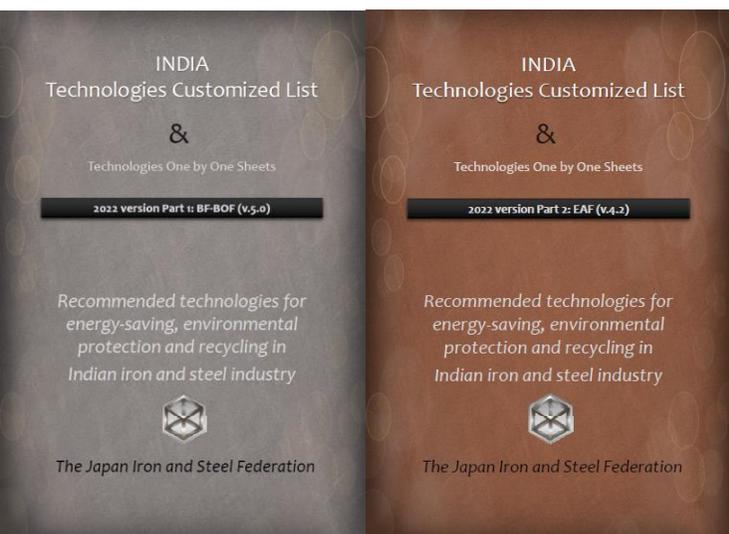


技術カスタマイズドリストの概要

一般社団法人 日本鉄鋼連盟
2022年1月



技術カスタマイズドリフト(TCL)とは何か？

- ◆ TCLはエコソリューションの活動の1つとして作成
- ◆ 現在、インド向けとASEAN向けのそれぞれのTCLがある
- ◆ TCLは対象国や地域の製鉄所にふさわしい以下の高炉や電炉技術を掲載
 - 1.省エネ
 - 2.環境保全
 - 3.リサイクル
- ◆ 各国でのCO₂削減効果や投資回収年数の情報も記述



技術カスタマイズドリストの目的

- 地球規模での温暖化対策を具体化するためのツール
- 相手国の政府は、ポジティブリストとしての活用が可能（自国の省エネ、環境保全等の技術導入を支援するためのフレームワークの作成等）
- 相手国の鉄鋼メーカーは、自社に適した省エネ、環境保全、リサイクル技術を調べ、直接エンジンメーカーにコンタクトをとることが可能

技術カスタマイズドリフトの変遷

参考文献

- APP-STF SOACT Handbook (Dec. 2010)
- NEDO Handbook (2008)
- EU-IPPC BAT Reference Document Jun. 2011, Draft)
- USA-EPA BACT (Oct. 2010)
- Other valuable technologies unlisted above references

