# Quick Introduction about Using Blockchain with Char-making TLUD Stoves

The CharTrac<sup>™</sup> System is for
Higher Standards for Transparency and
Trust in Carbon Accounting

www.CharTrac.com

ETHOS Conference - 2019



## Higher Standards for Transparency and Trust in Carbon Accounting

CharTrac

#### LEVERAGING TECHNOLOGY FOR HIGHER STANDARDS

Cryptography, Digital Signatures and Certificates, Blockchain (Distributed Ledger) Technology

#### IMMUTABLE AND TRANSPARENT AUDIT TRAIL

CharTrac implements a restricted-access private blockchain that is pegged to a public blockchain (Ethereum).

CharTrac

CharTrac

#### DIGITALLY-SIGNED DATA STREAMS

Partner-validated operations data are securely streamed and encoded to the blockchain as that data is available (often daily).

#### CARBON OFFSETS WITH TRUSTED DATA PROVENANCE

CharTrac raises the bar for carbon accounting standards that relate to data provenance, transparency, and trust.

CharTrac

# **CharTrac**<sup>TM</sup>

### Higher Standards for Transparency and Trust in Carbon Accounting

CharTrac builds data provenance for carbon offsets by securely and immutably documenting stakeholders, processes, assets, measurements, and transactions that define, create, or influence data of origin and historical record for project-enabled reductions of CO2e from otherwise normal processes (such as cooking or incense stick production).

At the implementation level, CharTrac is a blockchain-enabled system that securely records project parameters and digitally encoded assets from Juntos NFP and its implementation partners, and captures streams of digitally-signed operations data from in-field operations partners.

A key component of the system is the private blockchain (restricted access), which is pegged to a public blockchain (Ethereum). It is important to note that CharTrac's blockchain (a distributed ledger technology) is <u>not</u> utilized for tokenizing and tracking carbon credits (offsets) as crypto tokens for market trade. Instead, the CharTrac blockchain is used to solve data provenance and accounting issues related to carbon offsets.

By capturing streams of digitally-signed data that quantify time-interval charcoal yields, weekly bulk charcoal transfers to incense makers, and other measurable components, the CharTrac system provides an immutable and transparent audit trail (data provenance) for every carbon offset generated by Juntos NFP projects.

# **CharTrac**<sup>™</sup> **Principals**

## **Ownership and Coordination**

Juntos Energy Solutions NFP

Paul S. Anderson, PhD (Executive Director) — psanders@ilstu.edu

(Note: Investment partners are welcome. Please contact Dr. Anderson)

