With support from: OAK FOUNDATION

INNOVATION IN RENEWABLE ENERGY POLICIES IN ARGENTINA

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Prepared for:

4th GLOBAL CLIMATE POLICY CONFERENCE (GCPC)

HARNESSING RESEARCH FOR CLIMATE AMBITION AND TRANSPARENCY

16 – 17 AUGUST 2018

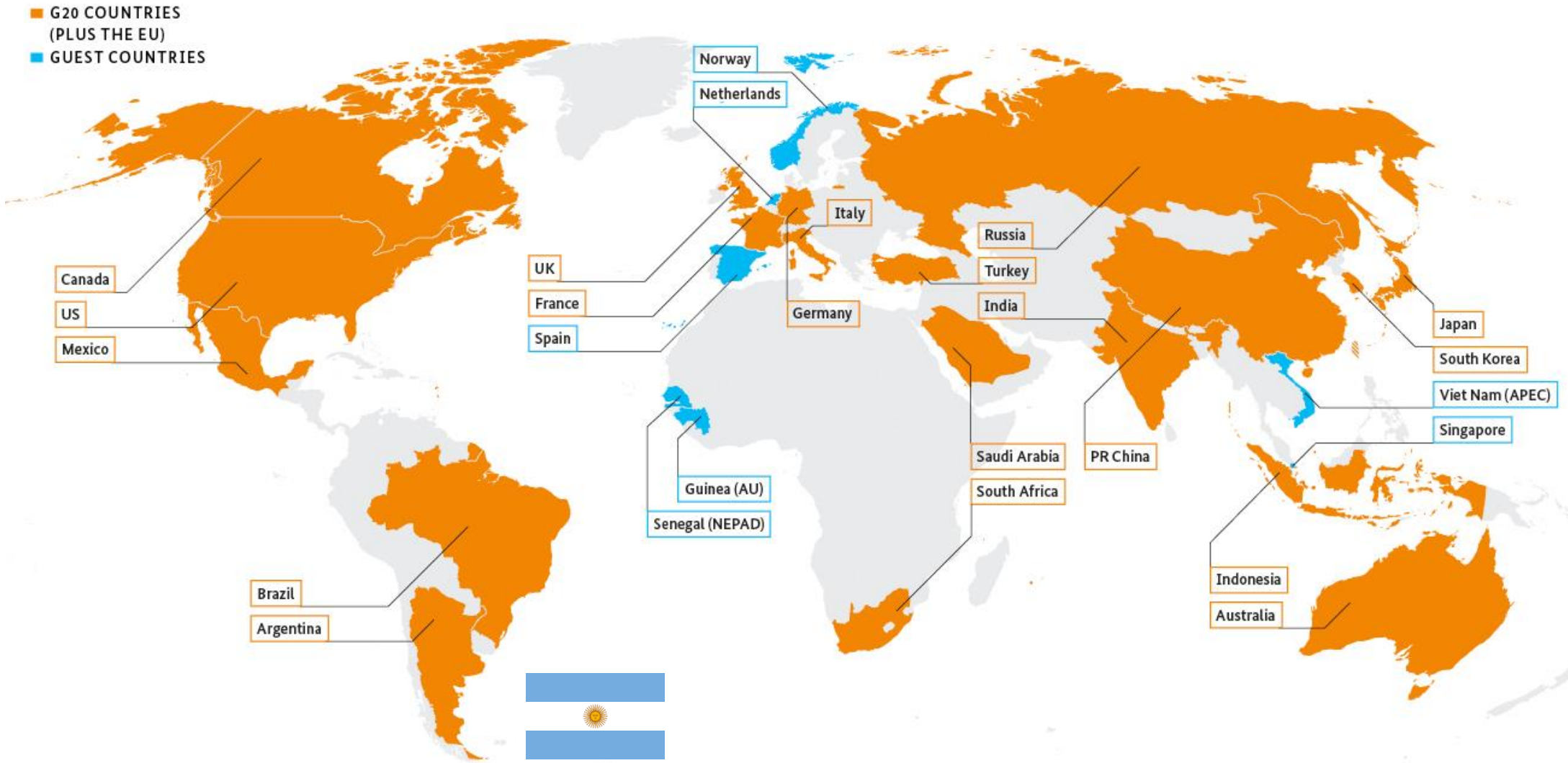
FGV 9 de Julho Room, Avenida Nove de Julho, 2029 – Bela Vista – SP

São Paulo, Brazil

Let me first tell you a bit about Argentina…

and why some <u>innovation</u> was necessary in renewable energy policy…

Argentina is a G20 country



Two and ½ decades of inconsistent energy policy

1992/2001

Privatization

US$ contracts

No planning

Price Competition

US$ rates

Low prices

Decent

Over supply

Rule-of-law

Private investment

Over

investment

Little g'vnt control

2002/2015

"Pesification" of prices and rates

Government intervention

Under investment

Energy Populism

Under supply

Subsidies

No planning

Fx restrictions

Which has resulted in…

- Price/market controls and **energy subsidies** to demand **halted investments** in upstream and power generation but **boosted demand**.
- 8 pipelines built in the late 2000´s to export natural gas to Chile, Brazil and Uruguay remain idle as exports were cancelled for **lack of sufficient production**.
- Argentina currently **imports 20-30% of its annual consumption of natural gas** while it holds some of the world largest shale gas reserves in Vaca Muerta and other plays yet unexplored.
- Argentina **imports 10-15% of its gasoline and diesel** for transportation. Oil exports are very limited.
- **Power generation became less efficient** (as older units were called in) and more **polluting** (as liquid fuels need to be used to substitute for natural gas)
- Barely **no investment in renewables** until 2016.
- Energy and transport **subsidies** amounted to **6-7% of GDP in 2012-2015**.

September 23, 2015

Clarín

Miércoles 23.09.2015

Cinco goles en 9 minutos

El polaco Lewandowski los marcó para el Bayern de Guardiola ante el Wolfsburgo en Alemania. P.78

Higuaín, afuera

Martino no lo llamó para los primeros partidos de las Eliminatorias. En cambio convocó al juvenil Paulo Dybala. P.70

Tema del día

Notable bienvenida al Papa en EE.UU.

Obama, en un gesto inusual, lo esperó al pie del avión junto a su familia. Francisco será el primer pontífice que hable ante el Congreso estadounidense. P.3

Apuntan a frenar el paralelo en medio de la campaña

Derrumbe de la Bolsa y bonos por una medida para controlar el dólar

Las acciones cayeron 6% y los títulos hasta 9,7%. Es por una resolución del Gobierno que intentaba hacer bajar el dólar "contado con liquidación". Se interpretó como una medida contra el mercado. El día siguiente de que Daniel Scioli hiciera gestos para atraer inversiones. P.50

Además...

Terror por sitios de internet que "leen" el futuro

Operativos en Rosario, Capital y zona Norte del GBA

La banda que impregnaba cocaína en arroz

La iban a mandar a Africa aprovechando un programa de la CNU. De allí seguirían a Europa. Hay 12 detenidos. P.50

Control insuficiente

Riesgo en la Illia por la expansión de la Villa 31

LA CIUDAD P.46

Stock exchange crashes among Fx control measures

December 10, 2015

Clarín

Jueves 10.12.2015

Copa Sudamericana

El sueño de Huracán terminó en Bogotá

Perdió 3-1 en los penales contra Santa Fe. El partido y el alargue habían finalizado sin goles. P.58

Larreta comenzó su gestión en la Ciudad

Coordinará su acción con la Nación y la Provincia, donde hoy asume Vidal. P.50

Tema del día Comienza una nueva etapa en el país

Macri asume: convoca al diálogo y la unidad

Jurará al mediodía en el Congreso, ante la Asamblea Legislativa. Luego recibirá el bastón y la banda presidencial en la Casa Rosada. En su discurso buscará diferenciarse claramente de la etapa kirchnerista. Hablará de "pobreza cero" y de lucha contra el narcotráfico, ejes de su campaña. Por la tarde pondrá en funciones al nuevo gabinete de ministros. P.3

DESDE EL BALCÓN Tras el fin del mandato de Cristina, apenas pasada la medianoche, Macri salió a saludar a una multitud que se congregó frente a su departamento de la Avenida del Libertador. También hubo festejos en los barrios de la Ciudad y en el GBA por el fin de la era K.

Cristina les ordenó que no vayan

Legisladores kirchneristas, divididos por la asistencia hoy a la jura de Macri

Vanoli renunció al Banco Central

Está denunciado por administración fraudulenta. Lo reemplaza Sturzenegger

En Foco • Daniel Fernández Canedo

Las cerealeras prometen US$ 3.000 millones

Inauguró un busto de Kirchner en la Casa Rosada

Cristina se despidió con una multitud en la Plaza

Criticó a los medios y a la Justicia. Cuestionó los aumentos de precios. Defendió su gestión sin autocrítica y le mandó mensajes a Macri.

Macri takes office and calls for national dialogue and unity

Renewable Energy Promotion national bill passed by Congress with 94% positive vote

President Macri takes office.
Former president Cristina Kirchner refuses to attend inauguration ceremony

March 30, 2016

Argentina´s foreign debt is still in default. Bondholders sue the country in NY.

