User	Role	Affiliation	EM Use & Frequency	Port-folio?	Portfolio Size, Organization	Task abstractions: current (not in EM)	Task abstractions: desirable	Task abstractions: possible (does data exist?)	Task abstractions: target
	space automation specialist	F	meta-user / power-user: frequently setting up charts, baselines for clients	YES	(Client portfolios range in size, hierarchical structure)	• **Lookup → Compare**: ranked performance (absolute and normalized) • **Lookup → Identify**: CUSUM of entire portfolio, single space	• **Locate → Compare**: portfolio performance faceted by any database field (tag, geographical location, primary use, square footage, year constructed...) • **Locate → Identify**: space's contribution to portfolio's CUSUM • **Lookup → Compare**: multivariate ranking of portfolio performance • **Locate → Identify**: validated savings vs. unvalidated savings • **Locate → Identify**: end-use disaggregation within a space; • **Locate → Identify**: contributions of parameters and events baselines (ECMs, weather, outages, holidays, other events) • **Locate → Compare** multiple baselines • **Produce** aggregate baselines • **Locate → Identify** noise / confidence / uncertainty in baseline	• **Locate → Compare**: portfolio performance faceted by any database field (geographical location, primary use, square footage, year constructed...), faceted by tag • **Locate → Identify**: space's contribution to portfolio's CUSUM • **Lookup → Compare**: multivariate ranking of portfolio performance	• **Locate → Compare**: portfolio performance faceted by space or by space attributes (over time) • **Locate → Identify**: contribution of individual space performance to aggregate space performance (over time) • **Lookup → Compare	Summarize**: multivariate ranking of spaces (over time)
	energy analyst	U	several hours a week, additional analysis in Excel	YES	...mpus: ~100 spaces (90% concentrated on single campus, subset in EM, departments cross-cuts spaces	• **Locate → Compare**: consumption of [largest spaces, libraries, mid-size spaces] • **Locate → Identify**: causes of threshold events in reference to OAT • **Lookup → Compare**: ranked space performance • **Locate → Compare**: before & after ECMs • **Lookup → Compare**: monthly department performance	• **Lookup → Compare**: department performance at arbitrary time scales • **Locate → Identify** contribution of department(s) to space consumption • **Lookup → Compare** OAT-demand regression curves before & after ECMs • **Locate → Identify**: end-use disaggregation within a space • **Lookup → Identify** changes in space sensitivity to OAT • **Locate → Compare**: consumption of ... other universities; • **Lookup → Identify**: weather predictions, trends	• **Lookup → Compare**: monthly department performance • **Lookup → Compare**: departments (arbitrary groups of spaces) performance at arbitrary time scales • **Locate → Identify**: contribution of department(s) to space consumption (assuming assignment of tags to sq. footage, occupants within a space) • **Lookup → Identify** changes in space sensitivity to OAT • **Lookup → Identify**: weather predictions, trends	• **Locate → Compare**: portfolio performance faceted by space or by space attributes (over time) • **Lookup → Compare	Summarize**: multivariate ranking of spaces (over time)
	energy manager	M	day-to-day monitoring	YES	2 ...mpuses, 4 zones in ...campus (~70 spaces), ...mpus (~20 spaces): all in EM, ...focuses on 50 steam meters	• **Locate → Compare	Summarize**: combined consumption of two campuses; four groups of spaces for main campus • **Browse → Identify**: contribution of individual spaces to combined consumption, anomalies (spikes, surges) • **Lookup → Identify**: threshold events	• **Lookup → Identify**: contribution of individual spaces to combined consumption, anomalies (spikes, surges) • **Locate → Identify**: causes of threshold events in wider context • **Lookup → Identify**: contributions of parameters to PAM baselines (weather, occupancy)	• **Lookup → Identify**: contribution of individual spaces to combined consumption, anomalies (spikes, surges) • **Locate → Identify**: causes of threshold events in wider context	• **Locate → Compare**: portfolio performance faceted by space or by space attributes (over time) • **Locate → Identify**: contribution of individual space performance to aggregate space performance (over time)
