

Primary Targets: High-Capacity Thermal Power Stations

Thermal power generation forms the unyielding backbone of the Iranian grid. These facilities are highly vulnerable to kinetic strikes due to their large physical footprints, exposed cooling towers, expansive natural gas metering and reduction stations, fuel storage tanks, and delicate turbine machinery. The strategic significance of these plants lies not just in their gross output, but in their geographic placement, which is designed to anchor specific industrial and administrative zones.

The most critical thermal facilities, categorized as primary targets, include:

Facility Name	Location (Province)	Primary Fuel / Type	Capacity (MW)	Strategic Significance
Shohadaye Pakdasht (Damavand)	Tehran	Natural Gas / Combined Cycle	2,868 - 2,900	The single largest power station in Iran. Covering 200 hectares southeast of Tehran, it serves as the absolute core of capital region power and load distribution.
Shahid Salimi (Neka)	Mazandaran	Natural Gas / Mazut	2,214 - 2,215	Operates as the northern energy loop anchor along the Caspian Sea. Provides vital power supply for the Caspian region and load balancing with Tehran. Features dual-fuel capability for winter resiliency.
Shahid Rajaei	Qazvin	Natural Gas / Combined Cycle	1,300 - 2,000	Located along the critical Karaj-Qazvin road, powering heavily industrialized zones and manufacturing corridors west of the capital.
Ramin	Khuzestan	Natural Gas / Steam Turbine	1,890	Vital for powering the oil-rich southwestern region. Directly supports massive crude oil extraction, pumping

Facility Name	Location (Province)	Primary Fuel / Type	Capacity (MW)	Strategic Significance
				operations, and export infrastructure.
Kerman	Kerman	Natural Gas / Combined Cycle	1,912	The sole heavy generation asset securing the southeastern provinces, providing power supply for peripheral regional development and transit routes.
Shahid Mohammad Montazeri	Isfahan	Natural Gas / Combined Cycle	1,600	Anchors the central industrial hub, providing dedicated baseload power to Isfahan's massive metallurgical clusters and defense-industrial facilities.
Mofatteh	Hamedan	Natural Gas / Thermal	1,200 - 1,300	A major regional anchor supporting the western provinces and facilitating cross-grid load balancing toward the Iraq border.
Rudshur	Tehran / Markazi	Natural Gas / Combined Cycle	1,200 - 1,300	Operates in tandem with Damavand and Parand to secure the massive electrical demand of the greater Tehran metropolis.
Parand	Tehran	Natural Gas / Combined Cycle	950 - 1,200	A critical modern combined-cycle facility contributing heavily to the capital's energy balance.

Data synthesized from multiple infrastructure registries and target matrices.

The Damavand Combined Cycle Power Plant (also designated as Shohadaye Pakdasht) represents the single most lucrative target within the thermal generation portfolio. Located on

the Khavaran road 50 kilometers southeast of Tehran, its construction required an investment of nearly 2 billion euros. Its removal from the grid would instantly erase nearly 3 GW of baseload power from the central hub, an event that grid operators cannot mitigate through rerouting. Similarly, the Shahid Salimi plant in Neka, sprawling across 200 hectares in Mazandaran, acts as the northern counterbalance. Notably, while Iran's primary fuel is natural gas, repeated winter shortages driven by high residential heating demand force plants like Neka to switch to burning mazut (a heavy, low-quality fuel oil) or diesel. The Iranian government has increasingly faced public backlash over the severe air pollution caused by burning mazut, indicating that strikes targeting the refined diesel and mazut storage tanks at these plants would render them inoperable during periods of natural gas curtailment.

In the heavily industrialized central corridor, the Shahid Mohammad Montazeri facility in Isfahan (1,600 MW) is paramount. Isfahan is a critical center for Iran's metallurgical industry, which requires continuous, uninterrupted power to operate arc furnaces and smelting equipment. A sudden loss of power from the Montazeri plant would not only halt production but cause catastrophic physical damage to the metallurgical equipment as molten materials cool and solidify within the machinery.

Strategic Hydroelectric Infrastructure and Dual-Use Risks

While thermal plants provide over 80 percent of Iran's electricity, hydroelectric dams offer critical peaking power, grid stabilization capabilities, and black-start functionality (the ability to restart the grid without an external power source). These assets, representing approximately 12,144 MW of the total national potential, are heavily concentrated in the Zagros Mountain range, particularly within Khuzestan and Chaharmahal and Bakhtiari provinces.