July 21, 2016

Political crisis around subsidy fade out plan

Executive Order regulating the RE bill signed in by President Macri

Executive Order appropriating budget for RE benefits and allowing for international arbitration signed in by President Macri

However reality can be changed… as done for wind power…

RE Law #26.190 passed

GENREN tender awards 17 wind projects (750 MW)

PE Diadema (6 MW) and PE Arauco (25 MW) COD

PE Rawson I & II (80 MW) COD

PE Loma Blanca 4 (50 MW) COD

RE Law #27.191 passed

RenovAr Round 1 & 1.5 awards 22 wind projects (1500 MW)

RenovAr Round 2 awards 12 wind projects (1000 MW)

22 wind projects contracted in private market (800 MW)

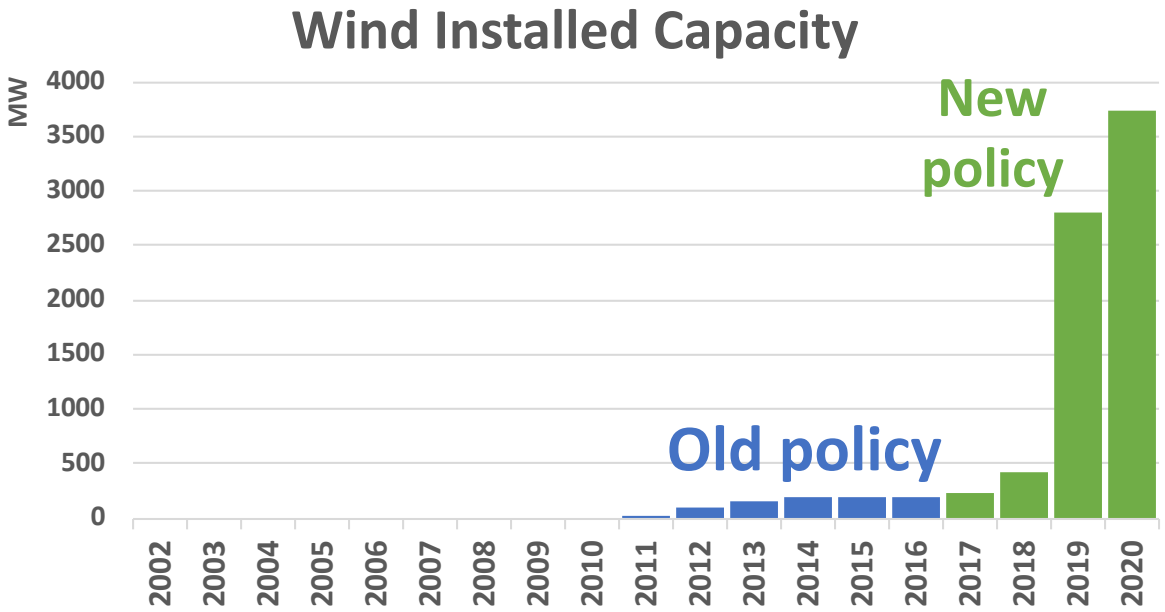
2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018

RenovAr Round 1 launched (600 MW wind)

Legacy Projects renegotiated (500 MW wind)

First RenovAr wind project COD June 2018

WTG start arrivals at Argentine ports



- ✓ 63 projects contracted (3.7 GW)
- ✓ 31 projects under construction
- ✓ 4.5 billion US$ investment
- ✓ 50% already financed long-term
- ✓ 50% of 2025 mandate already contracted (plus other technologies!)

So,

what did we do…?

…how did we innovate?

Where and how we got started

- ✓ Set clear and ambitious (but **achievable**) short term goals that would enable long-term targets

MAIN REGULATORY FRAMEWORK FOR RENEWABLES

MANDATES

8% (2018) => 16% (2021) => 20% (2025)

Enables Corporate PPAs and self-supply

RESOURCE DIVERSIFICATION

Geographical and Technological

New Utility-Scale
RE Framework
Law N° 27,191

FISCAL INCENTIVES

Applicable to IPPs and Local Manufacturers

RE DEVELOPMENT TRUST

Public Trust Fund for Guarantees and Financing

Where and how we got started

- ✓ Set clear and ambitious (but **achievable**) short term goals that would enable long-term targets
- ✓ Identified and assessed **key risks.** Then allocated them **thoughtfully**.
- ✓ Identified and summoned **key stakeholders**, made them part of the team.
- ✓ Studied **DOs and DON´Ts** of other renewable energy markets
- ✓ **Cherry-picked** what could work for Argentina plus added new ideas
- ✓ Focused on **bankability**, **execution** and **competition**
- ✓ Proceeded with **market design** and **fundamental regulation** ASAP

RE Markets

3 Contracting Mechanisms

100%
of RE Mandate

PPAs Tenders

- ✓ Guaranteed 20-year contracts
- ✓ Competitive pricing
- ✓ Incentives for local content
- ✓ Cost passed thru to demand

Private PPAs

for C&I corporates

- ✓ Freely negotiated PPA terms
- ✓ Grid access secured via competition
- ✓ RE-to-RE competition
- ✓ Fiscal benefits apply

