国際協力機構の水インフラ海外展開支援に関する取り組み

2011年2月14日

国際協力機構　地球環境部

水インフラ海外展開支援
JICAの取り組み

- セクター開発計画の策定支援
  （開発計画調査型技術協力）
  → 途上国の水道事業計画策定を支援。その中で、日本企業の参入を想定した事業を提案。

- 日本の技術・経験の紹介・移転
  （技術協力）
  → •途上国の水道事業体幹部を本邦に招聘してのセミナー実施
  •日本人専門家による途上国水道事業体の能力強化

- PPP事業の促進
  （PPPインフラ事業協力準備調査）
  → 円借款による公共事業と日本企業が参画する民間事業のPPP促進に向けたF/Sの実施

- 民間資金を補うファイナンス
  （円借款、海外投融資）
  → •PPPを通じた円借款と民間資金の連携
  •民間事業実施会社への出資／融資

水インフラ海外展開支援
PPP事業の促進
（PPPインフラ事業協力準備調査）

- **1．目的：**
- 円借款供与を前提としたPPPインフラ事業のF/SまたはF/Sの補完

- **2．対象：以下4つを満たすPPPインフラ事業**
- ①途上国の経済社会開発・復興や経済の安定に寄与する
- ②日本政府（新成長戦略等）・JICAの方針に沿っている
- ③円借款を活用する見込みがある
- ④建設及び運営を含むPPPインフラ事業であり、提案した当該企業（共同企業体の場合は、うち少なくとも一社）が事業への投資の形で参画予定

- **3．範囲：**
- 事業全体（官で事業化される部分と民で事業化される部分の両方を含む事業全体）を調査範囲とし、PPPインフラ事業全体としての実現可能性を確認

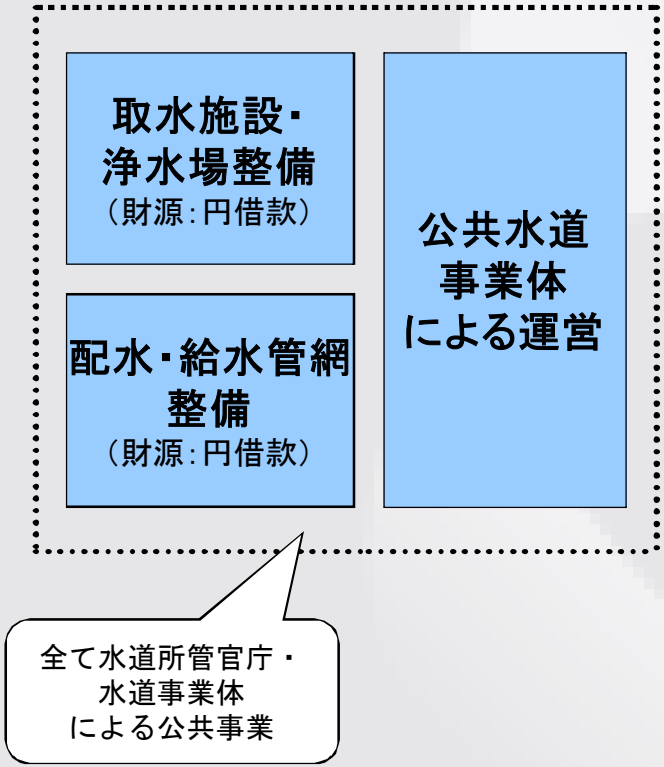
- **4．対象国：**
- 円借款事業の発掘・形成の可能性のある全ての協力対象国