The primary hydroelectric assets include:

- **Karun-3 Dam:** The largest hydroelectric facility in the country, boasting an installed capacity of 2,280 MW in Khuzestan.
- **Masjed Soleyman Dam (Karun-2):** Generating 2,000 MW, it operates in tandem with the other Karun cascade dams to manage the flow and power generation of the Karun River.
- **Karun-4 Dam:** Provides 1,020 MW to the national grid from Chaharmahal and Bakhtiari province.
- **Gotvand Dam:** Another major installation on the Karun River, contributing approximately 1,000 MW to the grid.
- **Dez Dam:** A vital 520 MW facility in Khuzestan.
- **Amir Kabir Dam:** Located near Karaj, this 90 MW facility is strategically critical not for its massive power output, but for its role in the water-energy nexus.

Targeting hydroelectric dams introduces severe, complex dual-use consequences that complicate military planning. Unlike thermal power plants, which primarily serve an electrical function, dams are critical for agricultural irrigation and municipal water supply. For example, the Amir Kabir Dam provides primary drinking water to the massive population of the Tehran metropolis. Furthermore, a kinetic breach of the structural containment of mega-dams like Karun-3 or Dez would result in catastrophic downstream flooding, destroying civilian population centers, inundating agricultural land, and potentially sweeping away downstream oil infrastructure in Khuzestan. Consequently, while they are highlighted as secondary targets in strategic matrices, the environmental and humanitarian fallout generally restricts strikes to their associated switchyards and transformer banks rather than the dam walls themselves.

The Central Hub and the Mathematics of Cascading

Failure

The concept of striking the "central hub" is rooted in the specific vulnerability of the electrical corridor stretching from Tehran south through Qom and Markazi provinces, terminating in Isfahan. This region is the beating heart of Iran's defense-industrial base, automotive manufacturing, steel production, and political administration.

The electrical architecture supporting this hub is governed predominantly by the Tehran Regional Electric Company (TREC) and relies on a fragile, highly stressed 400kV and 230kV transmission network comprising over 40 major substations. A kinetic disruption of 2 to 3 GW in the Tehran-Isfahan corridor forces power to reroute through fragile 400kV transmission bottlenecks. The subsequent overloading trips relays, precipitating a cascading blackout that disables industrial zones, urban centers, and above-ground nuclear support systems.

Topological Vulnerability of the 400kV Network

To understand the devastating impact of a 2 to 3 GW supply deficit, one must examine the mathematical topology of the Iranian grid. The 400kV ultra-high voltage network, which serves as the national transmission backbone, consists of roughly 105 primary generation and transmission substations interconnected by 142 major transmission lines.

Topological vulnerability studies of the Iranian 400kV grid demonstrate that the network is not a robust "scale-free" network (where highly connected hubs provide immense redundancy), but rather an exponentially distributed, sparse, heterogeneous structure. The grid's degree distribution function is modeled mathematically as $P(k \geq K) = 2.5446e^{-k/1.587}$ (with an R^2 of 0.9626). The network features a mean node degree of only 2.7048, meaning the average critical substation is connected to fewer than three other substations. The mean shortest path across the network is 6.8817, with a low clustering coefficient of 0.1097.

This specific topology dictates that the network severely lacks the dense interconnectivity required to seamlessly reroute massive power flows in the event of a sudden generation loss. When 2 to 3 GW of supply vanishes instantaneously—such as the destruction of the Damavand plant—the remaining transmission lines attempt to carry the unserved load. Because the Iranian grid already suffers from significant transmission waste (estimated at 23.5 percent) and aging infrastructure (with 10 percent of lines being over 30 years old), these lines will rapidly exceed their thermal and electrical limits.

Protection relays will automatically trip, disconnecting the overloaded lines to prevent the physical melting of the cables and the destruction of transformers. This protective action, however, forces the enormous electrical load onto an even smaller number of remaining, lower-capacity lines, triggering an uncontrolled domino effect known as a cascading failure.

Critical Node Identification and Substations

Academic and structural analyses utilizing the Borda Count method—a voting aggregation technique combining measures of topological degree, electrical betweenness, information, and closeness centrality—have identified specific nodes within the Iranian grid that represent critical points of failure.

In complex network models of the Iranian grid, specific high-voltage substations designated as Node 103, Node 104, and Node 105 display the highest electrical betweenness and the lowest reliability indices. For instance, Node 105 is identified as an exceptionally vulnerable bottleneck; its connection to Node 42 spans 43 kilometers with a relatively low reliability score of 0.6269. Even more precarious is the transmission link associated with Node 104 (connecting to Node 41), which spans an extreme distance of 252 kilometers, resulting in a high inherent failure rate

of 2.7362 occurrences per year per 100km, and an abysmal overall reliability score of just 0.0648.

Translating these theoretical nodes into physical infrastructure within the TREC central hub reveals an array of critical 400kV and 230kV substations that are ripe for targeting. The destruction of the switchgear and auto-transformers at these locations would sever the central energy loop without requiring the destruction of the power plants themselves.