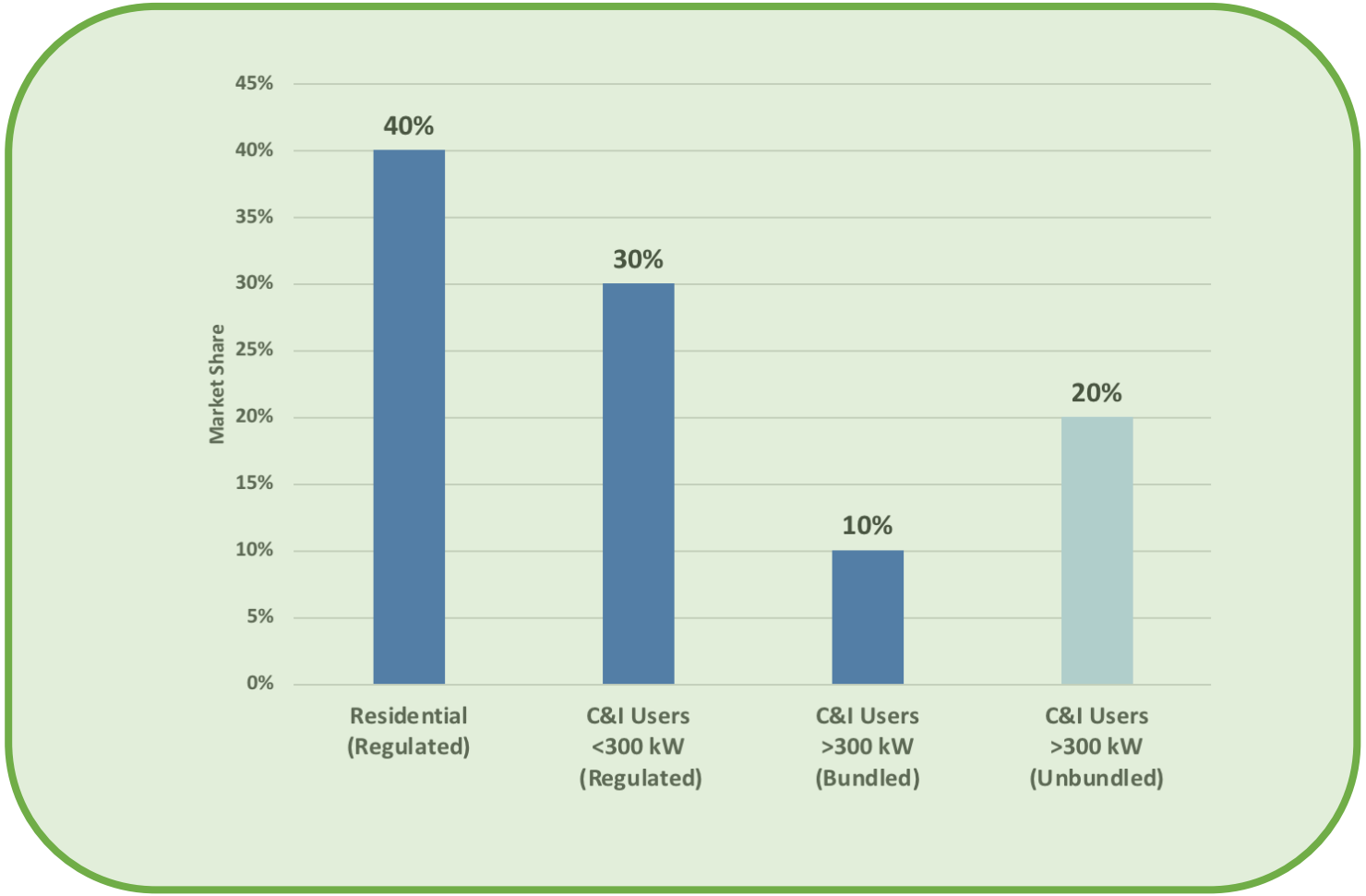
Self Generation

For C&I and residential

- ✓ Fiscal benefits apply
- ✓ Net billing for residential and small C&I

MANDATE ACHEIVED

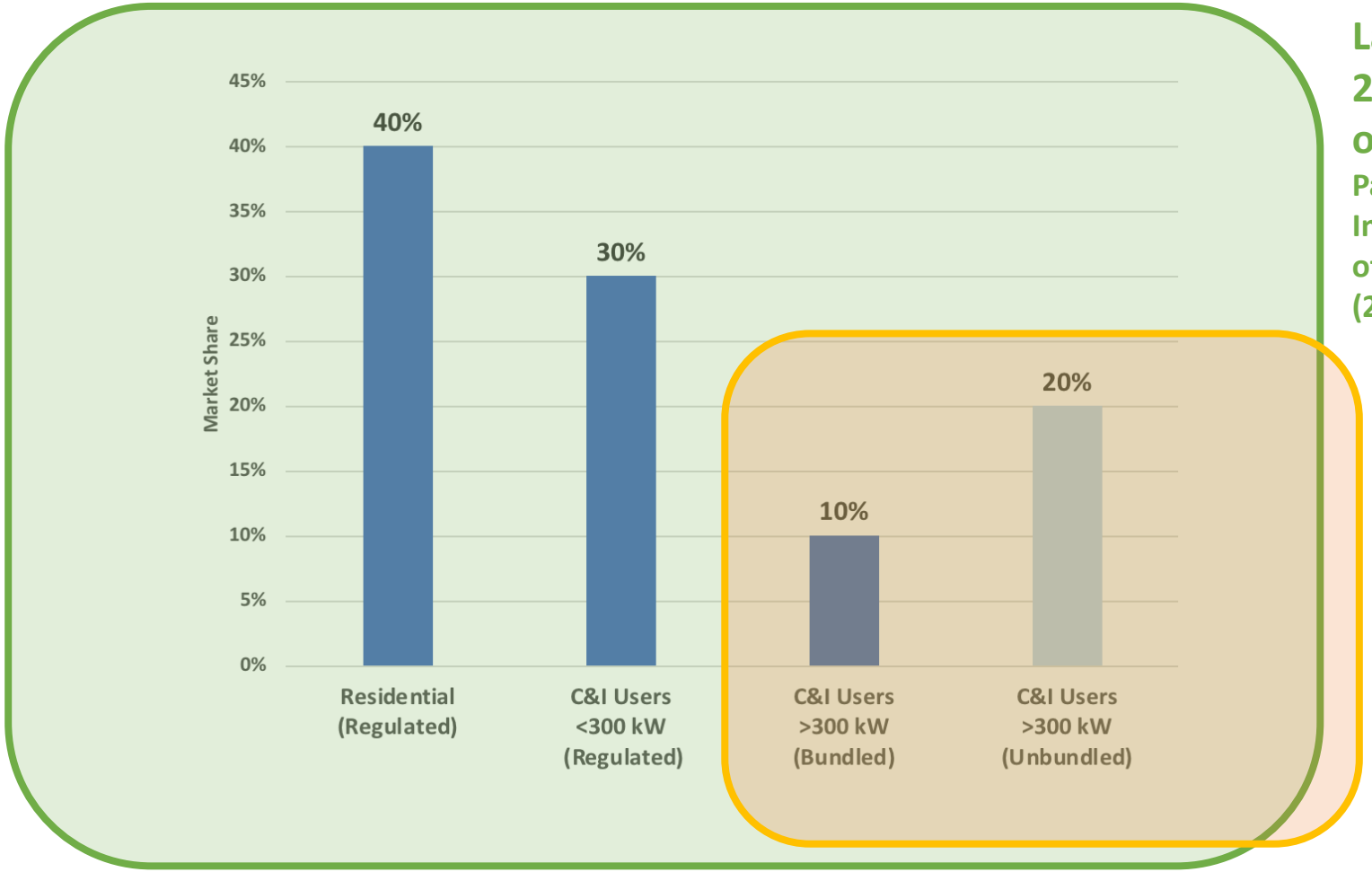
Regulation for Renewable Energy in Argentina



Law 27.191 mandates 20% RE by 2025 to 100% of power users.

Passed in September 2015. Implemented via RenovAr and other complementary actions (2016)

Regulation for Renewable Energy in Argentina



Law 27.191 mandates 20% RE by 2025 to 100% of power users.

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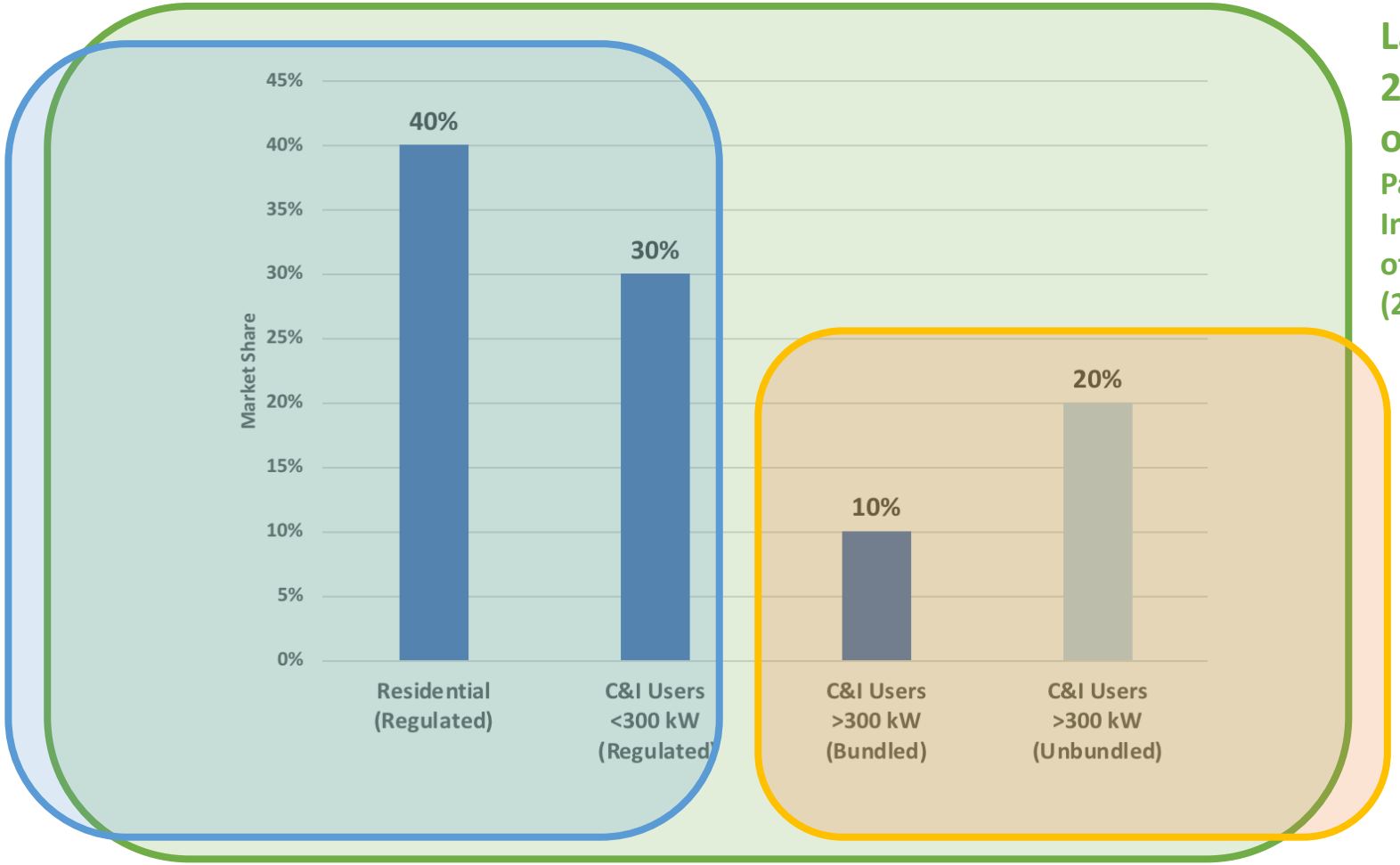
MATER (Corporate PPAs)

C&I users >300 kW have the right to purchase from IPPs and/or traders or self-supply.
Regulation published mid-2017.

Regulation for Renewable Energy in Argentina

Law 27.724 for distributed RE.
Passed late 2017. Implementation in progress. Provides de right to residencial and conmmercial users to sell excess RE into the grid.



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Regulation published mid-2017.

MOST IMPORTANT ISSUES TACKLED

ISSUE	ACTIONS / REMEDIES
Speed of Market Development towards Mandates	✓ **Step 1**: Launched ambitious tender process (**RenovAr**) privileging fully-permitted, more mature projects, financially sound sponsors. ✓ **Step 2**: Passed new regulation enabling **corporate PPAs**
Access to Long-term Financing	✓ Designed world-class **bankable project documents** ✓ Implemented sector-specific trust fund to **channel payment and early termination guarantees.** ✓ Designed a **sovereign guarantee** provided by national treasury and a last resource termination guarantee provided by the **World Bank**.
Tr**ansmission and Curtailment**	✓ Assessed available capacity and assigned such on a competitive price basis. ✓ Replicated the similar mechanism to grant dispatch priority to projects supplying corporate PPAs.
Appropriate equipment supply	✓ Increased competition in order to **incentivize the use of best-in-class technology.** ✓ Allowed tax free imports momentarily. Then further **incentivized local manufacturing** (especially WTG parts/assembly).

RenovAr Program

RenovAr - ATTRACTIVE CONTRACTUAL FRAMEWORK

2 Contracts 3 Levels of Guarantee

CONTRACTS

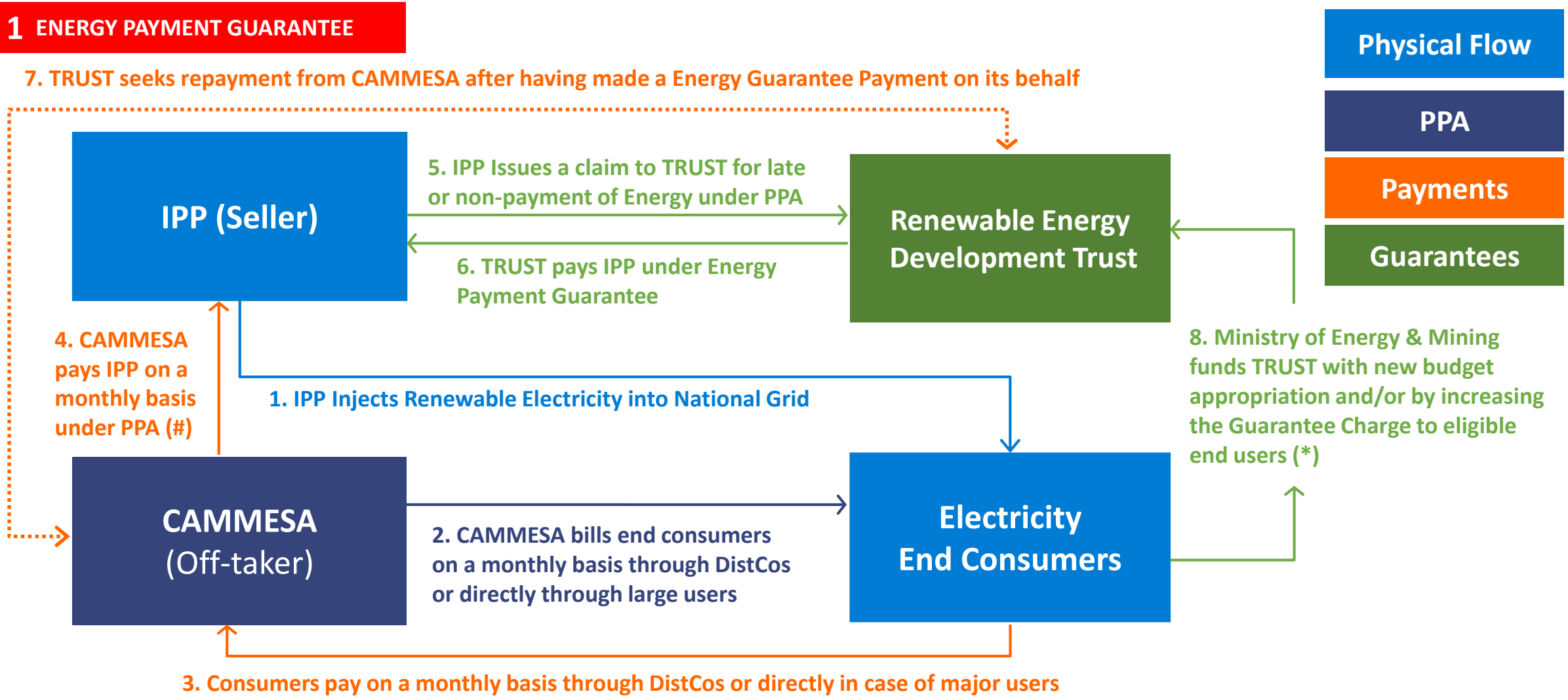
1 Power Purchase Agreement	**2** **RE DEVELOPMENT TRUST** Trust Adhesion Agreement
Energy Sales	Energy Payment and Early Termination Guarantees

