 to 5 kWh/day between winter and shoulder season — affects the values shown.
- The baseline column itself declines across the four years, from 52.5 to 36.3 kWh/day. This reflects change in the home's year-round load and is independent of the seasonal figures beside it.

- The HVAC system was replaced spring 2025. The 2025 row spans both systems: January and February precede the replacement, July follows it. All 2023 and 2024 figures reflect the prior system; all 2026 figures reflect the current system.
- The homeowner reports the pool is winterized. Pool equipment therefore contributes nothing to the January and February figures.
- Degree-day normalization has not been applied to this table. It is presented as observed.

Candidate Explanations — For Further Investigation

This section sets out scenarios that could account for the consumption this assessment was unable to attribute. None has been verified. They are presented with their arithmetic so that each can be tested or eliminated by whoever continues the investigation.

Two Distinct Quantities

The unattributed consumption takes two forms, and they require separate explanations.

Quantity	Magnitude	Character
Annual gap (estimate vs. metered)	~4,640 kWh/yr	12.7 kWh/day averaged across the year
Winter excess over shoulder baseline	+23 to +36 kWh/day	January and February only

A load present year-round contributes to the annual gap but largely cancels out of the winter figures, because it appears in both the baseline and the monthly value. A load confined to cold weather does the reverse.

Candidate Loads

Candidate	Magnitude	Affects	What would confirm or eliminate it
Hot tub in a cooler-than-assumed basement	+800 to +1,600 kWh/yr	Annual	Logged basement temperature in heating season; documented setpoint; plug-in measurement at the unit
Pool pump operated for freeze protection	Eliminated	—	Homeowner reports the pool is winterized (27 Aug 2026). No longer a candidate.
Load in the detached outbuilding	Negligible per homeowner	—	Homeowner reports a single light fixture, storage use only. Unverified by inspection.
Heat tape or de-icing cable	5–10 W per foot	Winter	Inspection of gutters, exposed plumbing, and basement piping; interval data showing a load switched on for the season
Garage or shop heater	200–600 kWh/month	Winter	Inspection of the attached garage; thermostat- or timer-controlled units operate without occupant awareness
Cumulative estimation error	Up to ±2,000 kWh/yr	Annual	Circuit-level monitoring, which replaces every estimate with a measured value

Metering or service issue	Per homeowner, 1,000–2,000 W	Both	Interval record for the 8/25–8/26 outage window; panel-versus-meter reconciliation

The homeowner reports no electric space heaters. Heat tape and a garage or shop heater are listed separately because neither is commonly described as a space heater by an occupant, and both operate without requiring attention once set.

Combined Scenario — Annual

With pool freeze protection eliminated and outbuilding load reported as negligible, the remaining identified candidate for the annual gap is the hot tub operating in a cooler basement than assumed.

Component	kWh/yr
Estimated total as reported	13,495
Hot tub adjustment, basement at 52–58°F	+800 to +1,600
Revised range	**14,295 – 15,095**
Metered	**18,134**
Residual	**3,039 – 3,839**

A residual of 3,000 to 3,800 kWh per year is approximately 8 to 10 kWh/day, or a continuous draw of 350 to 440 W. That exceeds the estimation uncertainty stated earlier in this report and is not accounted for by any load identified during this assessment.

Combined Scenario — Winter

The winter excess is not explained by the loads identified.

- The hot tub operates year-round and is therefore present in the April/May baseline. Only its seasonal variation — 3 to 5 kWh/day, derived from a standby loss of approximately 0.35 kWh/day per degree of temperature difference — appears in the winter columns.
- Pool equipment is eliminated; the homeowner reports the pool is winterized.
- The furnace blower cycles on Auto and accounts for a further 5 to 6 kWh/day in heating months.
- These together account for approximately 8 to 11 kWh/day against an observed winter excess of +23 to +36 kWh/day.

The remaining 12 to 28 kWh/day in the January and February columns has no identified source. The candidates that could produce a load of that size and seasonality are heat tape or de-icing cable, a heater in the attached garage, or a metering or service issue. None has been verified, and the first two were not observed during the site visit.

Observations That Constrain These Scenarios

Two features of the record do not fit the scenarios above and should be accounted for by any explanation.

- Winter 2023 shows an excess of only +2.9 and +8.7 kWh/day, against +23 to +36 in each of the three following winters. Whatever produces the winter excess was either absent or substantially smaller in that year.
- The 2023 shoulder-season baseline is 52.5 kWh/day, the highest of the four years, and that year predates the hot tub. A high baseline mechanically reduces the calculated excess for that year. The 2023 baseline itself has not been explained.

