

A guide · The $500 trillion PPP infrastructure opportunity

Launch a PPP program for Nuclear Energy Organizations in Jordan

WHAT THIS GUIDE IS FOR

Your organization launches a PPP program to prepare, finance and deliver small modular reactors, nuclear-powered desalination and isotope production as public-private partnerships (PPPs), starting with Jordan's $86 billion and Aqaba's $46 billion of projects.

PREPARED FOR
Nuclear Energy Organizations in Jordan

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INTRODUCTION

A century of infrastructure reaches the end of its useful life

Most of the roads, bridges, power plants, water networks, ports and airports the world runs on were built in the last hundred years, and much of that stock is wearing out at the same time.

The infrastructure of the twentieth century was designed, poured and left to age. It carried the growth of every modern economy, and it was built for a world with fewer people, far less data and a different climate. Pipes leak, grids strain under new demand, and assets designed for one purpose are asked to carry several. Replacing them is the largest building program in human history, and it has already begun.

Rebuilding and running the world's infrastructure will take about $500 trillion over the next fifty years. It is the largest investment humanity will make in that time. Public-private partnerships (PPPs) will carry a large share of it, because governments cannot fund, build and run the rebuild alone, and the private sector cannot do it without them.

How the $500 trillion adds up

	$300T	to build the physical assets: roads, rail, ports, grids, water, cities, schools and hospitals
+	$150T	to operate and maintain them across the life of each concession
+	$50T	for the sensors, compute and robotics that will sit inside them, the share of the rebuild that venture capital can fund
=	$500T	**in total to rebuild and run the world's infrastructure over the next fifty years**

INTRODUCTION

The next hundred years will build Earth's largest computer

For thousands of years the method has stayed the same: design it, pour it, forget it, and repair it when it fails. The next generation of infrastructure will carry a software layer specified alongside the concrete. Assets will monitor their own condition, predict their own failures and schedule their own maintenance, and fleets of machines will raise them with very few human hands involved.

The larger change is the connection between assets. When a port knows what the rail line is carrying before it arrives, a water utility prices its pumping energy against the grid in real time, and every contract and drawing on every project sits in one connected record, the built world starts to behave as one system. Joined across borders, the world's roads, grids, ports, water networks, data centers and satellites become one globally connected, superintelligent computer.

Future infrastructure will be self-building, self-monitoring and self-healing. A road that senses its own cracks can schedule its own repair and use the savings to fund the next stretch. A water network that finds its own leaks can put the recovered water into meters on the next street. Each asset leaves behind the money, the data and the proof for the asset that follows it, so each new project starts further ahead than the last.

The point where the built world starts improving itself faster than anyone can direct it is the infrastructure singularity. Three technologies bring it closer: artificial intelligence designs and runs the assets, robotics builds and maintains them, and tokenization finances them and opens their ownership to everyone. Nuclear energy can power much of what the three need. AI and robots run on steady electricity, robots already work inside reactors, and tokenization can spread a reactor's long finance across many investors.

Nuclear plants have mostly been built by states alone, with public money and long schedules, while companies supplied parts and services. The reactors of the next fifty years will be smaller, built in factories and paired with water and industry, and the organizations that prepare those partnerships now will decide how they are financed and run for as long as the contracts last. This guide invites nuclear energy organizations in Jordan to launch a PPP program, starting with the projects at home.

THE GUIDE

Bring nuclear energy to the $500 trillion PPP infrastructure opportunity

Your organization opens a dedicated PPP program, a team and a set of offers that prepare small modular reactors, nuclear desalination and isotope production, safety first, starting with Jordan's $86 billion of projects and the $46 billion anchored in Aqaba.

01 **A PPP nuclear team.** A dedicated team that knows how PPPs are prepared, procured and financed follows every energy, water and industry project in Jordan's pipeline from the first market sounding and decides early where nuclear power, heat or isotopes can serve it.

02 **Small modular reactors.** Jordan has studied small modular reactors for electricity and for desalting Red Sea water. Private partners can finance, build and run them under long contracts, while licensing and oversight stay with the regulator.