Key substations in the Tehran/Central hub include:

Substation Name	Voltage Level	Capacity / Configuration	Strategic Role & Vulnerability
Firouzbahram	400/230 kV	2000 MVA	One of the oldest (operational since 1969) and highest-capacity substations in the Tehran region. A critical nexus for bulk power transfer into the capital.
Tehranpars	400/230 kV	1000 MVA	Features advanced gas-insulated switchgear (GIS) with double busbars. Equipped with 500 MVA auto-transformers. Essential for the eastern capital grid.
Azadegan	400/230 kV	1500 MVA	Operational since 1987, carrying a massive 1500 MVA capacity load for the industrial zones.
Kan	400/230 kV	1000 MVA	Requires continuous upgrades to double busbar GIS systems to handle capacity expansion. A highly centralized node.
Jalal & Kalan	400 kV / 200 kV	Switching Stations	Pure switching stations (operational since 1981 and 1989 respectively) that act as routing hubs without local step-down loads. High electrical betweenness.
Roudshour	400/230 kV	1000 MVA	Directly supports the routing of power from the Roudshour gas turbine generation facilities into the broader TREC grid.

Substation Name	Voltage Level	Capacity / Configuration	Strategic Role & Vulnerability
Damavand Switchyard	400 kV	Step-up Station	The direct 400kV switch station that integrates the 2.9 GW Damavand plant into the grid. Destroying the switchyard strands the plant's entire output.

Data derived from JICA and TREC operational surveys.

Systemic Impact of the Disruption

A sustained 2 to 3 GW deficit and subsequent cascading failure in the central hub would result in immediate, devastating effects across multiple sectors.

1. **Industrial Halt:** The central hub is the core of Iranian manufacturing. The steel mills of Isfahan, the automotive plants surrounding Tehran, and the heavy manufacturing facilities in Markazi province would experience uncontrolled shutdowns. Continuous-process industries, such as metallurgy, petrochemical refining, and glass manufacturing, suffer severe physical equipment damage if power is cut without lengthy, safe ramp-down procedures.
2. **Societal Disruption and State Control:** Iran already operates at a highly precarious margin, facing peak demand deficits exceeding 17,500 MW during summer heatwaves and experiencing scheduled blackouts during the winter due to natural gas curtailments. Removing a major baseload asset would collapse the civilian energy supply entirely, plunging Tehran into darkness, disrupting municipal water pumping, shutting down the complex Tehran Metro network, and severely degrading the regime's ability to monitor and suppress domestic unrest.
3. **Military and Nuclear Degradation:** Command and control centers rely on the civilian grid. More critically, Iran's nuclear infrastructure is profoundly vulnerable to electrical disruption.

Nuclear Infrastructure Interdependencies

Iran's nuclear program represents the apex of its strategic ambitions and is correspondingly heavily fortified. Primary uranium enrichment cascades are buried deep underground at the Natanz Uranium Enrichment Complex and the Fordow Uranium Enrichment Site to withstand heavy ground-penetrating munitions (bunker-busting bombs). Furthermore, the Isfahan Nuclear Technology Center (ENTC) serves as a geographic hub for multiple critical steps of the fuel cycle, including the Uranium Conversion Facility (UCF), metal processing, and fuel fabrication. However, the program features a glaring, highly targetable vulnerability: its absolute reliance on the civilian electrical grid. The thousands of IR-1, IR-2m, and advanced IR-6 gas centrifuges spinning underground require continuous, highly stable, and perfectly synchronized electrical power to maintain their extreme rotational speeds. Any fluctuation in frequency or voltage can cause the delicate carbon-fiber or aluminum rotors to wobble and crash into their casings. This power is drawn from the national grid through highly visible, above-ground electrical substations and main power supply buildings. A strategic strike does not necessarily require penetrating 80 meters of reinforced concrete. As demonstrated during the June 2025 Israeli strikes, targeting the electrical sub-station, the main electric power supply building, and the emergency backup diesel generators at Natanz severed power to the underground cascades.

The resulting sudden loss of power caused the rapidly spinning centrifuges to crash, severely damaging or entirely destroying the cascade arrays. Consequently, destroying the 400kV substations in the central hub serves as an asymmetric method of neutralizing the nuclear program without striking the nuclear facilities directly.

Upstream and Midstream Natural Gas: The True Achilles Heel

Targeting Iran's electrical grid directly is complicated by the geographic dispersal of its 130 thermal plants and the sheer volume of transmission nodes. However, a far more efficient, asymmetric approach to collapsing the grid involves targeting its fuel supply. Because over 81 percent of the grid's capacity is thermal—and predominantly natural gas-fired—the midstream gas infrastructure represents Iran's true Achilles heel.

The South Pars Core and Asaluyeh Processing

The absolute center of gravity for Iran's energy sector lies offshore in the Persian Gulf at the South Pars gas field, which it shares with Qatar (where it is known as the North Field). This single geological formation accounts for a staggering 70 to 75 percent of Iran's total domestic natural gas output.

