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PROSPECTS FOR NUCLEAR-BASED GREEN HYDROGEN PRODUCTION IN UZBEKISTAN: A CONCEPTUAL AND TECHNO-SYSTEMIC ASSESSMENT[3]

M.Xayitbaeva
National Scientific Research Institute of Renewable Energy Sources under the Ministry of the Republic of Uzbekistan, Tashkent, 100084 Uzbekistan
S.Shovdirova
Branch of National Research Nuclear University MEPhI in Tashkent Republic of Uzbekistan, Tashkent,100214
G.Xayrullayeva
National University of Uzbekistan named after Mirzo Ulugbek, Tashkent, 100174 Uzbekistan

Abstract. Uzbekistan plans an integrated nuclear complex in Jizzakh comprising two VVER-1000 units and two 55 MW_e RITM-200N SMRs. This paper assesses the techno-systemic potential to couple that capacity (≈ 2.11 GW_e) to water electrolysis for low-carbon hydrogen. We synthesize site and technology options (grid-connected, private-wire, heat-assisted) and develop indicative output scenarios using published reactor ratings and typical electrolyser specific electricity consumption (50–55 kWh kg^{-1}). If fully allocated, the future nuclear fleet could produce on the order of 0.3 Mt H_2 yr^{-1}; even partial allocation would cover a large share of current domestic demand, dominated by ammonia. Using announced capacities at Navoiyazot (660 kt NH_3 yr^{-1}) and Farg'onaazot (475 kt NH_3 yr^{-1}), we estimate ≈ 0.20 Mt H_2 yr^{-1} is required today. We discuss siting, water needs, safety interfaces, and certification for “low-carbon” hydrogen, and outline a staged roadmap toward pilot (10–20 MW) and scale-up phases.

Keywords: Nuclear hydrogen; Green hydrogen; Water electrolysis; VVER reactors; RITM- 200N SMR; High-temperature electrolysis; Energy system integration; Ammonia production; Low-carbon fuels.

Аннотация. Узбекистан планирует построить интегрированный ядерный комплекс в Джизаке, состоящий из двух энергоблоков ВВЭР-1000 и двух реакторов SMR RITM-200N мощностью 55 МВт. В данной статье оценивается техно системный потенциал для объединения этой мощности (≈ 2,11 ГВт) с электролизом воды для получения низкоуглеродистого водорода. Мы анализируем варианты размещения и технологии (с подключением к электросети, с подключением по частному проводу, с использованием тепла) и разрабатываем ориентировочные сценарии производительности, используя опубликованные характеристики реактора и типичное удельное потребление

ISSN 3030-3907

электроэнергии электролизером (50-55 кВт*ч/кг−1). При полном распределении ресурсов будущий атомный флот мог бы производить порядка 0,3 млн тонн в год−1; даже частичное распределение позволило бы покрыть значительную долю текущего внутреннего спроса, в котором преобладает аммиак. Исходя из заявленных мощностей "Навоиазота" (660 тыс. тонн NH3 в год) и "Фаргонаазота" (475 тыс. тонн NH3 в год), мы оцениваем, что на сегодняшний день требуется около 0,20 млн тонн Nh2 в год. Мы обсуждаем выбор площадки, потребности в воде, взаимодействие в области безопасности и сертификацию для “низкоуглеродного” водорода, а также намечаем поэтапную дорожную карту для пилотных (10-20 МВт) и масштабных этапов.

Ключевые слова: ядерный водород; Экологически чистый водород; Электролиз воды; Реакторы ВВЭР; Реактор RITM-200N SMR; Высокотемпературный электролиз; Интеграция в энергетическую систему; Производство аммиака; Низкоуглеродистое топливо.