a

準備

- 日本の鉄鋼専門家が、ふさわしい技術をリストアップ



c

製鉄所診断

- 製鉄所診断を実施



b

調査

- 質問票を通じて各国鉄鋼業の技術について調査

d

対象国や地域と日本両国の専門家での議論



対象国や地域にふさわしい技術をカスタマイズ

TCL完成



TCL作成上のポイント

Point 1
鉄鋼専門家の
技術知識を反映
している

Point 2
日本鉄鋼業の経
験を反映している

Point 3
各国の状況を考慮
している

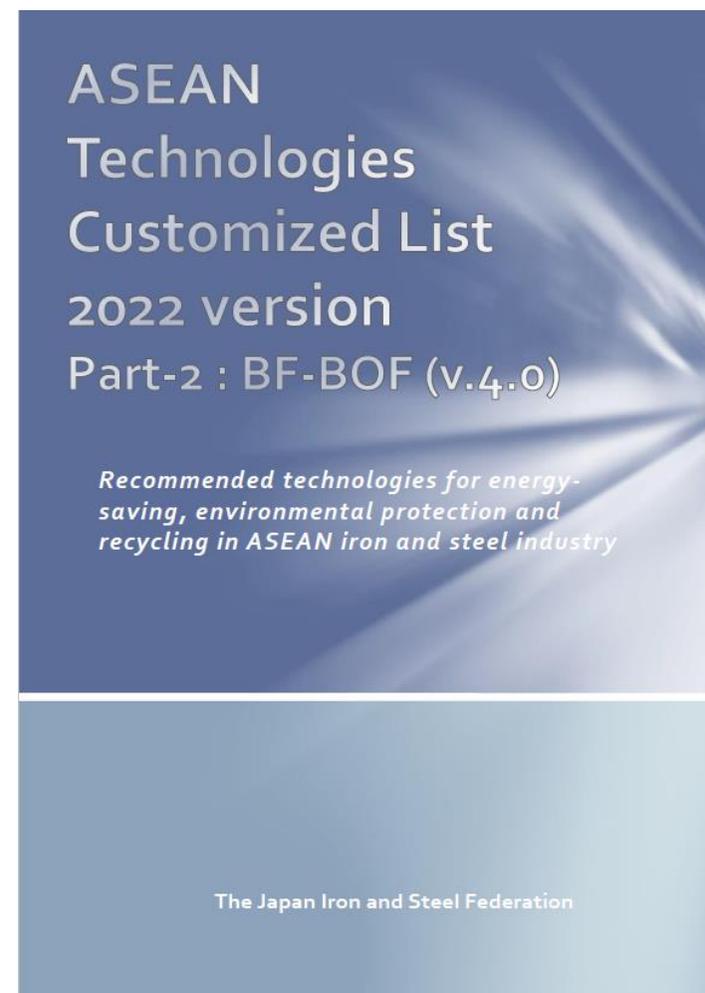


技術カスタマイズドリフト

(例)ASEAN向け技術カスタマイズドリフト第4.0版(高炉)

目次:

- 1. Energy-Saving Technologies
 - 1-1. Technologies Customized List.....4
 - 1-2. Technologies One by One Sheet...8
- 2. Environmental Protection Technologies
 - 2-1. Technologies Customized List...35
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- Contact Points of Suppliers.....56
- ANNEX1.
Guidance for calculating the profit, assumed
investment cost and payback time for your country



技術カスタマイズドリフト一覧

Technologies Customized List of Energy Saving Technologies for ASEAN Steel Industry 2022 version part-2: BF-BOF (v.4.0)

No.	Name of Technology	Technical Description	Expected Effects of Introduction								Estimation Details	Co-benefits
			Electricity Savings kWh/t of product	Fuel Savings GJ/t of product	CO2 Reduction							
					kg- CO2/t of product							
					Thailand	Indonesia	Vietnam	Philippines	Malaysia	Singapore		
Sintering (product: sinter)												
A-1	Sinter Plant Heat Recovery (Steam Recovery from Sinter Cooler Waste Heat)	The device recovers the sensible heat in the hot air with temperature of 250C to 50C from a sinter cooler.	-	0.25	23.85 (emission factor: steam coal)						-	SOx, NOx, Dust
A-2	Sinter Plant Heat Recovery (Power Generation from Sinter Cooler Waste Heat)	This is a waste gas sensible heat recovery system from sinter cooler to generate electric energy.	22.10	-	12.11	17.04	13.24	11.32	14.81	10.74	-	-