- **5．規模：**
- 1件当たりの調査金額（JICAの支払い対象金額）は原則として上限1.5億円を目処。

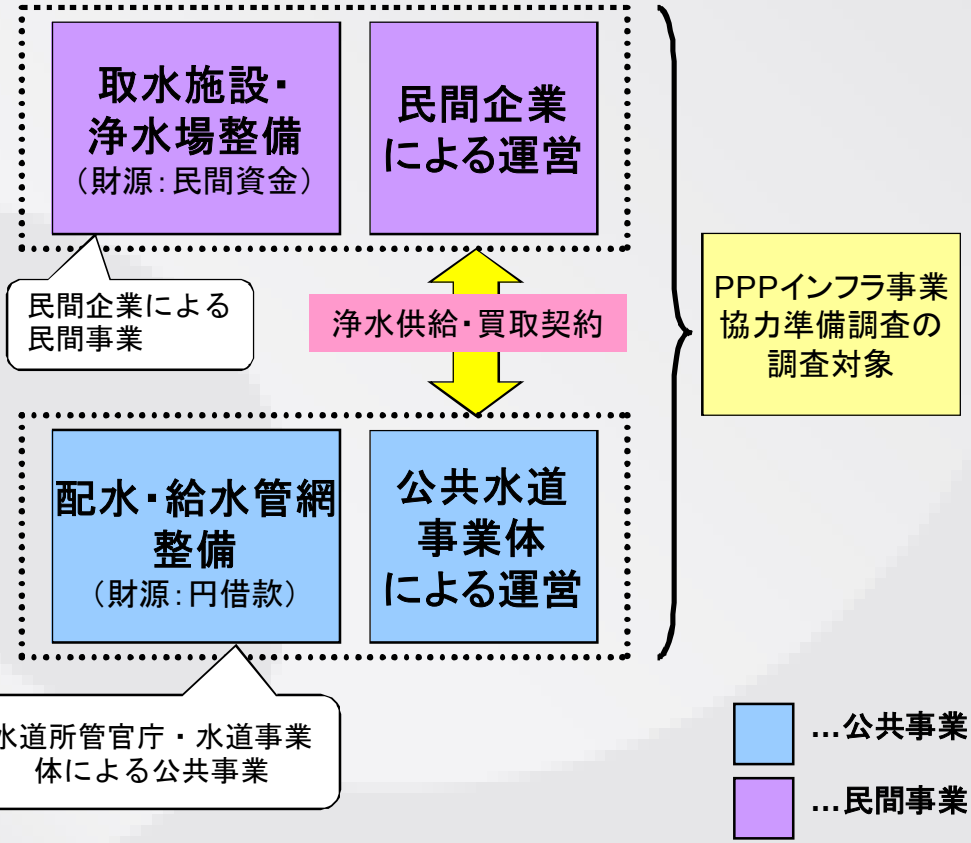
水インフラ海外展開支援
PPP事業の促進
（PPPインフラ事業協力準備調査）

水道事業におけるPPPインフラ事業の例

＜通常のODAプロジェクトの例＞



＜PPPインフラ事業の例＞



水インフラ海外展開支援

民間資金を補うファイナンス
海外投融資

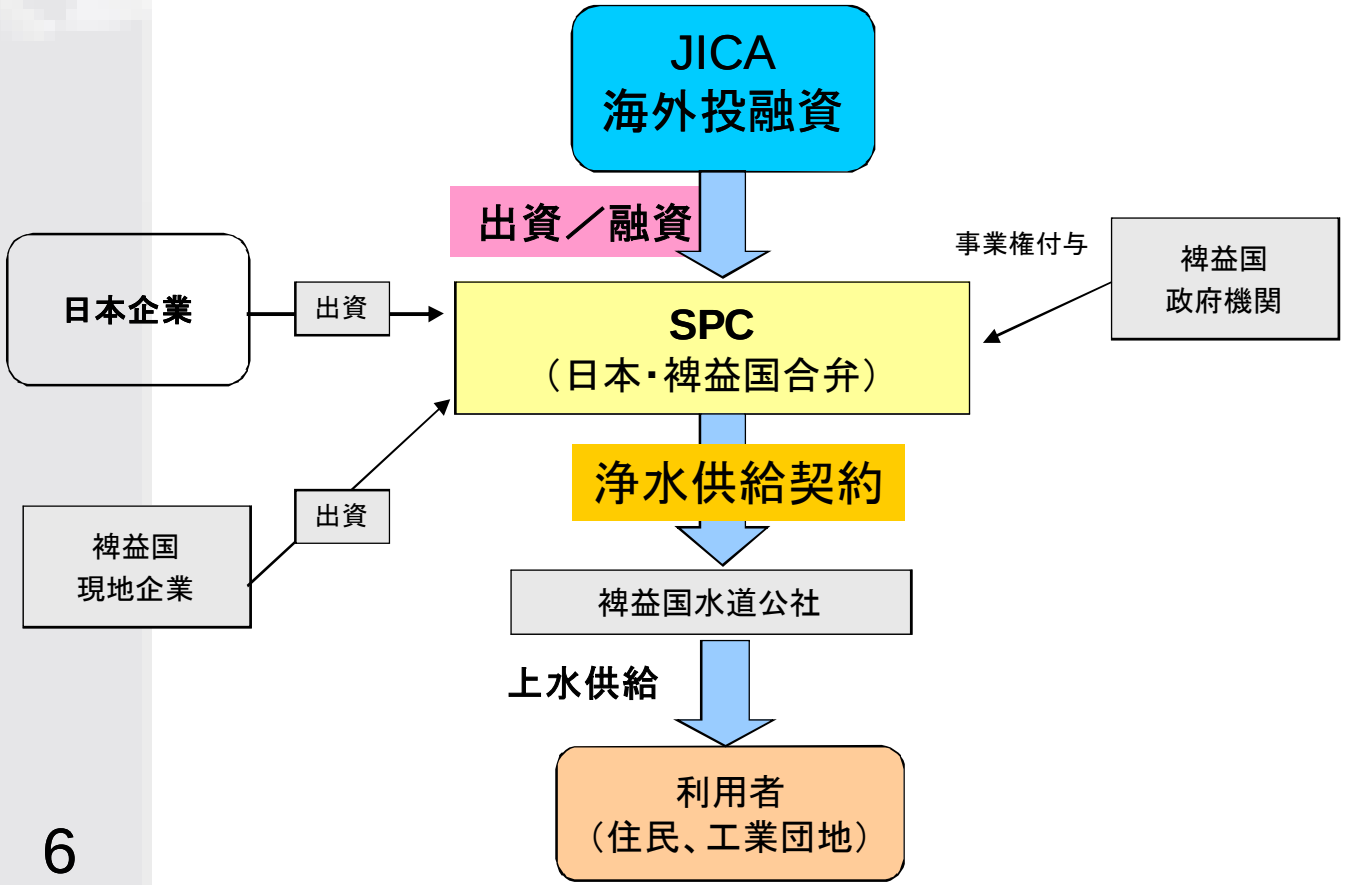
制度設計中：政府等と協議中のため変更の可能性あり

- **対象分野**
  - MDG・貧困：貧困層を直接受益者とする事業への支援
  - 気候変動対策：気候変動等により貧困層が蒙る負の影響の予防・軽減
  - インフラ・成長加速化：貧困削減に向けた生活・成長の基盤整備
- **出資**
  - **出資対象**
  - 商業的に妥当性のあるプロジェクトもしくはファンド
  - 例：PPPインフラ事業会社（SPC）、個別プロジェクトのスポンサー（日系企業/非日系企業、JVもしくは一企業体）
  - **出資比率**
  - マジョリティ出資は行わない
  - **出口戦略**
    持続可能な民間事業への移行を目指し、事前に出口戦略を設定する
- **融資**
  - 固定金利（基準金利：日本国債金利＋）*、円建貸付*、長期貸付期間（20年程度まで）・グレースピリオドを考慮

    ＊将来的には他通貨建・変動金利による融資を提供する可能性あり

水インフラ海外展開支援
民間資金を補うファイナンス
海外投融資

事例：都市化に対応する浄水供給事業
表流水を水源とした民間運営の取水施設及び浄水場建設



【開発効果】
・安全な水供給
・地下水から地表水への水源転換（地盤沈下の進行抑制、汚染された地下水による健康被害の防止）
・本邦浄水場管理運営技術の移転（遠隔監視システム）

