# Hitachi Hokkaido University Laboratory and Hokkaido University to hold the Programming Contest 2020 focused on "Future Autonomous Distributed City Development”

**Accelerating the development of multi-objective and spatio-temporal optimization solvers for local energy system through industry-academia collaboration**

Hitachi Hokkaido University Laboratory (hereafter, Hitachi Hokudai Lab.) and Hokkaido University announce the jointly organized Hitachi Hokudai Lab. & Hokkaido University Contest 2020.

Hitachi Hokudai Lab. and Hokkaido University are promoting joint research that will lead to regional revitalization by solving social issues such as the declining birthrate, aging population, and shrinking population in Hokkaido.

In reaction to the COVID-19 Pandemic, teleworking from home has become widespread, and people’s place of work no longer depends on their place of residence, so more people are considering living in areas with rich natural environments. In the future, more people are expected to migrate from Japan’s densely populated large cities to its sparsely populated rural regions, leading to new industries being created in those regions. To this end, the challenges are to ensure a stable power-supply capacity to meet the increasing energy demand and build a safe and secure living infrastructure in rural regions.

Aiming for a low-carbon society and regional economic development, Hitachi Hokudai Lab. and Hokkaido University are researching and developing local energy systems for local production and consumption in collaboration with Hokkaido Electric Power Co., Inc., Hokkaido Research Organization, and Hitachi Power Solutions Co., Ltd. In these systems, multiple small grids (nano grids) that utilize renewable energy will be scattered around the area and networked with electric vehicles (EVs) to build a movable grid in which supply and demand are integrated.

To achieve this system, optimal solutions must be found to reduce CO2 emissions and mitigate economic challenges. These solutions also need to be able to be robustly adapted to sudden temporal changes such as fluctuations in climate and demand. However, such optimization problems are difficult for the conventional optimization solvers to address. Thus, we need to develop next-generation optimization technology (multi-objective and spatio-temporal optimization technology) to solve optimization problems with trade-off multiple-objective functions and dynamical changes in the environment.

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To achieve such goals, Hitachi Hokudai Lab. and Hokkaido University have established a wide-ranging industry-academia collaboration, fostering synergies from diverse disciplines to research and develop next-generation optimization technology. Supported by the expertise of this network, Hitachi Hokudai Lab. and Hokkaido University designed this year's contest on spatio-temporal optimization to promote research through open innovation, as conducted through previous marathon-type programming contests in FY2017, 2018, and 2019. In past contests, more than 300 answer codes were submitted by a wide range of participants from junior high and high school students to working-age adults, and an algorithm superior to conventional technology was devised. In addition, the algorithms devised so far are examined for practical application together with the award winners, and the works are presented at international conferences every year.

In this year's contest, we will prepare two problem statements (A and B) on the topic of multi-objective and spatio-temporal optimization technology, necessary for building a regional energy system for local production and local consumption.

## Organizer

Hitachi Hokudai Lab, Center for Exploratory Research, Hitachi, Ltd.

Hokkaido University

## Cooperator

Hokkaido Electric Power Co., Inc.

## Period for submission

December 1st - 31st 2020 (Problems A and B)

The winners of contests A and B will be awarded ¥100,000 and ¥300,000, respectively. We are also currently preparing special items and further prize money for successful contestants. The contest's awards ceremony will be held online during the lunch seminar session of the 83rd IPSJ National Convention, at which the contest winners will be invited to present their algorithms.

- Date: March 19th, 2021, 11:30 am – 12:40 pm

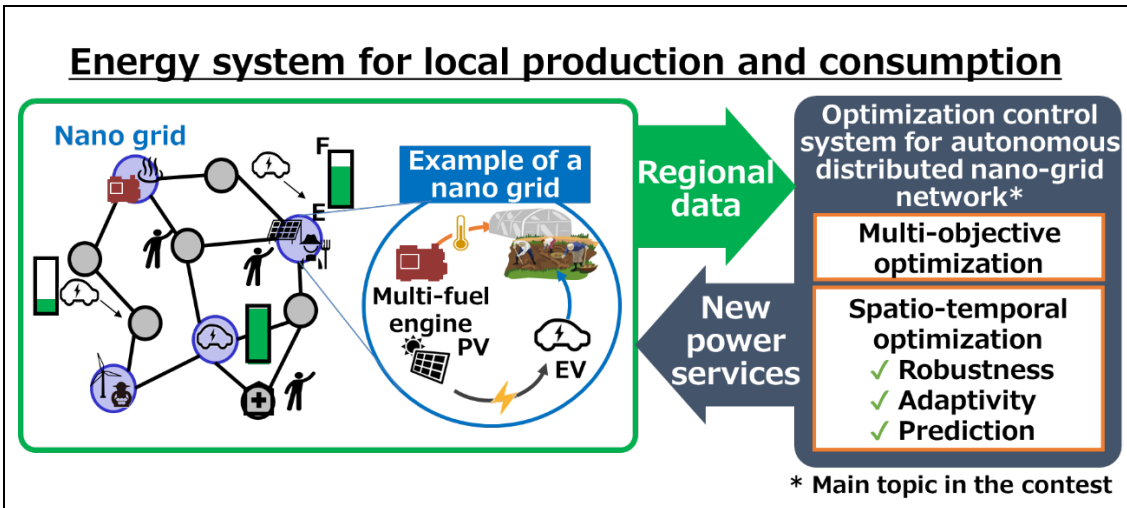
The programming contest is open to everybody, regardless of age, nationality, or gender, and everyone interested in participating in the contest is cordially invited to join through the following websites:

*** AtCoder Inc. does not support Internet Explorer.**

**Please use other web browsers such as Edge, Chrome, or Firefox.**

https://atcoder.jp/contests/hokudai-hitachi2020

**Reference:** Reginal energy systems for local production and consumption




*A marathon-type programming contest is an event in which submissions can be made for several days. This year, both contests will be open for a submission period of one month.

**Related news releases (in Japanese):**

「日立北大ラボ」を開設し、北海道が直面する社会課題解決に向け協創(2016 年 6 月 16 日)

http://www.hitachi.co.jp/New/cnews/month/2016/06/0616a.html

日立と各企業、岩見沢市、北海道大学 COI『食と健康の達人®』は、「“健康と地方創生”を基盤とした健康経営都市事業」を開始(2019 年 10 月 17 日)

http://www.hitachi.co.jp/New/cnews/month/2019/10/1017.html

日立と北大が、博士課程学生に対する研究支援「北大・日立協働教育研究支援プログラム」を開始することに合意（2020 年 2 月 4 日）

https://www.hitachi.co.jp/New/cnews/month/2020/02/0204a.html

北海道大学、森永乳業、日立製作所は、母子健康調査に関する協創成果としての知的財産を開放(2020 年 9 月 17 日)

https://www.hitachi.co.jp/New/cnews/month/2020/09/0917.html