A Note on Recall

Several of the questions raised by this report concern household operating practice three and four years in the past — pool winterization, pump runtime, seasonal habits. Recollection over that interval is not a reliable basis for conclusions, and answers obtained by interview should be weighted accordingly. Where the question can be settled from interval data or direct measurement instead, that route is preferable.

Homeowner's Metering Observation

The homeowner states that his meter continues to register consumption when his main breaker is open, at approximately 1 to 2 kWh per hour. I have not witnessed this and am not in a position to verify it. He performed the test himself and reported the result to me.

TEST WINDOW FOR REVIEW	Main breaker open
Date and time	8/25/2026 10:00 PM to 8/26/2026 3:00 AM, Central
Timing	Homeowner confirms he timed the open and close to the top of the hour
Billing status	Falls in the current unbilled cycle; last statement closed 8/20/2026
Meter	Landis+Gyr FOCUS AXRe-SD, Gridstream RF, #96 044 150
Meter detail	Form 2S, CL200, 240V 3W, TA=30, Kh 7.2

The observation expressed in engineering terms: 1 to 2 kWh per hour is 1,000 to 2,000 watts continuous, or 8,760 to 17,520 kWh annually. Metered consumption for the twelve months ending 8/20/2026 was 18,134 kWh.

One alternative explanation worth eliminating: the meter display reads in whole kWh. A register at 1.98 advancing to 2.00 would display as “1” then “2” — an apparent 1 kWh change from 0.02 kWh of actual consumption.

The interval record for the 8/25–8/26 window can be queried directly. I would defer that review and its interpretation to the utility's metering team.

A Separate Question Worth Distinguishing

The homeowner tracks consumption in kWh rather than in dollars. Where a billed amount has risen while consumption has fallen, the driver is the tariff rather than the meter, and the two questions are best answered separately.

A rate-only comparison — the January 2025 and January 2026 bills priced at each year's tariff — would isolate the effect of rate changes from the effect of consumption. That comparison is straightforward to produce and addresses a distinct part of the customer's concern.

Meter Exchange — Consumption Across the Boundary

Billing records show an off-cycle read on 03/02/2026, consistent with a meter exchange.

Period	kWh/day
02/20 – 03/02/2026	43.2
03/02 – 03/21/2026	34.6
April 2026	33.0
May 2026	39.6
June 2026	59.6
July 2026	64.9
August 2026	56.4

Note: the current meter has been in service since March 2026. All observation since installation covers shoulder season and summer only. No winter period has yet occurred on this meter; winter 2026–27 will be the first.

Separately, the homeowner reports a pole transformer in his front yard that he believes hums louder than normal. I have advised him that transformer losses are on the utility side of the meter and do not appear on customer billing. Noted here in case it arises.

PAYS Qualification

Attic insulation is the only measure I would consider putting forward — current R-27.8 against an R-49 target. Savings would be predominantly gas rather than electric, which may affect scoring.

The envelope tested tight, the HVAC system is one year old, water heating is gas, and the appliance inventory is modern. The two largest estimated electric loads are a hot tub and a pool pump, neither of which is a weatherization measure.

Basement rim joists, a common qualifying measure in homes of this construction, were inspected and found insulated throughout. No deficiency was identified there.

Operational Practices Already in Place

The two-speed pool pump is reported to run on low speed, which is the efficient configuration and the recommendation that would otherwise have been made. The pool is winterized. The hot tub is kept covered with supplemental insulation beneath. No operational recommendation arises from this assessment.

Recommendation: Circuit-Level Monitoring

Given that no load in this report is measured, I recommend circuit-level monitoring before further analysis.

A whole-panel monitor with current transformers on each branch circuit (IotaWatt, Emporia Vue, or equivalent, typically $150–250 in hardware) logs consumption per circuit continuously. Two weeks of data would establish measured values for every circuit in the panel.

What This Would Produce

1. Measured load data, replacing every estimate in this report.

2. A reconciliation. Summing branch circuits over a known period against meter registration for the same period would quantify whether panel consumption accounts for metered consumption.

Suggested Deployment

Because the pattern under discussion is winter-weighted and no winter has yet occurred on the current meter, a two-phase deployment would answer more than a single summer study.

Phase	Timing	What it establishes
Phase 1	Near term, 2 weeks	Measured values for hot tub, pool pump, and all other circuits; initial panel-versus-meter reconciliation
Phase 2	Dec 2026 – Jan 2027, 2–4 weeks	Winter pattern on the current meter — circuit monitoring plus logged basement temperature and documented hot tub setpoint, run concurrently

Phase 2 should include a logging thermometer in the basement alongside the circuit monitor. Without a measured basement temperature, hot tub consumption cannot be separated from other winter loads, and the winter question cannot be resolved by circuit data alone.