03 **Isotopes and research.** Jordan's research reactor, running since 2016, produces medical isotopes for cancer treatment. Partners can expand isotope supply and training under service contracts paid by hospitals and universities.

04 **Nuclear-led direct proposals.** Jordan's PPP Law No. 19 of 2023 accepts direct private proposals under Article 15. A nuclear energy organization can receive and invite proposals from companies, such as a reactor paired with a desalination plant or an isotope center, and review each one for safety before it moves forward.

05 **Pilots as small-scale PPPs.** PPP Regulation No. 9 of 2024 defines small-scale PPPs below $14.1 million, which can be bundled into one feasibility report and one tender. An isotope center, a training simulator or a radiation monitoring network at that scale gives the organization a live contract and a reference.

JORDAN AND AQABA

An $86 billion pipeline to start with

Jordan has 243 PPP and infrastructure projects in development, worth about $86 billion, of which $46 billion is anchored in Aqaba. Many of them, from desalination to industry, will need steady, low-carbon power for decades.

$86 billion
of PPP and infrastructure projects in development across Jordan

$46 billion
anchored in Aqaba, Jordan's only port and its gateway to the Red Sea

SECTOR	PROJECTS	VALUE	WHAT THE PROJECTS WILL BUY
Energy	33	**$28.3 billion**	Grid and demand forecasting, solar and storage analytics, robotic panel cleaning, predictive maintenance
Tourism	40	**$13.8 billion**	Visitor flow and demand forecasting, resort and heritage-site operations, booking and payment rails
Urban development	17	**$13.8 billion**	Digital twins of new districts, digital permitting, modular construction, district operations
Transport	33	**$11.7 billion**	Traffic and fleet AI, tolling and payments, inspection drones for roads and rail
Industry	31	**$8.1 billion**	Factory automation, quality verification, industrial sensors and energy management
Water	29	**$7.6 billion**	Leak detection, pressure management, smart metering, pipe-inspection robots
Mining	15	**$1.2 billion**	Autonomous drilling and haulage, drone surveying, ore sorting
Health	12	**$1.0 billion**	Hospital operations AI, patient flow, equipment monitoring
Agriculture	10	**$310 million**	Precision irrigation, farm robotics, crop and soil monitoring
Environment	15	**$270 million**	Waste-sorting robotics, emissions monitoring, circular materials
Digital	6	**$270 million**	Data centers, connectivity, sovereign compute
Education	2	**$20 million**	School and training campus PPPs, digital learning, building operations and energy retrofits

A Jordanian nuclear organization that delivers one PPP at home can share the same model with countries planning nuclear power across the region. Aqaba concentrates ports and terminals, logistics, rail to the port, industry, energy, water and tourism inside the Aqaba Special Economic Zone, which makes it a single place to test port automation, logistics software, desalination and energy technology on assets that connect Jordan to the world.

SECTOR GUIDES

Jordan's $86 billion, sector by sector

Jordan is investing in and advancing 23 sectors at once, and together their projects make up the $86 billion. A sector guide for each lists every project in it, its link to the infrastructure singularity and the ways a partner can take part.

The sectors closest to nuclear energy organizations

Nuclear Energy	JAEC's 5 MW Jordan Research and Training Reactor at JUST. 6 projects, $835m of forward investment. www.JordanPPP.com/sectors/nuclear
Mining and Minerals	Jordanian Uranium Mining Company produced uranium ore in central Jordan. 29 projects, $1.2bn of forward investment. www.JordanPPP.com/sectors/mining
Health	JRTR produces iodine-131 and supplies radiopharmaceuticals to Jordanian medical centers. 20 projects, $986m of forward investment. www.JordanPPP.com/sectors/health
Education and Skills	JRTR training center with full simulator trains reactor operators and engineers. 12 projects, $7m of forward investment. www.JordanPPP.com/sectors/education
Water	IAEA reviewed JAEC's SMR plans, including nuclear desalination. 29 projects, $6.7bn of forward investment. www.JordanPPP.com/sectors/water