Annotatsiya. O‘zbekiston Jizzaxda quvvati 55 MVt bo‘lgan ikkita VVER-1000 energiya bloki va ikkita SMR RITM-200N reaktoridan iborat integratsiyalashgan yadro majmuasini qurishni rejalashtirmoqda. Ushbu maqolada ushbu quvvatni (taxminan 2,11 GVt) past uglerodli vodorod olish uchun suv elektrolizi bilan birlashtirishning texnosistemaviy salohiyati baholanadi. Biz joylashtirish imkoniyatlari va texnologiyalarini tahlil qilamiz (elektr tarmog'iga ulangan, xususiy simga ulangan, issiqlikdan foydalangan holda) va reaktorning e'lon qilingan xususiyatlari va elektrolizatorning odatdagi elektr energiyasini iste'mol qilish (50-55 kVt/soat / kg−1) yordamida indikativ ishlash stsenariylarini ishlab chiqamiz. Resurslarni to‘liq taqsimlash sharoitida bo‘lajak yadro energetika quvvatlari yiliga taxminan 0,3 million tonna ishlab chiqarishi mumkin edi; hatto qisman taqsimlash ham ammiak ustunlik qiladigan joriy ichki talabning salmoqli qismini qoplashga imkon bergan bo‘lardi. "Navoiyazot" (yiliga 660 ming tonna NH3) va "Fargonaazot" (yiliga 475 ming tonna NH3) quvvatlaridan kelib chiqqan holda, bugungi kunda yiliga 0,20 million tonna Nh2 talab qilinishini taxmin qilamiz. Biz maydon tanlash, suvga bo‘lgan ehtiyoj, xavfsizlik sohasidagi o‘zaro hamkorlik va "kam uglerodli" vodorod uchun sertifikatlashtirish masalalarini muhokama qilamiz, shuningdek, tajriba (10-20 MVt) va keng ko‘lamli bosqichlar uchun bosqichma-bosqich yo‘l xaritasini ishlab chiqamiz.

Kalit so'zlar: Yadro vodorodi; Yashil vodorod; Suv elektrolizi; VVER reaktorlari; RITM- 200N SMR; Yuqori haroratli elektroliz; Energetika tizimini integratsiyalash; Ammiak ishlab chiqarish; Kam uglerodli yoqilg'ilar.

1. INTRODUCTION.

ISSN 3030-3907

Hydrogen is a strategic feedstock and energy carrier for decarbonising fertilisers, chemicals and, increasingly, heavy transport. Large, continuous hydrogen production requires stable low-carbon electricity. Nuclear power plants (NPPs) offer high capacity factors and predictable output, making them natural anchors for electrolysis. Uzbekistan is progressing a dual-track nuclear programme that combines large Generation III+ VVER–1000 units with land-based RITM–200N small modular reactors (SMRs) on a single site in Jizzakh, with each SMR rated at about 55 MW_e.[1, 2] In parallel, a pilot renewable hydrogen project (20 MW electrolyser with a 52 MW wind plant) aims to supply the fertiliser industry.[3]

This article examines the prospects for *nuclear-based* low-carbon hydrogen in Uzbekistan. We (i) outline credible coupling architectures between VVER/SMR units and electrolysers,

(ii) produce simple, transparent output scenarios using published reactor ratings and standard specific electricity consumption (SEC) for alkaline/PEM systems (50–55 kWh kg^{-1}), and (iii) discuss siting, water, safety and certification issues in the national context.[4, 5] The goal is a pragmatic roadmap from a 10–20 MW pilot toward staged scale-up aligned with the planned nuclear fleet.

Recent intergovernmental documents establish an integrated site configuration comprising two VVER–1000 units and two RITM–200N SMRs (each ~55 MW_e) at Jizzakh.[1, 2] The RITM–200N is a land-based adaptation of an established reactor line and is intended for multi-decadal service with high availability in baseload applications.[1]

Domestic hydrogen use is dominated by ammonia synthesis. Public company disclosures indicate nameplate capacities of 660 kt NH_3/y at Navoiyazot and 475 kt NH_3/y at Farg'onaazot,[6, 7] while independent assessments place current nationwide hydrogen con- sumption near 460 kt/y across ammonia (~80%), methanol (~14%) and synthetic fuels.[8] These anchors make chemicals the most credible near-term offtake for low-carbon ("pink" or renewable) hydrogen.

Near-term deployment will rely on mature low-temperature electrolysis (alkaline/PEM). For system-level planning, we adopt SEC = 50–55 kWh kg^{-1} (consistent with JRC project reviews and IEAGHG comparative analyses), with water needs of ~9 kg H_2O per kg H_2.[4, 9] Nuclear heat assistance and high-temperature routes remain longer-term options; integration guidance for operating NPPs is synthesised by the IAEA.[5]

ISSN 3030-3907

2.METHODS AND ASSUMPTIONS.