Constraints

- Installation requires work in an energized panel and should be performed by a licensed electrician.
- The monitor must log continuously. Spot amperage readings will not produce usable kWh figures for cycling loads.
- Amperage alone overstates consumption for motor loads; the monitor should measure true power.

I am available to help specify or coordinate this. I would want any reconciliation against meter data reviewed by the utility's team.

Outstanding Items

1. Interval record review for the 8/25/2026 10:00 PM – 8/26/2026 3:00 AM window.
2. Measured load data via circuit monitoring.
3. Specifications of the HVAC system removed in spring 2025, particularly blower type, which affects interpretation of the pre-2025 winter figures.
4. Degree-day normalization of the billing history, using HDD and CDD by billing period rather than calendar month, as the billing cycles do not align to month boundaries.
5. Identification of the source of the winter excess. With pool equipment eliminated and the hot tub accounting for only 3 to 5 kWh/day of seasonal variation, 12 to 28 kWh/day in the January and February columns remains unattributed.
6. Model and rating of the basement compact refrigerator, which was identified after the site visit and is carried at a general estimate.
7. Inspection for heat tape or de-icing cable on gutters and exposed plumbing, and for any heater in the attached garage.
8. Rate-only comparison of January 2025 and January 2026 at each year's tariff.
9. Winter observation on the current meter, which will not be available until winter 2026–27.

10. Measured basement temperature during heating season, and documented hot tub setpoint. These are the principal unverified inputs to the winter figures.
11. Documentation of the basement's exposure above grade and the extent of conditioned supply to that space.
12. Inspection of the detached outbuilding — whether it has electrical service, what loads it carries, and whether it is fed from the dwelling's panel or a separate service.

Scope

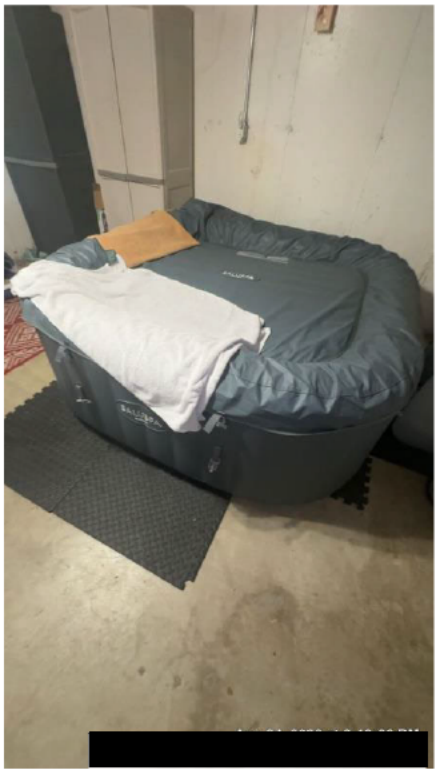
This assessment was performed under the PAYS referral scope and does not include electrical diagnostics or metering evaluation.

The assessment covered the dwelling. The detached outbuilding was not entered, and no figure or conclusion in this report accounts for loads it may carry.

I am an energy efficiency professional performing a usage analysis. I am not an electrician and am not equipped to evaluate metering or service equipment. The findings above are limited to what the assessment supports.

Appendix A — Equipment Photographs

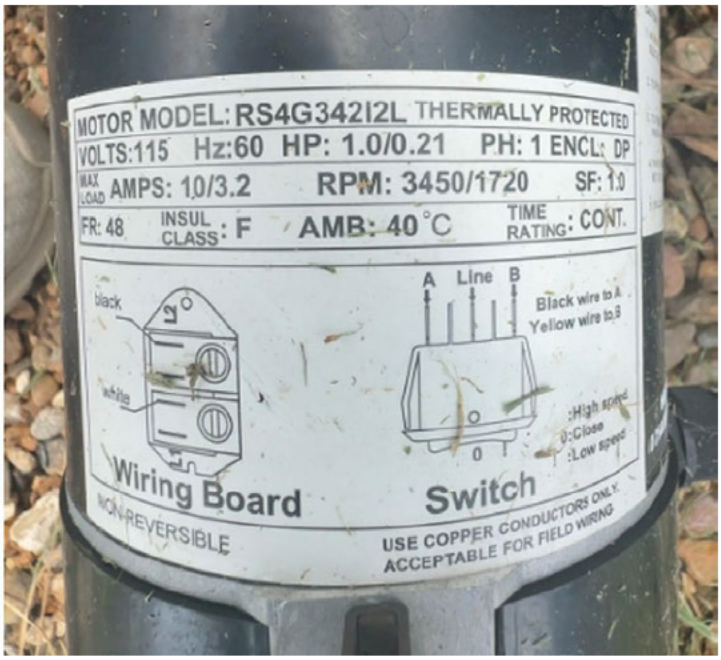
Photographs taken during the site visit, August 24, 2026.