All 23 sector guides

Oil, Gas and Power	$15.1bn	Wastewater and Reuse	$946m
Tourism	$13.8bn	Nuclear Energy	$835m
Urban Development	$12.8bn	Agriculture and Food	$400m
Green Hydrogen	$10.6bn	Solar Power	$326m
Transport	$8.1bn	Digital and AI	$243m
Water	$6.7bn	Circular Economy	$189m
Fertilizers and Chemicals	$6.5bn	Wind Power	$186m
Ports and Logistics	$3.6bn	Pharmaceuticals	$128m
Manufacturing	$2.4bn	Creative Industries	$47m
Storage and Grids	$1.4bn	Defense	$10m
Mining and Minerals	$1.2bn	Education and Skills	$7m
Health	$986m		

Every sector guide can be read and downloaded at www.JordanPPP.com/sectors.

ARTIFICIAL INTELLIGENCE

AI designs, structures and runs it

A PPP takes about seven years from concept to financial close and costs roughly 10% of capex to structure. Almost all of that work is documents and models, which is the work AI does well.

What changes

When the cost of intelligence approaches zero, the cost of preparing a project falls with it. Feasibility studies, options appraisals, cost plans, risk matrices, financial models and tender documents can be produced and tested in days, and contracts can be drafted and stress-tested in hours. PPP projects will soon appoint an AI technical advisor alongside the human ones. Once an asset is running, the same intelligence operates it: a digital twin models the asset in real time, sensors report wear and faults early, and maintenance follows the data.

Jordan arrives late to PPP software, and that is an advantage. With few legacy systems to migrate off, AI-native tools can be built from the ground up, and the reasoning behind each decision can be captured inside the transactions being structured today.

What it means for nuclear energy organizations

AI can help nuclear facilities run safely and plan ahead. It can watch thousands of sensor readings for early signs of wear, plan maintenance and refueling and model how a reactor and a desalination plant share power. A nuclear energy organization can use those tools under strict review to train staff and keep every plant within its limits.

What will be built

Project preparation	Software that turns feasibility studies, cost plans and tender documents into a repeatable process, so the years spent before tender shrink to months.
Procurement	Tools that let ministries compare bids on whole-life cost and deliverability.
Cost estimation	A national benchmark database that prices every project against real Jordanian rates.
Contract intelligence	Assistants that read, compare and answer questions on every contract, drawing and instruction on a project in plain language.
Asset monitoring	Sensors and digital twins that tell an operator what will fail before it fails.
Permits and approvals	Digital workflows that replace the paper trail across ministries, municipalities and utilities.

ROBOTICS

Robots build it and keep it running

Most of the $500 trillion of infrastructure due over the next fifty years will be built by machines, and people will design, train and supervise those machines.

What changes

Autonomous software combined with autonomous machines produces autonomous infrastructure. Tunneling machines, construction robots, drones and modular factories already raise structures with far fewer people on site. The machines then stay with the asset: drones inspect bridges and power lines, robots travel inside pipes to find leaks, and cleaning robots keep solar fields at full output.

Robotics also changes who can compete. A small company with the right machines can build what once needed a thousand-person contractor, and it can prove its method on a pilot before anyone asks for a track record, which opens PPP work to new companies for the first time.

What it means for nuclear energy organizations

Robots already work where radiation keeps people away. A nuclear energy organization can use them to inspect reactor vessels and pipes, handle isotopes and waste and survey the uranium-bearing land of central Jordan, and train Jordanian engineers to run and repair them.

What will be built

Water networks	Robots and acoustic sensors that find leaks inside the network, in a country that still loses about 41% of its water to leaks, theft and faulty meters.
Construction	Modular methods, on-site automation and quality verification suited to Jordan's labor market.
Inspection	Drones and crawlers that survey roads, bridges, rail, power lines and pipelines and report defects automatically.
Energy	Robotic cleaning and maintenance for solar fields, and retrofit technology for public buildings, street lighting and water pumping.
Mining	Autonomous drilling, haulage and drone surveying for phosphate, potash and new mineral projects.
Ports and logistics	Automated handling, yard robotics and drone delivery for Aqaba's terminals and Jordan's dry ports and border crossings.