We develop transparent, order-of-magnitude scenarios for nuclear-to-electrolyser coupling based on published unit ratings and standard planning values for electrolysers[4, 5]. Three supply configurations are considered:

S1 (SMR pair): 2×55 MW_e RITM–200N ($P_e = 110$ MW).

S2 (single large unit): $1 \times$ VVER–1000 ($P_e = 1000$ MW).

S3 (integrated site): $2 \times$ VVER–1000 + $2 \times$ RITM–200N ($P_e \approx 2110$ MW).

Unless stated otherwise, we assume capacity factor CF = 0.90, allocation fraction to electrolysis $\alpha \in [0, 1]$, and electrolyser specific electricity consumption SEC = 50–55 kWh kg^{-1} (alkaline/PEM planning range). [4, 9] Hourly hydrogen output is

$$\dot{m}_{H2} = \frac{\alpha P_e\,[\mathrm{MW}] \times 10^3\,[\mathrm{kW/MW}]}{\mathrm{SEC}\,[\mathrm{kWh/kg}]}\,[\mathrm{kg/h}], \quad (1)$$

with daily and annual production

$$M_{day} = \dot{m}_H \times 24 \times \mathrm{CF}/10^3\ [\mathrm{t/day}],$$
$$M_{year} = \dot{m}_H \times 8760 \times \mathrm{CF}10^3\,[\mathrm{kt/yr}]. \quad (2)$$

Process water demand is approximated as

$$\dot{m}_{H2O} \approx 9\,\dot{m}_{H2}, \quad (3)$$

and the ammonia equivalence uses $m_{H2} \approx 0.1765\, m_{NH3}$ (kg basis). We report results for $\alpha = 1$ and provide simple linear scaling rules: outputs scale $\propto \alpha$, $\propto$ CF, and $\propto 1/\mathrm{SEC}$.

3. RESULTS: ILLUSTRATIVE PRODUCTION ENVELOPES

Table 2 summarises indicative outputs at CF = 0.90 for two planning SEC values.

Even a dedicated SMR pair (S1) sustains tens of tonnes per day, while the integrated site (S3) reaches close to 0.9 Mt H_2/yr at SEC = 50 kWh kg^{-1} if fully allocated. For context,

Table 1:

Key assumptions for scenario calculations (values chosen for system planning studies).

№	Parameter	Value
1	Reactor configurations	S1: 2×55 MW_e; S2: 1×1000 MW_e; S3: 2110 MW_e

ISSN 3030-3907

2	Capacity factor (CF)	0.90 (sensitivity 0.85–0.92)
3	Electrolyser SEC	50–55 kWh kg−1 (alkaline/PEM)
4	Allocation to H_2 (α)	1.0 (linear scaling with α)
5	Water requirement	~ 9 kg H_2O per kg H_2

Table 2

Indicative hydrogen output and water demand at CF=0.90 (rounded).

Scenario	SEC (kWh kg^{-1})	H_2 (t/day)	H_2O (t/day)	H_2 (kt/yr)
S1:110 MW_e	50	47.52	427.68	17.35
S1:110 MW_e	55	43.20	388.80	15.76
S2: 100MW_e	50	432.00	3888.00	157.68
S2: 1000 MW_e	55	392.73	3534.55	143.84
S3: 2110 MW_e	50	911.52	8203.68	332.69
S3: 2110 MW_e	55	828.65	7457.89	302.93

public disclosures indicate 660 kt NH_3/yr at Navoiyazot and 475 kt NH_3/yr at Farg'onaazot; together they imply ~ 0.20 Mt H_2/yr at full load[6–8]. This suggests that partial allocation of the future nuclear fleet could cover a large share of current domestic needs.

Outputs scale linearly with CF; e.g., decreasing CF from 0.90 to 0.85 reduces results by ~6%. Likewise, SEC = 48 rather than 50 kWh kg^{-1} increases outputs by ~4%. Daily hydrogen outputs for S1–S3 at SEC = 50 and 55 kWh kg^{-1} are shown in Fig. 1.