【JICAの役割】
・計画作成支援
・金利、償還期間等緩やかな条件の投融資
・政府の政策への関与（料金設定など）
・浄水場運営にかかる専門家派遣、研修員受入

JICA's Activities on Water Related Infrastructure in Developing Countries

February 14, 2011

Japan International Cooperation Agency (JICA)
Global Environment Department

JICA's Activities on Water Related Infrastructure

At a glance

- **Support for elaboration of Sector Development Plans**
  (Technical cooperation on the development study)

  → support for elaboration of water supply master plan in developing country, in that it proposes the project that assumes the entry of Japanese company

- **Introduction and transfer of Japanese technology and experience**
  (Technical cooperation)

  → •It holds a seminar inviting the executive of water utilities in developing country to our country
  • Capacity strengthening of water utilities in developing country by Japanese experts

- **Promotion of PPP projects**
  (Preparatory survey on PPP infrastructure project)

  → Feasibility study for PPP projects that combine public portion by the yen loan and private portion in which Japanese firm participate

- **Finance that supplements the private capital**
  (Yen loan, Private sector investment finance)

  → combination of the yen loan and private capital through PPP
  •Investment/financing to company which is responsible for the private portion of PPP projects

Promotion of PPP projects
（Preparatory survey on PPP infrastructure project ）

- **1. Objective:**
- Feasibility study of PPP infrastructure project in which the yen loan is expected to be provided to its public portion, or supplementary study of existing F/S.

- **2. Target Project: PPP infrastructure project that fulfills following 4 conditions**
- ①it contributes to an economic and social development, revives, and economic stability in the developing country
- ②It is in line with the policy of Japanese Government (New Growth Strategy etc.) and JICA.
- ③There is an expectation of using the yen loan.
- ④It is PPP infrastructure project including construction and management, and an company concerned (at least one company at the joint venture) that proposes it is expected to participate by investing in the project.

- **3. Scope:**
- The scope of the study covers the whole project (including both the public portion and the private portion), and it will be confirmed whether the entire PPP infrastructure project will be feasible.

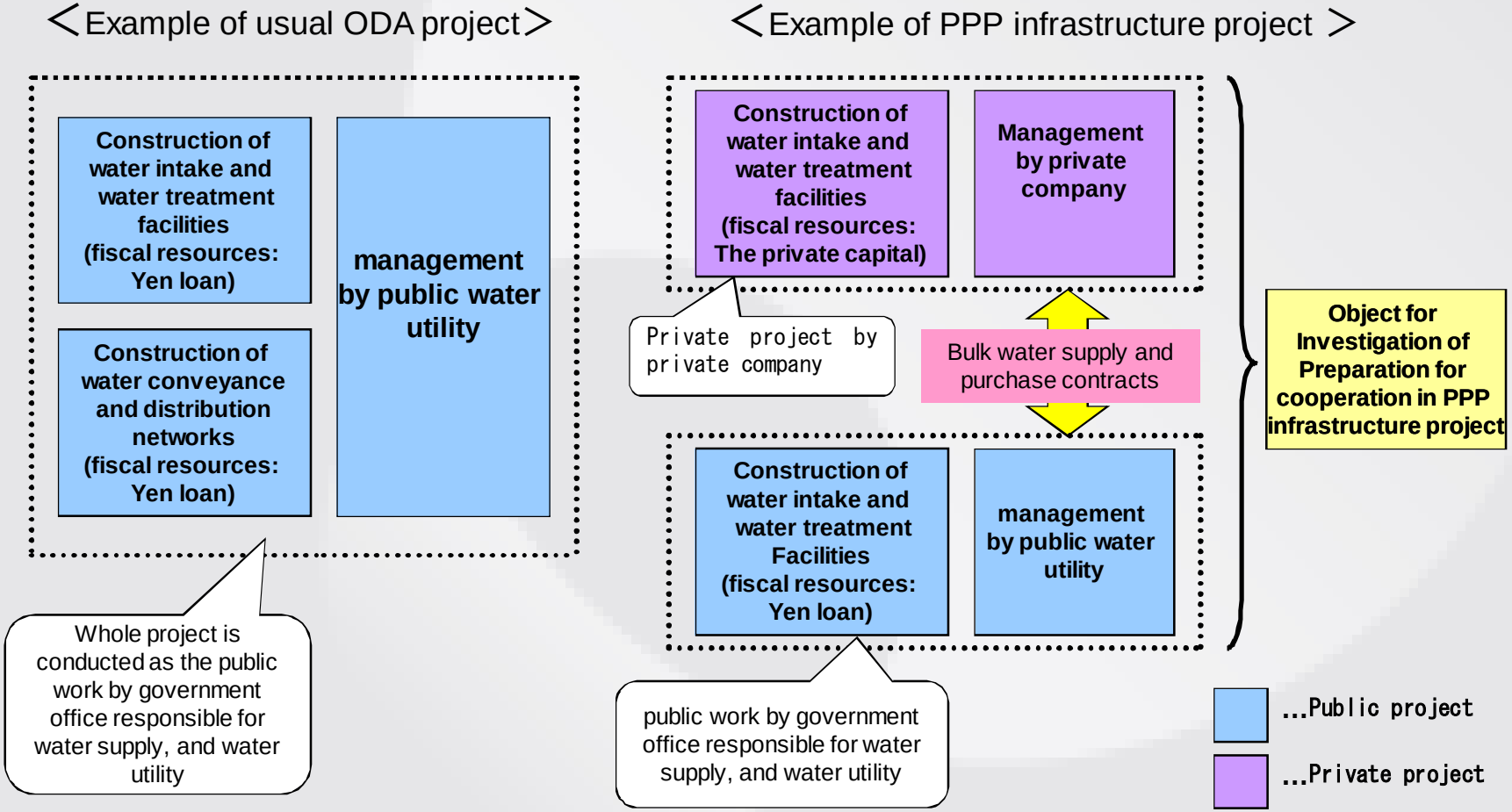
- **4. Eligible Countries:**
- All countries that are eligible for the yen loan project

- **5. Amount of funding:**
- As a rule, the amount of funding for one survey has the upper limit 150 million yen.