Hot tub, basement. Bestway SaluSpa inflatable spa, cover in place with additional towels and blanket laid over it. Interlocking foam matting beneath; side walls are uninsulated vinyl. This unit is the largest single estimated electrical load in the dwelling.



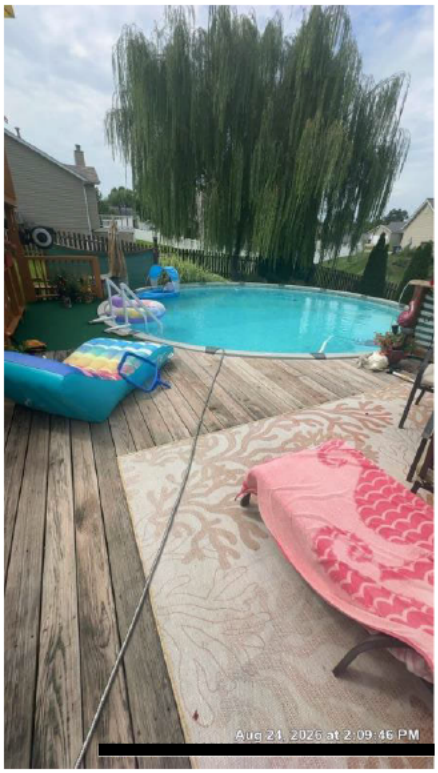
Hot tub control unit and electrical connection. The unit connects to a standard 120V receptacle through an inline GFCI cord, making it accessible to plug-in energy measurement without electrical work.



Pool pump motor nameplate. Two-speed, 115V, 10.0A high / 3.2A low, 1.0 / 0.21 HP, 3450 / 1720 RPM. Installed spring 2026, replacing a single-speed unit.



Pool equipment. Sand filter with multiport valve and pump motor, sited on grade adjacent to the pool wall. Enclosure at lower left.



Above-ground pool and surrounding deck. Solar cover visible at right, stored off the water at the time of the visit.



Service entrance. Meter and enclosures mounted to the wall above the exposed foundation, with a basement window at this elevation.



Utility meter. Landis+Gyr FOCUS AXRe-SD, Gridstream RF, meter #96 044 150. Form 2S, CL200, 240V 3W, TA=30, Kh 7.2. Installed March 2026.



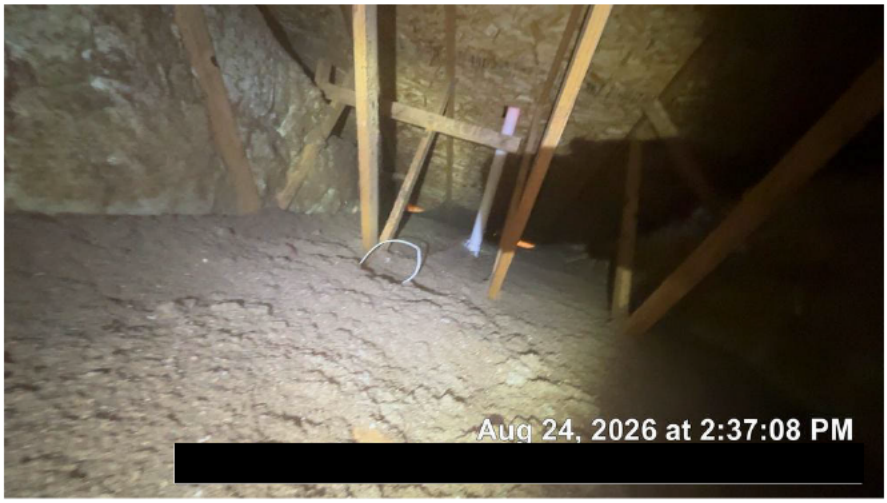
Mechanical closet. State 50-gallon natural gas water heater at left with atmospheric venting; Lennox gas furnace at right. Water heating is gas and does not contribute to electrical consumption.



Chest freezer, garage. Reported by the homeowner to be near capacity, which is the efficient operating condition for this appliance type.



Attic insulation depth measurement. Loose-fill cellulose at approximately 7.5 to 8 inches, corresponding to R-27.8. Homeowner reports no insulation has been added since original construction.



Attic, general view. Loose-fill insulation over the ceiling plane.