These simple levers allow quick *what-if* checks as vendor and grid data are refined.[4]

4. INTEGRATION AND SITING CONSIDERATIONS

Grid-connected electrolysis avoids a direct nuclear-to-hydrogen licensing interface and can start earliest; provenance can be ensured via power purchase agreements and guarantees-of- origin.

Private-wire (co-located) delivery maximises traceability and capacity factor for the electrolyser but requires careful treatment of safety zones, interfaces and islanding.

Heat-assisted concepts (steam preheat or high-temperature electrolysis) reduce electrical SEC, but they introduce new process boundaries and are contingent on plant design and regulatory acceptance.[5]. As summarised in Fig. 2, we consider grid-connected, private-wire, and heat-assisted coupling.

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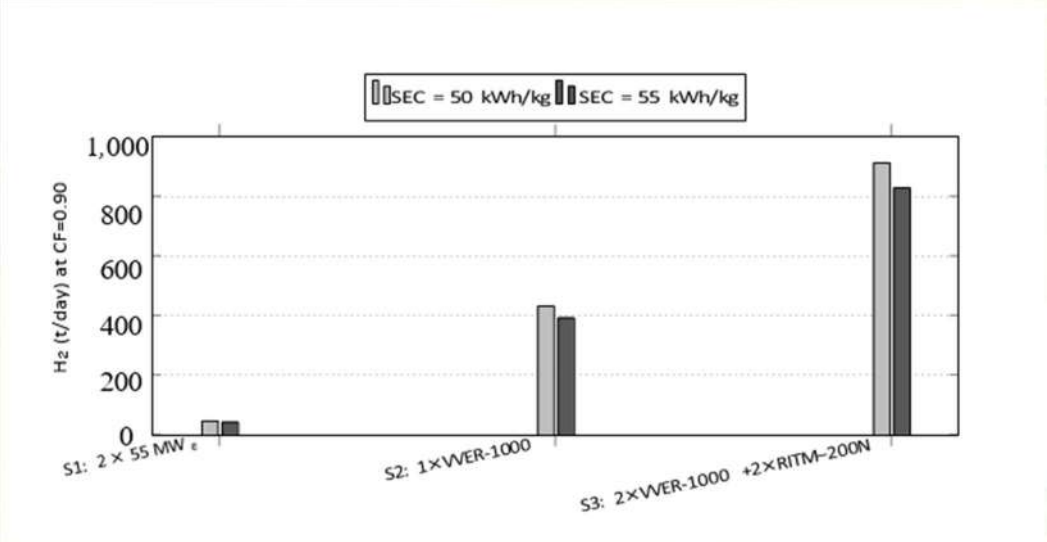


Figure 1: Indicative daily hydrogen output for the three supply scenarios (electricity-only electrolysis).