GUARANTEE

1 **TRUST** Guarantee	**2** Sovereign Guarantee	**3** World Bank Guarantee
Energy Payment	Termination Payment 1	Termination Payment 2

RenovAr - LIQUIDITY GUARANTEE

1 ENERGY PAYMENT GUARANTEE

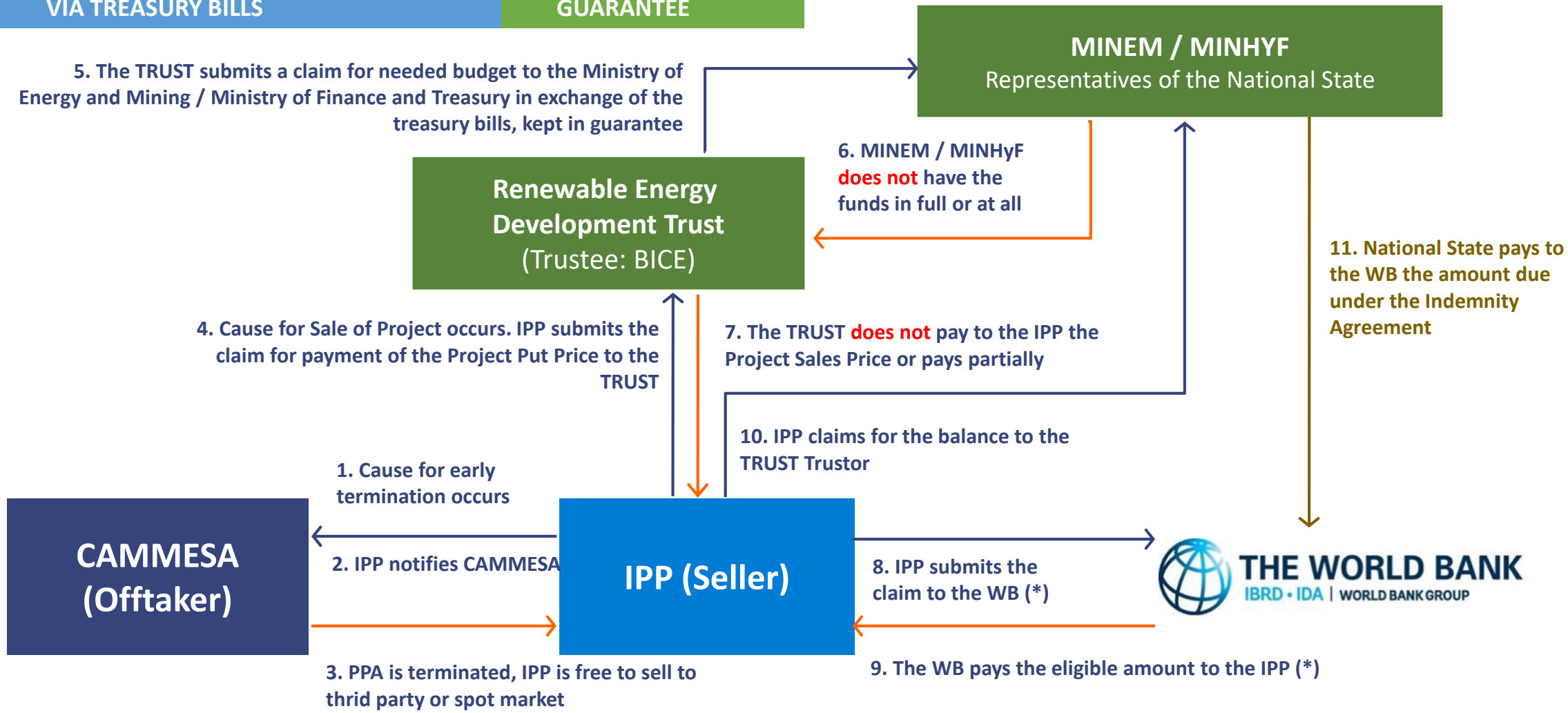


(*) To replenish FODER so that it always holds 12 months worth of eligible PPA payments as liquid reserve
(#) CAMMESA coordinates efforts with FODER on a monthly basis in order to ensure that all payments are covered in full on due date

RenovAr - SOLVENCY (TERMINATION) GUARENTEE

2 SOVEREIGN (TERMINATION) GUARANTEE VIA TREASURY BILLS

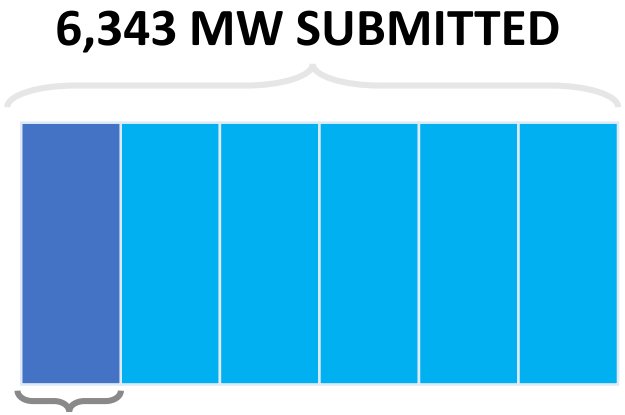
3 WORLD BANK GUARANTEE



(*) The TRUST grants individuals and legal entities which have issued projects the irrevocable right to directly submit claims before the World Bank in certain cases and to receive payments from the World Bank.

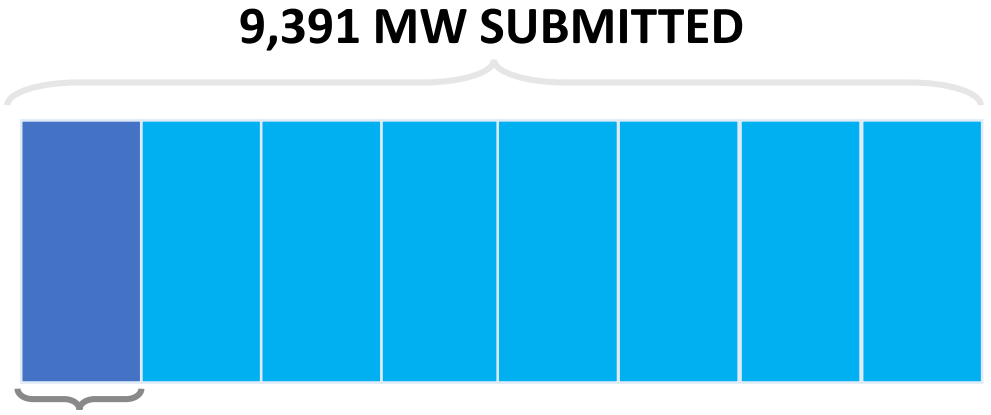
TENDERED CAPACITY VS. SUBMITTED BIDS CAPACITY