Support for the deployment of water infrastructure overseas

Promotion of PPP project
（Investigation of preparation for cooperation in PPP infrastructure project）

Examples of PPP infrastructure project in water service project



Finance that supplements the private capital

Private Sector Investment Finance

The system is being designed: There is a possibility of the change because one is conferring with the government etc.

Target areas

- MDGs and poverty reduction: Support to project of that direct beneficiary is the poor segment of the population
- Measures against the climate change: prevention and reduction of the negative impact on the poor segment of the population by the climatic change etc.
- Infrastructure and growth acceleration: provision of infrastructure for life and growth for poverty reduction

Investment

Investment object

- Project or fund with validity in commerce
- Example: Special purpose company (SPC) for PPP infrastructure project and Sponsor of individual project (Japanese Company/non-Japanese company, JV or one enterprise)

Ratio of capital contribution

- The majority investment is not done.

Exit strategy

the exit strategy is set beforehand with the aim of shifting to a sustainable private project

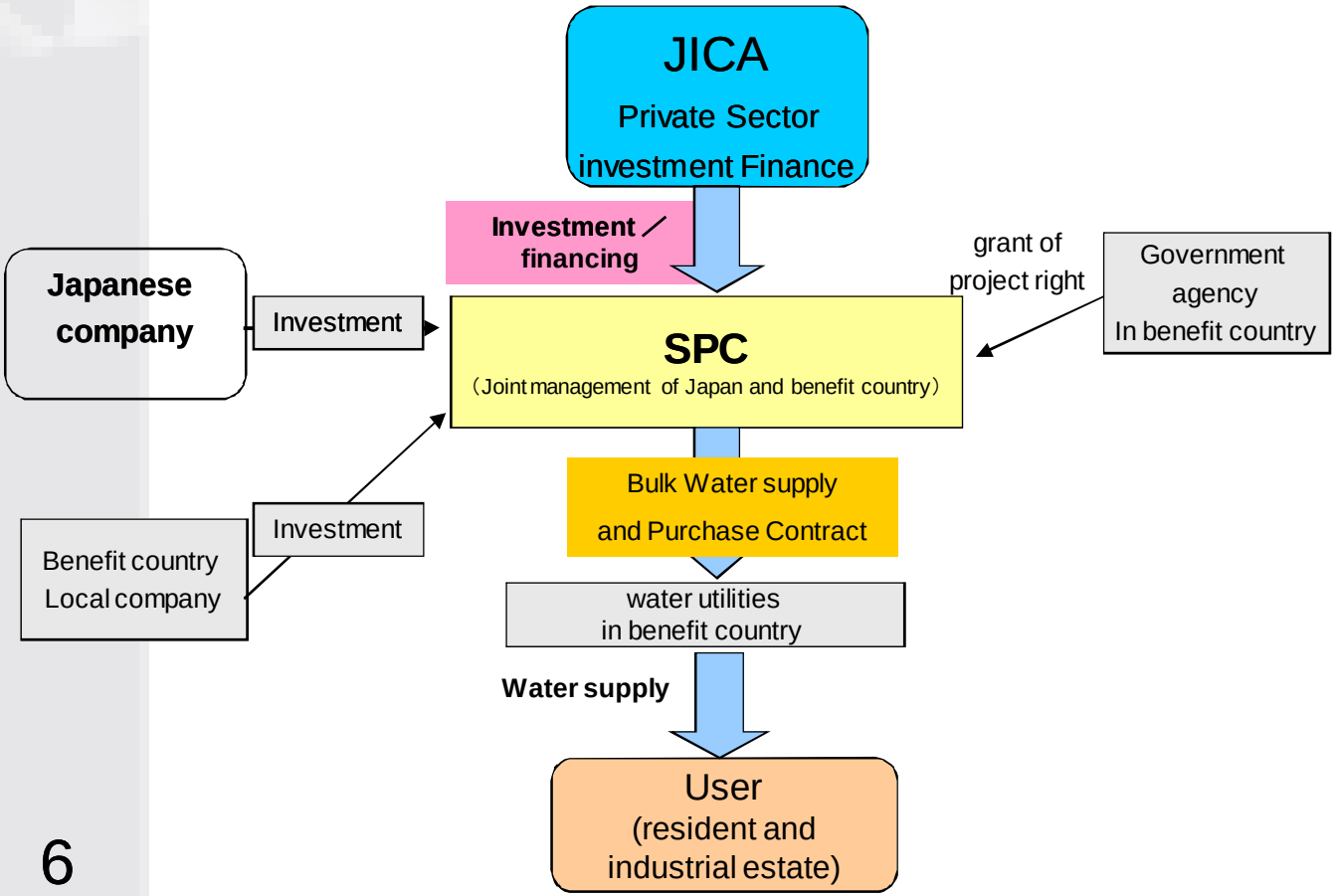
Financing

- Fixed interest rate (The key rate: Japanese government bond interest rate +) *, and yen-denominated lending *, a long-term loan period (Until about 20 years), and the Grace period are considered.

  * There is a possibility of offering the financing by another currency and the floating rate in the future.

