February 14, 2022

Indiana Utility Regulatory Commission
Attn: Research, Policy, and Planning Division
101 W. Washington Street, Suite 1500 E.
Indianapolis, IN 46204-3407

Re: Comments on NIPSCO's 2021 Integrated Resource Plan

Dear Dr. Borum,

Wärtsilä North America, Inc. ("Wärtsilä") respectfully submits these comments regarding Northern Indiana Public Service Company's ("NIPSCO") 2021 Integrated Resource Plan ("IRP") to the Indiana Utility Regulatory Commission ("Commission"). Wärtsilä thanks the Commission for the opportunity to participate in the IRP stakeholder process.

Wärtsilä is a global provider of flexible energy solutions and leader in the clean energy transition. Wärtsilä's solutions provide the needed flexibility to integrate renewable energy resources, secure power system reliability, and promote resiliency. Wärtsilä's offerings comprise engine-based flexible power plants – including liquid/gas systems – hybrid solar power plants, and energy storage and integration solutions. Wärtsilä supports its customers over the lifecycle of their installations with services that enable increased efficiency and guaranteed performance.

Wärtsilä's feedback on NIPSCO's 2021 IRP focuses on 1) NIPSCO's Energy Storage Operations ("ESOP") analysis conducted with Charles River Associates ("CRA"); and 2) NIPSCO's plan to procure new gas peaking resources to replace Schahfer Units 16A and 16B in the 2026 – 2028 timeframe. With respect to NIPSCO and CRA's ESOP analysis, additional modeling of reciprocating internal combustion engines ("RICE" or "ICE") should be performed to quantify the additional Operational Reliability and flexibility benefits this technology provides compared to combustion turbines. Regarding procurement of new gas resources to replace Schahfer Units 16A and 16B, further due diligence on thermal technologies is required to ensure the resources procured possess attributes required to implement NIPSCO's preferred portfolio. To this end, additional RFPs beyond the 2021 RFP should be conducted in the coming years to identify the best available technologies for meeting NIPSCO's stated cost, decarbonization, and reliability objectives.

I. NIPSCO and CRA's ESOP analysis does not adequately quantify the Operational Reliability and flexibility benefits of thermal generation technologies.

To analyze the Operational Reliability of NIPSCO's portfolio options, CRA and NIPSCO modeled the performance of four-hour duration lithium-ion battery storage, paired solar plus storage, and natural gas-fired combustion turbine peakers in CRA's ESOP model. These three

resource types were based on individual bids received during the RFP. However, these resources do not fully capture the set of technologies available to address sub-hourly operational constraints and capture value in real-time energy and ancillary service markets. Specifically, reciprocating internal combustion engines ("RICE" or "ICE") were excluded from the analysis. Compared to conventional gas "peaking" units (i.e., combustion turbines), RICE possess superior operational flexibility: the ability to turn on, off, or cycle anywhere between 10–100 percent load within a 5-minute dispatch interval, without incurring start-up costs or adversely impacting efficiency. A summary of the differences in operational flexibility between ICE and open cycle gas turbines ("OCGT") is shown in the following table adopted from the International Renewable Energy Agency ("IRENA").[1]

Table 1 Comparison of flexibility parameters before and after flexibilisation initiatives

Type of point		Start-up time[a]	Start-up cost (USD/MW instant start)	Minimum load [% Pnom]	Efficiency (at 100% load)	Efficiency (at 50% load)	Avg. ramp rate [% Pnom/min]	Minimum uptime	Minimum downtime
OCGT	Average plant	5–11 min	< 1–70	40–50%	35–39%	27–32%	8–12%	10–30 min	30–60 min
	Post flexibilisation/ advanced plant	5–10 min	< 1–70	20–50%	35–39%	27–32%	8–15%	10–30 min	30–60 min
ICE[c]	Average plant	5 min	< 1	20% (per unit)	45–47%	45–47%	> 100%	< 1 min	5 min
	Post flexibilisation/ advanced plant	2 min	< 1	10% (per unit)	45–47%	45–47%	> 100%	< 1 min	5 min

Because RICE technology has minimal constraints related to minimum downtimes/runtimes, ramping, and start costs, it can more readily monetize real-time sub-hourly volatility via energy, frequency regulation, and spinning reserves than the combustion turbines modeled in ESOP. The additional value of RICE in the real-time energy and ancillary service markets translates to greater reliability and affordability to NIPSCO customers. To quantify these benefits, NIPSCO should amend its ESOP analysis to include RICE technology.

II. In order to maximize the reliability, affordability, and emissions reduction benefits of procurement intended to replace Schahfer Units 16A and 16B, NISPCO should take an "attribute-based" approach rather than a "technology-based" one.

NIPSCO's Short-Term Action Plan calls for the replacement of Schahfer Units 16A an 16B with up to 300 MW of gas peaking capacity between 2026 – 2028. Throughout its IRP, NIPSCO refers to combustion turbines and "peaking" resources interchangeably.[2] However, combustion turbines are not the only thermal resource available for meeting NIPSCO's peak load and broader reliability needs. As previously mentioned, RICE technology offers greater operational

[1] IRENA (2019), *Innovation landscape brief: Flexibility in conventional power plants*, International Renewable Energy Agency, Abu Dhabi, p. 7.
[2] For Example, see p. 134 paragraph 3 of NIPSCO's 2021 IRP.

flexibility than combustion turbines. Moreover, highly flexible, efficient technology such as RICE can be thought of as "balancing" resources that promote greater integration of variable renewable energy resources. For example, because RICE can start up, ramp to full load, or turn off within a 5-minute dispatch interval, they can avoid "must-run" commitments and promote greater renewable energy penetration. Such "must-run" commitments are typical for less flexible thermal resources and often result in curtailment of renewables. By contrast, flexible "balancing" thermal generation can be shaped (i.e., dispatched) around variable renewable energy generation, thereby maximizing renewable energy uptake while minimizing curtailment, generation costs, and emissions. At the same time, RICE offer unique resiliency benefits, such as minimal deratings under extreme weather conditions and ability to operate on low gas pressures. As such, NIPSCO should not limit its thermal procurement options to gas turbines, but instead base procurement decisions on how well candidate resources satisfy NIPSCO's desired attributed.

Furthermore, as emerging technologies continue to evolve, NIPSCO should continue performing due diligence and update its preferred portfolio attributes, accordingly. NIPSCO states that "new peaking capacity may be hydrogen-enabled as options are explored further.[3]" If hydrogen production, storage, and distribution capabilities progress rapidly in the near-future, hydrogen conversion capabilities should be a pre-requisite of new thermal resources, for example. If other sustainable fuels – such as ammonia or methanol derived from green hydrogen – emerge as viable fuel sources, they should also be considered. Conducting additional RFP(s) in the coming years to supplement the information gathered in the 2021 RFP will ensure that the attributes required to implement NIPSCO's preferred portfolio are met by the best available technologies.

Respectfully submitted,

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[3] *I.d.*, 13.