RenovAr Round 1



6 x oversubscribed

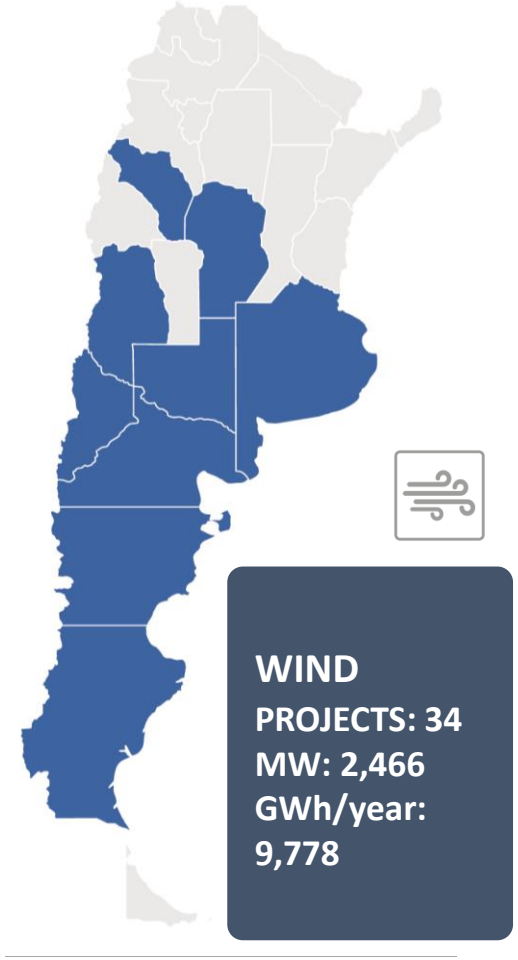
RenovAr Round 2



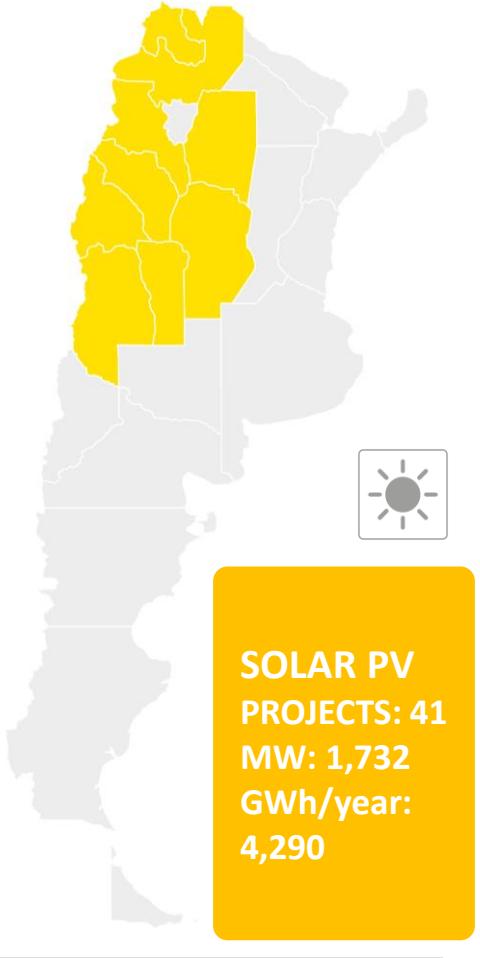
8 x oversubscribed

RenovAr ROUND 1, 1.5 & 2

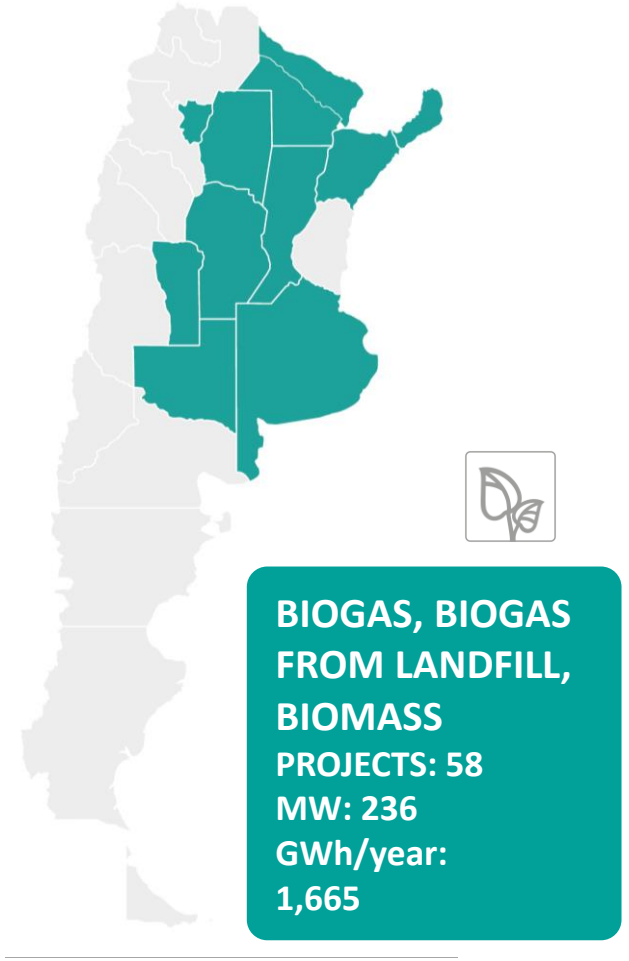
147 AWARDED Projects: 4,466 MW TOTAL AWARDED CAPACITY & 15,836 GWh/YEAR



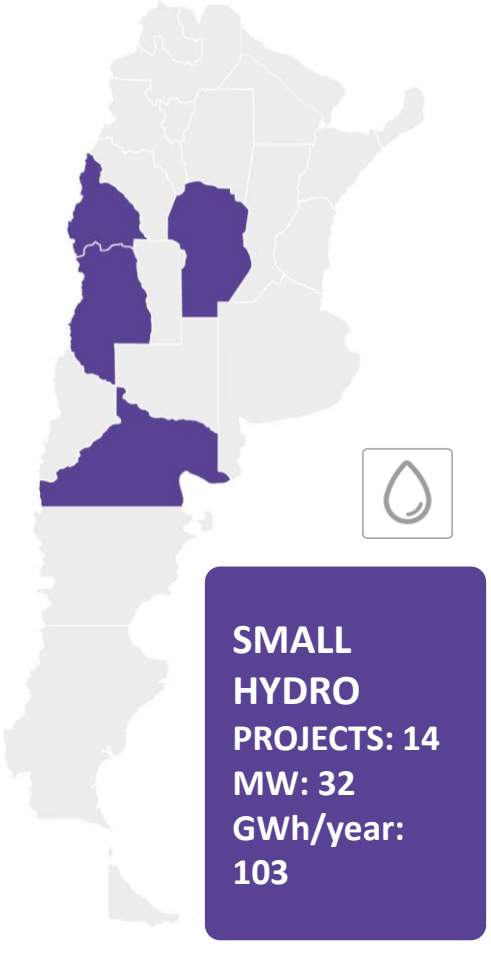
WIND
PROJECTS: 34
MW: 2,466
GWh/year: 9,778



SOLAR PV
PROJECTS: 41
MW: 1,732
GWh/year: 4,290



BIOGAS, BIOGAS FROM LANDFILL, BIOMASS
PROJECTS: 58
MW: 236
GWh/year: 1,665



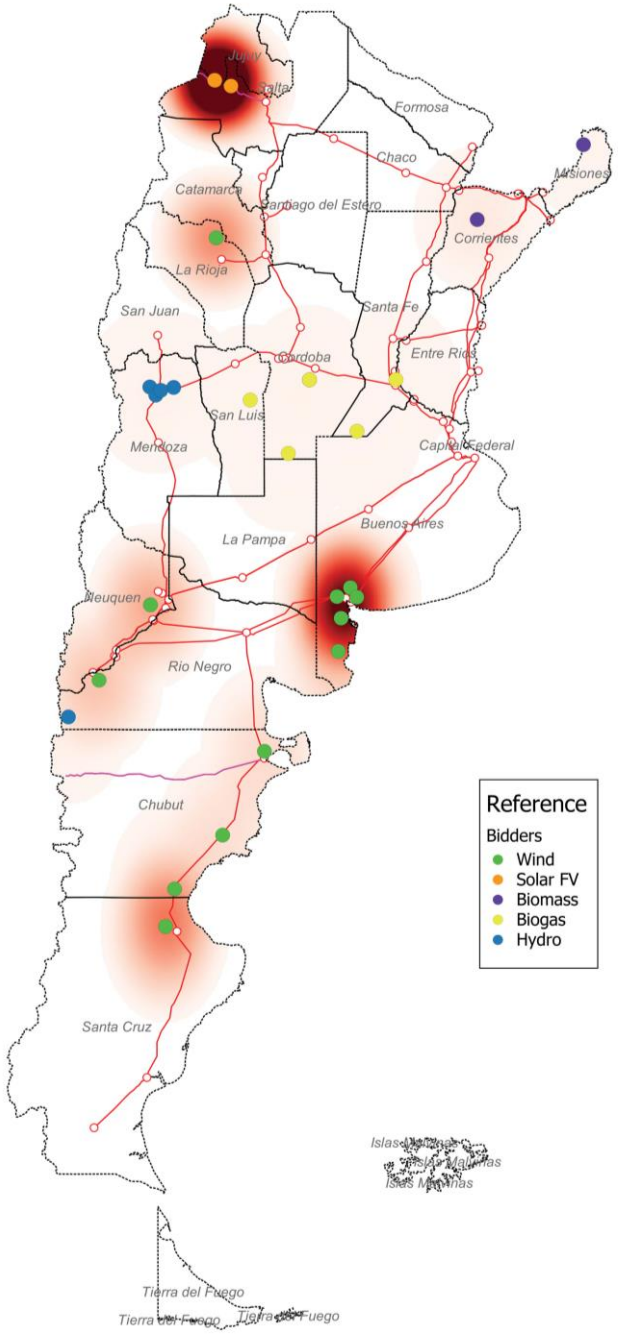
SMALL HYDRO
PROJECTS: 14
MW: 32
GWh/year: 103

Source: Ministry of Energy and Mining

RenovAr Round 1 - PROJECTS AWARDED (Oct. 2016)

Number of projects awarded: 29 for 1.1 GW

Technology	Projects	MW	GWh/year	Province
Wind	**12**	**707**	**2,882**	Buenos Aires, Chubut, Río Negro, Santa Cruz, Neuquén and La Rioja
Solar	**4**	**400**	**918**	Salta and Jujuy
Biogas	**6**	**9**	**70**	Santa Fe, San Luis and Córdoba
Biomass	**2**	**15**	**122**	Corrientes and Misiones
PAH	**5**	**11**	**68**	Río Negro and Mendoza
Total	**29**	**1,142**	**4,060**	**14 Provinces**