## **Field Implementation**

Moulindu Banerjee (Sapient Infotech) — sapientinfo1970@gmail.com

## Technical Design, Development and Administration

James S. Schoner (Software Engineer / BitMaxim) — jss@bitmaxim.com

Residential Only	
Project identifier: Hingalganj 500	H500R01S007
2. Stove Type: Champion TLUD-ND	
3. Stove ID: (Example: J123)	
4. Field Assistant (Reg. ID): 3 Name: Takis First Nam	e Middle Last Name
5. Quantity: 1 (One) Check one box: V First TLUD	Additional TLUD Replacement TLUI Replaced Stove ID:
6. Date of Distribution / Installation: (Day) 02 /(I	Month) 07 /(Year) 20/8
7. Stove Beneficiary / Recipient (Name of primary contact persons)    Harmonia   Ball     First Name   Middle Name (If Any)   Last Name     Residence size: The number of persons daily consuming mea	Li Clo - h
HLG, Boltala Potis Set	tingalgany -
HLG7 Boltocla Potts-Bott 9. Region 10. Village 11. Address	tingalgary -
HLC7 Bolfala PotPs-847  9. Region 10. Village 11. Address  13. GPS coordinates: Latitude: 22 · 29 · 36	tingalgary  12. Phone (Optional)  Longitude: 88.58.2
H L C7 Bolfacla PotPs-8at 1  9. Region 10. Village 11. Address  13. GPS coordinates: Latitude: 22 · 29 · 3  Terms  14. I berewith confirm receipt of a TLUD stove, and I confirm his willing to use the TLUD stove and to participate in monitoring a collected are used only within a carbon credit project, and identifying data are held in strict confidence.	iving used wood as a cooking fuel to date. I an and verification by Sapient and Juntos. All dat
H L C7  9. Region  10. Village  11. Address  13. GPS coordinates: Latitude: 22 · 29 · 3 · 2  Terms  14. I herewith confirm receipt of a TLUD stove, and I confirm his willing to use the TLUD stove and to participate in monitoring a collected are used only within a carbon credit project, and	oving used wood as a cooking fuel to date. I an and verification by Sapient and Juntos. All dat all personally identifying data and househol inficantly reduced price and therefore I cede a
H L C7  9. Region  10. Village  11. Address  13. GPS coordinates: Latitude:  22 · 29 · 3  Terms  14. I berewith confirm receipt of a TLUD stove, and I confirm his willing to use the TLUD stove and to participate in monitoring a collected are used only within a carbon credit project, and identifying data are held in strict confidence.  15. I have been informed that I receive the TLUD stove at a sign	oving used wood as a cooking fuel to date. I an and verification by Sapient and Juntos. All dat all personally identifying data and househole inficantly reduced price and therefore I cede a so Sapient and Juntos.
H L C7 Bolfacla PotPS-Balt  9. Region 10. Village 11. Address  13. GPS coordinates: Latitude: 22 * 29 * 3  Terms  14. I herewith confirm receipt of a TLUD stove, and I confirm his willing to use the TLUD stove and to participate in monitoring a collected are used only within a carbon credit project, and identifying data are held in strict confidence.  15. I have been informed that I receive the TLUD stove at a signentiflements resulting from reduced greenhouse gas emissions to 16. I will not sell the stove. If the stove is transferred to another	living used wood as a cooking fuel to date. I an and verification by Sapient and Juntos. All dat all personally identifying data and househol difficantly reduced price and therefore I cede a o Sapient and Juntos.  I address or to another owner, or if the stove is a Sapient field assistant.
H L C7 Bolfacla PotPs-Balt  9. Region 10. Village 11. Address  13. GPS coordinates: Latitude: 22 * 29 * 3 * * * * * * * * * * * * * * * * *	living used wood as a cooking fuel to date. I an and verification by Sapient and Juntos. All dat all personally identifying data and househol difficantly reduced price and therefore I cede a o Sapient and Juntos.  It address or to another owner, or if the stove is a Sapient field assistant.
9. Region 10. Village 11. Address 13. GPS coordinates: Latitude: 22 * 29 * 3 * * * * * * * * * * * * * * * * *	iving used wood as a cooking fuel to date. I an and verification by Sapient and Juntos. All dat all personally identifying data and househol difficantly reduced price and therefore I cede a conficient and Juntos.  It address or to another owner, or if the stove is a Sapient field assistant.  Ition.  Frield Assistant Signature (Salesperson)

## **Example sheets of manually sourced data**

for contracts and charcoal collection. Data are entered into workbooks for uploading to the CharTrac System. The workbooks are digitally signed by authorized field implementation associates at the time of submission.

CHARCOAL FA DAILY SHEET - HL9 500

FA NAME	16	17	18	19	20	21	TOTAL	
YOUNUS MONDAL	277	281	279	293	290	279	1499	SZZYZY NYZY
SALAUDDIN MONDAL	275	282	288	283	277	292	1697	Strong in or gray out
TOTAL	552	563	567	576	567	571	3196	

## CharTrac<sup>™</sup> Data Entry Workbook (Example from India (left side))

- Workbook allows offline data entry by remote implementation partners.
- Digitally signed and submitted online via the CharTrac.com website.

Project Identifier	: Hingalganj !	500		Stove Type: Champion TLUD-ND				Destination Typ	e: Residential		Stov	1		
Enter Contract	Data													
		Field /	Assistant						Beneficiary /	Stove Recipient				
Office Use Code	Stove ID	ID	First Name	Middle Name	Last Name	Placement Type	Replaced Stove ID	Date of Placement (Distribution)	First Name	Middle Name	Last Name	Alternative Name	Residence Size	Regio
H500R08S358	J52	5	Azhar	Uddin	Mondal	First TLUD		16/08/2018	()-nnndi		<u>D</u> its	Tandi	4	HLG
H500R08S359	J71	5	Azhar	Uddin	Mondal	First TLUD		01/09/2018	Fojii		Bibi	Jal a	4	HLO
H500R08S360	J114	5	Azhar	Uddin	Mondal	First TLUD		22/08/2018	So it:		Bibi	Cas .ul	4	HLO
H500R08S361	J153	5	Azhar	Uddin	Mondal	First TLUD		02/09/2018	Sulpha		Bibi	laf	4	HLO
H500R08S362	J54	5	Azhar	Uddin	Mondal	First TLUD		18/08/2018	Pite tir		Bibi	öbal	4	HLO
H500R08S363	J352	2	Ayub	Ali	Mondal	First TLUD		29/08/2018	N∺ na		Bibi	∵je.*	4	HL
H500R08S364	J338	2	Ayub	Ali	Mondal	First TLUD		03/08/2018	M na		Bibi	.jak	6	HLO
H500R08S365	J330	2	Ayub	Ali	Mondal	First TLUD		31/08/2018	f0.,		Bibi	At the British	4	HLO
H500R08S366	J275	2	Ayub	Ali	Mondal	First TLUD		24/08/2018	<i>P</i> ∈∃n-		Bibi	/b ·· ( B. r)	6	HLO
H500R08S367	J343	2	Ayub	Ali	Mondal	First TLUD		19/08/2018	Taylim i		Bibi	H mid	3	HLO
H500R08S368	J294	2	Ayub	Ali	Mondal	First TLUD		31/08/2018	Squin		Bibi	N anu	4	HLO
H500R08S369	J348	2	Ayub	Ali	Mondal	First TLUD		21/08/2018	A ya		Bibi	<u> </u>	5	HLO
H500R08S370	J476	3	Jakir		Hossain	First TLUD		02/09/2018	R y.		Bibi	r ad	5	HLO
H500R08S371	J401	3	Jakir		Hossain	First TLUD		24/08/2018	≥s⊬ n. ia		Bibi	€ (C	4	HLG
H500R08S372	J433	3	Jakir		Hossain	First TLUD		28/08/2018	l · a ε		Bibi		4	HLG
H500R08S373	J455	3	Jakir		Hossain	First TLUD		18/08/2018	54 ma		Bibi	Hal	5	HLG