1

技術名

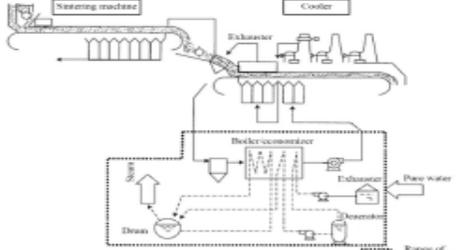
3

期待される効果

2

技術の説明

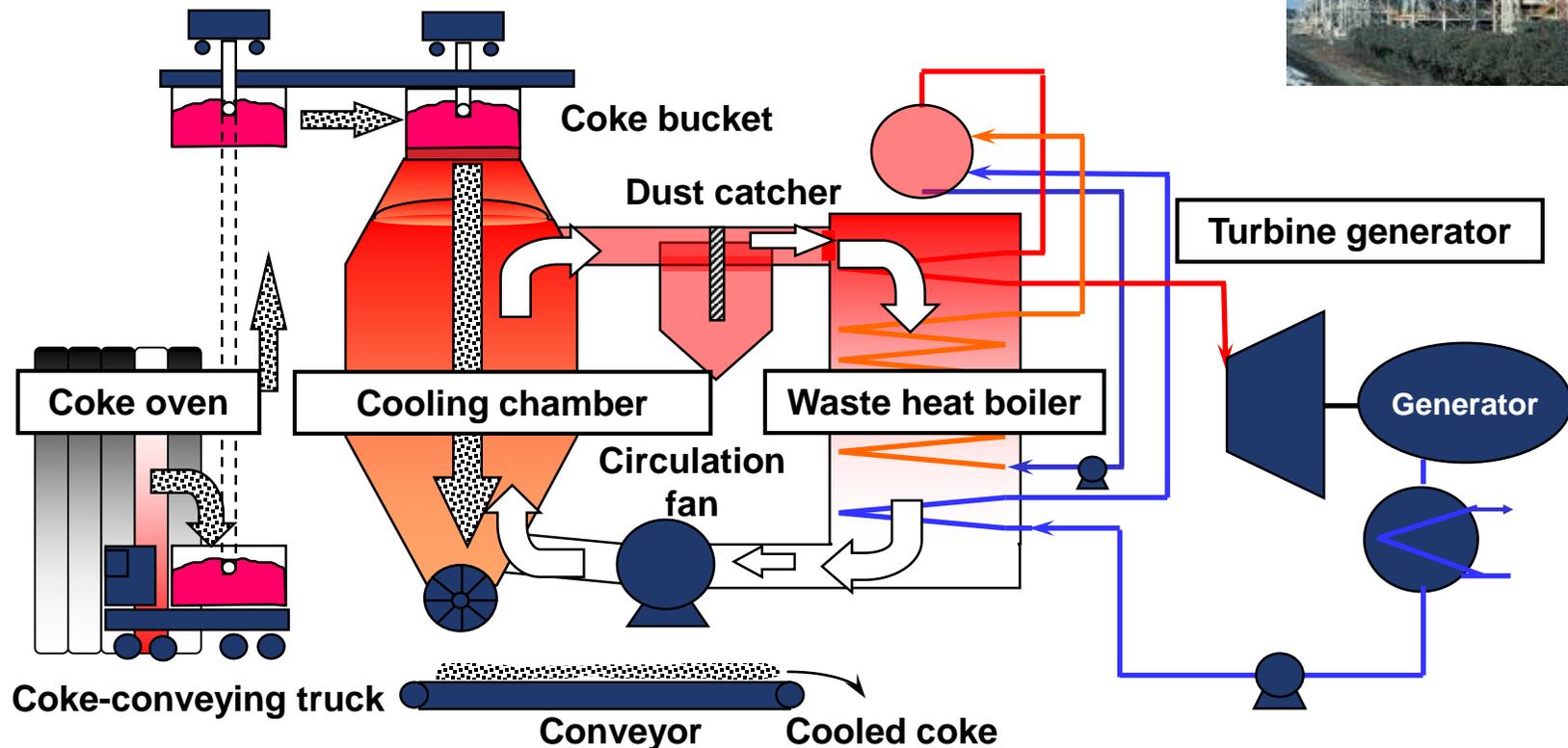
一件一葉シート

<p>ナンバー →</p>	<p>A-1</p>	<p>Sintering Sinter Plant Heat Recovery (Steam Recovery from Sinter Cooler Waste Heat)</p>	<p>技術名 ←</p>
<p>工程系統図 →</p>	<p>1. Process Flow</p>	 <p>Steam recovery system from sintering machine</p>	
<p>導入効果 →</p>	<p>2. Technology Definition/Specification</p>	<p>技術の説明と仕様</p> <p>This device recovers the sensible heat in the hot air with temperature of 250 C to 450 C from a sinter cooler. It comprises mainly; a) boiler/economizer, b) pure water feed device, c) deaer, d) steam After heat is introduced to the boiler/economizer to generate steam and is recycled to the cooler. Unit recovery of waste heat is on the order of 60,000 kcal/t-sinter The sensitive heat can be recovered by one or more of the following ways: -steam generation in a waste heat boiler -hot water generation for local heating -preheating combustion air in the ignition furnace -power generation</p>	<p>導入コストと耐用年数 ←</p>
	<p>3. Investment Cost & Operating Life</p>	<p>Equipment cost : approx. ¥3,000 million (annual sinter production : 1 mil. ton/y) [177 Crore] Construction cost: approx. ¥500 million [30 Crore]</p>	
	<p>4. Effect of Technology Introduction</p>	<p>-Reduction of CO₂ Emission : 23.86kg-CO₂/t-sinter -Fuel Savings : 0.251GJ/t-sinter [NEDO] : 60,000 kcal/t-sinter/ 1,000,000 * 4.186</p>	