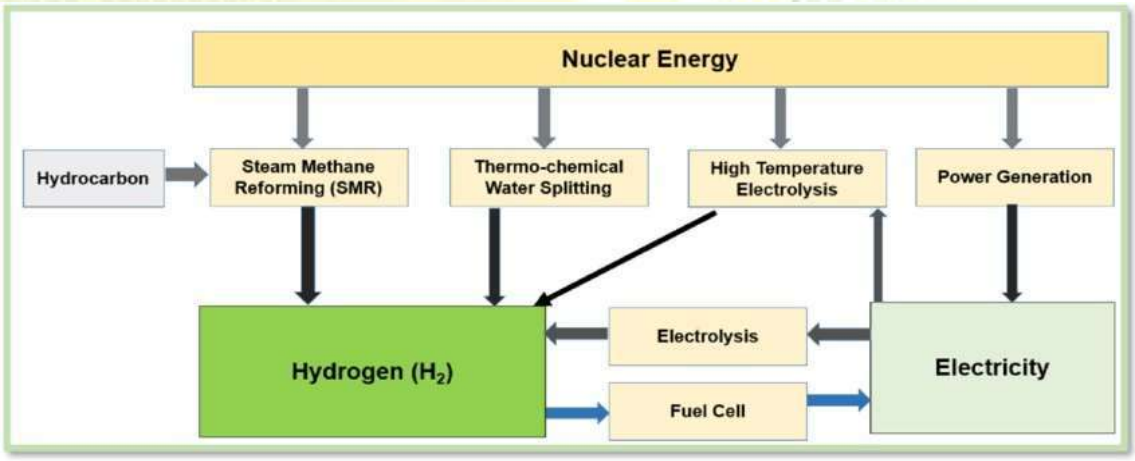


Figure 2: Overview of nuclear-to-hydrogen routes. Nuclear energy can supply high- temperature heat and/or electricity to (i) thermochemical water-splitting cycles, (ii) high- temperature electrolysis (HTE), or (iii) low-temperature electrolysis powered by nuclear elec- tricity. Conventional power generation is shown on the right. Bidirectional arrows indicate electricity–hydrogen interconversion via electrolysis and fuel cells. Steam methane reforming (SMR) appears for completeness; it is not a low-carbon pathway unless coupled with effective CO_2 capture

Colocation demands clear physical separation, access control, and classified piping/electrical interfaces between the nuclear island and hydrogen process units. The IAEA synthesises practical guidance drawn from operating-plant case studies; early engagement with the regulator to define interface boundaries and responsibilities is essential.[5]

Electrolysis requires demineralised feedwater (~9 kg per kg H_2) and reliable make-up for cooling and utilities. For greenfield sites, shared intake

ISSN 3030-3907

and treatment may offer economies of scope, but quality specifications for nuclear and chemical islands differ and should be engineered independently.

Near-term offtake in Uzbekistan is likely to be ammonia (NH_3) for fertilisers; alternatives include tube-trailer hydrogen, blending in industrial hubs, or synthetic fuel precursors. Siting the hydrogen plant near existing ammonia complexes logistics while creatinian ammonia complexes logistics while creatinian immediate decarbonisation pathway.

A pragmatic pathway is: (i) a 10–20 MW pilot electrolyser aligned with the NPP site schedule; (ii) a 100–300 MW phase integrated with one nuclear unit; and (iii) progressive expansion toward gigawatt-scale as units enter service. Certification of low-carbon hydrogen (nuclear-powered) should be clarified early to unlock finance and export options.[8] Grid services from flexible electrolysis (curtailment absorption, ancillary services) can further improve system economics.

5. CONCLUSION.

Nuclear-coupled electrolysis can supply continuous, low-carbon hydrogen at meaningful scale in Uzbekistan. Scenario envelopes using published unit ratings indicate that even partial allocation of the planned fleet could cover much of today's domestic hydrogen demand for ammonia. The near-term focus should be electricity-only integration, with heat-assisted options considered as designs and regulations mature. Future work will refine techno-economics, dynamic dispatch with the grid, and the safety case in coordination with the national regulator and vendors.

Data Availability

All data supporting the findings of this study are included within the main text, figures, and tables. Additional details are available from the corresponding author upon reasonable request.

REFERENCES

1. Rosatom. The russian federation and uzbekistan sign an agreement on the construction of a small nuclear power plant, 05 2024. RITM-200N land-based SMR; 55 MWe rating.

2. AtomMedia / Rosatom. Rosatom and uzbekistan sign documents to expand cooperation in the nuclear sector, 10 2025. Confirms integrated site: two VVER-1000 and two RITM- 200N (55 MWe each).

3. European Bank for Reconstruction and Development. Ebrd supports first renewable hy- drogen project in central asia, 08 2024. 20 MW electrolyser + 52 MW wind; fertiliser sector pilot.

4. IEAGHG. Comparative analysis of electrolytic hydrogen production

ISSN 3030-3907

technologies. Techni- cal report, 2024. Benchmarks and ranges for alkaline/PEM SEC (50–55 kWh/kg typical planning value).
5. International Atomic Energy Agency. Hydrogen production with operating nuclear power plants. Technical report, 2025. Integration concepts and safety interface guidance.
6. Navoiyazot JSC. Investment projects: Construction of ammonia and urea poduction at navoiyazot jsc, 2024. Expected capacity: 660,000 t NH3/yr.
7. European Bank for Reconstruction and Development. Low carbon hydrogen economy in uzbekistan. Technical report, 2024. Estimates current national H2 demand ˜460 kt/yr, with ˜80% for ammonia.
8. J. Davies, F. Dolci, E. Weidner, and R. Weidner. Historical analysis of fch2ju electrolyser projects. Technical report, European Commission Joint Research Centre, 2020. Project data summarising ˜48–55 kWh/kg system consumption.

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