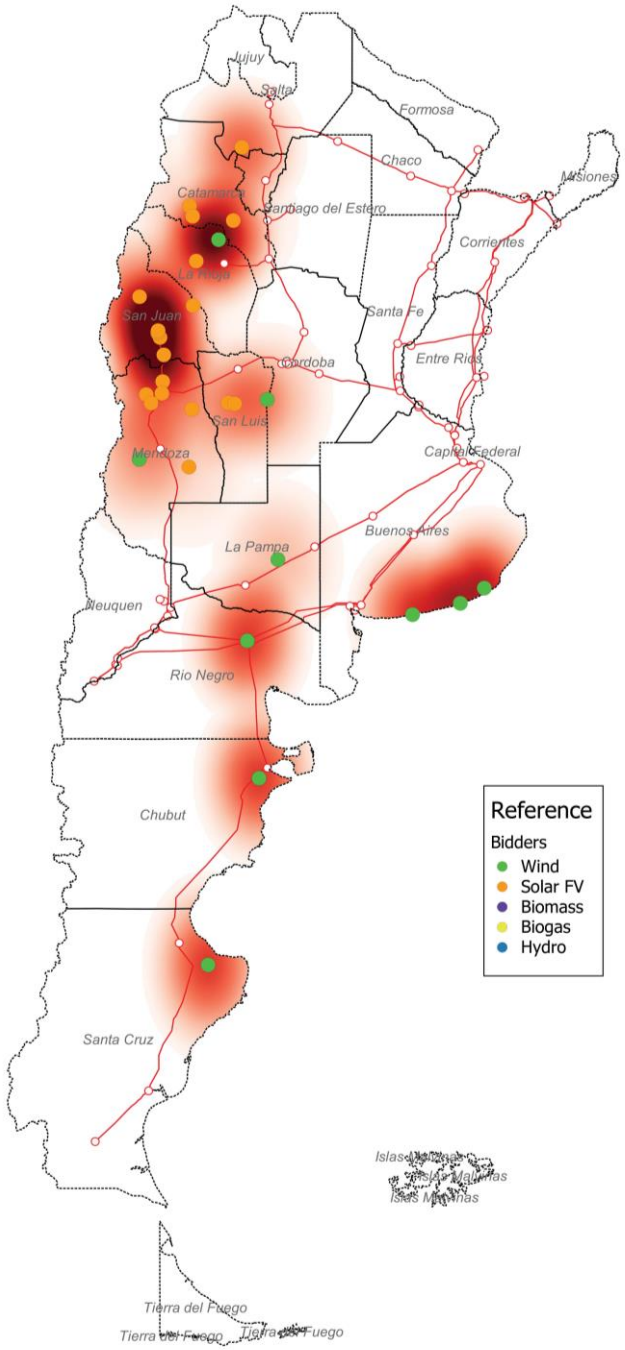


Source: Ministry of Energy and Mining

RenovAr Round 1.5 - AWARDED PROJECTS (Nov. 2016)

Number of projects awarded: 30 for 1.3 GW

TECHNOLOGY	NUMBER OF PROJECTS	AWARDED POWER CAPACITY (MW)	AVERAGE AWARDED PRICE (US$/MWh)	ANNUAL ENERGY PRODUCTION (TWh/YEAR)
WIND	10	765	53.34	3.0
SOLAR	20	516	54.94	1.3
Total	30	1,282	53.98	4.3



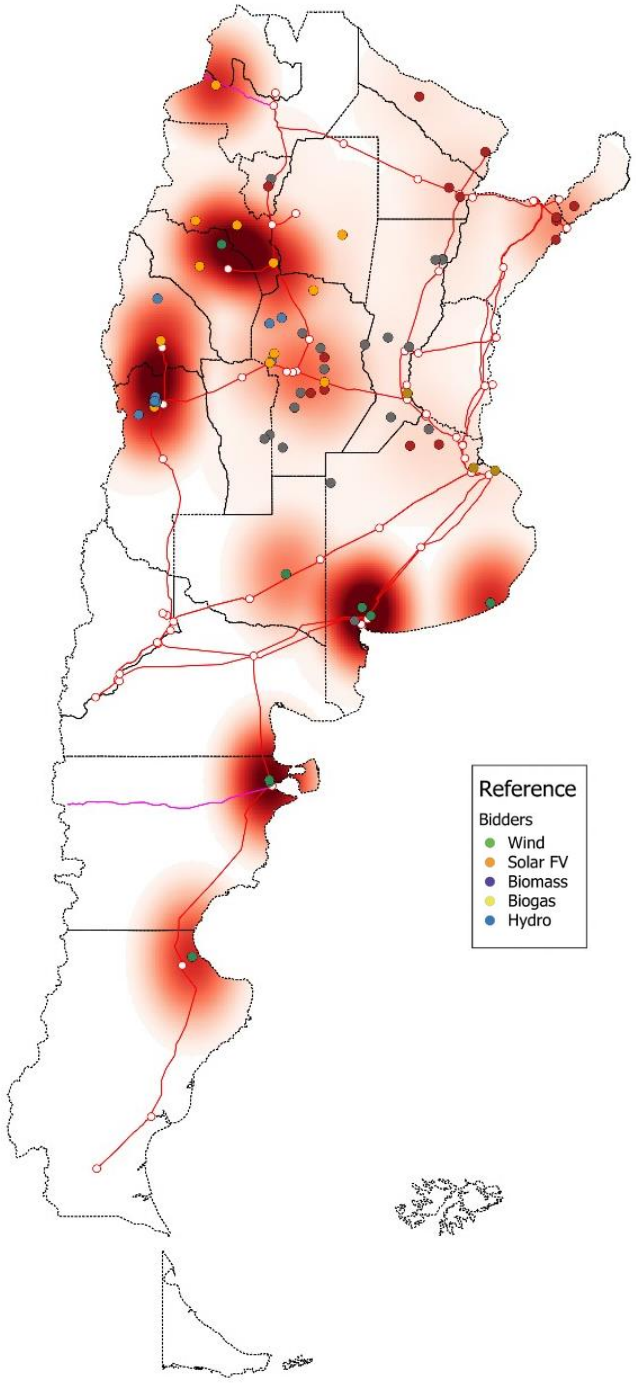
Source: Ministry of Energy and Mining

RenovAr Round 2 - PROJECTS AWARDED (Dec. 2017)

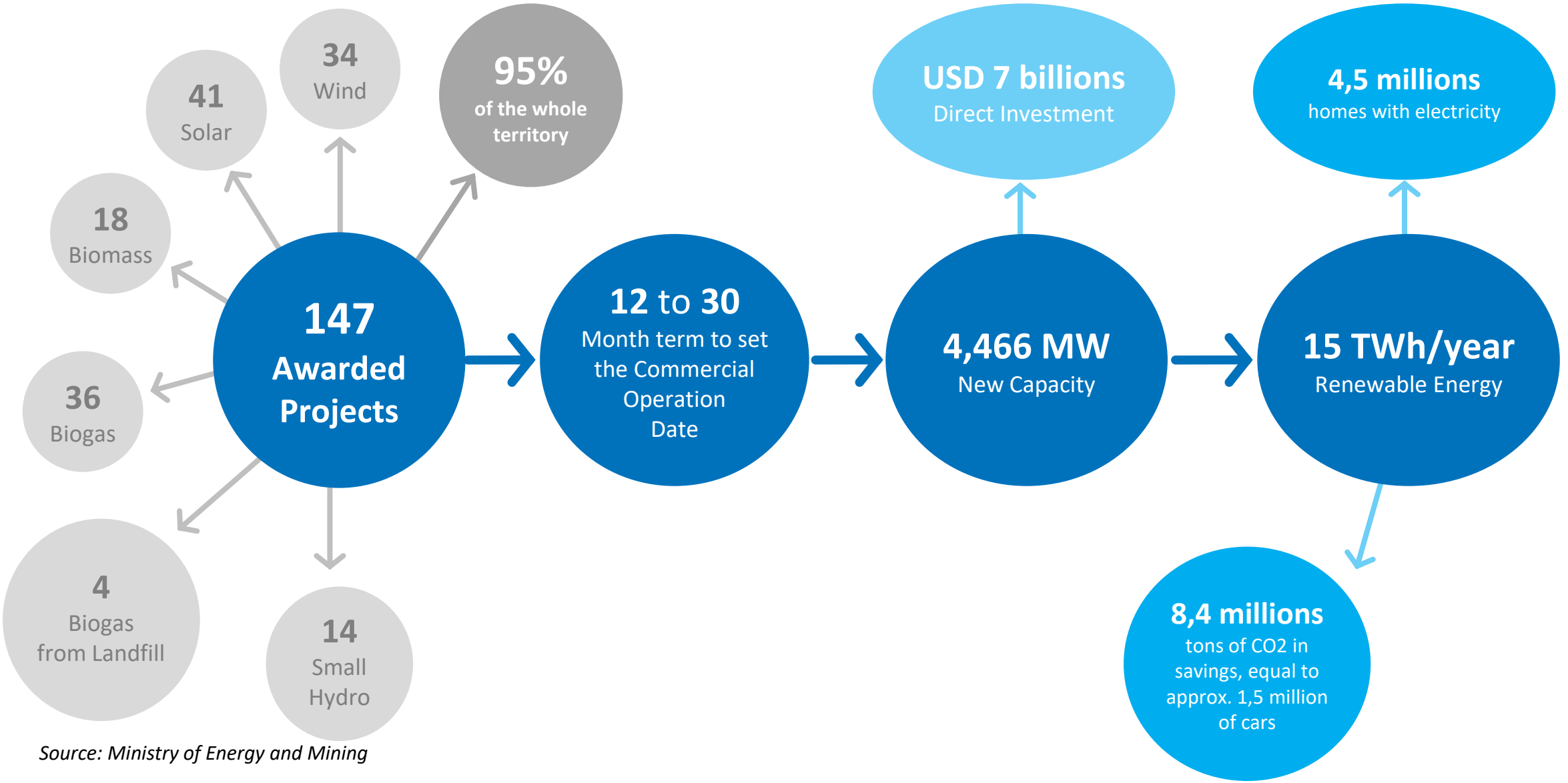
Number of projects awarded: 88 for 2.0 GW

Technology	Projects	MW	GWh/year
Wind	12	993	3,952
Solar	17	816	2,162
Biogas	31	56	392
Biomass	16	143	1,046
PAH	9	21	67
Landfill Biogas	3	13	51
Total	**88**	**2,043**	**7,671**