Finance that supplements the private capital
Private Sector Investment Finance

Case: Bulk water supply project corresponding to urbanization
construction of intake facilities and water treatment plant that make surface water as the water source



【Effect of development】

- Safe water supply
- conversion of water source from underground water to surface water (control of ground subsidence and prevention of health hazard with contaminated groundwater)
- Transfer of Japanese technology on WTP operation and management (remote monitoring system, etc)

【Roll of JICA】

- Support to planning
- Investment and lending with gradual condition of interest rate and repayment period, etc.
- Recommendation to the government policy (water tariff setting etc.)
- Dispatch of Japanese expert and acceptance of trainee in Japan for WTP operation and management

日本下水道事業団の国際展開支援

日本下水道事業団とは、

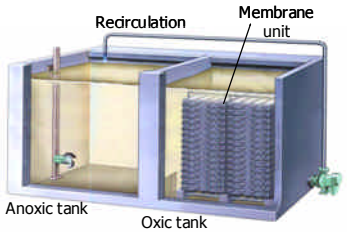
・我が国の下水道整備を促進するため1972年に設立された公的機関
・計画、設計、建設、管理と下水道のライフサイクルを一貫して支援
・約400人の下水道技術者を有する。
・我が国の急速な下水道普及の原動力(我が国の約2120箇所ある処理場の約70%の建設を支援)
・毎年約2000人、延べ約55,000人以上の下水道技術者を研修を実施
・世界にも通じる多くの技術を開発

2010年度の事業概要
建設事業　1400億円
設計事業　50億円
300プロジェクト

我が国の優れた技術の海外展開支援、各国の人材育成に貢献

・技術の開発

世界で活用できる技術を民間企業と共同で開発、実用化



MBR

・膜分離活性汚泥法(MBR)
・炭化
・担体添加活性汚泥法
・アナモックス
・りん除去
・高速嫌気性消化
・消化ガス発電

・技術の認定(検討中)

民間企業の開発した技術について、各国でのプロジェクトにおける適用性を評価

・専門家の派遣

これまで、100人以上の下水道技術者をJICA専門家として派遣。引き続き技術者の派遣を実施。

・人材の育成

JICAの要請によりOJT専門家を現地に派遣
来日研修に講師を派遣(20人以上/年)

International development support by Japan Sewage Works Agency (JS)

About Japan Sewage Works Agency:

・Public organization founded in 1972 in order to promote sewage equipment and service
・Consistent support of planning, design, construction, supervision and life cycle of sewerage
・The organization keeps about 400 engineers in sewerage engineering field.
・Driving force of rapid sewerage spread in our country
(has supported the construction of about 70% of today about 2120 existing sewage treatment plant in our country)
・Annually about 2000, and totally more than 55,000 sewage engineers have undergone training.
・has developed a lot of world-class technologies

Outline of business in fiscal year 2010

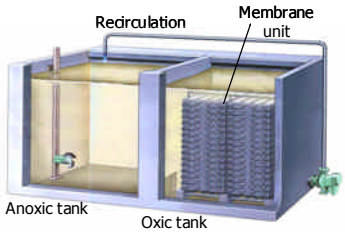
Construction business
140 billion yen
Design business
five billion yen

300 projects

support of overseas deployment of our country's excellent technology,
contribution to the personnel training in each country

・Technology development

The technology that can be used in the world has been developed and put to practical use in cooperation with the private company.



MBR

・Membrane bioreactor (MBR)
・Carbonization
・Carrier added activated sludge method
・Anammox
・Phosphorus removal
・High efficiency anaerobic digestion
・Digestion gas power generation

▪ Recognition of technology (now considering)

Evaluation of applicability of the technology, that the private company has developed, in the project in each country

・ Dispatch of experts

Dispatch of more than 100 sewage engineers till now as JICA experts. Dispatch of engineers continued

▪ Promotion of talented people

Based on the requirements from JICA , JS has dispatched OJT experts to the actual spot.

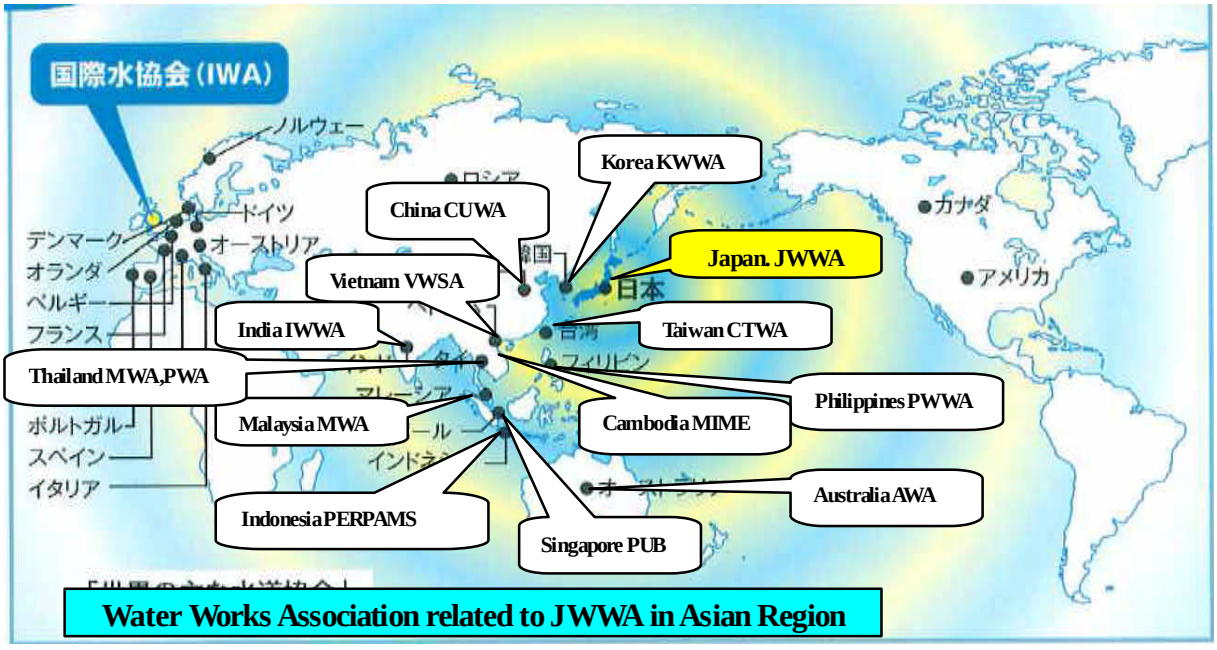
JS has dispatched trainers to the Visit-to-Japan-sessions. (more than 20 annually)