TOKENIZATION

Tokenization finances it and opens its ownership

A PPP absorbs capital over four years and releases it over thirty. Today's investors expect to enter and exit easily, and tokenization gives them that option.

What changes

A concession is a long-dated, contracted, inflation-linked cash flow, the kind of asset a token represents well and an ordinary investor has rarely been able to hold directly. Tokenization lets a small pilot be funded by a few hundred investors, with returns paid automatically from the asset's own revenue and no lender between them.

The rails already exist in the region. ADGM regulates tokenized securities, the Dubai Land Department records tokenized title deeds on its own register, and Jordan adopted a national Blockchain Technology Policy in December 2024. Tokenized concession revenues are still rare, so the first tokenized PPP in Jordan is open to whoever builds it.

PPP companies will be tokenized before PPP projects, because a developer already gathers projects, risks and revenues into one entity. People will own the builders first, then the portfolios, then the projects, and at the end of that sequence sits a stock exchange for the physical world.

What it means for nuclear energy organizations

Tokenization can spread the long finance of nuclear assets across many investors. Stakes in a desalination plant powered by a small reactor or in an isotope center can be offered as tokenized notes, paid from water, power and service contracts, under rules set by the regulators.

What will be built

Issuance	Compliant token issuance for PPP companies, infrastructure funds and small pilots.
Investor onboarding	Identity checks, suitability and custody built for Jordanian and regional investors.
Revenue distribution	Smart contracts that pay holders from tolls, tariffs and availability payments as the money arrives.
Registries	Shared records of contracts, milestones and asset performance that every party can trust.
Secondary markets	Venues where holders can buy and sell stakes in operating infrastructure.
Citizen participation	Tools for citizens to propose projects, vote them up and invest small amounts in what gets built.

SMALL PPPS IN PARALLEL

A thousand small PPPs teach more than one large one

The World Bank counted 315 private infrastructure projects reaching financial close across all low- and middle-income countries in 2024, only a few per country. No country can learn quickly at that pace, and each lesson arrives years after the technology behind it has moved on.

Each of those projects is too large, too slow and too expensive to try anything new on, and every approval, guarantee and stakeholder on a $1 billion project pulls it toward the way things were done before. Small projects are where a new idea can afford to be wrong, because the downside is small, the learning cycle is fast and the bureaucracy is thin.

Run them in parallel

Software has already moved from building one idea at a time to building ten at once, and infrastructure can follow. Picture 100 small schools built within six months, each delivered through its own PPP and each testing a slightly different legal structure, financing model, construction method and operating approach. Performance data arrives quickly, the models that work are copied, the weak ones are retired early and policy improves with every round, so a thousand small projects teach a country tens of thousands of lessons where one large project teaches a few.

$10M	spent preparing a single $100 million PPP, enough to build 100 pilots at $100,000 each
780	small PPPs a year in Jordan at $100,000 each, from 1% of the budgets of its 40 contracting authorities, about $78 million, in a country that closes only a handful of PPPs a year today
97,500	small PPPs a year if every country ran 500 at $100,000 each, for $9.75 billion, less than the price of one metro line

The PPP singularity

The PPP singularity is the point at which it becomes cheaper to build the pilot than to conduct the study. One feasibility study can make a project look feasible, another can make it look unfeasible, and the decision still comes down to judgment, while a pilot settles the argument with evidence. Governments that work this way become portfolio managers of experimentation: they set the objectives and the guardrails, standardize contracts that can adapt, collect the data and publish every pilot, every cost and every failure on one public website.

PPP RESEARCH LABS

Pilots need somewhere to live

PPP innovation needs the public and private sectors working together, so each lab is built the way a PPP is built: the public sector spearheads it and the private sector designs, finances, builds and operates it.