	<p>5. Direct Effect (Annual Operating Cost)</p>	<p>-Economic Effect (payback time) : Equipment only : approx. 22.1 years [11.6 years] : Including construction cost : approx. 25.8 years [13.5 years] Annual steam recovery : 60,000 * 10⁶ kcal/y Reduction in crude oil equivalent : 7,500 t-crude oil/y Economic effect : ¥135.8 mil./y (=60,000 * (1.81/0.8) / 1,000) [153 Crore]</p> <p>-Productivity Improvement : Not announced -Maintenance Cost Reduction : Not announced</p>	
	<p>6. Indirect Effect (Co-benefits)</p>	<p>-Product Quality Improvement : Not announced -SO_x, Dust Decrease : Not announced</p>	
	<p>7. Diffusion Rate of Technology in Japan</p>	<p>widely spread and mostly applied</p>	
	<p>8. Japanese Main Supplier</p>	<p>JP Steel Plantech Co.</p>	
	<p>9. Technologies Reference:</p>	<p>Nippon Kokan Technical Report, 1980, No.84, 25</p>	
	<p>10. Preconditions</p>	<p>その他(サプライヤーや参考情報等)</p> <p>* Important values were revised with referring to various values in *1-4. Used values and applied preconditions. Especially as for investment cost and payback time for the case of India, revised values were indicated in []. * Payback time was defined as (Investment cost / Economical merit) in this project. * annual sinter production : 1 mil. ton/y * CO₂ emission factor of coal : 0.095 * unit cost of C heavy oil : ¥1.81/ 1,000 kcal [NEDO] overall boiler efficiency : 0.8 Economic effect : 60,000 * 1.81 /0.80 = ¥136 mil./y</p>	

Technologies Customized List #A4 (コークス製造)

(参考)コークス乾式消火設備(CDQ)

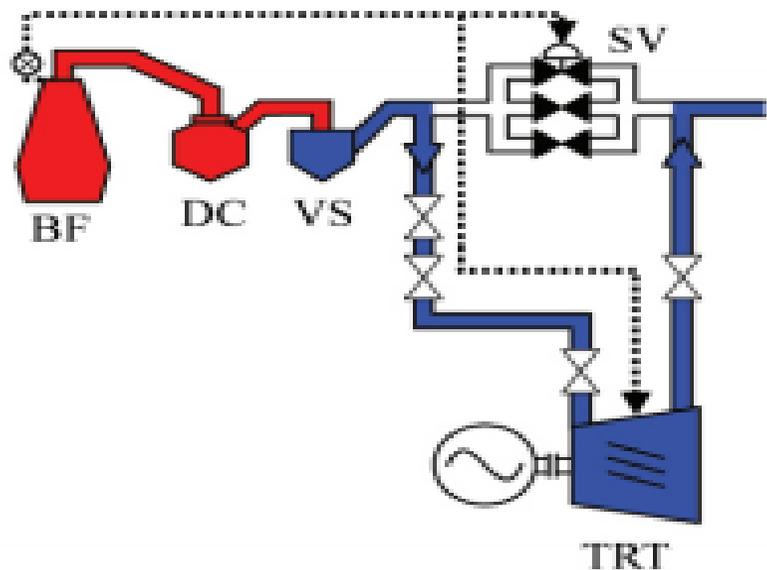
- 従来水により消火していた赤熱コークスを、不活性ガスで消火すると共に顕熱を蒸気として回収し発電に利用する設備。排熱回収の他、コークス品質向上、環境改善の効果もある。
- CDQは日本の鉄鋼メーカーのすべてのコークス炉に設置され、世界中に普及している