日本水道協会の水インフラ海外展開支援に関する取り組み

（社）日本水道協会

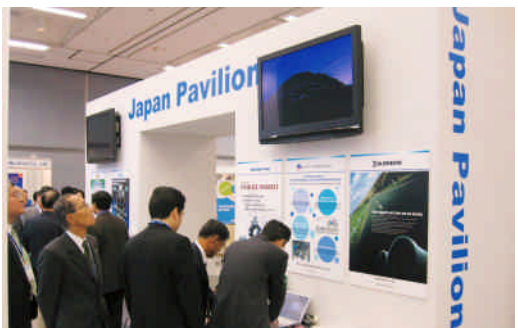
１、各国水道協会との連携強化

日本水道協会では、海外水道事情の把握、水道事業関係団体とのネットワークを形成するため、国際水協会（ＩＷＡ）に加わり、各国の水道協会等と様々な形で交流を行っている。これらの活動を通じ、水ビジネスチャンスに繋がる情報の収集・発信に努めている。現在、いくつかの水道協会とＭＯＵ締結など、さらに関係を深めているところである。*（右の写真：2010 年 1 月、横浜でインドネシア・ベトナム・インド水道協会およびカンボジア鉱工業省と情報交換）*



２、国際会議における我が国水道技術のＰＲ

国際水協会（ＩＷＡ）では偶数年に世界会議、奇数年にアジア太平洋地域会議を開催している。その際に本会が中心となり企業及び水道事業体とともに展示会に Japan Pavilion を出展し、浄水技術、漏水防止技術など日本企業の技術・ノウハウのプロモーションに取り組んでいる



2009 年台湾会議でのジャパン･パビリオン

2010 年モントリオール会議でのジャパン・パビリオン

また、本年 10 月には、東京においてＩＷＡアジア太平洋地域会議を開催することになっており、日本の水道の高い技術をアジア地域の国々に対してアピールする。

（IWA アジア太平洋地域会議ホームページアドレス　http://www.aspire2011.org/j/index.html）

３、セミナー・ワークショップ等の開催によるＰＲと情報収集

世界の水道にかかわる重要課題をテーマに、海外から講師を招きワークショップを開催している。本年も１月に「蛇口の水のプロモーション」をテーマに開催し、企業・水道事業体に最新の海外情報を提供した。

2007 年第３回別府でのワークショップ

2011 年第６回横浜市でのワークショップ

また、厚生労働省からの受託事業として、ベトナム・カンボジアなどにおいてセミナーを開催。日本企業及び水道事業体の参加のもと、我が国の水道技術のＰＲ及び海外展開のための情報収集を行っている。

（右の写真：2010 年ハイフォンでの日本-ベトナム水道セミナーの模様）

(社)日本水道協会・研修国際部国際課
〒102-0074　東京都千代田区九段南 4-8-9
電話:03-3264-2307　FAX:03-3264-2306
Email: kokusai@jwwa.or.jp

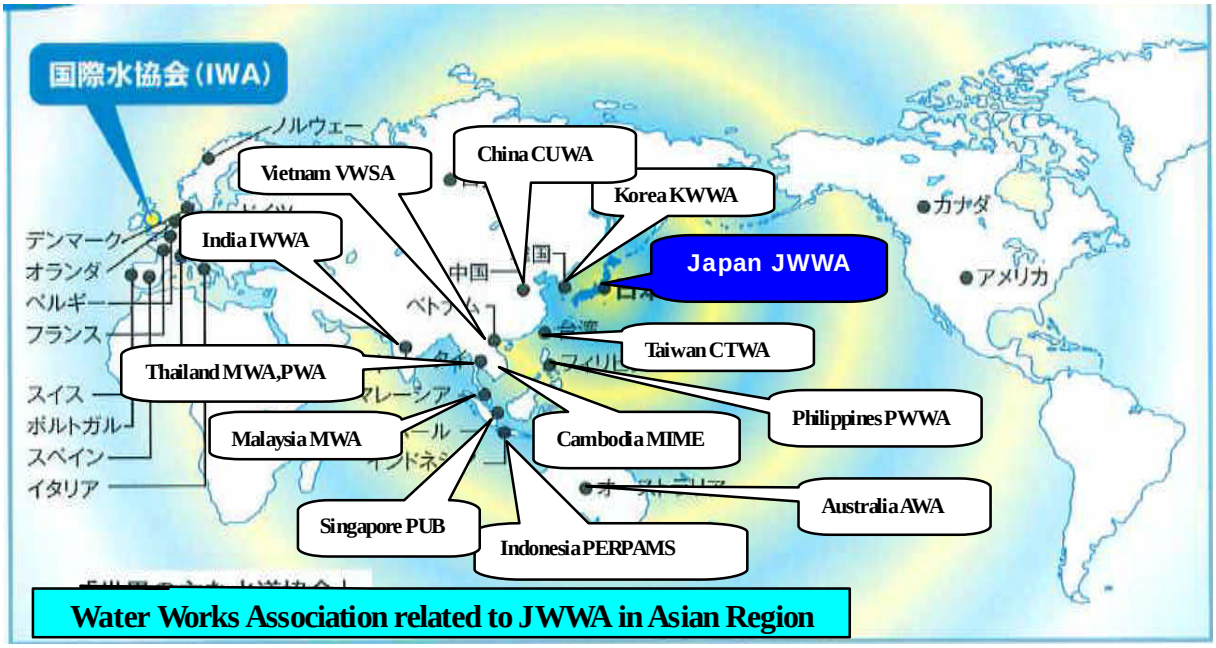
JWWA (Japan Water Works Association)'s activities to support for the Japanese water industry's contribution to solve overseas water issues

Yoshihiko Misono
Executive Director, Japan Water Works Association

1. To intensify the Partnership with overseas Water Associations

JWWA has been intensifying the partnership with the water related organization globally, especially with water supply associations/utilities of Asian countries which is shown in the map below. Besides, JWWA has been the member of IWA (International Water Association) and got involved in world water community to enhance the partnership. JWWA has the intention to strengthen the human and information network among those countries, in order to provide Japan's water industry with opportunities of contributing to solve water issues worldwide through business activities. JWWA is now going on to tighten the bonds with several associations by MOU.