One lab per sector	Water, power, transport, aviation, health, education, agriculture, digital, tourism and urban development each get a lab inside the ministry or authority that runs the sector.
A one-line brief	Run ten small PPP projects a year at up to $100,000 each, testing new technologies, new PPP frameworks, new construction methods and new financing structures.
A PPP itself	The ministry tenders the lab, and private companies bid to design, finance, build and operate it with their own capital, effort and technology.
Funding	About $1 million a year per lab, found by moving 1% of an authority's budget away from inefficient spending. Ten labs can run a hundred experiments a year on a modest budget.
Open results	Every result is published as it happens, including the failures: what worked, what failed and what the contract should have said. The lessons go straight into the large PPPs already running and the ones still to come.
Room to explore	Labs carry no fixed deliverables, because predetermined outputs defeat the purpose of research, and they are judged on engineering results.

Who builds and who funds

Small projects open PPPs to founders and small companies. On a large concession a bid costs 3% to 5% of capex, prequalification asks for a decade of comparable projects and performance bonds run to tens of millions. AI cuts the bid cost, robotics cuts the crew a project needs and tokenization lets a few hundred investors fund a pilot, so a small PPP moves at the speed of the founders running it. Venture capital funds the technology, infrastructure funds finance the assets, and a $10 billion fund raised by both, deploying $2 billion in its first year, could back 20,000 small PPPs, about 100 in every country.

What it means for nuclear energy organizations

Small PPPs let a nuclear organization prove new models safely at low cost. It can host a PPP research lab that trials AI monitoring, inspection robots and isotope logistics, publish every result and carry the pilots that work into larger power and water contracts.

UNSOLICITED PROPOSALS

Jordanian law accepts unsolicited PPP proposals

Any private company can take its own PPP idea to government. Article 15 of PPP Law No. 19 of 2023 lets a proposer submit a direct proposal to the Ministry of Investment or a public authority, and PPP Regulation No. 9 of 2024 sets out how it is assessed.

How a direct proposal works

Conditions	The proposal offers an innovative solution for a public service, is prepared on the proposer's own initiative, gives value for money, fits government programs, covers the government's obligations from project revenues and discloses any conflict of interest.
Contents	The scope, the proposer and its experience, a pre-feasibility study with the innovation and intellectual property behind it, the fiscal implications and any support or guarantees sought, and the cost of preparing the study.
Review	A public authority or municipality that receives a proposal refers it to the Ministry, which has 60 days to take it up for study or return it unopened, and can charge a study fee of at least $7,050.
Registry	A qualifying proposal is listed as a PPP project in the national registry of public investment projects, and one that falls short is rejected.
Tender	If the project goes to tender, the proposer can match the best offer, and if another bidder wins, the winner repays the proposer's direct study costs.
Small projects	Projects with a capital cost below $14.1 million are small-scale PPPs, and similar ones can be bundled into one feasibility report and one tender under simpler procedures.

Limitless ideas

This is the Swiss Challenge approach: the proposer brings the idea, the market competes on it and the proposer keeps the right to match the best offer. Many of the projects in Jordan's $86 billion pipeline are still early enough for a partner to shape the deal or bring its own idea, and a direct proposal can be as large as a mini city built and operated under one contract or as small as a $100,000 pilot. The PPP research labs can be proposed the same way, and every company with an idea for a public service becomes a possible project sponsor.

What it means for nuclear energy organizations

Direct proposals let companies bring a small reactor, an isotope center or a desalination plant to Jordan as a project of their own. A nuclear organization can invite them, review each one for safety and keep the proposer's right to match the best offer at tender.

WHY NUCLEAR ENERGY ORGANIZATIONS

Nuclear energy organizations plan assets that serve generations

A reactor runs for decades and needs steady finance, strict safety and a buyer for its power, heat or water. Those needs match the long contracts of a PPP, where partners share the cost and the risk while the state keeps control of safety and licensing.

Where nuclear organizations fit in a PPP

Preparation	Siting, safety and grid studies that show whether a nuclear project is viable.
Tender	Safety and licensing conditions written into every bid and contract.
Financial close	Long power and water purchase contracts that make reactors bankable.
Operation	Licensed operation, inspection and training for the life of the plant.
Exit	Stakes in operating plants and isotope centers that long-term funds can buy.