The raw, sour gas extracted from the offshore platforms is piped to massive onshore processing hubs primarily located at the Asaluyeh complex and the broader Pars Special Economic Energy Zone in Bushehr province. Here, the gas is sweetened, dehydrated, and separated from valuable gas condensates. Previous limited military strikes on the South Pars infrastructure immediately took roughly 12 percent of the national gas output offline, halted the operation of downstream refineries processing 100 million cubic meters per day, and drastically curtailed petrochemical output. If the processing facilities at Asaluyeh are systematically degraded by sustained strikes, Iran physically cannot extract and treat enough natural gas to keep its power grid operational, forcing the entire country into an immediate energy deficit.

The IGAT Trunkline System

Once processed at Asaluyeh or other southern refineries like Bid Boland and Fajr Jam, the natural gas must be transported thousands of kilometers north to the population centers of Tehran, the industrial zones of Isfahan, and the borders for export. This mammoth logistical task is achieved via the Iran Gas Trunkline (IGAT) system, a network of massive pipelines.

The critical arteries of the IGAT system include:

- **IGAT-1:** A 42-inch diameter pipeline constructed between the Bid Boland Refinery in Khuzestan Province and Astara in the north.
- **IGAT-2:** A 56-inch diameter pipeline running from the Fajr Jam Refinery in Bushehr province to Qazvin.
- **IGAT-3:** A 56-inch pipeline transporting gas from Asaluyeh through the Central Province toward the northwest.
- **IGAT-4:** A critical 56-inch pipeline specifically dedicated to transferring natural gas produced in South Pars phases 1 through 5 directly from Asaluyeh to the power-hungry Fars and Isfahan provinces.
- **IGAT-6:** A 56-inch pipeline targeting gas delivery to Bushehr and Khuzestan for both domestic consumption and oil reservoir injection.
- **IGAT-8 & IGAT-9:** High-capacity 56-inch pipelines designed to handle newer phases of

South Pars, moving gas to the central and northern regions (Naaien, Eastern Tehran) and supporting export routes to Europe via Turkey.

Compressor Stations as Unrepairable Bottlenecks

While pipelines span thousands of kilometers, they are notoriously difficult to keep disabled; a severed pipeline section can often be excavated, cut, and patched by engineering teams within a matter of days. Therefore, the true strategic targets within the midstream sector are the **gas compressor stations**.

As natural gas travels through the pipelines, friction causes it to lose pressure. Compressor stations are installed at regular intervals to repressurize the gas and maintain flow. These stations contain massive, highly specialized gas turbine-compressors. For example, the original IGAT-1 line utilized 34 Russian-made turbo-compressors, each rated at 11,400 horsepower, and English Electric 8,700 horsepower industrial turbines to maintain a pipeline pressure of 750 to 1,100 psig. The modern IGAT-4 line relies on units like the 25MW Siemens SGT-600 gas turbines.

Destroying a compressor station creates a catastrophic bottleneck. The custom-built, multi-megawatt gas turbines are exceptionally complex and virtually impossible for Iran to replace quickly under the current international sanctions regime. A strike that destroys the turbine halls and associated control rooms at a compressor station permanently throttles the capacity of the entire pipeline.

Critical compressor stations that sustain the flow of gas to the central power hub include:

- **Bid Boland and Ahvaz Stations:** Vital gathering and boosting stations in the south that initially feed the IGAT system from the Aghajari, Maroun, and Ahvaz fields.
- **Saveh, Qom, and Kashan Stations:** Located along the central IGAT routes, these stations act as the final pressure boosters before the gas reaches the industrial heartlands and power plants surrounding Tehran and Isfahan.
- **Tange Pirzal and Dorahan Stations:** High-capacity stations required to push millions of cubic meters of gas vertically through the treacherous Zagros mountain passes.
- **Khonj, Lamerd, and Safashahr Stations:** Critical booster stations located on the IGAT-4 line, dictating the flow rate directly into Isfahan.

Pipeline Route	Diameter	Key Function	Critical Compressor Stations (Targets)
IGAT-1	42-inch	Connects Bid Boland to Astara	Ahvaz, Bid Boland, Tange Pirzal
IGAT-2	56-inch	Connects Fajr Jam to Qazvin	Saveh, Qom, Kashan
IGAT-3 & 4	56-inch	Routes South Pars gas to Isfahan/Central Hub	Khonj, Lamerd, Safashahr, Shahreza
IGAT-8	56-inch	Routes South Pars to Eastern Tehran	Station No. 2, Khonj 8

Data compiled from IGAT operational specifications and construction plans.

A coordinated strike on the compressor stations at Saveh and Qom would effectively sever the gas lifeline to the Damavand, Rajaei, and Montazer Ghaem power plants. The central hub would be forced to switch to its limited onsite reserves of liquid fuels (diesel and mazut). These reserves are entirely insufficient for long-term baseload generation, ensuring that the power plants would run dry within days, rapidly resulting in the 2 to 3 GW deficit and subsequent grid collapse modeled previously.