# CharTrac<sup>™</sup> Data Entry Workbook (Example from India (right side))

- Workbook allows offline data entry by remote implementation partners.
- Digitally signed and submitted online via the CharTrac.com website.

	Copyright © 2	2018 Juntos NFP. All righ	nts reserved.									
	Total Stoves P	Placed (Target): 5	00									
				GPS La	titude		GPS Lor	ngitude				
Region	Village	Address	Phone	Degrees	Minutes	Thousandths	Degrees	Minutes	Thousandths	Beneficiary	Field Assistant	Other Stoves (Types and Usage)
Kegion	village	Address	THORE	Degrees	Millates	of a Minute	Degrees	Millacco	of a Minute	Signature	Signature	other otoves (Types and osage)
HLG	Sandalar Bil	:Kanchonpur, PS:Hingalga		22	26	dinin	88	58	- 74	Thumb/Fingerprint	Handwritten	
HLG		:Kanchonpur, PS:Hingalga		22	26	9.2	88	58		Handwritten	Handwritten	
HLG		:Kanchonpur, PS:Hingalgi		22	29	£.2	88	58	C71	Handwritten	Handwritten	
HLG		:Kanchonpur, PS:Hingalga		22	26	ğ 7,-	88	58	1), 5.	Handwritten	Handwritten	
HLG	Sandalar Bil	:Kanchonpur, PS:Hingalga		22	26	- E	88	58	0.10	Handwritten	Handwritten	
HLG	Bankra	O:Bankra, PS: Hingalgan		22	26	84 -	88	59	274	Thumb/Fingerprint	Handwritten	
HLG	3 no. Sandalar B	:Kanchonpur, PS: Hingalg		22	27	44	88	58	5:7:	Thumb/Fingerprint	Handwritten	
HLG	3 no. Sandalar B	:Kanchonpur, PS: Hingalg		22	27	431	88	58	5.4	Thumb/Fingerprint	Handwritten	
HLG	3 no. Sandalar B	:Kanchonpur, PS: Hingalg		22	27	x. A	88	58	5-3-	Handwritten	Handwritten	
HLG	3 no. Sandalar B	:Kanchonpur, PS: Hingalg		22	27	45 :	88	58	533.	Thumb/Fingerprint	Handwritten	
HLG	3 no. Sandalar B	:Kanchonpur, PS: Hingalg		22	27	7-4	88	58	5 6.9	Handwritten	Handwritten	
HLG	3 no. Sandalar B	:Kanchonpur, PS: Hingalg		22	27	· Z	88	58	580	Thumb/Fingerprint	Handwritten	
HLG	Sahapur	PO+PS :Hingalganj		22	27	840	88	59	0.44	Thumb/Fingerprint	Handwritten	
HLG	Sahapur	PO+PS :Hingalganj		22	27	E C 7	88	59	)Ü-	Handwritten	Handwritten	
HLG	Sahapur	PO+PS :Hingalganj		22	27	8€ /	88	59	2.4	Handwritten	Handwritten	
HLG	Sahapur	PO+PS :Hingalganj		22	27	(-,€- }	88	59	.) of 4	Handwritten	Handwritten	
HLG	Katakhali	O:Borunhat, PS:Hingalgar		22	30	.34 T	88	57	l U	Thumb/Fingerprint	Handwritten	