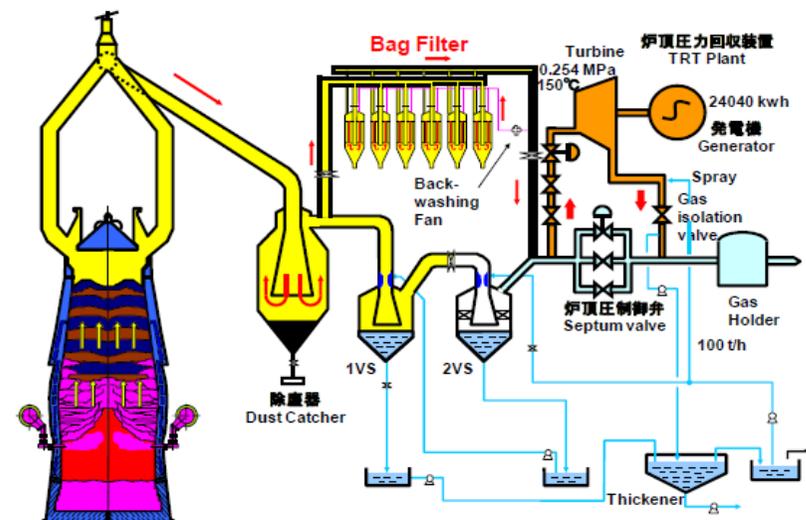
Technologies Customized List #A6 (製鉄設備)

(参考)炉頂圧回収タービン発電設備 (TRT)

- TRTは、タービン発電機を熱と圧力で動かすことで発電する設備。加えて、炉頂圧を制御する機能もある。
- TRTは日本の鉄鋼メーカーのすべてのコークス炉に設置され、世界中に普及している