The Petroleum Supply Chain: Refineries and Export

Terminals

While natural gas sustains the domestic power grid and internal economy, crude oil and petroleum condensates sustain the regime's financial apparatus. In 2023, Iran's net oil export revenues were estimated at \$53 billion, funding the state bureaucracy, the Islamic Revolutionary Guard Corps (IRGC) operating budget, and the network of regional proxy forces. Consequently, targeting the petroleum supply chain is an exercise in strategic revenue denial.

Primary and Secondary Export Terminals

Targeting Iran's oil export capabilities requires focusing on maritime loading terminals, as the vast majority of Iranian crude is exported via seaborne tankers.

- **Kharg Island Terminal:** This is the absolute center of gravity for Iranian crude oil exports. Located in the northern Persian Gulf, the Kharg Island tanker terminal historically handles upwards of 90 to 97 percent of the nation's crude exports, processing roughly 1.6 to 2.0 million barrels per day. A military strike on the massive "T-jetty" and "Sea Island" loading arms, the crude storage tank farms, or the manifold pumping infrastructure at Kharg would instantly paralyze the regime's primary revenue stream.
- **Jask Oil Terminal (The Strategic Bypass):** Recognizing the profound strategic vulnerability of Kharg Island and the geographic trap of the Strait of Hormuz, Iran aggressively pursued the construction of the 1,000-kilometer Goreh-Jask pipeline. Branching off from the Khuzestan fields, this 46-inch diameter pipeline transports crude oil to the newly developed Jask port on the Gulf of Oman, entirely bypassing the Strait of Hormuz. The Jask terminal is designed with a capacity to export 1 million barrels per day. Consequently, Jask represents a critical secondary target; destroying Kharg Island is strategically hollow if the Jask bypass remains operational and capable of moving 1 million barrels per day to Chinese and Syrian markets.
- **Assaluyeh Terminal:** While Asaluyeh is known for natural gas processing, its port is dedicated primarily to the highly lucrative export of natural gas condensates, methanol, and petrochemicals derived from the South Pars field.
- **Bandar Abbas, Lavan, and Sirri Terminals:** Smaller secondary terminals located further into the Persian Gulf, utilized for refined petroleum products and supplementary crude loading.

Major Oil Refineries

To paralyze Iran's internal logistics, military mobility, and emergency power generation, domestic oil refineries present high-value targets. Key facilities include:

- **Abadan Refinery:** One of the oldest and largest refineries in the Middle East, located in the southwest near the Iraqi border.
- **Tehran and Shahr Rey Refineries:** These facilities are critical for supplying refined gasoline, diesel, and aviation fuel to the densely populated capital and the central military command apparatus. The Shahr Rey oil depot and adjacent facilities have already been subject to Israeli strikes during recent escalations.
- **Bandar Abbas and Isfahan Refineries:** Massive complexes that process a variety of crude types for both domestic civilian consumption and maritime export.

Targeting these refineries inherently disrupts the domestic production of diesel. Because diesel serves as the emergency backup fuel for the thermal power grid when natural gas is unavailable, a combined strike on gas compressor stations and oil refineries would eliminate both primary and secondary fuel sources for electricity generation, locking the country into a

blackout.

Secondary Targets: Desalination and The Water-Energy Nexus

Beyond hydrocarbons and electricity, the Middle East possesses highly specialized infrastructure whose disruption yields profound strategic leverage. The Persian Gulf region is characterized by acute, existential water scarcity, making desalination technology a cornerstone of regional survival.

The six Gulf Cooperation Council (GCC) states and Iran are heavily dependent on desalination, with the Gulf region alone producing roughly 40 percent of the world's desalinated water across more than 400 coastal plants. While Iran relies more heavily on terrestrial dams, rivers, and deep aquifers compared to the near-total reliance of the Gulf Arab states, it still operates critical desalination facilities along its southern coast to sustain populations in arid provinces. Recent conflicts have highlighted this vulnerability, with Iran reporting attacks on its desalination plants on Qeshm Island in the Strait of Hormuz, cutting off water to 30 villages.

Desalination plants are large, fixed, open-air industrial complexes that utilize energy-intensive reverse osmosis membranes or multi-stage flash thermal distillation processes. They are completely unarmored and highly vulnerable to kinetic strikes on their seawater intake pipes, high-pressure pumping stations, or membrane buildings.

Crucially, the vulnerability of desalination is tied directly to the power grid. Desalination is an incredibly energy-intensive process; roughly three-quarters of the plants in the region are integrated power and water production facilities. Therefore, striking Iran's coastal power plants inherently disables its fresh water production.