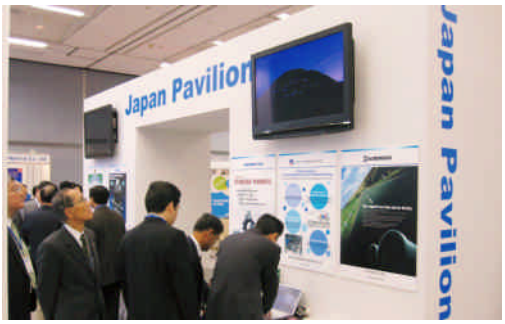
Above photo shows JWWA discussed with the member of the water association of Indonesia, Vietnam, India and MIME of Cambodia.



2. To promote Japanese Water Technology as Solution of Water Issues Worldwide

JWWA has organized the Japan Pavilion at exhibition of the IWA World Congress and the IWA-Asian Pacific Regional Conference (ASPIRE) which are held every year by turns. JWWA has invited Japanese water utilities and companies and promoted the Japan's advanced water treatment technologies, leakage prevention know-how and so forth at the exhibition.

Next photo shows left is Japan Pavilion in Taiwan 2009 and right is In Montreal 2010.



This year, the ASPIRE conference is being held in Tokyo on October 2-6, and we are expecting many oversea attendees who might enjoy and realize the Japan's characteristics of water technology in Tokyo.

(IWA ASPIRE 2011 Website: www.aspire2011)

3. To organize Seminars and Workshops discussing Solution of Water Issues

JWWA has organized seminars and meetings in Vietnam, Cambodia and so on for these few years which were entrusted by the Ministry of Health, Labour and Welfare. Through the event, Japanese water utilities and companies made promotion of water technologies and delivered some ideas for solution of problems to the participants of respective countries.

IWA Workshop in Beppu 2007

IWA Workshop in Yokohama 2011

Moreover, JWWA has co-organized international workshops in Japan with IWA almost every year. Several specialists were invited to the workshop every time, and told oversea information to Japanese audience that are very useful to up-date topics and provide hints for water business worldwide.

Vietnam-Japan Waterworks Seminar in Haiphong 2010

International Div. , JWWA
4-8-9, Kudan-minami, Chiyoda-ku
Tokyo 102-0074
kokusa@jwwa.or.jp

Activities of NEDO

(New Energy and Industrial Technology Development Organization)