Wet Type Dust Cleaner



Dry Type Dust Cleaner

サプライヤー情報

Company	Energy Saving Technologies	Environmental Protection Technologies	Contact Points
Chugai Ro Co., Ltd.	A-12: Low NOx regenerative burner system for ladle preheating A-15: Process control for reheating furnace A-16: Regenerative Burner Total system for reheating furnace A-17: High temperature recuperator for reheating furnace A-18: Fiber block for insulation of reheating furnace A-20: Oxygen enrichment for combustion air		3-6-1 Hiranomachi, Chuo-ku, Osaka 541-0046, Japan TEL: +81-6-6221-1251 FAX: +81-6-6221-1411 https://chugai.co.jp/en/
Daido Steel Co., Ltd.	A-21: Highly efficient combustion system for radiant tube burner		1-10, Higashi Sekure 1-chome, Higashi-ku, Nagoya, Aichi, 461-8581, Japan TEL: +81-52-963-7501 FAX: +81-52-963-4386 https://www.daido.co.jp/en/index.html
Fuji Electric CO., LTD.	A-23: Energy Monitoring and Management Systems	B-18: Gas Analyzer	Gate City Ohtaeki, East Tower, 11-2, Otsaki 1-chome, Shinagawa-ku, Tokyo 141-0032, Japan https://www.fujielectric.com/contact/?u_medium=g_ofnavi
JP Steel Plantech Co.	A-1: Sinter Plant Heat Recovery (Steam Recovery from Sinter Cooler Waste Heat) A-2: Sinter Plant Heat Recovery (Power Generation from Sinter Cooler Waste Heat) A-3: High Efficient (COG) Burner in Ignition Furnace for Sinter Plant A-4: Coke Dry Quenching (CDQ) A-8: Pulverized Coal Injection (PCI) System A-11: Converter Gas Recovery Device A-13: Converter Gas Sensible Heat Recovery Device A-25: Management of Compressed Air Delivery Pressure Optimization	B-15: Ring Silt Washer (RSW) Wet Gas Scrubber	Kaneko 2nd Building 4-9F 2-6-23 Shin-yokohama, Kohoku-ku, Yokohama 222-0033 JAPAN TEL: +81-45-471-3911 Fax: +81-45-471-4002 https://steelplantech.com/en/
J-POWER EnTech, Inc.		B-13: Dry Activated Coke Exhaust Gas Treatment Facilities	Deiwa NishiShimbashi Building (4F), 3-2-1, Nishi-shimbashi, Minato-ku, Tokyo, 105-0003 Japan TEL: +81-3-3434-7081 FAX: +81-3-3434-7086 Email: mail-box@jp-entech.co.jp https://www.jp-entech.co.jp/en/
Kobe Steel, Ltd.	A-26: Power Recovery by Installation of Steam Turbine in Steam Pressure Reducing Line		ON Building, 9-12, Kita-Shinagawa 5-chome, Shinagawa-ku, Tokyo, 141-8688, Japan TEL: +81-3-5739-6000 FAX: +81-3-5739-6903 http://www.kobelco.co.jp/english/machinery/inquiry/
Kobelco Eco-Solutions Co., Ltd		B-2: High-speed Filtration Equipment B-3: Multi-Stage Fluidized-Bed Activated Carbon Absorption Equipment B-5: Cooling Tower	4-7B, 1-chome, Wakinohama-cho, Chuo-ku, Kobe, 651-0072, Japan TEL: +81-78-232-8018 FAX: +81-78-232-8051 https://www.kobelco-eco.co.jp/english/
Mitsubishi Heavy Industries Environmental & Chemical Engineering Co., Ltd.		B-6: Electro Chlorination System(MGPS)	(Mitsubishi Group) MITSUBISHI HEAVY INDUSTRIES, LTD. 2-3,Marunouchi 3 Chome, Chiyoda-ku, TOKYO 100-8332 JAPAN TEL: +81-3-6275-6199 FAX: +81-3-6275-6474 https://www.mhi.com/
Mitsubishi Heavy Industries Power Environmental Solutions, Ltd.		B-1: High-Speed Coagulating Sedimentation Equipment B-4: High-Speed Air Flootation System B-8: Wet type Electrostatic Precipitator B-9: Dry type Electrostatic Precipitator B-10: Moving Electrode Electrostatic Precipitator(MEEP) B-11: Wet type Electrostatic precipitator for Scarfing Machine and Gas Cutting Machine B-12: Wet type Electrostatic Precipitator for By-Produced Gas Turbine	NISSEKI YOKOHAMA Bldg. 1-8, Sakuragicho 1-Chome Naka-Ku, Yokohama 231-0062, Japan TEL: +81-(0)45-232-4948 FAX: +81-(0)45-307-3400 URL: https://power.mhi.com/jp/group/es/
Mitsui E&S Machinery Co., Ltd.	A-6: Top Pressure Recovery Turbine (TRT)		1-1 Tama 3-chome, Tamano, Okayama, JAPAN Sales Gr. Plant Machinery Service Dept. Technoservice Div. TEL: +81-863-23-2586 https://www.mes.co.jp/machinery/english/
Mitsui E&S Power Systems Inc.	A-19: Induction type billet heater for direct rolling		MESPS Tokyo Office: TEL: +81-3-6806-1075 FAX: +81-3-5294-1121 https://www.mesps.co.jp/contact/index.html

技術カスタマイズドリフトの利点は何か？

1. 技術導入の利点が明確に説明されている

- 各国のエネルギー料金や設備設置費、CO₂排出係数をもとに各国でのCO₂削減効果や投資回収年数を掲載

2. TCLに掲載されている技術は信頼性が高い

- 日本の鉄鋼メーカーの稼働実績を通して技術の効果が実証

3. 必要な時に追加の情報が容易に入手できる

- 当該技術を有するエンジンメーカーのコンタクト先が記載