This dynamic presents a massive risk of asymmetric retaliation. If Iran's infrastructure is targeted, Tehran has demonstrated the intent and capability to retaliate by striking the massive desalination complexes of U.S. allies. Eight of the ten largest desalination plants in the world are located on the Arabian Peninsula, including the Jebel Ali complex in Dubai (which produces 160 billion gallons annually) and facilities across Saudi Arabia. Iranian drone strikes or ballistic missile impacts on these facilities would trigger an unprecedented regional humanitarian and economic crisis, abruptly removing the basic drinking water supply for tens of millions of people within days.

The Digital Front: Dual-Use Data Centers

The modern definition of critical energy infrastructure extends to the digital systems that manage power flow, financial transactions, and military logistics. A sea change in modern warfare involves the kinetic targeting of data centers.

During recent conflicts, Iran made a strategic decision to kinetically strike two Amazon Web Services (AWS) data centers in the United Arab Emirates and a third in Bahrain. This action was designed to disrupt the financial, enterprise, and digital services of U.S. allies in the Gulf. Furthermore, Iran published lists of "legitimate tech targets" across the Gulf, explicitly threatening Microsoft, Google, Oracle, and Palantir facilities.

In response, data centers within Iran have become highly viable targets. A notable strike hit a central data center linked to Bank Sepah in Tehran. Because this specific data center processed the salary data and financial logistics for the Islamic Revolutionary Guard Corps (IRGC) and the conventional Iranian army, the strike successfully disrupted salary payments to military elements and rendered online banking temporarily inoperable. Targeting the digital infrastructure that controls the SCADA (Supervisory Control and Data Acquisition) systems of

the national power grid and the financial routing of the oil ministries provides a non-lethal but highly disruptive avenue for degrading state capacity.

Geopolitical and Economic Ripple Effects of Infrastructure Degradation

A systemic degradation of Iran's energy infrastructure cannot be contained within its sovereign borders. The Iranian electrical grid and gas network are deeply integrated into the broader regional economy, and strikes will precipitate severe geopolitical blowback.

Regional Grid Interconnectivity

Iran actively trades electricity with seven neighboring nations, including Iraq, Turkey, Armenia, Afghanistan, Pakistan, and Turkmenistan.

- **Iraq's Dependency:** Iraq is highly dependent on Iranian electricity exports and natural gas to fuel its own domestic power plants. A collapse of the Iranian grid, or a halt in gas production from the South Pars field, would instantly cause severe power deficits in Iraq, risking widespread rolling blackouts, social unrest in Basra and Baghdad, and destabilizing the fragile Iraqi government.
- **Armenian and Turkish Interconnects:** Iran trades electricity with Armenia and Turkey under barter agreements (often trading gas for electricity) and commercial contracts. Given Iran's current 25,000 MW domestic shortage, it has increasingly relied on importing electricity from Turkey and Azerbaijan to keep its northern industrial zones afloat. Severing these 400kV cross-border interconnects would accelerate the collapse of the Iranian grid in the northwest, while simultaneously denying revenue to its neighbors.

Global Energy Market Shocks

Striking Iran's primary oil export terminals (Kharg and Jask) or its gas processing hubs (South Pars) inherently threatens the physical security of the Strait of Hormuz. Roughly 20 percent of global seaborne oil and liquefied natural gas (LNG) flows through this narrow maritime chokepoint.

Iran has explicitly warned—and demonstrated—that if its upstream infrastructure is targeted, it views the energy facilities of neighboring states as legitimate retaliatory targets. When Israel and the U.S. targeted the South Pars gas field, Iran retaliated by launching strikes against Qatar's Ras Laffan Industrial City (the world's largest LNG processing facility), Saudi Arabia's Ras Tanura refinery, and the Fujairah oil terminal in the UAE. The resulting disruptions to global LNG flows from Qatar and oil shipments from Saudi Arabia drove immediate, severe spikes in global energy prices, demonstrating Tehran's capacity to weaponize its geographic position to impose massive economic consequences on global markets.

Strategic Synthesis and Conclusion

The Islamic Republic of Iran's energy infrastructure presents a target-rich environment characterized by severe interdependencies and structural vulnerabilities. While the total nameplate generation capacity of 90 to 95 GW appears robust, the topological fragility of the 400kV transmission grid—particularly in the dense Tehran-Isfahan central hub—means that the precise elimination of 2 to 3 GW of generation is sufficient to induce cascading, systemic blackouts. The destruction of mega-facilities like the Damavand or Shahid Rajaei plants, or the

severing of high-betweenness 400kV substations like Firouzbahram and Kan, would force the remaining network beyond its thermal limits, triggering uncontrollable grid collapse. Furthermore, direct kinetic strikes on widely dispersed electrical generation are not strictly necessary to paralyze the state. The grid's overwhelming reliance on thermal generation creates a critical, centralized vulnerability in the midstream natural gas sector. Targeting the highly specialized, difficult-to-replace turbine compressor stations along the IGAT pipeline system (specifically at nodes like Saveh, Qom, and Kashan) serves as a profound force multiplier. Severing the gas flow simultaneously disables the power grid, halts continuous-process industrial output in Isfahan, and disables the above-ground electrical support infrastructure required to sustain the subterranean nuclear enrichment centrifuges at Natanz and Fordow.