Safety and regulation come first

Every nuclear PPP starts with the regulator and international safety standards. Licensing, waste management, emergency planning and decommissioning are written into the contract from the first study, so private partners can finance and run a facility while the state keeps full oversight of its safety.

Why a program, and why now

Small modular reactors are moving from design to construction in several countries, and Jordan has uranium resources in its central region and a research reactor already at work. A program gives a nuclear organization a team, a pipeline and the partners to act early, and the first nuclear PPPs in the region will set the standard for the rest.

THE PROGRAM

How the program could work

The program can sit inside the organization's technical, safety and planning teams, with a PPP lead at its center and offers built from the research and sites it already holds.

PPP team	A small team of engineering, safety, legal and finance people that covers every relevant PPP in Jordan's pipeline.
Small reactors	Studies and partnerships for small modular reactors that supply power and heat under long contracts.
Desalination	Water projects that pair nuclear power with desalination for Jordan's cities and industry.
Isotopes	Medical and industrial isotopes, cyclotrons and training financed by service contracts.
Direct proposals	Nuclear projects proposed under Article 15 and reviewed for safety before they move forward.
Pilots	Small-scale PPPs below $14.1 million, such as an isotope center or a radiation monitoring network.
Partners	Agreements with reactor vendors, utilities, water authorities, universities, banks and long-term funds.

What the organization gains

The organization gains partners who share the cost and risk of nuclear projects, long contracts that make them bankable and a growing pool of Jordanian engineers who build and run each facility safely.

It also gains a lead role in the region's energy future. The organization that structures the first nuclear power and water PPPs will shape how small reactors are financed and regulated, in Jordan and across the region.

ABOUT

Jordan PPP

Accelerate Jordan
Accelerate the infrastructure singularity
Accelerate the Jordan PPP singularity

AMMAN, JORDAN WWW.JORDANPPP.COM

Jordan PPP helps every kind of organization in Jordan launch a public-private partnership (PPP) program of its own. It publishes 96 guides, one for each kind of organization, from the Royal Hashemite Court and Parliament to banks, contractors, universities, humanitarian organizations, companies in twenty-one sectors and organizations in twelve governorates.

Its vision is the infrastructure singularity, when roads, grids, ports and water networks become one globally connected, superintelligent computer, built by robotics, run by artificial intelligence and financed by tokenization. Rebuilding and running the world's infrastructure will take about $500 trillion over the next fifty years.

Its method starts small: a PPP program for every organization, small PPPs run in parallel, a research lab in each sector and direct proposals under Article 15 of PPP Law No. 19 of 2023, starting with Jordan's $86 billion and Aqaba's $46 billion of projects.

JORDAN PPP

What Jordan PPP offers

The guides

One for every organization

96 guides, each with the case, the program and six first steps.

www.jordanppp.com/guides →

The summary

All guides in one document

Every guide, its organization and its ask, in one place.

www.jordanppp.com/summary →

Futureproofing

AI, robotics, tokenization

What the three technologies change for every organization.

www.jordanppp.com/futureproofing →

The opportunity

$500 trillion

The $500 trillion PPP infrastructure opportunity, from the crisis to the exchanges.

www.jordanppp.com/opportunity →

NEXT STEPS

How a nuclear organization can start

Any nuclear energy organization in Jordan can take this guide forward. The first steps use the studies, sites and partners it already has.

Mandate	Leadership approval for a PPP program, with its services, its sites and its first-year goals.
Team	A named program lead, with engineering, safety, legal and finance people drawn from the organization's existing teams.
Pipeline	A map of Jordan's $86 billion of projects by sector and stage, and the power and water projects nuclear energy could serve.
Safety	A review of how licensing, waste and decommissioning can be written into each PPP contract from the start.
Partners	Reactor vendors, utilities, water authorities, universities, banks and long-term funds.
Pilot	A first isotope center, monitoring network or direct proposal invited from companies, taken from idea to submission.

Jordan has the projects, the engineers and a law that lets companies propose their own projects. A PPP program puts your organization at the center of how the superintelligent infrastructure future is powered in Jordan.

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