1. **Overview of NEDO**
2. **NEDO's Activity for Water Technologies**

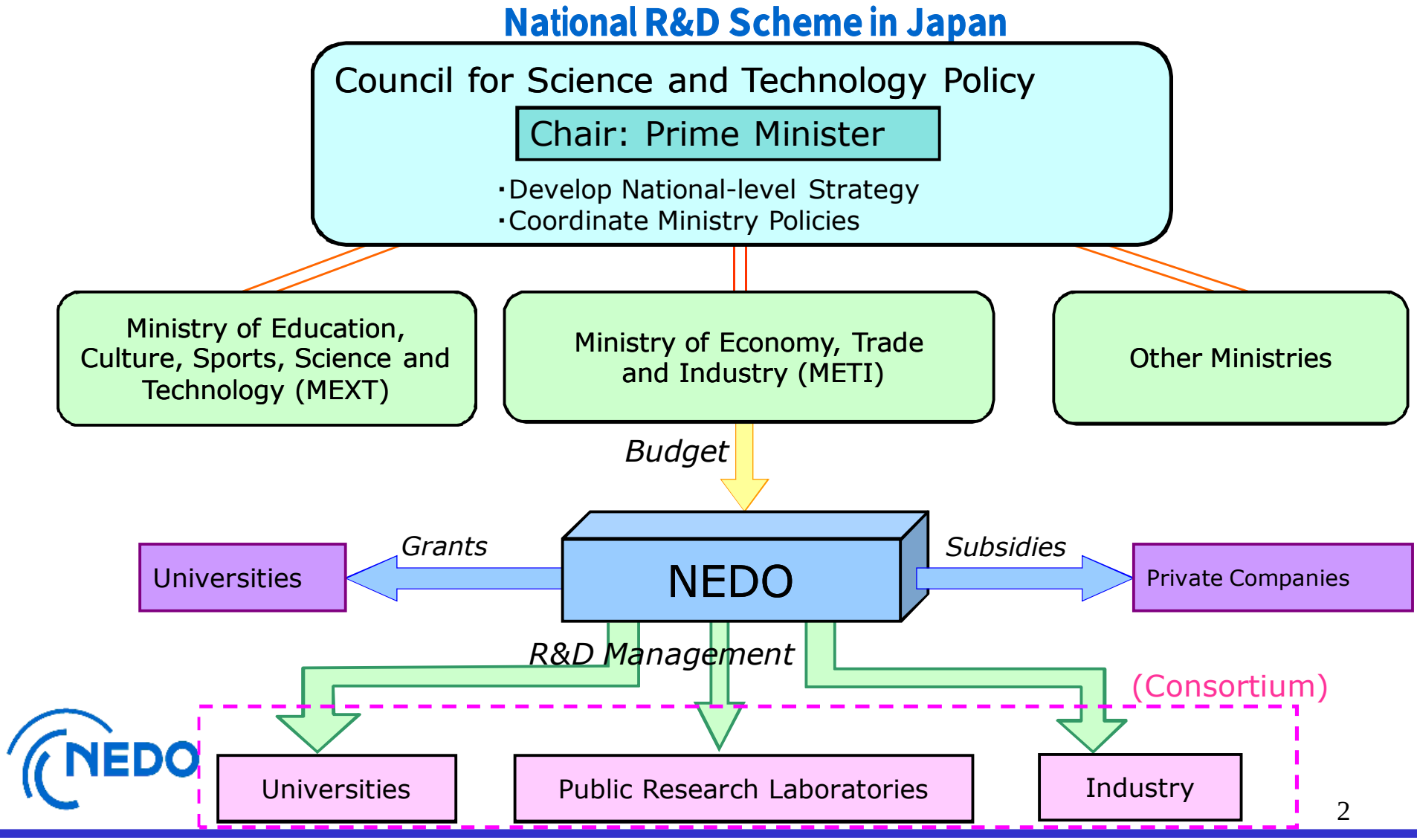
Feb. , 2011

http://www.nedo.go.jp

Overview of NEDO

- Designation: Incorporated Administrative Agency under the jurisdiction of Ministry of Economy, Trade and Industry (METI)
- Foundation : 1980
- Personnel : Approx.1,000
- Budget : ¥209.7 billion (FY2010)
  (USD2.6 billion （1USD≒¥82）)
- Mission :1. Enhancement of Japan's industrial competitiveness
  2. Addressing energy and global environmental problems
- Role of NEDO: Promote R&D projects
  - Advanced R&D project management
  - R&D activities with flexible and agile project management

Overview of NEDO



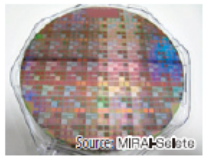
Overview of NEDO

Main Activities of NEDO:

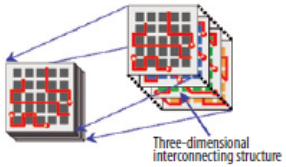
1. R&D of industrial technologies
2. Introduction and dissemination of new energy and energy efficient technologies
3. Contribution to fulfillment of Japan's Kyoto Protocol commitment (acquisition of emission reduction credits through Kyoto Mechanisms)
4. International cooperation

Overview of NEDO

Electronics & IT

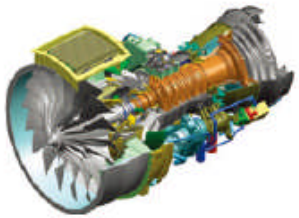


Evaluation device for detecting semiconductor and LSI design/ manufacturing flaws

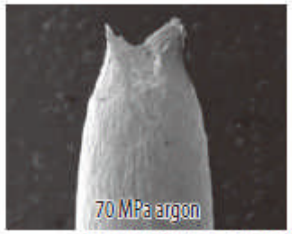


"Dream chips" create new value added

Aircraft & Space

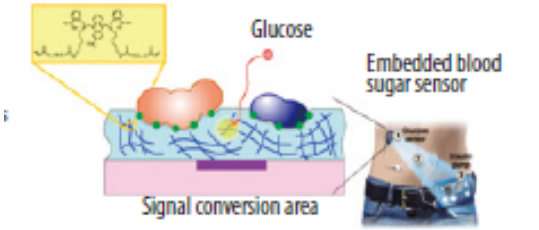


Fuel cells & Hydrogen



Impact of hydrogen on metals undergoing tensile testing

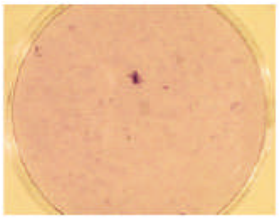
Machinery systems



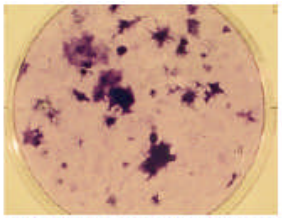
Embedded biosensor device continuously measures blood sugar level

Robot separating waste material at a construction site

Chemical sub. management



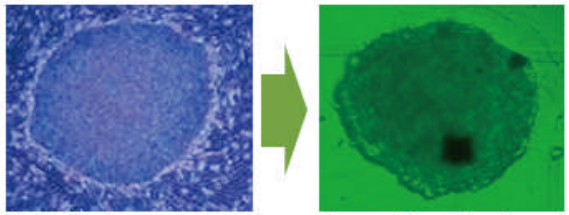
Cells for carcinogenicity evaluation cultured without chemical substances



By introducing carcinogenic substances to cells, cellular properties are altered and the cells grow in clusters.

Biotechnology & Medicine

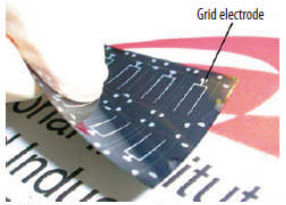
Induction of cardiac muscle cell differentiation from human iPS cell



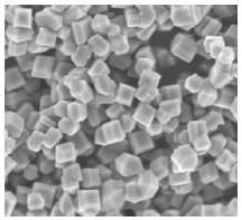
Human iPS cell

Human cardiac muscle cell

Energy & Environment



Flexible CIGS PV cell with ceramic substrate



High-performance UV photocatalyst

Offshore wind power generation facility in Setana, Hokkaido

©Toray

NEDO's Activity for Water Technologies

Activity for Water Technologies

Project on Water-saving Recycling Systems

（Period:2009～2013）

(Budget: about ¥7billion≒USD0.1billion)

・Developing advanced water treatment technology and testing water resource management systems in Japan and overseas

Objectives

Contributing to the resolution of global water resource problems

1. Development for advanced technologies
2. Test-bedding for dissemination of newly developed systems

NEDO

Activity for Water Technologies

Project on Water-saving Recycling Systems

Theme

1. Development for advanced technologies
   RO, NF, MBR, Metal recovery, AOP, etc

2. Test-bedding for dissemination of newly developed systems
   6 countries (Australia, Japan, UAE, China, Vietnam, Thai, Egypt, Singapore)

   11projects (SWRO, MBR, Reuse, Leakage control, Control of water distribution, Rainwater harvesting etc.)