Coupled with the neutralization of the primary Kharg Island maritime loading facility and the strategic Jask pipeline bypass terminal, a coordinated campaign targeting these specific midstream bottlenecks and topological electrical nodes would effectively dismantle Iran's economic viability, severely degrade its military-industrial complex, and precipitate profound domestic instability. However, planners must account for the reality that Iran will respond asymmetrically, leveraging its proximity to the Strait of Hormuz to target the desalination plants, data centers, and LNG terminals of the Gulf Arab states, guaranteeing that any infrastructure war in the region results in severe global economic contamination.

Works cited

1. Energy Targets Hit So Far in the Iranian War, <https://energynewsbeat.co/energy-targets-hit/>
2. Iran Raising the Costs of the Conflict by Targeting Critical Energy Infrastructure, <https://thesoufancenter.org/intelbrief-2026-march-2b/>
3. Table of Iranian Nuclear Sites and Related Facilities - Iran Watch, <https://www.iranwatch.org/our-publications/weapon-program-background-report/table-iranian-nuclear-sites-related-facilities>
4. Structural Properties and vulnerability of Iranian ... - Hilaris Publisher, <https://www.hilarispublisher.com/open-access/structural-properties-and-vulnerability-of-iranian-kv-power-transmission-grid-a-complex-systems-approach-2169-0316.1000112.pdf>
5. Iran's thermal power plants break record in electricity production - Trend.Az, <https://www.trend.az/iran/3956624.html>
6. List of power stations in Iran - Wikipedia, https://en.wikipedia.org/wiki/List_of_power_stations_in_Iran
7. Thermal power capacity in Iran surpasses 77,000 MW - Tehran Times, <https://www.tehrantimes.com/news/515676/Thermal-power-capacity-in-Iran-surpasses-77-000-MW>
8. Can Iran's power grid be knocked out?, <https://www.iranintl.com/en/202603225117>
9. Mapping Iran's oil and gas sites and those attacked by Israel - Al Jazeera, <https://www.aljazeera.com/news/2025/6/17/mapping-irans-oil-and-gas-sites-and-those-attacked-by-israel>
10. Top five thermal power plants in operation in Iran, <https://www.power-technology.com/data-insights/top-five-thermal-power-plants-in-operation-in-iran/>
11. Iran Power Plants - Open Infrastructure Map, <https://openinframap.org/stats/area/Iran/plants>
12. Power Outages Highlights Iran's Growing Vulnerability - FDD, https://www.fdd.org/analysis/policy_briefs/2024/11/18/power-outages-highlights-irans-growing-vulnerability/
13. Final Report - JICA Report PDF, <https://openjicareport.jica.go.jp/pdf/12283909.pdf>
14. Comparing topological and reliability-based vulnerability analysis of ..., https://re.public.polimi.it/retrieve/handle/11311/968327/488715/Comparing%20topological%20and%20reliability-based%20vulnerability%20analysis_11311-968327_Alipour.pdf
15. A Survey on Power System Blackout and Cascading Events: Research Motivations and Challenges - MDPI, <https://www.mdpi.com/1996-1073/12/4/682>
16. Iran Update Special Report, March 18, 2026 | ISW, <https://understandingwar.org/research/middle-east/iran-update-special-report-march-18-2026/>
17. Network Centrality Analysis of Tehran Urban and Suburban Railway