Source: Ministry of Energy and Mining

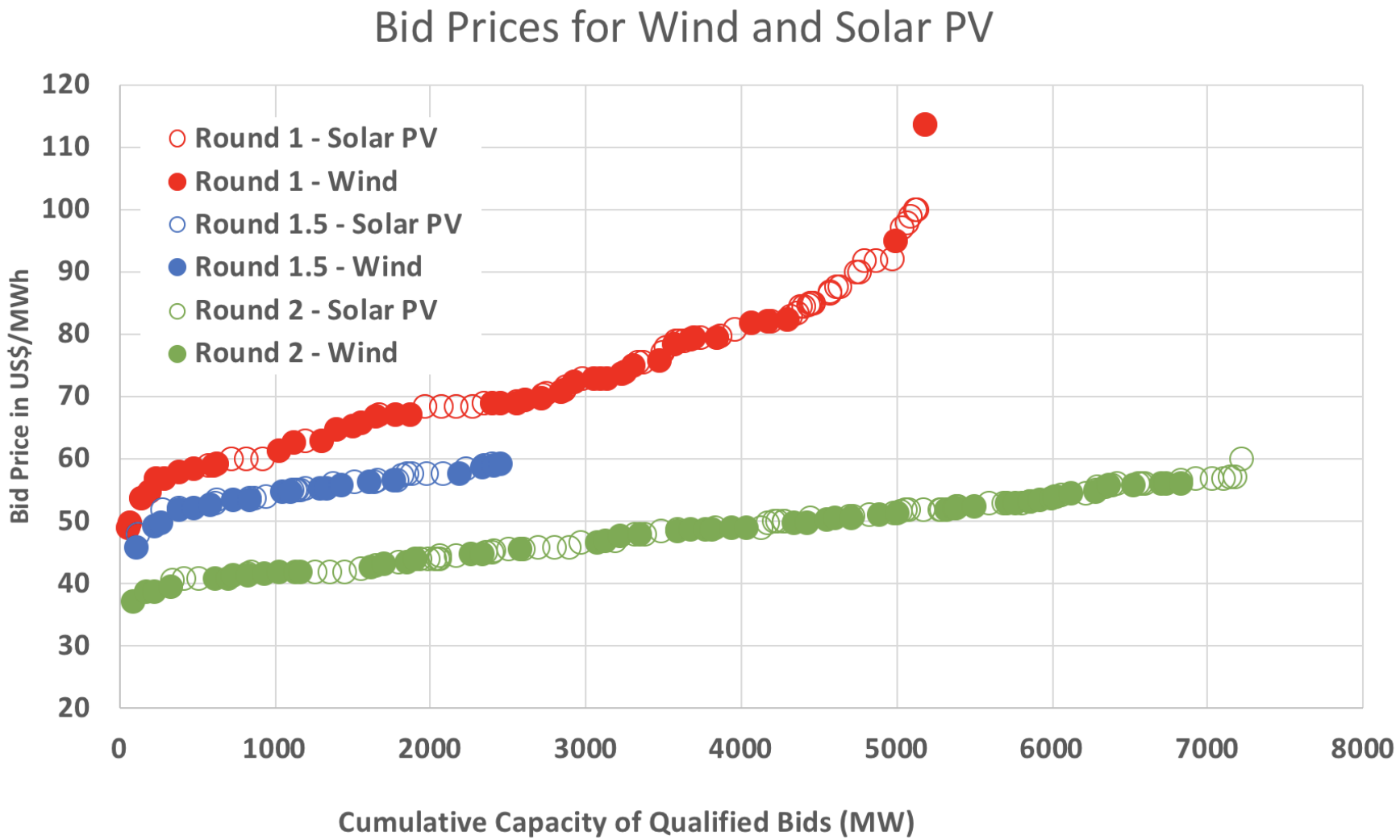


RENOVAR SUMMARY OUTCOME



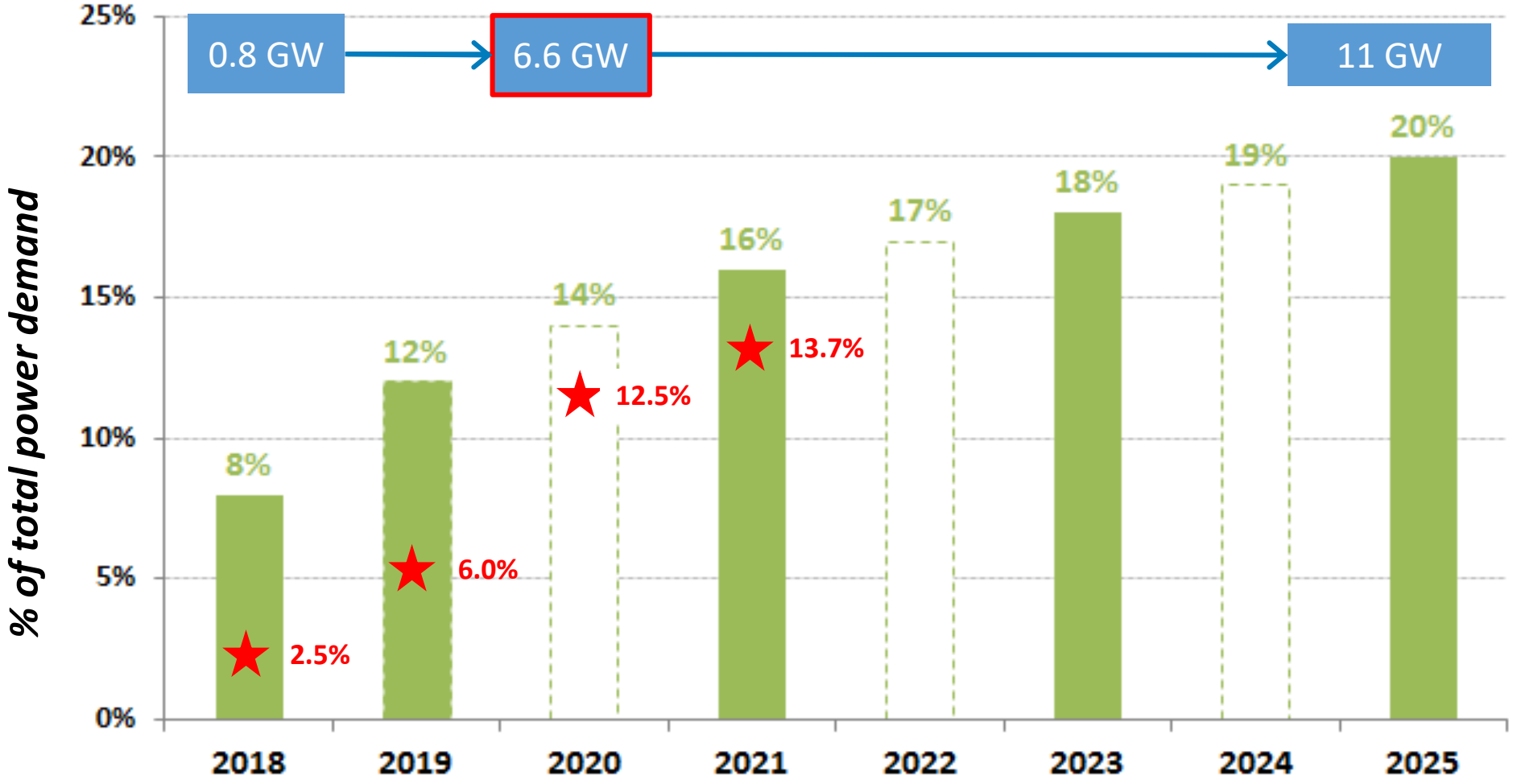
Source: Ministry of Energy and Mining

RenovAr – Downward Trend in Wind and Solar PV Bid Prices



Source: EOS Energía

Progress on National Renewable Energy Mandates to 2025



★ % of total power demand supplied from projects contracted and/or awarded in RenovAr Program (Round 1, 1.5 and 2) and former GENREN projects (*Resolution MINEM #202/2016*)

Corporate PPAs Market
(a.k.a. “MATER” for ”Mercado a Término de Energías Renovables”)

EOS energía

MAIN REGULATORY FRAMEWORK FOR RENEWABLES

OPT-OUT MECHANISM

Allows large C&I users to save costs as they voluntarily leave the Joint Purchases Scheme. Exemption from certain charges and capacity credits.

PRIORITY OF DISPATCH

Provides a mechanism to competitively bid for available transmission capacity lowering the risk of curtailment

MATER

Resolution MINEM N° 281/E-2017

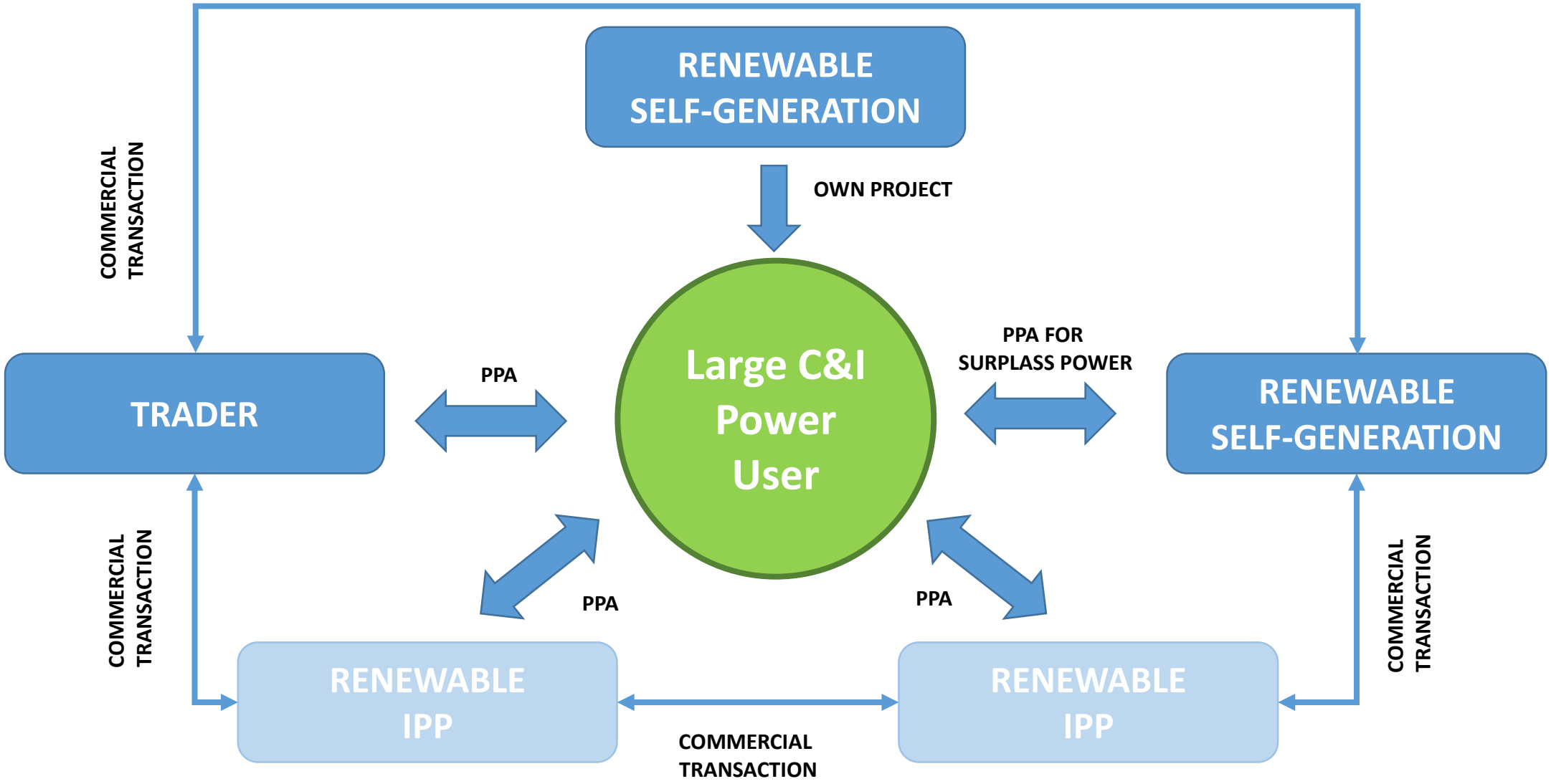
SIMPLE TRANSACTIONS

Monthly balance of RE purchased vs. power consumed. Annual enforcement of mandates.