	energy specialist	S	EM for data export; analysis done in Excel, EM analysis offloaded to student volunteers	YES	~130 schools, 2 accounts, 36 in EM (Electricity, 2 submetered), 4 in EM (Natural Gas)	• **Lookup → Compare**: ranked performance (absolute and normalized) • **Browse → Identify**: anomalies (jumps in rankings), trends (consistent rankings) at macro-level between spaces • **Locate → Compare**: single-space performance across N time periods • **Produce** annotations to explain aspects of performance	• **Lookup → Compare**: multivariate ranking of portfolio performance • **Locate → Identify	Compare**: single space performance, within and between operating hours and between days	• **Lookup → Identify**: anomalies (jumps in rankings), trends (consistent rankings) at macro-level between spaces • **Locate → Compare**: single-space performance across N time periods • **Produce** annotations to explain aspects of performance • **Lookup → Compare**: multivariate ranking of portfolio performance • **Locate → Identify	Compare**: single space performance, within and between operating hours and between days	• **Lookup → Compare	Summarize**: multivariate ranking of individuals (over time) • **Locate → Compare**: individual performance (over time)
	head maintenance engineer, automation	U C	daily email digest, follow-up in EM ~3-4 hrs / week	YES	...campus, ~100 spaces and 2 zones in EM, monitors about 10 spaces / week	• **Lookup → Compare**: ranked space performance • **Locate	Explore → Identify**: anomalies, causes of threshold events / alerts	• **Locate → Identify**: end-use disaggregation within a space • **Locate → Identify** contributions of parameters to PAM baselines (weather, outages, holidays, other events)		**Lookup → Compare	Summarize**: multivariate ranking of individuals (over time)
	climate and energy engineer	U C	infrequent (annual, semi-annual reports)	YES	...mpus, ~100 spaces and 2 zones in EM, ...y interested in handful of ... spaces	• **Lookup → Identify**: differential between actual and predicted performance • **Lookup → Identify**: CUSUM • **Locate → Compare**: actual to baseline performance	• **Locate → Identify**: cause of long-term trend alerts • **Locate → Identify**: baseline precisions / uncertainty • **Locate → Compare**: performance across arbitrary time periods	**Locate → Compare**: performance across arbitrary time periods	**Locate → Compare**: individual performance (over time)
	energy efficiency engineer (consultant)	S	some exploratory analysis, most analysis done in Excel	NO (small)	(single-space focus or small group of spaces (e.g. 5))	• **Explore	Browse → Identify**: load profile of space, anomalies; • **Lookup	Locate → Compare**: within and across spaces: monthly and seasonal differences in consumption / schedule / demand; OAT vs. demand for occupied and unoccupied periods. • **Lookup → Summarize**: distribution of OAT, demand	**Locate → Identify**: end-use disaggregation use within a space; **Locate → Identify	Compare**: effects of simulated ECMs on space performance	• **Lookup	Locate → Compare**: within and across spaces: monthly and seasonal differences in consumption / schedule / demand; OAT vs. demand for occupied and unoccupied periods. • **Lookup → Summarize**: distribution of OAT, demand	• **Locate → Compare**: individual performance (over time) • **Lookup → Summarize**: distributions of individual's attributes (over time)
	energy efficiency engineer (consultant)	S	some exploratory analysis, confirmatory analysis done in Excel	NO	(single-space focus)	**Lookup → Compare**: month-to month %Δ in consumption, peak demand, actual : baseline	• **Locate → Identify**: effects of simulated ECMs on a space based on previous success • **Locate → Compare**: effect of ECMs between spaces	**Lookup → Compare**: month-to month %Δ in consumption, peak demand, actual : baseline	**Locate → Compare**: individual performance (over time)