System - arXiv, <https://arxiv.org/pdf/1802.06219> 18. Targeting of Energy Facilities turned Iran War into worst-case Scenario for Gulf States, <https://www.juancole.com/2026/03/targeting-facilities-scenario.html> 19. Middle East & Iran Petroleum Maps | IranOilGas Network, <https://www.iranoilgas.com/exclusive/map> 20. Iran Gas Trunkline - Wikipedia, https://en.wikipedia.org/wiki/Iran_Gas_Trunkline 21. Natural Gas Industry in Iran - OSTI, <https://www.osti.gov/etdeweb/servlets/purl/21390284> 22. Iran Oil and Gas Scenario | PDF - Scribd, <https://www.scribd.com/document/82926215/Iran-Oil-and-Gas-Scenario> 23. Iranian Gas Trunk line—IGAT IX gas pipeline, Iran - Offshore Technology, <https://www.offshore-technology.com/marketdata/iranian-gas-trunk-line-igat-ix-gas-pipeline-iran/> 24. IGAT pipe line will use 34 USSR-made turbine compressors. [Iran] (Journal Article) - OSTI, <https://www.osti.gov/biblio/5692830> 25. NATURAL GAS INDUSTRY IN IRAN - Encyclopaedia Iranica, <https://www.iranicaonline.org/articles/natural-gas-industry-in-iran/> 26. Geothermal Energy for Natural Gas Compressor Stations; an Environmental and Economical Assessment, https://www.eeer.ir/article_95893_d149ca841cfcafaa3c78166a8a60b9de.pdf 27. Iran - International - U.S. Energy Information Administration (EIA), <https://www.eia.gov/international/analysis/country/irn> 28. Over 940 km of gas transmission pipelines to be commissioned by Mar. 2026, <https://www.tehrantimes.com/news/518664/Over-940-km-of-gas-transmission-pipelines-to-be-commissioned> 29. Iran's Oil & Gas Pipelines - IranOilGas Network, <https://www.iranoilgas.com/facilities/pipelines/> 30. Infrastructure that supplies the world with oil and gas is at risk due to Iran war | AP News, <https://apnews.com/article/oil-gas-infrastructure-iran-war-persian-gulf-24c4b439d2c6a5b571fea90e4d1227d8> 31. Iran to start crude exports from Jask terminal in June | Latest Market News - Argus Media, <https://www.argusmedia.com/zh/news-and-insights/latest-market-news/2216453-iran-to-start-crude-exports-from-jask-terminal-in-june> 32. THE STRATEGIC IMPORTANCE OF JASK PORT Yasir Rashid - IRAM Center, https://iramcenter.org/uploads/files/The_Strategic_Importance_of_Jask_Port-WebPDF_v21.pdf 33. Pipeline Supplying Bandar Abbas Refinery Officially Operational - TankTerminals, <https://tankterminals.com/news/pipeline-supplying-bandar-abbas-refinery-officially-operational/> 34. ASSALUYEH PORT - Star Marine Services Ltd., <https://www.starmarine.net/assaluyeh-port/> 35. How much of the Gulf's water comes from desalination plants?, <https://www.aljazeera.com/news/2026/3/12/how-much-of-the-gulfs-water-comes-from-desalination-plants> 36. Persian Gulf desalination plants could become military targets in regional war - Seattle PI, <https://www.seattlepi.com/news/persian-gulf-desalination-plants-could-become-a21957502> 37. Potential Public Health Impacts of Water Infrastructure Damage in the Persian Gulf, <https://www.crisis24.com/articles/potential-public-health-impacts-of-water-infrastructure-damage-in-the-persian-gulf> 38. Could Iran Disrupt the Gulf Countries' Desalinated Water Supplies?, <https://www.csis.org/analysis/could-iran-disrupt-gulf-countries-desalinated-water-supplies> 39. Iran and the Arabian Peninsula depend on desalination plants to survive – why water has become a target, <https://www.thenewsminute.com/news/iran-and-the-arabian-peninsula-depend-on-desalination-plants-to-survive-why-water-has-become-a-target> 40. Desalination by country - Wikipedia, https://en.wikipedia.org/wiki/Desalination_by_country 41. The Persian Gulf's Vulnerable Desalination Plants, <https://flaglerlive.com/persian-desalination/> 42. Iranian Data Strikes Shake Global Digital Infrastructure | Royal United Services Institute, <https://my.rusi.org/resource/iranian-data-strikes-shake-global-digital-infrastructure.html> 43. Data Is Now the Front Line of Warfare - CSIS, <https://www.csis.org/analysis/data-now-front-line-warfare> 44. Iran Pushes Regional Development and Power Interconnections - Industrial Info, <https://www.industrialinfo.com/news/article/iran-pushes-regional-development-and-power-interconnections--234933> 45. Iran Lists Gulf Energy Targets - TT - Transport Topics, <https://www.ttnews.com/articles/iran-list-gulf-energy-target> 46. Armenia's regional power links: plans and opportunities - German Economic Team, <https://www.german-economic-team.com/en/newsletter/armeniens-grenzueberschreitende-stromleitungen-plaene-und->

chancen/ 47. Iran Turns to Turkey and Azerbaijan Amid Energy Shortages - Stimson Center, <https://www.stimson.org/2025/iran-turns-to-turkey-and-azerbaijan-amid-energy-shortages/> 48. Iran warns regional energy infrastructure will be 'legitimate targets' if own facilities hit, <https://www.aa.com.tr/en/energy/energy-diplomacy/iran-warns-regional-energy-infrastructure-will-be-legitimate-targets-if-own-facilities-hit/55745> 49. Iran hits Gulf energy sites, escalating war, as U.S. mulls sanctions rollback, <https://www.washingtonpost.com/world/2026/03/19/us-iran-war-trump-gas-prices-qatar/> 50. Iran Targets Energy Facilities Across Gulf After Israel Struck its Key Gas Installations, <https://energynow.com/2026/03/iran-targets-energy-facilities-across-gulf-after-israel-struck-its-key-gas-installations/>