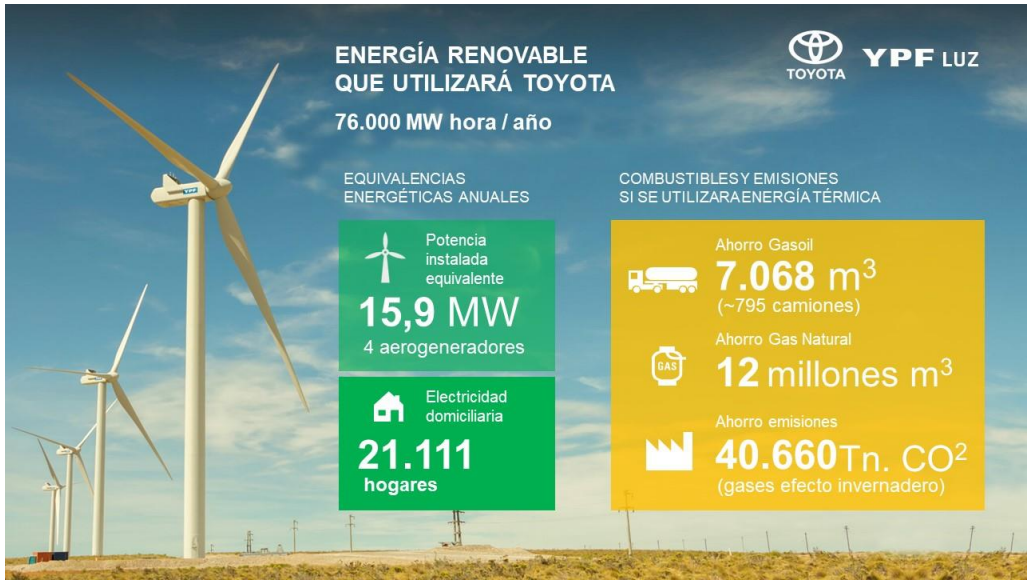
SELF-GENERATION

Provides details on how C&I users may comply with mandates thru self-generation projects.

POSSIBLE TRANSACTIONS IN THE RE POWER MARKET



Free RE market in action…



AUGUST 13, 2018

Eólica: Coca Cola FEMSA en Argentina con 100% energía no contaminante

19/04, 12:10

PARQUE EÓLICO RAWSON

Genneia firmó contrato para proveerle energía a Oroplata

Por Redaccion EconoJournal

La empresa le proveerá un volumen anual de 38.000 MWh por un período de 10 años, el 100 por ciento de la capacidad de generación que quedaba disponible de la reciente ampliación en 24 MW del Parque Eólico Rawson. Es el segundo contrato que la compañía suscribe con el Mercado a Término de Energía Renovables.

The results of innovating regulation

MARKET DEVELOPMENT / ACTIVE PROJECTS

PROGRAM	OFFERED CAPACITY (GW)	BIDS RECEIVED (#)	PROJECTS AWARDED (#)	CAPACITY AWARDED (GW)
RenovAr			**147**	**4.5**
Round 1	6.3	123	29	1.1
Round 1.5	2.8	48	30	1.3
Round 2	9.4	228	88	2.1
Former Genren	**N/A**	**10**	**10**	**0.5**
MATER			**44**	**1.1**
#1 (Nov. 2017)	2.1	39	9	0.3
#2 (Mar. 2018)	2.0	43	*18*	0.4
#3 (Jun. 2018)	1.2	30	*17*	0.4
TOTAL			**201**	**6.1**

Source: EOS Energía

RE Projects: Status as of July 2018

RenovAr Rounds 1 & 1.5 and Res. 202

2.92 GW

69 projects awarded

100 % PPAs signed

9.6 TWh/year

LEVELS	100 % GUARANTEES PROVIDED
	1- FODER 619 Mill USD
	2- Sovereign 4,500 Mill USD
	3- World Bank 480 Mill USD

2.32 GW
(52 projects)
3.45 Bill USD
investment in progress

2018 current awarded projects status

Today	December
10 % Commercial Operation	28 % Commercial Operation
65 % Under Construction	62 % Under Construction
25 % Remaining	10 % Remaining

RenovAr Round 2

2.04 GW

88 projects awarded

46 PPAs signed

7.3 TWh/year

1 project reached COD
(May 29th 2018)

5 project under construction

PRICES DECREASE IN ROUND 2

-22 % lower than average price offered in Rounds 1 & 1.5
40.4 USD/MWh (minimum price)

-29 % lower than average price offered in Rounds 1 & 1.5
37.3 USD/MWh (minimum price)

RenovAr Rounds 1, 1.5 & 2 + Res. 202

AWARDED CAPACITY		
	Biogas	63.65 MW 36 projects
	Biomass	202.72 MW 19 projects
	Biogas from Landfill	14.32 MW 4 projects
	PAH	32.13 MW 14 projects
	Wind	2,911.22 MW 41 projects
	Solar PV	1,742.43 MW 43 projects

STATED LOCAL CONTENT

Round 1: 14 %
Round 1.5: 18 %
Round 2: 30 %

Expected Commercial Operation Date *(aggregate)*

2018	2019	2020	2021
660 MW	3,625 MW	4,890 MW	4,966 MW

CORPORATE PPAs (44 projects)
ALLOCATION OF PRIORITY OF DISPATCH: 1,080 MW

Source: Ministry of Energy

Thank you.

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EOS Energía COMPANY PROFILE

EOS is a company based in Buenos Aires, Argentina and which provides advisory and consultancy services in the energy industry, mainly focused in the renewable electricity. Our services include legal, regulatory, financial and technical expert advice applicable to all stages of the investment cycle of projects.

Through its offices in Buenos Aires EOS provides consultancy services to private companies and public administrations in the Latin American market. Its services include complete legal services for business and project structuring including incorporation of new entities, contract drafting and negotiations, competitive bid preparation, legal due diligence and support in M&A transactions. EOS also provides financial advisory services that include financial and tax modeling, financial structuring, market-entry and funding strategy and execution including supply chain analysis and management. It also provides consultancy on regulatory issues and market intelligence to private companies and public entities in Argentina and abroad.

Through its network of highly qualified and trustful partners it provides specialized technical services for renewable projects including complete management of greenfield project development, project design and engineering, renewable wind and solar resource engineering, technical due diligence, and technical support for project bidding, construction and operations.

The company's operations began in 2017 in Argentina but it´s executive team has more than 20 years of individual professional experience having worked with large local and international firms as well as with the Argentine Government.

OUR TEAM

Mauro G. Soares
Socio

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Mauro Soares is Managing Director of **EOS Energía,** a local consultancy specialized in energy projects advisory services including legal, regulatory, fiscal, financial and commercial issues. He currently consults to many companies across the renewables supply chain. Prior to EOS, Mauro was National Director for Renewable Energy at the Undersecretariat for Renewable Energy of the Ministry of Energy and Mines of Argentina where he was in charge of redesigning and implementing a new regulatory framework for the clean energy industry in Argentina.

He is an economist (Universidad del Salvador, Buenos Aires) and he has Master's of Sciences in Management (Sloan Program, Stanford University). He has worked in the traditional and renewable energy industries for more than 20 years. He has held different management positions in the private sector where his last role was as Manager of Business Development for Tecpetrol based out of Buenos Aires. He has also worked extensively in the creation and growth of the Argentine Renewable Energy Chamber (CADER) and with other local NGOs and think tanks such as AERA, Fundación Avina, Directorio Legislativo, Escenarios Energéticos 2030, Fundación la Tierra Habla. He is Academic Director of the Executive Program in Renewable Energy at UCES in Buenos Aires and has been a professor of Energy Markets and Project Evaluation at the National Technological University (UTN) in Buenos Aires. Since 2011, and based on his background and contributions, Mauro is a member of the BMW Foundation´s network of World Sustainable Leaders.

In 2018 Mauro was featured by Harvard University´s Kennedy School of Government in the case study that was written on the the successful RenovAr programme.

OUR CLIENTS

SIEMENS Gamesa
RENEWABLE ENERGY

TECHINT

DESA
ENERGÍA QUE TRANSFORMA

TOTAL
COMMITTED TO BETTER ENERGY

NEOEN

BR·a
Benito Roggio

aluar
Aluminio Argentino

EOLIASUR

FRALI
DESARROLLOS INMOBILIARIOS

Vestas

MINERA
ALUMBRERA LTD.

fate

FIELDFARE
RENEWABLES

green power
ACADEMY

360 ENERGY

CÁMARA ARGENTINA
DE LA CONSTRUCCIÓN

KINGSUN

Ledesma
RENOVABLES

MARTIFER

Grupo
Rassmuss
Chile

UCES

AMARILLAGAS

Galicia

TOTAL eren